# City of Franklin

109 3rd Ave S
Franklin, TN 37064
(615)791-3217

## Meeting Agenda

## Work Session

**Tuesday, July 12, 2016** | **5:00 PM** | **Board Room**

**Call to Order**

**Citizen Comments**

**WORKSESSION DISCUSSION ITEMS**

**1.** 16-0594 Presentation of Water Plant Status

**2.** 16-0334 PUBLIC HEARING: Consideration Of Ordinance 2016-008, To Be Entitled, "An Ordinance To Rezone 30.39 Acres From General Commercial (GC) District To Specific Development-Residential (SD-R 10) District For The Property Located West Of Interstate 65, At 840 And 880 Oak Meadow Drive." (06-23-16 FMPC Recommended Disapproval 7-1; 07-12-16 BOMA WS; 08-09-16 BOMA 1st Reading 4-3) SECOND OF THREE READINGS

***Sponsors:*** Ald. Ann Petersen

***Attachments:***
- 6085 Map Epoch Development PUD Subdivision Rezoning
- 2016-008 ORD_ Epoch Rezoning_Law Approved 3
- Epoch Rezoning Set
- Impact Study (5.26.16) - WITHOUT ACCESS ON SRO
- Staff report and attachments from 4.28.16 FMPC Agenda item

***Legislative History***

| | | |
|---|---|---|
| 4/28/16 | Franklin Municipal Planning Commission | referred to the Franklin Municipal Planning Commission |
| 6/23/16 | Franklin Municipal Planning Commission | recommended unfavorably |

**3.** 16-0342 PUBLIC HEARING: Consideration Of Resolution 2016-20, To Be Entitled: "A Resolution Approving A Development Plan For Epoch Development PUD Subdivision, For The Property Located West Of Interstate 65, At 840 And 880 Oak Meadow Drive." (06-23-16 FMPC Recommended Disapproval 7-1; 07-12-16 WS)

***Sponsors:*** Ald. Ann Petersen and Amy Diaz-Barriga

***Attachments:***
- 6086 Map Epoch Development PUD Subdivision DP
- 6086 Conditions of Approval_02
- 2016-20 RES Epoch PUD Development Plan Law Approved 2
- Epoch PUD Site layout sheets
- Epoch PUD elevations and perspectives
- Epoch PUD FULL Resubmittal
- Impact Study (5.26.16) - WITHOUT ACCESS ON SRO
- 4.28.16 FMPC item.staff report and attachments

***Legislative History***

| | | |
|---|---|---|
| 4/28/16 | Franklin Municipal Planning Commission | referred to the Franklin Municipal Planning Commission |
| 6/23/16 | Franklin Municipal Planning Commission | recommended unfavorably to the Work Session |

**4.** 16-0465 Consideration of Ordinance 2016 - 19, To Be Entitled: "An Ordinance To Rezone 5.03 Acres From Specific Development-Residential District (SD-R 2.82) To Specific Development-Residential District (SD-R 2.92) For The Property Located South Of South Carothers Road And East Of Carothers Parkway, 4373 South Carothers Road." (06-23-16 FMPC 8-0; 07-12-16 WS, 07/12/16 BOMA 7-0; (08/23/16 BOMA 8-0) THIRD AND FINAL READING

***Sponsors:*** Ald. Ann Petersen

***Attachments:***
- Updated Ord 2016-19 6021 Lockwood Glen Rezoning Res Map Updated
- Lockwood Glen PUD Subdivision, rezoning (Residential) - submittal 003 Plans.p
- Lockwood Glen 2nd reading date move request
- Ordinance 2016-19 Lockwood Glen PUD Subd Rezoning Residential_with map
- Ord 2016-19 6021 Lockwood Glen Rezoning Res Map.pdf

***Legislative History***

| | | |
|---|---|---|
| 5/26/16 | Franklin Municipal Planning Commission | referred |
| 6/23/16 | Franklin Municipal Planning Commission | recommended favorably to the Board of Alderman and to the Work Session |

**5.** 16-0464 PUBLIC HEARING: Consideration of Resolution 2016-28, To Be Entitled: "A Resolution Approving A Revised Development Plan For Lockwood Glen PUD Subdivision, For The Property Located South Of South Carothers Road And East Of Carothers Parkway, 4373 South Carothers Road.". (05/26/16 FMPC 9-0; 07-12-16 WS)

***Sponsors:*** Ald. Ann Petersen

***Attachments:*** Resolution 2016-28 Law Approved Lockwood Glen DP Rev 1.pdf
6120 Lockwood Glen PUD Subd, DP, Rev 1 Conditions of Approval_01.pdf
Full Dev Plan Rev 05.05.16.pdf
Development Plan Only Sheet.pdf
Arch Elevations Sheet.pdf
Lockwood Glen 2nd reading date move request
Res-2016-28 6020 Lockwood Glen DP Rev 1 Map.pdf

***Legislative History***

| | | |
|---|---|---|
| 5/26/16 | Franklin Municipal Planning Commission | recommended favorably to the Board of Alderman and to the Work Session |

**6.** 16-0466 Consideration Of Ordinance 2016 - 20, To Be Entitled: "An Ordinance To Rezone 8.68 Acres From Specific Development-Residential District (SD-R 2.82) District To Neighborhood Commercial District (NC) For The Property Located South Of South Carothers Road And East Of Carothers Parkway."; (05/26/16 FMPC 9-0; 07-12-16 WS, 07/12/16 BOMA 7-0; 08/23/16 BOMA 8-0) THIRD AND FINAL READING

***Sponsors:*** Ald. Ann Petersen

***Attachments:*** Ord 2016-20 Lockwood Glen Rezoning Commercial Law Approved
Ord 2016-20 6022 Lockwood Glen Rezoning CommMap.pdf
Lockwood Glen PUD Subdivision, rezoning (Commercial) - submittal 003 Plans.
Lockwood Glen 2nd reading date move request

***Legislative History***

| | | |
|---|---|---|
| 5/26/16 | Franklin Municipal Planning Commission | recommended favorably to the Board of Alderman and to the Work Session |

**7.** 16-0512 Consideration of Ordinance 2016-22, An Ordinance to Rezone 0.99 Acres from Office Residential To Specific Development Residential (10.0) District For The Property Located South of West Main Street, Located At 725 West Main Street. (06-23-16 FMPC 8-0; 07-12-16 WS, 07/12/16 BOMA 1st Reading 7-0; 08/09/16 2nd Reading 7-0) THIRD AND FINAL READING

***Sponsors:*** Ald. Ann Petersen

***Attachments:*** Ord 2016-22 Arlington at West Main Rezoning Map.pdf
16-06-02_PUD Rezoning Resubmittal - Bound.pdf
2016-22 Ord Rezone 725 West Main Steet with Map Law Approved

***Legislative History***

| | | |
|---|---|---|
| 6/23/16 | Franklin Municipal Planning Commission | recommended favorably to the Board of Alderman and to the Work Session |

**8.** 16-0511 PUBLIC HEARING: Consideration of Resolution 2016-32, To Be Entitled "A Resolution Approving A Development Plan for Arlington at West Main PUD Subdivision For The Property Located South of West Main Street Located At 725 West Main Street. (06-23-16 FMPC 8-0; 07-12-16 WS)

***Sponsors:*** Ald. Ann Petersen

***Attachments:*** 6148 Arlington at West Main PUD Subd Dev Plan Conditions of Approval.pdf
Res 2016-32 Arlington at West Main Dev Plan Map.pdf
Arlington PUD DevPlan Dev Plan Sheets.pdf
Arlington PUD DevPlan Elevations.pdf
Res 2016-32 Arlington at West Main PUD Subd DP_ with map Law Approved

***Legislative History***

| | | |
|---|---|---|
| 6/23/16 | Franklin Municipal Planning Commission | recommended favorably to the Board of Alderman and to the Work Session |

**9.** 16-0577 Consideration of a Professional Services Agreement (COF Contract No. 2016-0230) with Volkert, Inc. for the Downtown Parking Capacity and Management Study in an Amount Not-to-Exceed $183,900.00 (07-12-16 WS)

***Sponsors:*** Engineering

***Attachments:*** Central Franklin Parking Study 7-12-16 Final.pdf
COF 2016-0230 - Downtown Parking Study PSA - Law Approved

**10.** 16-0575 *Consideration of Resolution 2016-37, a Resolution to Amend Master Lease Agreement with U S Bank and Authorize the City Administrator to Execute Related Documents (07-12-16 WS)

***Sponsors:*** Eric Stuckey and Russ Truell

***Attachments:*** Documents - Franklin, City of, TN (3); 6.23.16

2016-37 Resolution - U S Bank Schedule 3 for Equipment Lease.Law Approved

**11.** 16-0583 Continued Discussion Regarding the Development of the Fiscal Years 2017-2026 Capital Investment Plan

***Sponsors:*** Engineering

***Attachments:*** CIP_StrategicPlanCriteria.pdf

CIP_Tiers_Category_Rev2.pdf

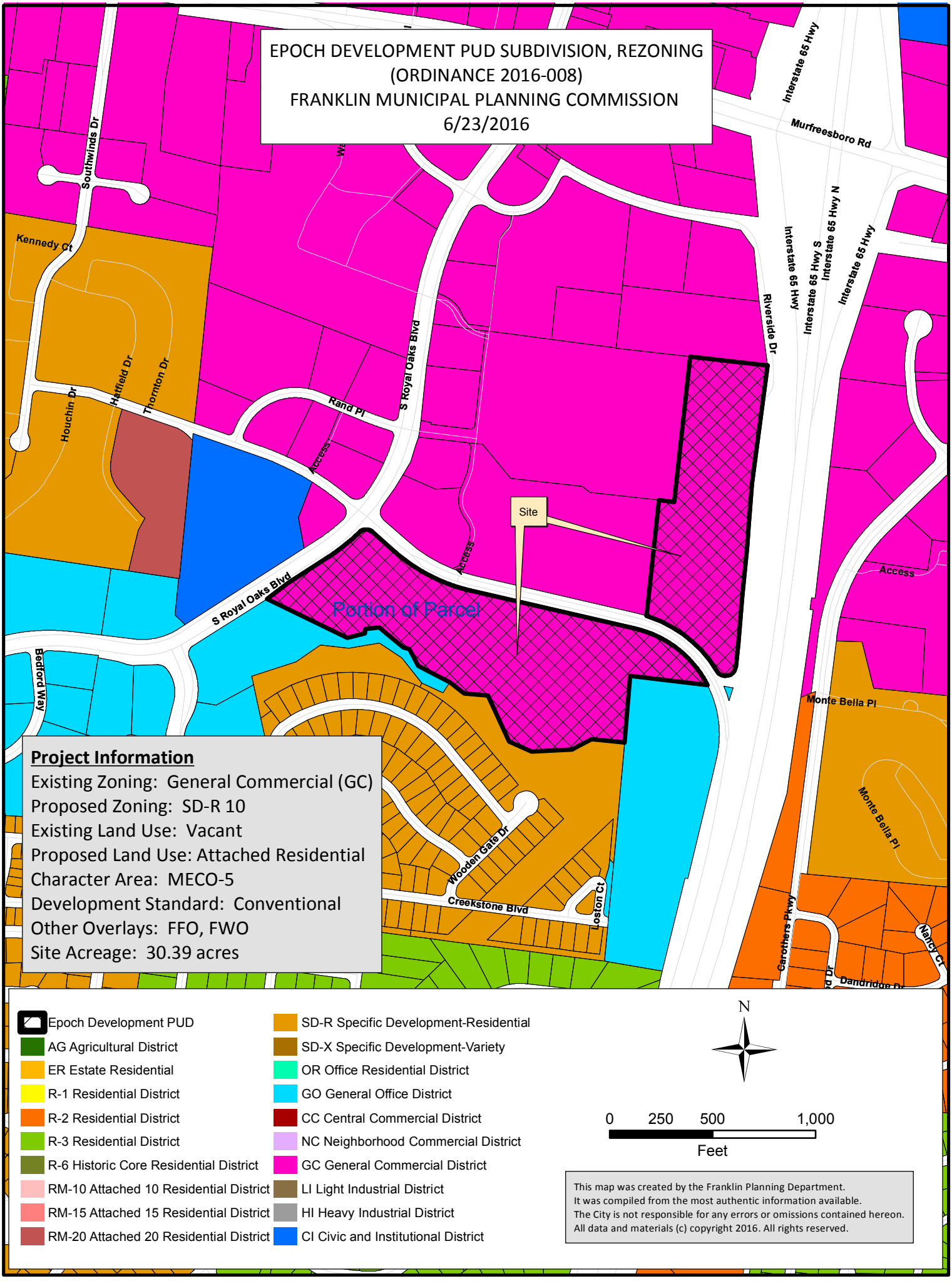
CIP_Tiers_Combined_Rev2.pdf

6-30-2016 CIP FY2017-2026 Reduced

## Other Business

## Adjournment

Anyone requesting accommodations due to disabilities should contact ADA coordinator at 791-3277.


EPOCH DEVELOPMENT PUD SUBDIVISION, REZONING
(ORDINANCE 2016-008)
FRANKLIN MUNICIPAL PLANNING COMMISSION
6/23/2016
Project Information
Existing Zoning: General Commercial (GC)
Proposed Zoning: SD-R 10
Existing Land Use: Vacant
Proposed Land Use: Attached Residential
Character Area: MECO-5
Development Standard: Conventional
Other Overlays: FFO, FWO
Site Acreage: 30.39 acres
Site
Portion of Parcel
Southwinds Dr
Kennedy Ct
Houchin Dr
Hatfield Dr
Thornton Dr
Rand Pl
S Royal Oaks Blvd
Access
Bedford Way
Wooden Gate Dr
Creekstone Blvd
Loston Ct
Murfreesboro Rd
Interstate 65 Hwy
Interstate 65 Hwy S
Interstate 65 Hwy N
Riverside Dr
Monte Bella Pl
Carothers Pkwy
Nancy Ct
Dandridge Dr
Epoch Development PUD
AG Agricultural District
ER Estate Residential
R-1 Residential District
R-2 Residential District
R-3 Residential District
R-6 Historic Core Residential District
RM-10 Attached 10 Residential District
RM-15 Attached 15 Residential District
RM-20 Attached 20 Residential District
SD-R Specific Development-Residential
SD-X Specific Development-Variety
OR Office Residential District
GO General Office District
CC Central Commercial District
NC Neighborhood Commercial District
GC General Commercial District
LI Light Industrial District
HI Heavy Industrial District
CI Civic and Institutional District
N
0 250 500 1,000
Feet
This map was created by the Franklin Planning Department.
It was compiled from the most authentic information available.
The City is not responsible for any errors or omissions contained hereon.
All data and materials (c) copyright 2016. All rights reserved.

**ORDINANCE 2016-008**

**TO BE ENTITLED, "AN ORDINANCE TO REZONE 30.39 ACRES FROM GENERAL COMMERCIAL (GC) DISTRICT TO SPECIFIC DEVELOPMENT-RESIDENTIAL (SD-R 10) DISTRICT FOR THE PROPERTY LOCATED WEST OF INTERSTATE 65, AT 840 AND 880 OAK MEADOW DRIVE."**

**WHEREAS,** the City of Franklin, Tennessee, encourages responsible growth and the sensible transition of land uses and densities; and

**WHEREAS**, the Specific Development-Residential district provides zoning for land uses compatible with both the Franklin Land Use Plan and surrounding development; and

**WHEREAS,** the Board of Mayor and Alderman (BOMA) of the City of Franklin, Tennessee, adopted Resolution 2016-20, approving a Plan Unit Development (PUD) Development Plan as required by the Franklin Zoning Ordinance; and

**WHEREAS,** the zoning has been reviewed and approved by BOMA after a public hearing and a recommendation by the Franklin Municipal Planning Commission.

**NOW THEREFORE BE IT ORDAINED BY THE BOARD OF MAYOR AND ALDERMAN OF THE CITY OF FRANKLIN, TENNESSEE, AS FOLLOWS:**

**SECTION I.** That the following described property shall be, and is hereby, rezoned from its present zoning classification of **GC** District to **SD-R (10.0)** District:

PREMISES CONSIDERED

| Map-Parcel | Acres |
|---|---|
| 79-88 (portion of) | 13.06 |
| 79-101.19 | 17.33 |
| Total | 30.39 |

**LOT 24**
**MAP 79, PORTION OF PARCEL 88.00**
**SURVEY TRACT 1**

A TRACT OF LAND IN THE NINTH CIVIL DISTRICT OF WILLIAMSON COUNTY, CITY OF FRANKLIN, TENNESSEE AND BEING GENERALLY BOUNDED ON THE NORTH BY OAK MEADOW DRIVE, (RIGHT-OF-WAY WIDTH VARIES), ON THE EAST BY NASHVILLE LODGE NO. 72, B.P.O. ELKS, RECORDED IN DEED BOOK 1708, PAGE 12, REGISTER'S OFFICE FOR WILLIAMSON COUNTY, TENNESSEE (R.O.W.C.,T.) ON THE SOUTH BY OPEN SPACE LOT 808 AS SHOWN ON THE PLAN ENTITLED "CREEKSTONE COMMONS, P.U.D SUBDIVISION, SECTION FOUR" OF RECORD IN PLAT BOOK P58, PAGE 10, R.O.W.C.,T. AND LOT 27 AS SHOWN ON THE PLAN ENTITLED "CREEKSTONE COMMONS, REVISION FOUR" OF RECORD IN PLAT BOOK P49, PAGE 110, R.O.W.C.,T. AND ON THE WEST BY THE REMAINDER OF LOT 24 OF FINAL PLAN OF WATSON GLEN SUBDIVISION, SECTION 1, REVISION 10, OF RECORD IN PLAT BOOK 29, PAGE 139, R.O.W.C.T AND BEING DESCRIBED ACCORDING TO A SURVEY DATED OCTOBER 15, 2015 AND PREPARED BY KEVIN L. BIRDWELL, R.L.S. NO. 1797 WHOSE ADDRESS IS RAGAN SMITH ASSOCIATES, 315 WOODLAND STREET, NASHVILLE, TN 37206 AND BEING MORE

PARTICULARLY DESCRIBED AS FOLLOWS:
COMMENCING IN THE EAST RIGHT-OF-WAY LINE OF SOUTH ROYAL OAKS BOULEVARD AND BEING THE SOUTH END OF A CURVE AT THE INTERSECTION OF THE EAST RIGHT-OF-WAY LINE OF SOUTH ROYAL OAKS BOULEVARD AND THE SOUTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE AND PROCEEDING AS FOLLOWS:
THENCE, WITH A CURVE TO THE RIGHT HAVING A RADIUS OF 50.00 FEET, AN ARC LENGTH OF 72.76 FEET, A CENTRAL ANGLE OF 83 DEGREES 22 MINUTES 19 SECONDS, AND A CHORD BEARING AND DISTANCE OF NORTH 89 DEGREES 31 MINUTES 21 SECONDS EAST, 66.50 FEET TO AN IRON ROD (NEW) WITH CAP STAMPED (RSA) IN THE SOUTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE;
THENCE, WITH THE SOUTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE THE FOLLOWING TWO CALLS:
1. SOUTH 48 DEGREES 47 MINUTES 29 SECONDS EAST, 121.81 FEET;
2. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 820.00 FEET, AN ARC LENGTH OF 71.61 FEET, A CENTRAL ANGLE OF 05 DEGREES 00 MINUTES 12 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 51 DEGREES 17 MINUTES 35 SECONDS EAST, 71.58 FEET TO AN IRON ROD (NEW) WITH CAP STAMPED (RSA), THE **POINT OF BEGINNING** OF THE HEREIN DESCRIBED TRACT OF LAND AND PROCEEEDING AS FOLLOWS:
THENCE, WITH SAID SOUTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE THE FOLLOWING THREE CALLS:
1. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 820.00 FEET, AN ARC LENGTH OF 330.94 FEET, A CENTRAL ANGLE OF 23 DEGREES 07 MINUTES 24 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 65 DEGREES 21 MINUTES 21 SECONDS EAST, 328.69 FEET TO AN IRON ROD (OLD) WITH CAP STAMPED (RSA);
2. SOUTH 76 DEGREES 55 MINUTES 03 SECONDS EAST, 834.46 FEET TO AN IRON ROD (NEW)WITH CAP STAMPED (RSA);
3. WITH A CURVE TO THE RIGHT HAVING A RADIUS OF 537.96 FEET, AN ARC LENGTH OF 464.57 FEET, A CENTRAL ANGLE OF 49 DEGREES 28 MINUTES 46 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 52 DEGREES 10 MINUTES 40 SECONDS EAST, 450.27 FEET TO AN IRON ROD (NEW)WITH CAP STAMPED (RSA);
THENCE, LEAVING THE SOUTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE AND WITH THE NORTH LINE OF THE NASHVILLE LODGE NO. 72, B.P.O. ELKS PROPERTY, NORTH 83 DEGREES 59 MINUTES 15 SECONDS WEST, 376.29 FEET TO A 1/2 INCH DIAMETER IRON ROD (OLD),
THENCE, WITH THE WEST LINE OF THE NASHVILLE LODGE NO. 72, B.P.O. ELKS PROPERTY, SOUTH 05 DEGREES 14 MINUTES 00 SECONDS WEST, PASSING A WITNESS IRON ROD (NEW) ON THE NORTH SIDE OF WATSON BRANCH AT A DISTANCE OF 298.26 AND A TOTAL DISTANCE OF 323.26 FEET TO A POINT IN THE CENTER OF WATSON BRANCH, SAID POINT BEING THE NORTHEAST CORNER OF LOT 808 ON SAID PLAN OF CREEKSTONE COMMONS P.U.D. SUDIVISION, SECTION FOUR;
THENCE, WITH THE CENTERLINE OF WATSON BRANCH AND THE NORTH LINE OF LOT 808 OF SAID CREEKSTONE COMMONS P.U.D. SUBDIVISION, SECTION FOUR AND THE NORTH LINE OF LOT 27 ON SAID PLAN OF CREEKSTONE COMMONS SUBDIVISION, REVISION 4 THE FOLLOWING SIXTEEN BEARINGS AND DISTANCES:
1. NORTH 83 DEGREES 48 MINUTES 10 SECONDS WEST, 161.22 FEET;
2. SOUTH 61 DEGREES 46 MINUTES 08 SECONDS WEST, 106.65 FEET;
3. SOUTH 86 DEGREES 48 MINUTES 30 SECONDS WEST, 198.12 FEET;
4. NORTH 65 DEGREES 28 MINUTES 52 SECONDS WEST, 120.02 FEET;
5. NORTH 24 DEGREES 43 MINUTES 04 SECONDS WEST, 244.21 FEET;
6. NORTH 84 DEGREES 36 MINUTES 00 SECONDS WEST, 115.35 FEET;
7. NORTH 52 DEGREES 04 MINUTES 01 SECONDS WEST, 87.70 FEET;
8. NORTH 57 DEGREES 18 MINUTES 12 SECONDS WEST, 163.19 FEET;
9. NORTH 29 DEGREES 52 MINUTES 55 SECONDS WEST, 101.80 FEET;
10. NORTH 74 DEGREES 02 MINUTES 09 SECONDS WEST, 41.15 FEET;
11. NORTH 48 DEGREES 56 MINUTES 27 SECONDS WEST, 137.25 FEET;
12. SOUTH 88 DEGREES 57 MINUTES 25 SECONDS WEST, 67.60 FEET,

13. SOUTH 10 DEGREES 32 MINUTES 54 SECONDS WEST, 26.12 FEET,
14. SOUTH 74 DEGREES 19 MINUTES 35 SECONDS WEST, 89.75 FEET,
15. NORTH 75 DEGREES 22 MINUTES 06 SECONDS WEST, 55.08 FEET,
16. NORTH 62 DEGREES 35 MINUTES 03 SECONDS WEST, 10.27 FEET,
THENCE, LEAVING WATSON BRANCH WITH A THE CENTERLINE OF A DRAINAGE DITCH AND SEVERING SAID LOT 24 OF FINAL PLAN OF WATSON GLEN SUBDIVISION, SECTION 1, REVISION 10, THE FOLLOWING SEVEN BEARINGS AND DISTANCES:
1. NORTH 39 DEGREES 40 MINUTES 55 SECONDS EAST, 27.30 FEET,
2. SOUTH 89 DEGREES 07 MINUTES 57 SECONDS EAST, 31.47 FEET,
3. NORTH 25 DEGREES 32 MINUTES 12 SECONDS EAST, 70.78 FEET,
4. NORTH 10 DEGREES 00 MINUTES 40 SECONDS WEST, 49.37 FEET,
5. NORTH 54 DEGREES 59 MINUTES 41 SECONDS EAST, 103.02 FEET,
6. NORTH 40 DEGREES 36 MINUTES 36 SECONDS EAST, 74.71 FEET,
7. NORTH 53 DEGREES 28 MINUTES 05 SECONDS EAST, 164.68 FEET TO THE POINT OF BEGINNING AND CONTAINING 754,942 SQUARE FEET OR 17.33 ACRES, MORE OR LESS.

**and**

## LOT 32
## MAP 79, PARCEL 101.00

A TRACT OF LAND IN THE NINTH CIVIL DISTRICT OF WILLIAMSON COUNTY, CITY OF FRANKLIN, TENNESSEE, AND BEING LOT 32 AS SHOWN ON THE FINAL PLAT ENTITLED “WATSON GLEN SUBDIVISION, SECTION 2, REVISION 1, RESUBDIVISION OF LOT 31” OF RECORD IN PLAT BOOK P62, PAGE 45, REGISTER'S OFFICE FOR WILLIAMSON COUNTY TENNESSEE (R.O.W.C.T.). AND BEING GENERALLY BOUNDED ON THE NORTH BY LOT 10 AS SHOWN ON PLAN ENTITLED “WATSON GLEN SUBDIVISION, SECTION 2” OF RECORD IN PLAT BOOK 13, PAGE 85, R.O.W.C.T., ON THE EAST BY RIVERSIDE DRIVE (IMPROVED AND UNIMPROVED ROAD, RIGHT-OF-WAY WIDTH VARIES), ON THE SOUTH BY OAK MEADOW DRIVE (RIGHT-OF-WAY WITH VARIES), AND ON THE WEST BY LOT 2 AS SHOWN ON THE PLAN ENTITLED “WATSON GLEN SUBDIVISION, SECTION 1, REVISION 10, (RESUBDIVISION OF LOT 2 AND OF RIVERSIDE BUSINESS PARK SUBDIVISION, SECTION 1, REVISION 4, LOT 11) OF RECORD IN PLAT BOOK 29, PAGE 139, R.O.W.C.T. AND LOT 31 ON SAID PLAN ENTITLED “WATSON GLEN SUBDIVISION, SECTION 2, REVISION 1, RESUBDIVISION OF LOT 31” OF RECORD IN PLAT BOOK P62, PAGE 45, R.OW.C.T., AND BEING DESCRIBED ACCORDING TO A SURVEY DATED OCTOBER 15, 2015 AND PREPARED BY KEVIN L BIRDWELL, R.L.S. NO. 1797 WHOSE ADDRESS IS RAGAN SMITH ASSOCIATES, 315 WOODLAND STREET, NASHVILLE, TN 37206 AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:
**COMMENCING** AT AN IRON ROD (OLD) WITH CAP STAMPED “RAGAN-SMITH ASSOCIATES” (RSA), SAID PIN BEING IN THE EASTERLY RIGHT-OF-WAY OF SOUTH ROYAL OAKS BOULEVARD AND BEING THE NORTH END OF A CURVE AT THE INTERSECTION OF THE EAST RIGHT-OF-WAY LINE OF SOUTH ROYAL OAKS BOULEVARD AND THE NORTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE AND BEING A WESTERLY CORNER OF LOT 30 OF THE FINAL PLAT ENTITLED “WATSON GLEN SUBDIVISION, SECTION 2 OF RECORD IN PLAT BOOK P43, PAGE 40, R.O.W.C.T.;
THENCE, WITH A CURVE TO THE LEFT HAVING A RADIUS OF 50.00 FEET, AN ARC LENGTH OF 73.83 FEET, A CENTRAL ANGLE OF 84 DEGREES 35 MINUTES 53 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 06 DEGREES 29 MINUTES 38 SECONDS EAST, 67.30 FEET TO AN IRON ROD (OLD) WITH CAP STAMPED (RSA) IN THE NORTHERLY RIGHT-OF-WAY OF OAK MEADOW DRIVE (RIGHT-OF-WAY WIDTH VARIES);
THENCE, CONTINUING WITH SAID RIGHT-OF-WAY AND WITH THE SOUTHERLY LINE OF SAID LOT 30 THE FOLLOWING TWO CALLS:
1. SOUTH 48 DEGREES 47 MINUTES 29 SECONDS EAST, 157.42 FEET IRON ROD (OLD) WITH CAP STAMPED (RSA);
2. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 750.00 FEET, AN ARC LENGTH OF 251.97 FEET, A CENTRAL ANGLE OF 19 DEGREES 14 MINUTES 55 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 58 DEGREES 24 MINUTES 57 SECONDS EAST, 250.78 FEET TO AN IRON ROD (OLD) WITH CAP STAMPED (RSA) AT THE SOUTHWEST CORNER OF LOT 31 ON THE PLAN ENTITLED “WATSON GLEN SUBDIVISION, SECTION 2, REVISON 1, RESUBDIVISION OF LOT 31” OF RECORD IN PLAT BOOK P62, PAGE 45, R.O.W.C.T.;
THENCE, CONTINUING WITH SAID RIGHT-OF-WAY AND WITH THE SOUTHERLY LINE OF SAID LOT 31 THE FOLLOWING THREE CALLS:
1. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 750.00 FEET, AN ARC LENGTH OF 116.20 FEET,

A CENTRAL ANGLE OF 08 DEGREES 52 MINUTES 38 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 72 DEGREES 28 MINUTES 44 SECONDS EAST, 116.09 FEET TO AN IRON ROD (OLD) WITH CAP STAMPED (RSA);
2. SOUTH 76 DEGREES 55 MINUTES 03 SECONDS EAST, 811.13 FEET TO AN IRON ROD (OLD);
3. WITH A CURVE TO THE RIGHT HAVING A RADIUS OF 607.96 FEET, AN ARC LENGTH OF 43.08 FEET, A CENTRAL ANGLE OF 04 DEGREES 03 MINUTES 37 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 74 DEGREES 53 MINUTES 15 SECONDS EAST, 43.07 FEET TO A PK NAIL (OLD) IN THE CENTERLINE OF AN ACCESS DRIVE, THE **POINT OF BEGINNING** OF THE HEREIN DESCRIBED TRACT OF LAND AND PROCEEEDING AS FOLLOWS:
4. THENCE, LEAVING SAID RIGHT-OF-WAY OF OAK MEADOW DRIVE WITH THE CENTERLINE OF SAID ACCESS DRIVE AND THE EAST LINE OF SAID LOT 31 ON THE PLAN ENTITLED "WATSON GLEN SUBDIVISION, SECTION 2, REVISON 1, RESUBDIVISION OF LOT 31" OF RECORD IN PLAT BOOK P62, PAGE 45, R.O.W.C.T.;NORTH 06 DEGREES 14 MINUTES 29 SECONDS EAST, 564.50 FEET TO A PK NAIL (OLD) IN THE SOUTH LINE OF LOT 2 AS SHOWN ON THE PLAN ENTITLED "WATSON GLEN SUBDIVISION, SECTION 1, REVISION 10, (RESUBDIVISION OF LOT 2 AND OF RIVERSIDE BUSINESS PARK SUBDIVISION, SECTION 1, REVISION 4, LOT 11);
THENCE, WITH THE SOUTH AND EAST LINE OF SAID LOT 2, THE FOLLOWING TWO BEARINGS AND DISTANCES:
1. SOUTH 83 DEGREES 35 MINUTES 44 SECONDS EAST, 73.68 FEET TO AN IRON ROD (OLD) WITH CAP STAMPED (RSA);
2. NORTH 06 DEGREES 24 MINUTES 16 SECONDS EAST, 708.89 FEET TO PUNCH HOLE IN A LIGHT BASE IN THE SOUTH LINE OF SAID LOT 10 OF FINAL PLAT ENTITLED "WATSON GLEN SUBDIVISION, SECTION 2";
THENCE, WITH THE SOUTH LINE OF SAID LOT 10, SOUTH 83 DEGREES 32 MINUTES 35 SECONDS EAST, 377.77 FEET TO CONCRETE MONUMENT OLD IN THE WESTERLY RIGHT-OF-WAY OF RIVERSIDE DRIVE (RIGHT-OF-WAY WIDTH VARIES);
THENCE, WITH THE WESTERLY RIGHT-OF-WAY OF RIVERSIDE DRIVE (IMPROVED AND UNIMPROVED ROAD), THE FOLLOWING FOUR CALLS:
1. SOUTH 07 DEGREES 40 MINUTES 29 SECONDS WEST, 577.88 FEET TO AN IRON ROD (OLD);
2. SOUTH 04 DEGREES 01 MINUTES 39 SECONDS WEST, 310.67 FEET TO AN IRON ROD (OLD);
3. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 11300.00 FEET, AN ARC LENGTH OF 470.04 FEET, A CENTRAL ANGLE OF 02 DEGREES 23 MINUTES 00 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 05 DEGREES 13 MINUTES 09 SECONDS WEST, 470.01 FEET TO A CONCRETE MONUMENT (OLD);
4. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 11300.00 FEET, AN ARC LENGTH OF 112.73 FEET, A CENTRAL ANGLE OF 00 DEGREES 34 MINUTES 18 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 06 DEGREES 41 MINUTES 48 SECONDS WEST, 112.73 FEET TO A CONCRETE MONUMENT (OLD);
THENCE, LEAVING SAID RIGHT-OF-WAY OF RIVERSIDE DRIVE AND WITH THE NORTH RIGHT-OF-WAY OF OAK MEADOW DRIVE (RIGHT-OF-WAY WIDTH VARIES) THE FOLLOWING TWO CALLS:
1. WITH A CURVE TO THE RIGHT HAVING A RADIUS OF 50.00 FEET, AN ARC LENGTH OF 123.89 FEET, A CENTRAL ANGLE OF 141 DEGREES 58 MINUTES 19 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 77 DEGREES 58 MINUTES 06 SECONDS WEST, 94.54 FEET TO AN IRON ROD (OLD);
2. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 607.96 FEET, AN ARC LENGTH OF 443.66 FEET, A CENTRAL ANGLE OF 41 DEGREES 48 MINUTES 42 SECONDS, AND A CHORD BEARING AND DISTANCE OF NORTH 51 DEGREES 57 MINUTES 06 SECONDS WEST, 433.88 FEET TO THE **POINT OF BEGINNING** AND CONTAINING 569,021 SQUARE FEET OR 13.06 ACRES, MORE OR LESS.

**SECTION II:** That the attached Location Map shall serve the purpose of further delimiting the geographical boundaries as described by this Ordinance.

**SECTION III.** BE IT FINALLY ORDAINED by the Board of Mayor and Aldermen of the City of Franklin, Tennessee, that this Ordinance shall take effect from and after its passage on third and final reading, the health, safety, and welfare of the citizens requiring it.

**ATTEST:**

By: _____
**Eric Stuckey**
City Administrator/Recorder

**CITY OF FRANKLIN, TENNESSEE:**

By: _____
**Dr. Ken Moore**
Mayor

Approved as to form by:

_____
Shauna R. Billingsley
City Attorney

PLANNING COMMISSION RECOMMENDED: _____

PASSED FIRST READING: _____

PUBLIC HEARING HELD: _____

PASSED SECOND READING: _____

PASSED THIRD READING: _____

## SITE DATA

| | |
|---|---|
| PROJECT NAME | THE EPOCH DEVELOPMENT<br>REZONING & PUD APPLICATION |
| PROJECT NUMBER: | 6086 |
| LOTS: | 2 EXISTING, 5 PROPOSED |
| ADDRESS: | 840 & 880 OAK MEADOWS DR. |
| CITY: | FRANKLIN |
| COUNTY: | WILLIAMSON |
| STATE: | TENNESSEE |
| CIVIL DISTRICT: | 9TH |
| MAP, GROUP AND PARCEL NUMBERS: | MAP 79, PARCELS 88.00 (PORTION OF) & 101.19 |
| EXISTING ZONING: | GC (GENERAL COMMERCIAL) |
| PROPOSED ZONING: | SD-R (10) (SPECIFIC DEVELOPMENT RESIDENTIAL 10 UNITS/AC.) |
| CHARACTER AREA OVERLAY: | MECO-5 |
| OTHER APPLICABLE OVERLAYS: | FFO & FWO |
| APPLICABLE DEVELOPMENT STANDARD: | CONVENTIONAL |
| ACREAGE OF SITE: | 13.06 + 17.33 = 30.39 ACRES |
| SQUARE FOOTAGE OF SITE: | 569,021 + 754,942 = 1,323,963 SQUARE FEET |
| MINIMUM REQUIRED SETBACK LINES: | ATTACHED RESIDENTIAL USE |
| YARD FRONTING COLLECTOR (OAK MEADOWS) | 40' |
| SIDE YARD | 15' |
| REAR YARD | 30' |
| OWNER (BOTH PARCELS): | E. WARNER BASS, TRUSTEE |
| ADDRESS: | 150 3RD AVE. SOUTH, SUITE 2800, NASHVILLE, TN 37201 |
| PHONE NO.: | 615.742.6400 |
| E-MAIL ADDRESS: | wbass@bassberry.com |
| CONTACT NAME: | MR. WARNER BASS |
| MINERAL RIGHTS: | CONTROLLED BY CURRENT PROPERTY OWNER |
| APPLICANT: | CRUNK ENGINEERING LLC |
| ADDRESS: | 1894 GEN. GEORGE PATTON DR., SUITE 600<br>FRANKLIN, TN 37067 |
| PHONE NO.: | 615.873.1795 |
| E-MAIL ADDRESS: | adam@crunkeng.com |
| CONTACT NAME: | MR. ADAM CRUNK, P.E. |
| DENSITY | |
| ATTACHED DWELLING UNITS | 302 UNITS |
| LAND AREA | 30.39 ACRES |
| LAND AREA WITHIN FLOODPLAIN OVERLAY | 8.32 ACRES |
| OVERALL DENSITY | 9.9 UNITS/ACRE |
| NET DENSITY (MINUS OVERLAY CONSTRAINT) | 13.7 UNITS/ACRE |
| BUILDING HEIGHT | |
| ALLOWABLE | 6 STORIES MAXIMUM |
| PROPOSED | NORTH PARCEL - 4 STORIES<br>SOUTH PARCEL 2/3 STORIES (2 STORY FACING STREET) |
| PROPOSED LANDSCAPE SURFACE RATIO: | NORTH SITE - 0.53; SOUTH SITE - 0.76; COMBINED - 0.66 |
| MINIMUM LANDSCAPE SURFACE RATIO: | 0.20 |

PARKING

EXISTING 0

REQUIRED (1.5/1BR + 2.5/2BR + 3/3BR)

| NORTH SITE | | SOUTH SITE | |
|---|---|---|---|
| 1BR - 72 UNITS * 1.5 = | 108 SPACES | 1BR - 28 UNITS * 1.5 = | 42 SPACES |
| 2BR - 116 UNITS * 2.5 = | 290 SPACES | 2BR - 50 UNITS * 2.5 = | 125 SPACES |
| 3BR - 16 UNITS * 3.0 = | 48 SPACES | 3BR - 20 UNITS * 3.0 = | 60 SPACES |
| TOTAL REQUIRED = | 446 SPACES | TOTAL REQUIRED = | 227 SPACES |
| INCLUDING 9 ADA SPACES | | INCLUDING 7 ADA SPACES | |

MAXIMUM PARKING: NORTH SITE - 536 SPACES; SOUTH SITE - 273 SPACES

PROPOSED

| NORTH SITE | | SOUTH SITE | |
|---|---|---|---|
| REGULAR SPACES | 430 | REGULAR SPACES | 186 |
| COMPACT SPACE (0 % OF TOTAL) | 0 | COMPACT SPACES (14 % OF TOTAL) | 31 |
| ADA SPACES | 16 | ADA SPACES | 10 |
| TOTAL PROVIDED | 446 | TOTAL PROVIDED | 227 |

TREE CANOPY:

SITE HAS BEEN WALKED WITH LARRY MIZZELL TO IDENTIFY TREES TO BE REMOVED. TREE CANOPY REQUIREMENTS WILL BE ADDRESSED AT SITE PLAN REVIEW TO COMPLY WITH ZONING ORDINANCE.

PARKLAND DEDICATION: FEE IN LIEU OF FOR 4.64 ACRES, 302 TOTAL UNITS PROPOSED

OPEN SPACE:

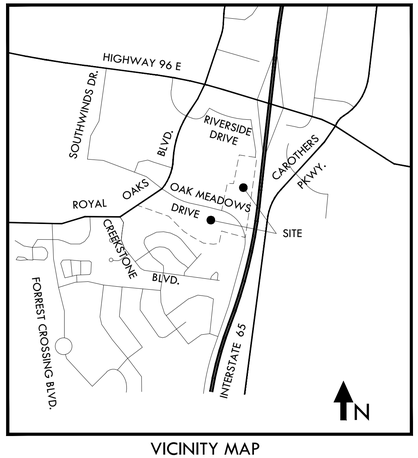
| | |
|---|---|
| TOTAL OPEN SPACE REQ'D (15% OF 30.39 AC.) | 4.56 AC. |
| FORMAL OPEN SPACE REQUIRED (33% OF OPEN SPACE REQUIRED) | 1.52 AC. |
| | 2.4 AC. PROVIDED |
| INFORMAL OPEN SPACE REQUIRED (67% OF OPEN SPACE REQUIRED) | 3.04 AC. |
| | 8.0 AC. PROVIDED |

USE BUFFER: 50-FT CLASS C INCOMPATIBLE LAND USE BUFFER (SOUTH PORTION OF SOUTH SITE)
40-FT INTERSTATE BUFFER (EAST PORTION OF NORTH SITE)

### NOTES:

PROPERTY IS LOCATED ON MAP 79 AS A PORTION OF LOT 88.00 AND PARCEL 101.19 CONTAINING 30.39 ACRES.

PARCEL 88.00 DOES LIE WITHIN THE 100-YEAR FLOOD PLAIN AS INDICATED BY FIRM MAP NO. 47187C0212F DATED SEPTEMBER 29, 2006.




VICINITY MAP
NO SCALE

# REZONING

# The Epoch Development

# REZONING SUBMITTAL

## Franklin, Williamson County, Tennessee

## CITY OF FRANKLIN PROJECT NO. 6085

JUNE 2 2016

PREPARED FOR:

## EPOCH RESIDENTIAL

359 Carolina Avenue
Winter Park, Florida
(407) 644-9055

STATEMENT OF IMPACT - POLICE, FIRE, SOLID WASTE, PARKS:
The proposed project will add 302 multi-family units. The property is currently undeveloped within the existing City Limits of the City of Franklin. Therefore, no new land is being developed outside the existing jurisdiction of City of Franklin Police, Fire, or Solid Waste services.

The project is approximately a 4 mile driving distance from the Police Station; 1.5 mile driving distance from the nearest fire station on Murfreesboro Rd.
The project will have two dumpster locations for solid waste. One serving 204 units and the other serving 98 units.
No new parkland is being dedicated as part of this project. However, this project will contribute to parkland funds.

STATEMENT OF IMPACT - STORMWATER:

The proposed development contains two site features that will be protected during construction. The south site contains a wetland area as well as a stream, Watson Branch. the site has been designed not to impact these site features. The required buffers for each feature have been shown on these plans.

STATEMENT OF IMPACT - TRANSPORTATION:
The proposed project will add 302 multi-family units with access along Oak Meadow Drive and Riverside Drive. The primary road corridor serving the project is the major arterial South Royal Oaks Boulevard. Based on the traffic study performed for this project, the majority of traffic will be directed in the northernly direction toward Cool Springs.

STATEMENT OF IMPACTS - WATER AND SEWER:
The proposed project is the construction of 302 new attached dwelling units with a mixture of one, two, and three bedroom units. The project will result in a projected flow of 87,400 GPD. The Northern site will be served by water off of the existing 10" main in the old Riverside Drive ROW, and sewer at the existing manhole behind the Home Depot. The Southern site will be served by water with a new 8" main along Oak Meadow Dr. that will connect from Royal Oaks Blvd. and tie into the 10" main along the old Riverside Drive ROW, and sewer will be served by the existing 24" main that runs along Watson Branch on the subject property. Reclaimed water is not located in the project vicinity.

| SHEET NO. | SHEET TITLE |
|---|---|
| C0.0 | COVER SHEET |
| C1.0 | OVERALL EXISTING CONDITIONS |
| C1.1 | NORTH SITE EXISTING CONDITIONS |
| C1.2 | SOUTH SITE EXISTING CONDITIONS |


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


ENGINEERING CRUNK

WILSON CAIN — REGISTERED LANDSCAPE ARCHITECT — AGRICULTURE — COMMERCE — No. 114180 — STATE OF TENNESSEE — 6/2/16

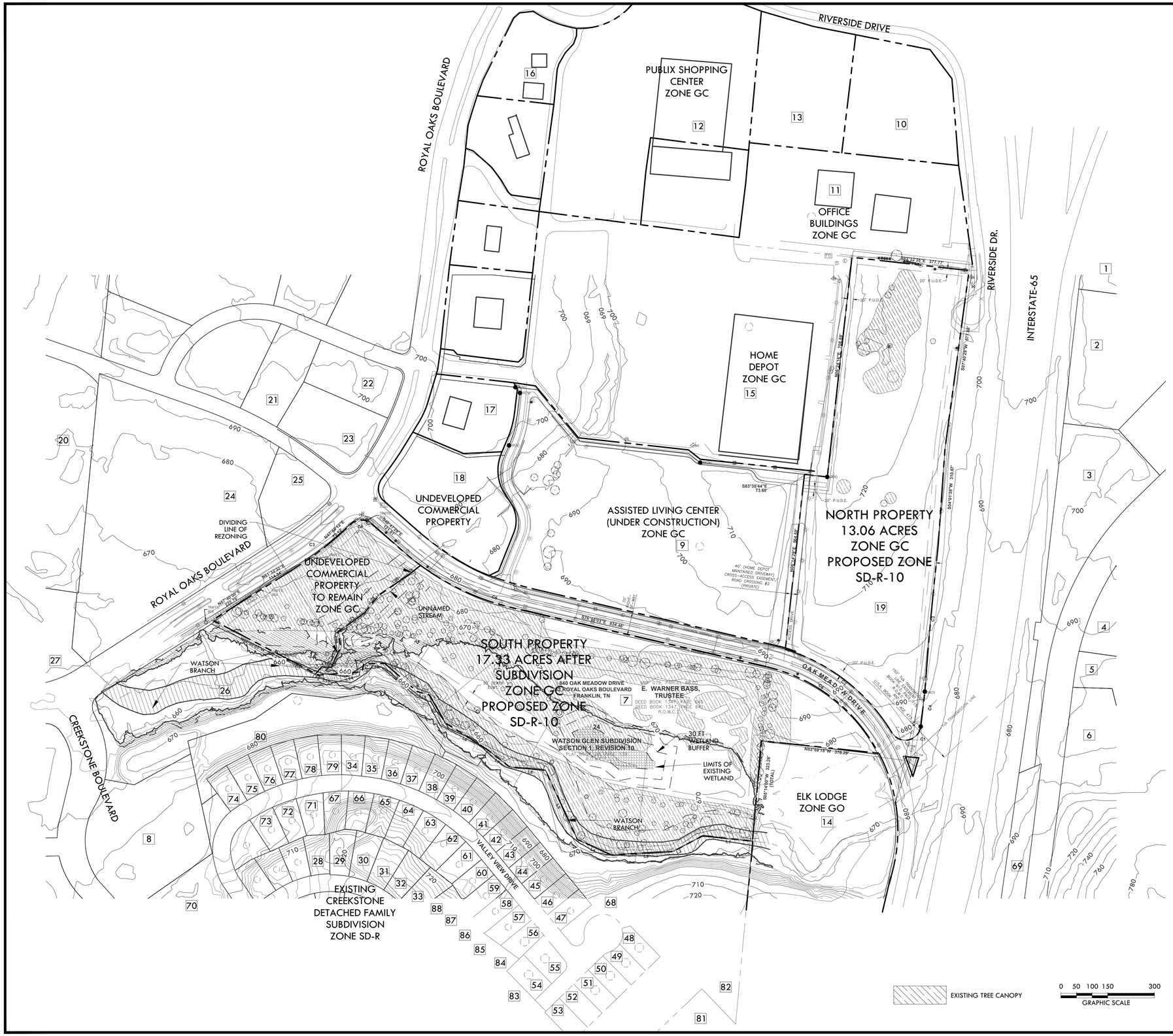
THE EPOCH DEVELOPMENT
REZONING SUBMITTAL
COF #6085 FRANKLIN, TN

| REVISIONS | | |
|---|---|---|
| No. | DATE | |
| | | |

06/02/16 15001

C0.0

COVER SHEET




| ID | PRCUID | DEED / PLAT | LAND USE | OWNER | ZONING |
|---|---|---|---|---|---|
| 1 | 079---06905 | DB 3844 DP 619 PB116 PP114 | HOTEL | BRE/LQ PROP LLC | GC |
| 2 | 079---06906 | DB 2906 DP 435 PB22 PP11 | AUTO DLR | ADKINS RODNEY G | GC |
| 3 | 079---07600 | DB 4341 DP763 PB22 PP11 | CHURCH | CHURCH GATE THE | GC |
| 4 | 079---08000 | DB6337 DP70 PB61 PP69 | REC | SOAR ADVENTURE TOWER LLC | GC |
| 5 | 079---08200 | DB5165 DP555 | UNDEV. | NICHOLS J DONALD | SD-R |
| 6 | 079---08300 | DB1350 DP525 | ATTACHED RESID. | UNITED DOMINION REALTY LP | GC |
| 7 | 079---08800 | DB1347 DP645 PB29 PP139 | UNDEV. | BASS E WARNER TR | GC |
| 8 | 079---10001 | DB2192 DP320 PB31 PP125 | DAYCARE | WOOD & WOOD LLC | GO |
| 9 | 079---10100 | DB6533 DP243 PB62 PP45 | ASST. LVG | DOMINION SENIOR LIVING OF FRANKLIN L | GC |
| 10 | 079---10101 | DB5434 DP690 | OFFICE | 5107 LLC | GC |
| 11 | 079---10102 | DB2200 DP199 PB19 PP59 | OFFICE | LIN DON REALTY LLC | GC |
| 12 | 079---10103 | DB5459 DP859 PB99 PP3 | RETAIL | PUBLIX TENNESSEE LLC | GC |
| 13 | 079---10104 | DB6168 DP806 PB22 PP120 | ASST. LVG | FRANKLIN TN SENIOR CARE PROPERTY LLC | GC |
| 14 | 079---10105 | | REC | NASHVILLE LODGE #72 BPO ELKS | GO |
| 15 | 079---10110 | DB4406 DP792 PB29 PP138 | RETAIL | HD DEVELOPMENT OF MARYLAND INC | GC |
| 16 | 079---10114 | DB5459 DP859 PB29 PP139 | RETAIL | PUBLIX TENNESSEE LLC | GC |
| 17 | 079---10116 | DB1792 DP29 PB29 PP139 | RETAIL | FIRST-CITIZENS BANK AND TR CO | GC |
| 18 | 079---10117 | PB 43 PP40 | UNDEV. | BASS E WARNER TR | GC |
| 19 | 079---10119 | PB 43 PP40 | UNDEV. | BASS E WARNER TR | GC |
| 20 | 079I-A01401 | DB4197 DP993 PB41 PP33 | UNDEV. | SWJ2 TENNESSEE LLC | RM-20 |
| 21 | 079O-A00300 | DB4200 DP849 PB27 PP4 | INSTIT. | CHURCH CORNERSTONE-MINISTRIES INC | GC |
| 22 | 079O-A00301 | DB5790 DP107 PB29 PP10 | RETAIL | MAGLI CHERYL S FAMILY TRUST | GC |
| 23 | 079O-A00302 | DB5871 DP528 PB26 PP10 | RETAIL | LCJ LLC | GC |
| 24 | 079O-A00400 | DB794 DP881 PB12 PP76 | | UNITED STATES POSTAL SERV | CI |
| 25 | 079O-A00401 | DB1946 DP286 PB12 PP76 | RETAIL | COMMUNITY BANK | GC |
| 26 | 079O-G02500 | DB5136 DP628 | UNDEV. | CADENCE BANK NA | GO |
| 27 | 079O-O02800 | PB47 PP142 | UNDEV. | ROYAL OAKS PARK SOUTH | GO |
| 28 | 079O-O00100 | DB5814 DP815 PB55 PP146 | RESIDENTIAL | THURM DAVID M | SD-R |
| 29 | 079O-O00200 | DB5807 DP985 PB55 PP146 | RESIDENTIAL | HAMILTON MALLORY | SD-R |
| 30 | 079O-O00300 | DB6624 DP480 PB55 PP146 | RESIDENTIAL | LYLE JORDAN WILLIAM | SD-R |
| 31 | 079O-O00400 | DB5780 DP386 PB55 PP146 | RESIDENTIAL | EVANGELISTA BERNARDINO JR | SD-R |
| 32 | 079O-O00500 | DB5841 DP984 PB55 PP146 | RESIDENTIAL | CASTANEDA ORESTES | SD-R |
| 33 | 079O-O00600 | DB5809 DP135 PB55 PP146 | RESIDENTIAL | VOSS STEPHEN M | SD-R |
| 34 | 079O-E00100 | DB6336 DP118 PB58 PP10 | RESIDENTIAL | KHOT SOHAM | SD-R |
| 35 | 079O-E00200 | DB6190 DP252 PB58 PP10 | RESIDENTIAL | GOOCH RYAN M | SD-R |
| 36 | 079O-E00300 | DB6218 DP405 PB58 PP10 | RESIDENTIAL | SULLIVAN JOHN | SD-R |
| 37 | 079O-E00400 | DB6232 DP972 PB58 PP10 | RESIDENTIAL | CULLEN ROBERT BARRY | SD-R |
| 38 | 079O-E00500 | DB6231 DP1 PB58 PP10 | RESIDENTIAL | MILLER ROBERT FRANK | SD-R |
| 39 | 079O-E00600 | DB6288 DP734 PB58 PP10 | RESIDENTIAL | DHARANI KHAIRUNISSA | SD-R |
| 40 | 079O-E00700 | DB6218 DP407 PB58 PP10 | RESIDENTIAL | KNOX CONSUELIA S | SD-R |
| 41 | 079O-E00800 | DB6229 DP797 PB58 PP10 | RESIDENTIAL | DAWKINS BRETTON GUY | SD-R |
| 42 | 079O-E00900 | DB6296 DP854 PB58 PP10 | RESIDENTIAL | COMEAUX MARGARET A | SD-R |
| 43 | 079O-E01000 | DB6273 DP312 PB58 PP10 | RESIDENTIAL | SMITH CHRISTOPHER S | SD-R |
| 44 | 079O-E01100 | DB6281 DP281 PB58 PP10 | RESIDENTIAL | DANIELS THOMAS | SD-R |
| 45 | 079O-E01200 | DB6341 DP640 PB58 PP10 | RESIDENTIAL | SUNDARAM BARATH SHANMUGA | SD-R |
| 46 | 079O-E01300 | DB6331 DP190 PB58 PP10 | RESIDENTIAL | HOSSAIN MOHAMMAD | SD-R |
| 47 | 079O-E01400 | DB6264 DP154 PB58 PP10 | RESIDENTIAL | MAPLESDEN LAWRENCE | SD-R |
| 48 | 079O-E01500 | DB6346 DP779 PB58 PP10 | RESIDENTIAL | BECHARD BRIAN | SD-R |
| 49 | 079O-E01600 | DB6329 DP817 PB58 PP10 | RESIDENTIAL | VIDYAM SATHEESH | SD-R |
| 50 | 079O-E01700 | DB6145 DP158 PB58 PP10 | RESIDENTIAL | RUSSO JOHN M | SD-R |
| 51 | 079O-E01800 | DB6177 DP164 PB58 PP10 | RESIDENTIAL | OLIGLEY J PATRICK | SD-R |
| 52 | 079O-E01900 | DB6151 DP238 PB58 PP10 | RESIDENTIAL | BONHAM SYDNEY | SD-R |
| 53 | 079O-E02000 | DB6156 DP254 PB58 PP10 | RESIDENTIAL | BURGER JORDAN | SD-R |
| 54 | 079O-E02100 | DB6172 DP871 PB58 PP10 | RESIDENTIAL | NOLAN MICHAEL S TRUST | SD-R |
| 55 | 079O-E02200 | DB6195 DP626 PB58 PP10 | RESIDENTIAL | PARSI SREEKANTH | SD-R |
| 56 | 079O-E02300 | DB6329 DP771 PB58 PP10 | RESIDENTIAL | KOLLI MURALL KRISHNA | SD-R |
| 57 | 079O-E02400 | DB6252 DP619 PB58 PP10 | RESIDENTIAL | KAMAN VENKATESH | SD-R |
| 58 | 079O-E02500 | DB6231 DP816 PB58 PP10 | RESIDENTIAL | RAJENDRAN THAMIL S | SD-R |
| 59 | 079O-E02600 | DB6195 DP601 PB58 PP10 | RESIDENTIAL | DOPPALAPUDI SRIKANTH | SD-R |
| 60 | 079O-E02700 | DB6182 DP362 PB58 PP10 | RESIDENTIAL | CHINTAKINDI VARUN K | SD-R |
| 61 | 079O-E02800 | DB6177 DP138 PB58 PP10 | RESIDENTIAL | KRISHNAN JAGADEESWARAN | SD-R |
| 62 | 079O-E02900 | DB6152 DP63 PB58 PP10 | RESIDENTIAL | MOHAMED ABDUL R J | SD-R |
| 63 | 079O-E03000 | DB6153 DP125 PB58 PP10 | RESIDENTIAL | PICHAIMUTHU NARAYANAN | SD-R |
| 64 | 079O-E03100 | DB6100 DP536 PB58 PP10 | RESIDENTIAL | ZELLER JAMES S JR | SD-R |
| 65 | 079O-E03200 | DB6583 DP472 PB58 PP10 | RESIDENTIAL | MURRAY KIMBERLY | SD-R |
| 66 | 079O-E03300 | DB6172 DP802 PB58 PP10 | RESIDENTIAL | ZIPPER NATHAN M | SD-R |
| 67 | 079O-E03400 | DB6154 DP157 PB58 PP10 | RESIDENTIAL | VIGIL MARIO G | SD-R |
| 68 | 079O-E03500 | DB6104 DP222 PB58 PP10 | RESIDENTIAL | CREEKSTONES HOMEOWNERS ASSOCIATION I | SD-R |
| 69 | 089---02609 | DB3915 DP 891 PB14 PP17 | RESIDENTIAL | A T & T CORP BY & THROUGH | R-2 |
| 70 | 089B-004200 | DB5309 DP243 PB54 PP20 | RESIDENTIAL | CREEKSTONE HOMEOWNERS ASSOCIATION IN | SD-R |
| 71 | 089B-004600 | DB5727 DP67 PB54 PP20 | RESIDENTIAL | BLACKSHER NICOLE E | SD-R |
| 72 | 089B-004700 | DB6656 DP836 PB54 PP20 | RESIDENTIAL | DRUSE JONATHAN | SD-R |
| 73 | 089B-004800 | DB5674 DP620 PB54 PP20 | RESIDENTIAL | KUMAR RATNA | SD-R |
| 74 | 089B-005000 | DB6412 DP384 PB54 PP20 | RESIDENTIAL | BLANKENSHIP JON I | SD-R |
| 75 | 089B-005100 | DB5710 DP738 PB54 PP20 | RESIDENTIAL | BURRELL GERALD MARK | SD-R |
| 76 | 089B-005200 | DB5716 DP104 PB54 PP20 | RESIDENTIAL | BUCKNER RICHARD D | SD-R |
| 77 | 089B-005300 | DB5604 DP513 PB54 PP20 | RESIDENTIAL | LERCHE MICHAEL | SD-R |
| 78 | 089B-005400 | DB6046 DP929 PB54 PP20 | RESIDENTIAL | RUSSELL KAREN KINGSBURY | SD-R |
| 79 | 089B-005500 | DB5747 DP463 PB54 PP20 | RESIDENTIAL | THEURER DAVID S | SD-R |
| 80 | 089B-005600 | DB5309 DP243 PB54 PP20 | RESIDENTIAL | CREEKSTONE HOMEOWNERS ASSOCIATION IN | SD-R |
| 81 | 089B-P01500 | DB6057 DP780 PB56 PP76 | RESIDENTIAL | BARLOW JOHN | SD-R |
| 82 | 089B-P01600 | DB6119 DP165 PB56 PP76 | RESIDENTIAL | ERWIN DEVAN A | SD-R |
| 83 | 089B-P02000 | DB6031 DP735 PB56 PP76 | RESIDENTIAL | PATEL NIKUNJ M | SD-R |
| 84 | 089B-P02100 | DB5983 DP439 PB56 PP76 | RESIDENTIAL | JANI BHAVESHKUMAR | SD-R |
| 85 | 089B-P02200 | DB5989 DP962 PB56 PP76 | RESIDENTIAL | HARRIS JOHN | SD-R |
| 86 | 089B-P02300 | DB6003 DP115 PB56 PP76 | RESIDENTIAL | LEDGISTER KEVIN ARTHUR | SD-R |
| 87 | 089B-P02400 | DB6377 DP104 PB56 PP76 | RESIDENTIAL | JOHANSEN MICHAEL | SD-R |
| 88 | 089B-P02500 | DB5899 DP690 PB56 PP76 | RESIDENTIAL | COLLIER EDWARD W III | SD-R |


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


ENGINEERING CRUNK

WILSON COUNTY TENNESSEE AGRICULTURE 6/2/16 COMMERCE No. 114180 STATE OF TENNESSEE

# THE EPOCH DEVELOPMENT

REZONING SUBMITTAL

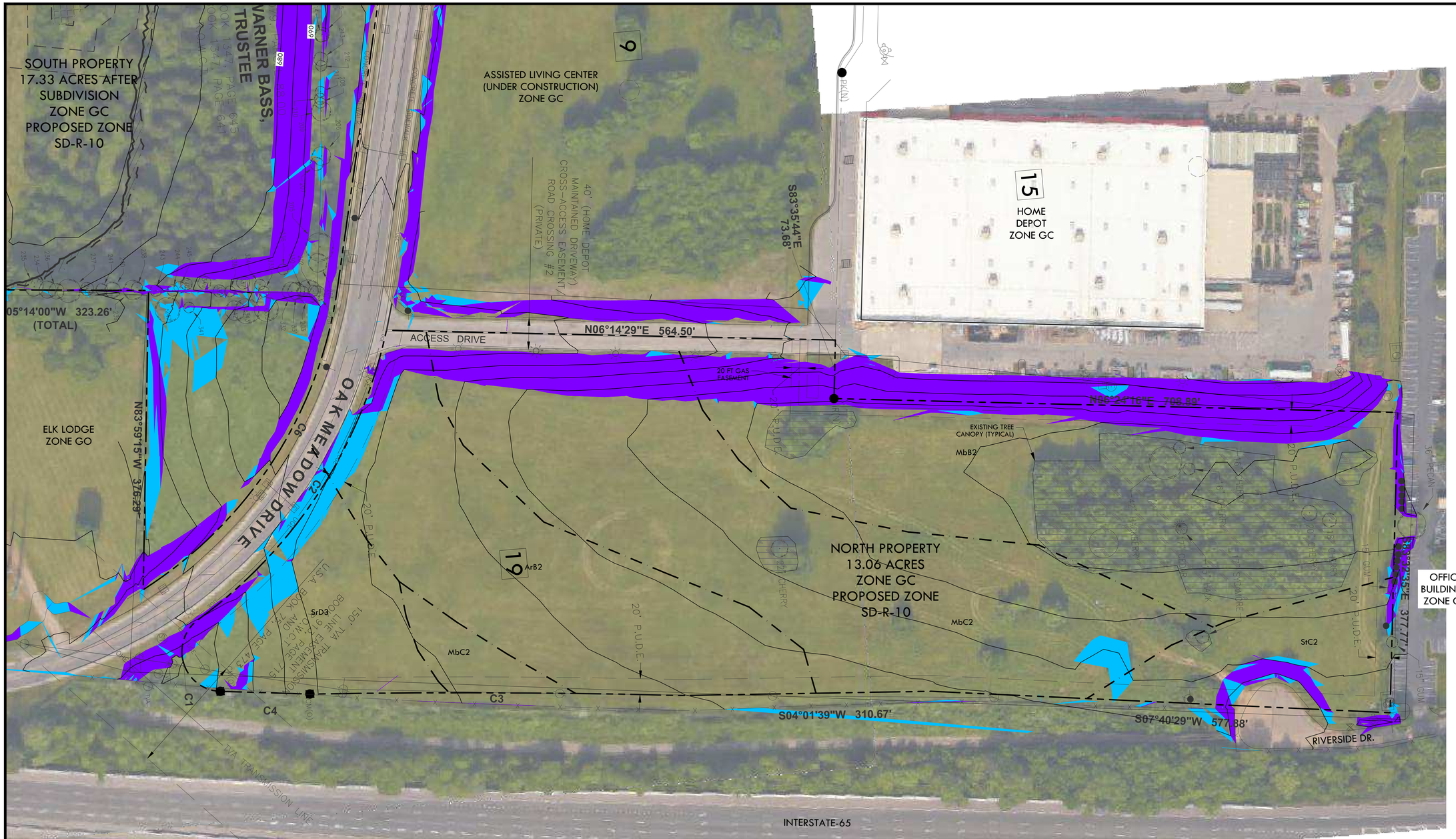
COF #6085 FRANKLIN, TN

| REVISIONS | |
|---|---|
| No. | DATE |
| | |

06/02/16 15001

# C1.0

OVERALL EXISTING CONDITIONS PLAN




SLOPE LEGEND

- GREATER THAN 14% AND LESS THAN 20% SLOPE
- GREATER THAN 20% SLOPE

SOIL TYPES

| | |
|---|---|
| ArB2 | Armour silt loam, 2% to 5 % slopes, eroded |
| CaC2 | Captina silt loam, phosphatic, 5% to 12% slopes, eroded |
| Eg | Egam silt loam, phosphatic |
| Hu | Huntington silt loam, phosphatic |
| InE3 | Inman silty clay loam, 20% to 30% slopes, severely eroded |
| MbB2 | Maury silt loam, 2% to 5% slopes, eroded |
| MbC2 | Maury silt loam, 5% to 12% slopes, eroded |
| SrC3 | Stiversville clay loam, 5% to 12% slopes, eroded |
| SrD3 | Stiversville clay loam, 12% to 20% slopes, severely eroded |
| StC2 | Stiversville silt loam, 5% to 12% slopes, eroded |

CURVE TABLE

| CURVE | RADIUS | LENGTH | DELTA | TANGENT | CHORD | CHD BRG |
|---|---|---|---|---|---|---|
| C1 | 50.00' | 123.89' | 141°58'19" | 145.10 | 94.54' | S77°58'06"W |
| C2 | 607.96' | 443.66' | 41°48'42" | 232.23 | 433.88' | N51°57'06"W |
| C3 | 11300.00' | 470.04' | 2°23'00" | 235.06 | 470.01' | S05°13'09"W |
| C4 | 11300.00' | 112.73' | 0°34'18" | 56.37 | 112.73' | S06°41'48"W |

0 30 60 120
GRAPHIC SCALE

CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM

# THE EPOCH DEVELOPMENT

REZONING SUBMITTAL

COF #6085 FRANKLIN, TN

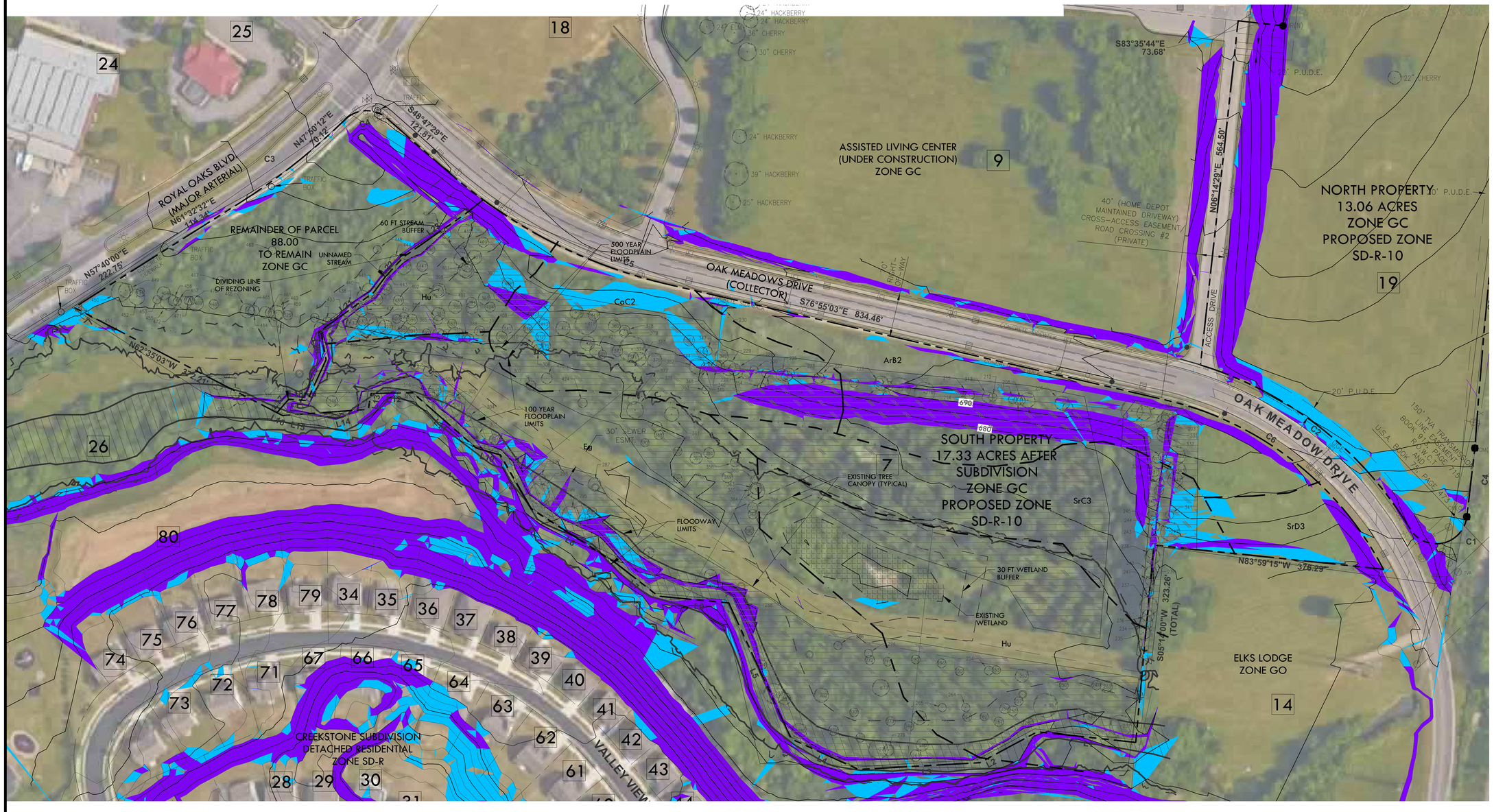
REVISIONS

| No. | DATE |
|---|---|
| | |

06/02/16 15001

# C1.1

NORTH SITE
EXISTING
CONDITIONS PLAN




SLOPE LEGEND

- GREATER THAN 14% AND LESS THAN 20% SLOPE
- GREATER THAN 20% SLOPE

SOIL TYPES

| | |
|---|---|
| ArB2 | Armour silt loam, 2% to 5 % slopes, eroded |
| CaC2 | Captina silt loam, phosphatic, 5% to 12% slopes, eroded |
| Eg | Egam silt loam, phosphatic |
| Hu | Huntington silt loam, phosphatic |
| InE3 | Inman silty clay loam, 20% to 30% slopes, severely eroded |
| MbB2 | Maury silt loam, 2% to 5% slopes, eroded |
| MbC2 | Maury silt loam, 5% to 12% slopes, eroded |
| SrC3 | Stiversville clay loam, 5% to 12% slopes, eroded |
| SrD3 | Stiversville clay loam, 12% to 20% slopes, severely eroded |
| StC2 | Stiversville silt loam, 5% to 12% slopes, eroded |

0 40 80 160
GRAPHIC SCALE

N

CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM

CRUNK ENGINEERING

WILSON CARL STREET, TENNESSEE LICENSED LANDSCAPE ARCHITECT AGRICULTURE 6/2/16 COMMERCE No. 114180 STATE OF TENNESSEE

# THE EPOCH DEVELOPMENT

REZONING SUBMITTAL

COF #6085 FRANKLIN, TN

| REVISIONS | |
|---|---|
| No. | DATE |

06/02/16 15001

# C1.2

SOUTH SITE EXISTING CONDITIONS PLAN

F i s c h b a c h
Transportation Group, LLC
Traffic Engineering and Planning

# Traffic Impact Study

# Epoch Apartments
# Oak Meadow Drive
# Franklin, TN

Prepared May 2016
(Originally Prepared April 2016)
For Epoch Residential

**FTG, LLC**
**P.O. Box 682736**
**Franklin, TN 37068**
**(615) 771-8022 phone**
**Gillian@FTGtraffic.com**

**Traffic Impact Study**

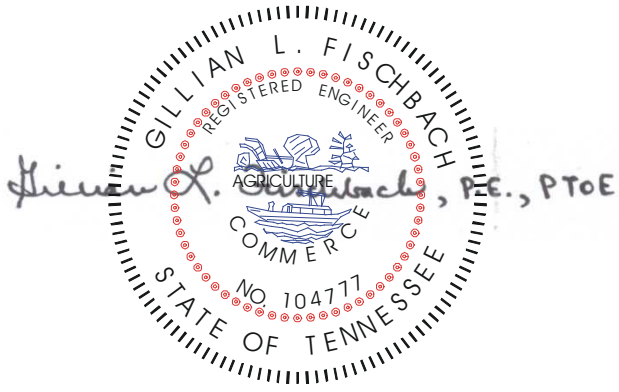
# Epoch Apartments
# Oak Meadow Drive

## Franklin, Tennessee

**Prepared May 2016**
**(Originally Prepared April 2016)**


**PREPARED FOR:**
Epoch Residential
359 Carolina Avenue
Winter Park, FL 32789

**PREPARED BY:**
Ms. Gillian L. Fischbach, P.E., PTOE
Fischbach Transportation Group (FTG, LLC)
P.O. Box 682736
Franklin, TN 37068
Phone: (615) 771-8022
FTG Project Number: 10728

## Table of Contents

1. INTRODUCTION ..... 4
2. PROJECT DESCRIPTION ..... 5
FIGURE 1. LOCATION OF THE PROJECT SITE ..... 6
FIGURE 2A. CURRENT PROJECT SITE PLAN (SOUTHERN APARTMENT SITE) ..... 7
FIGURE 2B. CURRENT PROJECT SITE PLAN (NORTHERN APARTMENT SITE) ..... 8
FIGURE 2C. SITE PLAN FOR FUTURE COMMERCIAL DEVELOPMENT ..... 9
3. EXISTING TRAFFIC VOLUMES ..... 10
FIGURE 3. EXISTING LANEAGE WITHIN THE STUDY AREA ..... 11
FIGURE 4. EXISTING PEAK HOUR TRAFFIC VOLUMES ..... 12
TABLE 1. DESCRIPTIONS OF LOS FOR SIGNALIZED INTERSECTIONS ..... 13
TABLE 2. DESCRIPTIONS OF LOS FOR UNSIGNALIZED INTERSECTIONS ..... 14
TABLE 3. EXISTING PEAK HOUR LEVELS OF SERVICE ..... 15
4. PROJECTION OF BACKGROUND TRAFFIC VOLUMES ..... 18
TABLE 4. HISTORICAL TRAFFIC VOLUMES IN THE STUDY AREA ..... 18
FIGURE 5A. INITIAL YEAR 2018 BACKGROUND TRAFFIC VOLUMES ..... 19
TABLE 5. TRIP GENERATION (SOMERBY ASSISTED LIVING FACILITY) ..... 20
FIGURE 5B. DIRECTIONAL DISTRIBUTION OF ASSISTED LIVING TRAFFIC ..... 21
FIGURE 5C. PEAK HOUR TRAFFIC GENERATED BY ASSISTED LIVING ..... 22
FIGURE 5D. FINAL BACKGROUND TRAFFIC VOLUMES ..... 23
TABLE 5. BACKGROUND PEAK HOUR LEVELS OF SERVICE ..... 24
5. IMPACTS OF PROPOSED DEVELOPMENT ..... 27
5.1 TRIP GENERATION ..... 27
TABLE 6A. TRIP GENERATION FOR THE PROPOSED PROJECT ..... 27
TABLE 6B. TRIP GENERATION FOR ALTERNATIVE LAND USES ..... 28
5.2 TRIP DISTRIBUTION AND TRAFFIC ASSIGNMENT ..... 29
FIGURE 6A. DIRECTIONAL DISTRIBUTION OF SITE TRAFFIC (SOUTHERN SITE) ..... 30
FIGURE 6B. DIRECTIONAL DISTRIBUTION OF SITE TRAFFIC (NORTHERN SITE) ..... 31
FIGURE 6C. DIRECTIONAL DISTRIBUTION OF SITE TRAFFIC (FUTURE RETAIL) ..... 32
FIGURE 7A. PEAK HOUR SITE TRAFFIC (SOUTHERN SITE) ..... 33
FIGURE 7B. PEAK HOUR SITE TRAFFIC (NORTHERN SITE) ..... 34
FIGURE 7C. PEAK HOUR SITE TRAFFIC (FUTURE RETAIL) ..... 35

FIGURE 7D. TOTAL PEAK HOUR SITE TRAFFIC (TOTAL BOTH SITES) .....36
5.3 CAPACITY ANALYSES.....37
FIGURE 8. TOTAL PROJECTED PEAK HOUR TRAFFIC VOLUMES.....38
TABLE 7. PROJECTED PEAK HOUR LEVELS OF SERVICE.....39
5.4 CAPACITY ANALYSIS COMPARISON .....43
TABLE 8. COMPARISON OF AM PEAK HOUR LEVELS OF SERVICE .....45
TABLE 9. COMPARISON OF PM PEAK HOUR LEVELS OF SERVICE.....45
6. CONCLUSIONS AND RECOMMENDATIONS .....46
APPENDIX A.....49
APPENDIX B.....53
APPENDIX C.....62
APPENDIX D.....205

## 1. INTRODUCTION

This traffic study has been prepared in order to identify the traffic impacts of a multi-family residential development that is proposed to be constructed on the north and south sides of Oak Meadow Drive, east of S. Royal Oaks Boulevard, in Franklin, Tennessee.

For the purposes of this study, existing and background traffic volumes were established, and capacity analyses were conducted for these conditions. Also, trip generation calculations were performed, and the trips which are expected to be generated by the proposed project were distributed to the roadway system and added to the background traffic volumes. The roadways and intersections which provide access to the site were then re-evaluated to determine the traffic impacts of the proposed project. Access needs for the project were evaluated, and the necessary roadway and/or traffic control improvements were identified. This report presents the results of these analyses and the subsequent recommendations.

It is important to note that the scope of this Traffic Impact Study was provided by the City of Franklin Engineering Department and their third-party private consultant, Neel-Schaffer, Inc. The approved scope is included in in Appendix A.

## 2. PROJECT DESCRIPTION

The location of the proposed project is shown in Figure 1. As shown, the project site is located on the north and south sides of Oak Meadow Drive, east of S. Royal Oaks Boulevard, in Franklin, Tennessee. The current project site plan is shown in Figures 2A and 2B. As shown, the proposed plan includes 98 apartments on the south side of Oak Meadow Drive and 204 apartments on the north side of Oak Meadow Drive.

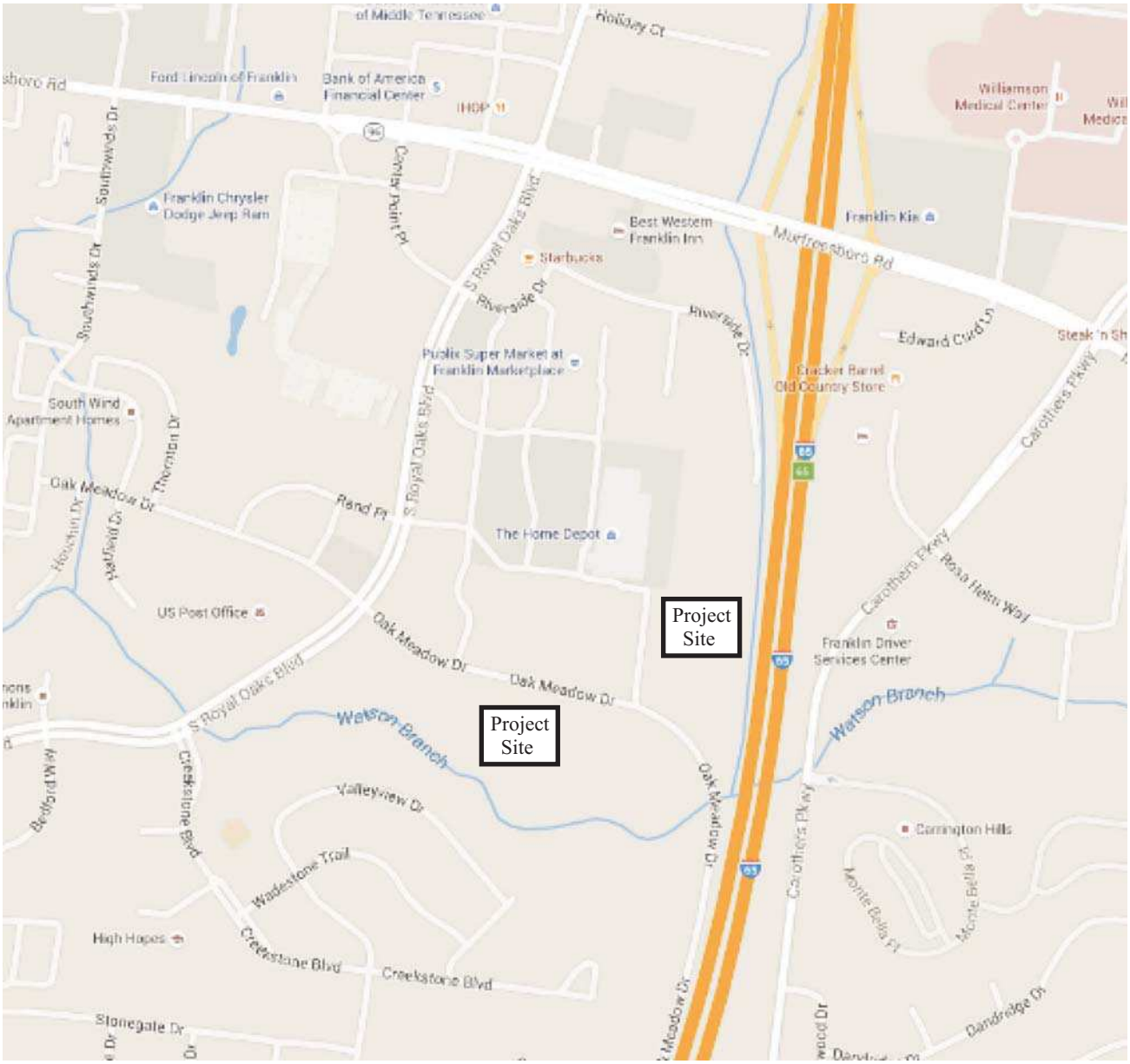
Access for the southern portion of the site will be provided at two locations on Oak Meadow Drive, and access for the northern portion of the site will be provided at one location on the eastern access for the Home Depot shopping center on the north side of Oak Meadow Drive. Also, secondary access for the northern portion of the site will be provided at the existing terminus of Riverside Drive.

Also, it is possible that, in the future, a commercial site will be developed in the southeast quadrant of the intersection of S. Royal Oaks Boulevard and Oak Meadow Drive. For the purposes of this study, it was assumed that 15,000 sq.ft. of specialty retail space will be constructed on this site as shown in Figure 2C. Also, for the purposes of this study, it was assumed that sole access for the future commercial site will be provided on Oak Meadow Drive at the western access proposed for the apartments.

In large part, economic and market considerations will dictate the pace and timing with which the proposed project is actually completed. The analyses conducted within this study are based on the estimation that the entire project will be completed within two years.

.

F i s c h b a c h
Transportation Group, LLC
**Traffic Engineering and Planning**




N

**No Scale**

**Figure 1.**
**Location of the Project Site**

| LINE TABLE | | |
|---|---|---|
| LINE | BEARING | DISTANCE |
| L1 | N83°48'10"W | 161.22' |
| L2 | S61°46'08"W | 106.65' |
| L3 | S86°48'30"W | 198.12' |
| L4 | N65°28'52"W | 120.02' |
| L5 | N24°43'04"W | 244.21' |
| L6 | N84°36'00"W | 115.35' |
| L7 | N52°04'01"W | 87.70' |
| L8 | N57°18'12"W | 163.19' |
| L9 | N29°52'55"W | 101.80' |
| L10 | N74°02'09"W | 41.15' |
| L11 | N48°56'27"W | 137.25' |
| L12 | S88°57'25"W | 67.60' |
| L13 | S10°32'54"W | 26.12' |

| LINE TABLE | | |
|---|---|---|
| LINE | BEARING | DISTANCE |
| L14 | S74°19'35"W | 89.75' |
| L15 | N75°22'06"W | 55.08' |
| L16 | N62°35'03"W | 10.27' |
| L17 | N39°40'55"E | 27.30' |
| L18 | S89°07'57"E | 31.47' |
| L19 | N25°32'12"E | 70.78' |
| L20 | N10°00'40"W | 49.37' |
| L21 | N54°59'41"E | 103.02' |
| L22 | N40°36'36"E | 74.71' |
| L23 | N53°28'05"E | 164.68' |

| CURVE TABLE | | | | | | |
|---|---|---|---|---|---|---|
| CURVE | RADIUS | LENGTH | DELTA | TANGENT | CHORD | CHD BRG |
| C5 | 820.00' | 330.94' | 23°07'24" | 167.75 | 328.69' | S65°21'21"E |
| C6 | 537.96' | 464.57' | 49°28'46" | 247.89 | 450.27' | S52°10'40"E |

TOTAL OF 98 UNITS ON SOUTH PARCEL

0 40 80 160
GRAPHIC SCALE

N

CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM

# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

COF #6086 FRANKLIN, TN

REVISIONS

| No. | DATE |
|---|---|
| | |

04/07/16 15001

# C2.2

SOUTH SITE DEVELOPMENT PLAN

SOUTH PROPERTY
17.33 ACRES AFTER
SUBDIVISION
98 UNITS

ASSISTED LIVING CENTER
(UNDER CONSTRUCTION)
ZONE GC

HOME
DEPOT
ZONE GC

ELK LODGE
ZONE GO

40 FT FRONT SETBACK

EXISTING 20' PUDE

52 UNITS
4 STORY

44 UNITS
4 STORY

44 UNITS
4 STORY

60 UNITS
4 STORY

2 UNITS
2 STORY

2 UNITS
2 STORY

TRASH
COMPACTOR AND
ENCLOSURE

MAINTENANCE
BUILDING

OFFICE
BUILDINGS
ZONE GC

EXISTING 20' PUDE

40 FT FRONT SETBACK

STORMWATER
DETENTION/TREATMENT
AREA

40 FT INTERSTATE
BUFFER

EXISTING TVA
EASEMENT

NORTH PROPERTY
13.06 ACRES
204 UNITS

EXISTING 20' PUDE

RIVERSIDE DR.

INTERSTATE-65

TOTAL OF 204 UNITS ON NORTH PARCEL

| CURVE TABLE | | | | | | |
|---|---|---|---|---|---|---|
| CURVE | RADIUS | LENGTH | DELTA | TANGENT | CHORD | CHD BRG |
| C1 | 50.00' | 123.89' | 141°58'19" | 145.10 | 94.54' | S77°58'06"W |
| C2 | 607.96' | 443.66' | 41°48'42" | 232.23 | 433.88' | N51°57'06"W |
| C3 | 11300.00' | 470.04' | 2°23'00" | 235.06 | 470.01' | S05°13'09"W |
| C4 | 11300.00' | 112.73' | 0°34'18" | 56.37 | 112.73' | S06°41'48"W |

0 30 60 120
GRAPHIC SCALE

N


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


ENGINEERING CRUNK

WILSON CRUNK
REGISTERED
LANDSCAPE
ARCHITECT
AGRICULTURE
5/16
No. 114180
STATE OF TENNESSEE

# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

COF #6086 FRANKLIN, TN

REVISIONS

| No. | DATE |
|---|---|

04/07/16 15001

C2.1

NORTH SITE
DEVELOPMENT
PLAN

## SITE DATA TABLE

| |
|---|
| 15,000 SQ-FT RETAIL SPACE |
| REQUIRED PARKING (3 SPACES PER 1,000 SQ-FT) = 45 |
| PROVIDED PARKING = 55 SPACES |
| PROPOSED PROPERTY AREA = 3.5± ACRES |

S. ROYAL OAKS BLVD

OAK MEADOWS DR.

BUILDING SETBACK

434.01

88.80

220.09

New Left Turn Lane

Existing driveway serving Post Office

Full access intersection proposed

We understand this connection may not be possible, which is why we are proposing access into the Epoch Development site.

60.0 FT

15,000 SQ-FT RETAIL BUILDING

DETENTION AREA

DUMPSTER

RETAINING WALL

60-FT STREAM BUFFER

EXISTING STREAM

PROPOSED PROPERTY LINE

Epoch Development Site

100-YR FLOOD PLAIN

WATSON BRANCH

0 10 20 30 60

GRAPHIC SCALE

N


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


# PROPOSED RETAIL SITE
AT
ROYAL OAKS & OAK MEADOWS DRIVE
FRANKLIN, TN

REVISIONS

| No. | DATE |
|---|---|

04/27/15 15001

C1.0

SCHEMATIC SITE PLAN OVERALL

# 3. EXISTING TRAFFIC VOLUMES

In order to quantify the impact of the traffic that will be generated by the proposed project, peak hour traffic volumes were counted at the following locations:

1. Oak Meadow Drive and the project accesses
2. S. Royal Oaks Boulevard and Oak Meadow Drive
3. S. Royal Oaks Boulevard and Rand Place / Access for Home Depot
4. S. Royal Oaks Boulevard and Riverside Drive / Center Point Place

Also, the City of Franklin requested that peak hour traffic counts be collected for signal timing purposes at the following intersections:

5. Murfreesboro Road and Royal Oaks Boulevard
6. Murfreesboro Road and the Ramps for Southbound I-65
7. Murfreesboro Road and the Ramps for Northbound I-65

This data was collected during the morning and afternoon peak hours on typical weekdays in February 2016 when schools were in session. The raw traffic volumes are included in Appendix B. The existing laneage at the intersections within the study area is shown in Figure 3, and the existing peak hour traffic volumes are shown in Figure 4.

Using the existing peak hour traffic volumes shown in Figure 4, capacity analyses were conducted for the intersections counted. Specifically, in order to identify current peak hour levels of operation within the study area, the capacity calculations were performed according to the methods outlined in the Highway Capacity Manual 2010 (HCM2010). These analyses result in the determination of a Level of Service (LOS), which is a measure of evaluation is used to describe how well an intersection or roadway operates. LOS A represents free flow traffic operations, and LOS F suggests that the traffic demand exceeds the available capacity. In an urbanized area, LOS D is typically considered to be the minimum acceptable LOS. Table 1 presents the descriptions of LOS for signalized intersections, and Table 2 presents the descriptions of LOS for unsignalized intersections.

It is important to note that the City of Franklin Engineering Department provided the Synchro software files that were used to identify existing operations at the signalized intersections within the study area. Specifically, the files were updated to include the February 2016 traffic volumes. Also, the files were updated to reflect the recently-approved City ordinance that prohibits right-turns-on-red for the northbound right turns on S. Royal Oaks Boulevard at Murfreesboro Road.

The results of the capacity analyses for the existing peak hour traffic volumes are shown in Table 3, and Appendix C includes the capacity analyses worksheets.

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning

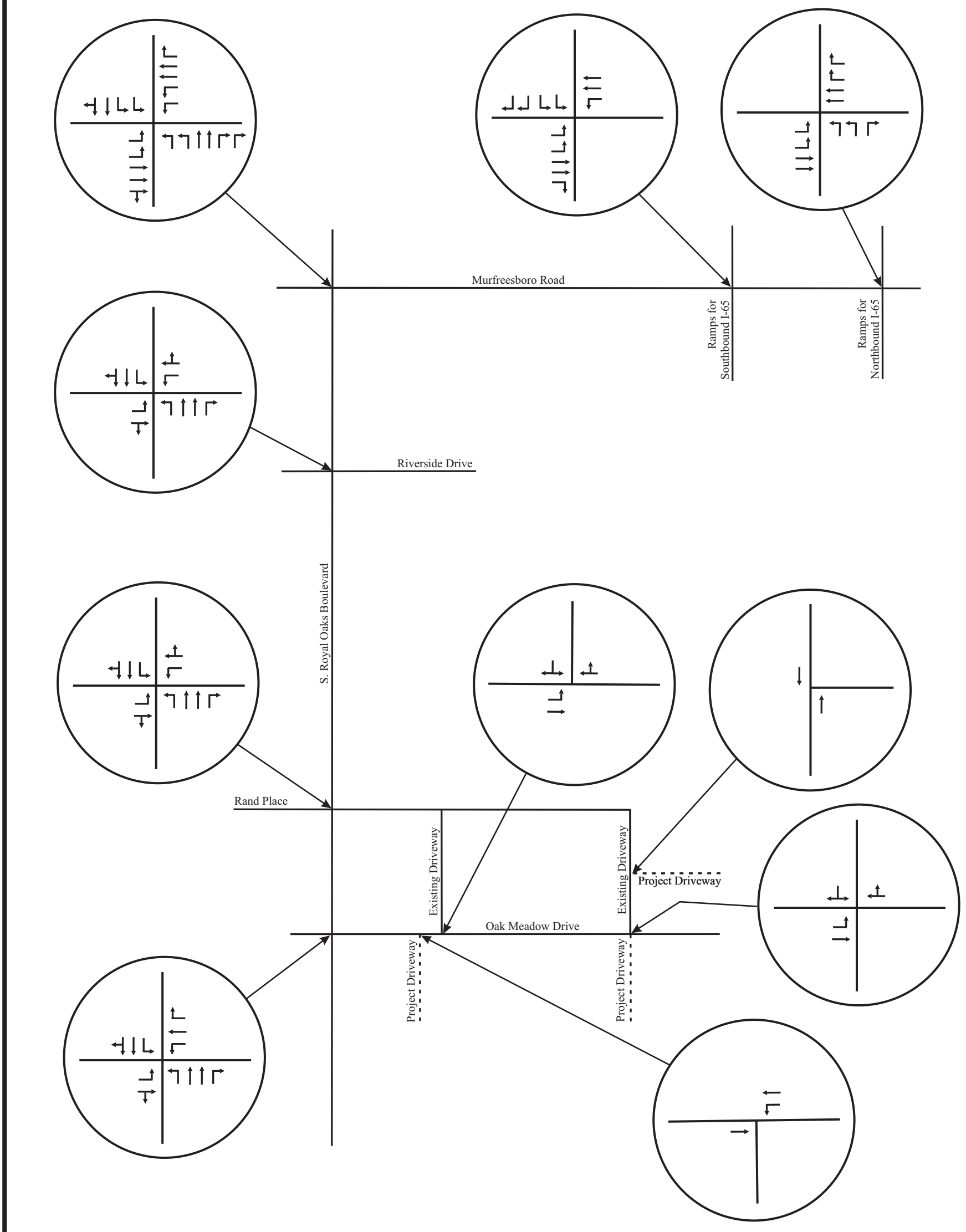
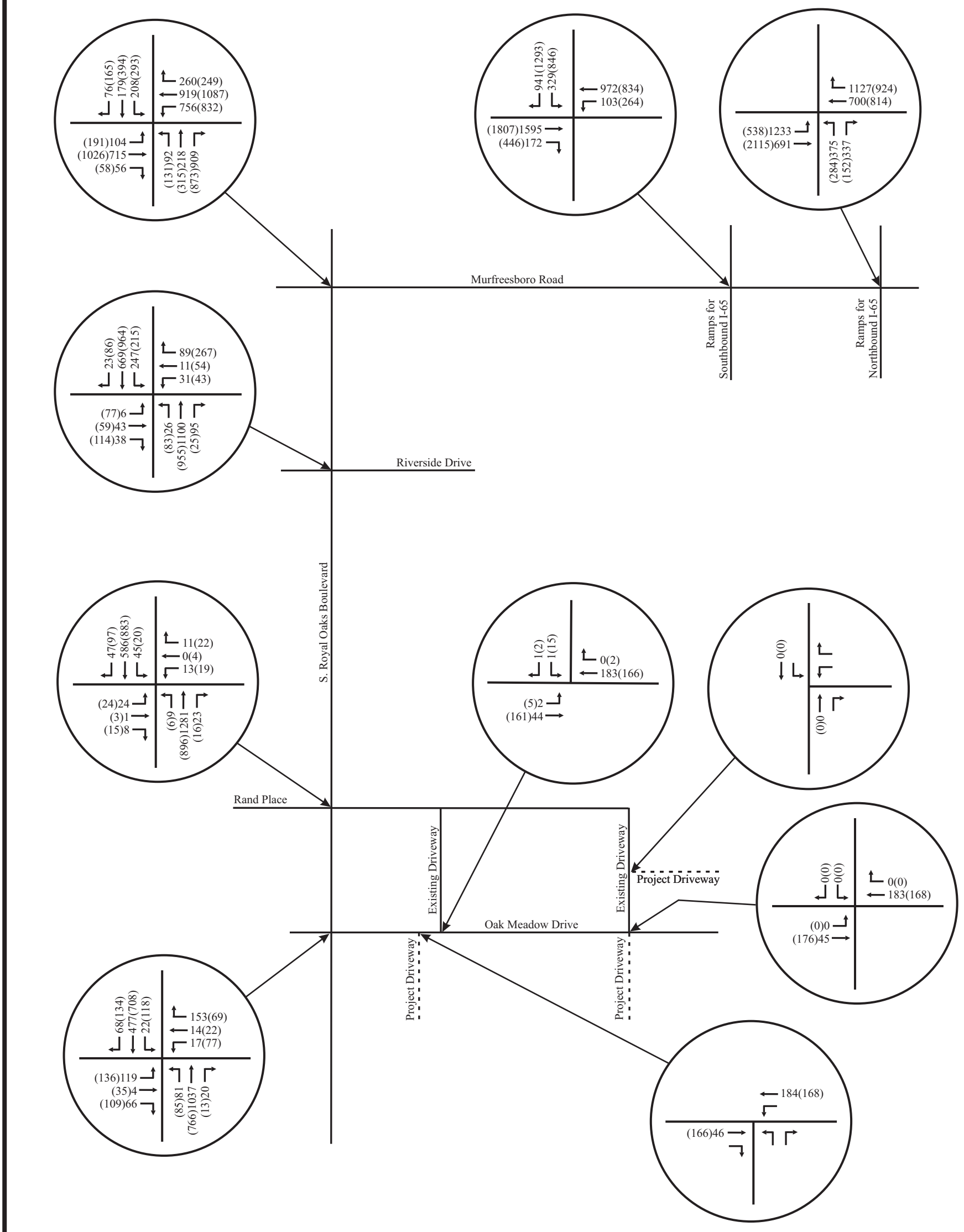



**Figure 3.**
**Existing Laneage at the Intersections within the Study Area**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning




**No Scale**

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

**Figure 4.**
**Existing Peak Hour Traffic Volumes within the Study Area**

**TABLE 1. DESCRIPTIONS OF LOS FOR SIGNALIZED INTERSECTIONS**

| Level of Service | Description | Average Control Delay per Vehicle (sec) |
|---|---|---|
| A | Operations with very low control delay. Progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay. | ≤ 10 |
| B | Operations with stable flows. This generally occurs with good progression, short cycle lengths, or both. More vehicles stop than for LOS A, causing higher levels of average delay. | > 10 and ≤ 20 |
| C | Operations with stable flow. Occurs with fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, although many still pass through the intersection without stopping. | > 20 and ≤ 35 |
| D | Approaching unstable flow. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop. | > 35 and ≤ 55 |
| E | Unstable flow. In many cases, this is considered to be the limit for acceptable delay. These high delays generally indicate poor progression, long cycle lengths, and high v/c ratios. | > 55 and ≤ 80 |
| F | Unacceptable delay. This condition often occurs with oversaturation or with high v/c ratios. Poor progression and long cycle lengths may also cause such delay levels. | > 80 |

Source: Highway Capacity Manual 2010 (HCM2010)

**TABLE 2. DESCRIPTIONS OF LOS FOR UNSIGNALIZED INTERSECTIONS**

| Level of Service | Description | Average Control Delay (sec/veh) |
|---|---|---|
| A | Minimal delay | ≤ 10 |
| B | Brief delay | > 10 and ≤ 15 |
| C | Average delay | > 15 and ≤ 25 |
| D | Significant delay | > 25 and ≤ 35 |
| E | Long delay | > 35 and ≤ 50 |
| F | Extreme delay | > 50 |

Source: Highway Capacity Manual 2010 (HCM 2010)

**TABLE 3. EXISTING PEAK HOUR LEVELS OF SERVICE**

| INTERSECTION | TURNING MOVEMENT | AM PEAK HOUR | | PM PEAK HOUR | |
|---|---|---|---|---|---|
| | | LEVEL OF SERVICE | 95TH %-ILE QUEUE | LEVEL OF SERVICE | 95TH %-ILE QUEUE |
| **Oak Meadow Drive and the Eastern Access for Home Depot** | Eastbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Southbound Left and Right Turns | LOS A | 1 veh | LOS A | 1 veh |
| **Oak Meadow Drive and the Western Access for Home Depot** | Eastbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Southbound Left and Right Turns | LOS A | 1 veh | LOS B | 1 veh |
| **S. Royal Oaks Boulevard and Oak Meadow Drive** (signalized) | Northbound Left Turns | LOS A | 32 feet | LOS B | 47 feet |
| | Northbound Thrus | LOS B | 308 feet | LOS B | 268 feet |
| | Northbound Right Turns | LOS A | 0 feet | LOS A | 0 feet |
| | Southbound Left Turns | LOS A | 12 feet | LOS A | 64 feet |
| | Southbound Thrus/Right Turns | LOS A | 130 feet | LOS C | 356 feet |
| | Eastbound Left Turns | LOS D | 120 feet | LOS D | 137 feet |
| | Eastbound Thrus/Right Turns | LOS B | 13 feet | LOS C | 63 feet |
| | Westbound Left Turns | LOS C | 27 feet | LOS D | 82 feet |
| | Westbound Thrus | LOS D | 25 feet | LOS D | 35 feet |
| | Westbound Right Turns | LOS B | 88 feet | LOS A | 33 feet |
| | **Overall Intersection** | **LOS B** | | **LOS C** | |
| **S. Royal Oaks Boulevard and Rand Place / Home Depot Access** | Northbound Left Turns | LOS A | 1 veh | LOS B | 1 veh |
| | Southbound Left Turns | LOS B | 1 veh | LOS B | 1 veh |
| | Eastbound Left Turns | LOS D | 1 veh | LOS D | 1 veh |
| | Eastbound Thrus/Right Turns | LOS B | 1 veh | LOS B | 1 veh |

| | | | | | |
|---|---|---|---|---|---|
| | Westbound Left Turns | LOS E | 1 veh | LOS D | 1 veh |
| | Westbound Thrus/Right Turns | LOS B | 1 veh | LOS B | 1 veh |
| **S. Royal Oaks Boulevard and Riverside Drive / Center Point Place** (signalized) | Northbound Left Turns | LOS A | 11 feet | LOS B | 55 feet |
| | Northbound Thrus | LOS B | 320 feet | LOS C | 464 feet |
| | Northbound Right Turns | LOS A | 26 feet | LOS A | 0 feet |
| | Southbound Left Turns | LOS D | 161 feet | LOS C | 91 feet |
| | Southbound Thrus/Right Turns | LOS A | 85 feet | LOS A | 161 feet |
| | Eastbound Left Turns | LOS D | 18 feet | LOS F | 214 feet |
| | Eastbound Thrus/Right Turns | LOS D | 99 feet | LOS C | 141 feet |
| | Westbound Left Turns | LOS E | 58 feet | LOS D | 70 veh |
| | Westbound Thrus/Right Turns | LOS B | 24 feet | LOS D | 255 veh |
| | **Overall Intersection** | **LOS B** | | **LOS C** | |
| **Murfreesboro Road and Royal Oaks Boulevard** (signalized) | Eastbound Left Turns | LOS E | 88 feet | LOS E | 144 feet |
| | Eastbound Thrus / Right Turns | LOS D | 310 feet | LOS D | 336 feet |
| | Westbound Left Turns | LOS D | 412 feet | LOS F | 499 feet |
| | Westbound Thrus | LOS D | 539 feet | LOS D | 492 feet |
| | Westbound Right Turns | LOS A | 80 feet | LOS B | 120 feet |
| | Northbound Left Turns | LOS E | 73 feet | LOS E | 103 feet |
| | Northbound Thrus | LOS D | 146 feet | LOS E | 218 feet |
| | Northbound Right Turns | LOS C | 567 feet | LOS D | 617 feet |
| | Southbound Left Turns | LOS E | 148 feet | LOS F | 242 feet |

| | | | | | |
|---|---|---|---|---|---|
| | Southbound Thrus / Right Turns | LOS D | 141 feet | LOS E | 398 feet |
| | **Overall Intersection** | **LOS D** | | **LOS E** | |
| **Murfreesboro Road and Ramps for Southbound I-65** (signalized) | Eastbound Thrus | LOS C | 330 feet | LOS E | 609 feet |
| | Eastbound Right Turns | LOS A | 51 feet | LOS C | 265 feet |
| | Westbound Left Turns | LOS E | 156 feet | LOS F | 465 feet |
| | Westbound Thrus | LOS B | 273 feet | LOS C | 337 feet |
| | Southbound Left Turns | LOS D | 164 feet | LOS D | 465 feet |
| | Southbound Right Turns | LOS E | 617 feet | LOS F | 1065 feet |
| | **Overall Intersection** | **LOS C** | | **LOS E** | |
| **Murfreesboro Road and Ramps for Northbound I-65** (signalized) | Eastbound Left Turns | LOS F | 913 feet | LOS E | 341 feet |
| | Eastbound Thrus | LOS A | 71 feet | LOS C | 370 feet |
| | Westbound Thrus | LOS D | 337 feet | LOS C | 406 feet |
| | Westbound Right Turns | LOS C | 502 feet | LOS A | 234 feet |
| | Northbound Left Turns | LOS F | 302 feet | LOS E | 201 feet |
| | Northbound Right Turns | LOS C | 225 feet | LOS D | 172 feet |
| | **Overall Intersection** | **LOS E** | | **LOS C** | |

# 4. PROJECTION OF BACKGROUND TRAFFIC VOLUMES

In order to account for the traffic growth which will occur within the study area because of typical growth, background traffic volumes were established for the intersections within the study area. Specifically, in order to account for typical growth within the study area, consideration was given to the historical traffic volumes near the project site. The Tennessee Department of Transportation (TDOT) conducts an annual count program throughout the state. This count program includes the annual collection of average daily traffic (ADT) counts at numerous fixed locations. As shown in Table 4, the daily traffic volumes within the study area have increased 2.65% per year since 2006. Based on this information, for the purposes of this study, the existing traffic volumes at the intersections within the study area were increased by 8% to represent initial background traffic volumes in the Year 2018, as shown in Figure 5A.

**TABLE 4. HISTORICAL TRAFFIC VOLUMES IN THE STUDY AREA**

| Year | Station 164 S. Royal Oaks Blvd ADT | Annual Growth | |
|---|---|---|---|
| 2006 | 18,274 | | |
| 2007 | 17,787 | -2.66% | |
| 2008 | 20,374 | 14.54% | |
| 2009 | 19,666 | -3.48% | |
| 2010 | 19,324 | -1.74% | |
| 2011 | 19,090 | -1.21% | |
| 2012 | 19,435 | 1.81% | |
| 2013 | 20,343 | 4.67% | |
| 2014 | 22,118 | 8.73% | **Overall Growth** |
| 2015 | 22,638 | 2.35% | **2.65%** |

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning

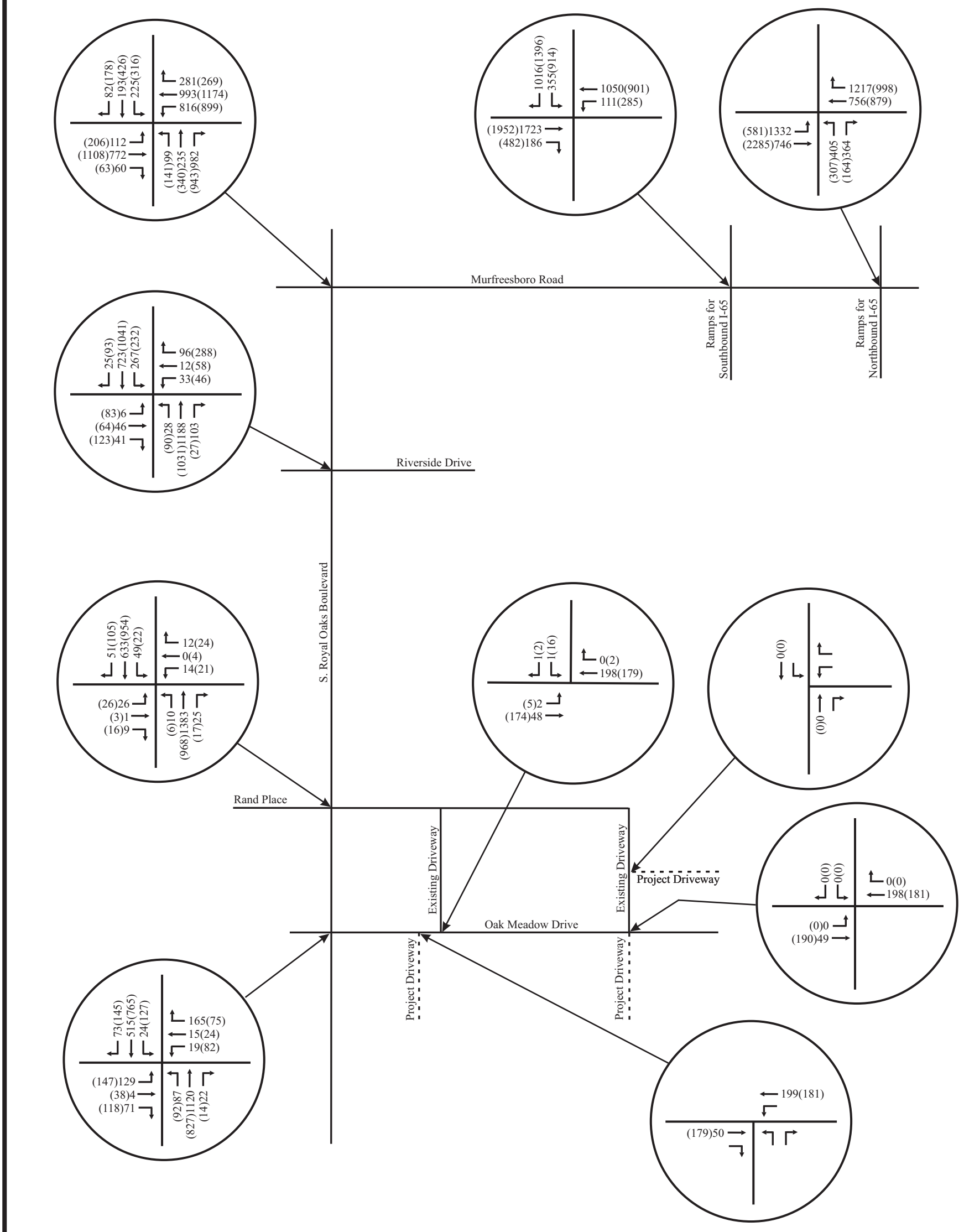



**Figure 5A.**
**Initial Background Peak Hour Traffic Volumes within the Study Area**

It is important to note that a day care center is under construction on the north side of S. Royal Oaks Boulevard at Mack Hatcher Parkway, southwest of the proposed project. It is likely that a significant portion of the traffic that will be generated by the day care center will be pass-by traffic that is already traveling on the S. Royal Oaks Boulevard corridor. The 8% growth rate applied to the existing traffic volumes will account for the additional traffic that will be generated by the day care center.

Also, it is important to note that an assisted living facility with 208 beds is under construction on the north side of Oak Meadow Drive, opposite the southern project site for the proposed project. For the purposes of this study, trip generation calculations were conducted in order to identify how much traffic is expected to be generated by the assisted living facility. Trip generation data for daily and peak hour trips were identified from Trip Generation, Ninth Edition, which was published by the Institute of Transportation Engineers (ITE) in 2012. Table 5 presents the daily and peak hour trip generations, and these calculations are included in Appendix D.

**TABLE 5. TRIP GENERATION (SOMERBY ASSISTED LIVING FACILITY)**

| LAND USE | SIZE | DAILY TRAFFIC | GENERATED TRAFFIC | | | |
|---|---|---|---|---|---|---|
| | | | AM PEAK HOUR | | PM PEAK HOUR | |
| | | | ENTER | EXIT | ENTER | EXIT |
| Assisted Living Facility (LUC 254) | 208 beds | 570 | 34 | 13 | 30 | 47 |

Figures 5B and 5C include the directional distribution and assignment of peak hour traffic volumes that are expected to be generated by the assisted living facility.

The peak hour traffic volumes shown in Figures 5B and 5C were added to the traffic volumes shown in Figure 5A in order to establish the final background traffic volumes shown in Figure 5D. Using the background peak hour traffic volumes, capacity analyses were conducted for the intersections within the study area. For these analyses, it was assumed that all existing laneage and traffic control will be maintained and no improvements will be provided. The results of the capacity analyses for the background peak hour traffic volumes are shown in Table 5, and Appendix C includes the capacity analyses worksheets. These analyses indicate that the background conditions are consistent with the existing conditions within the study area.

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning

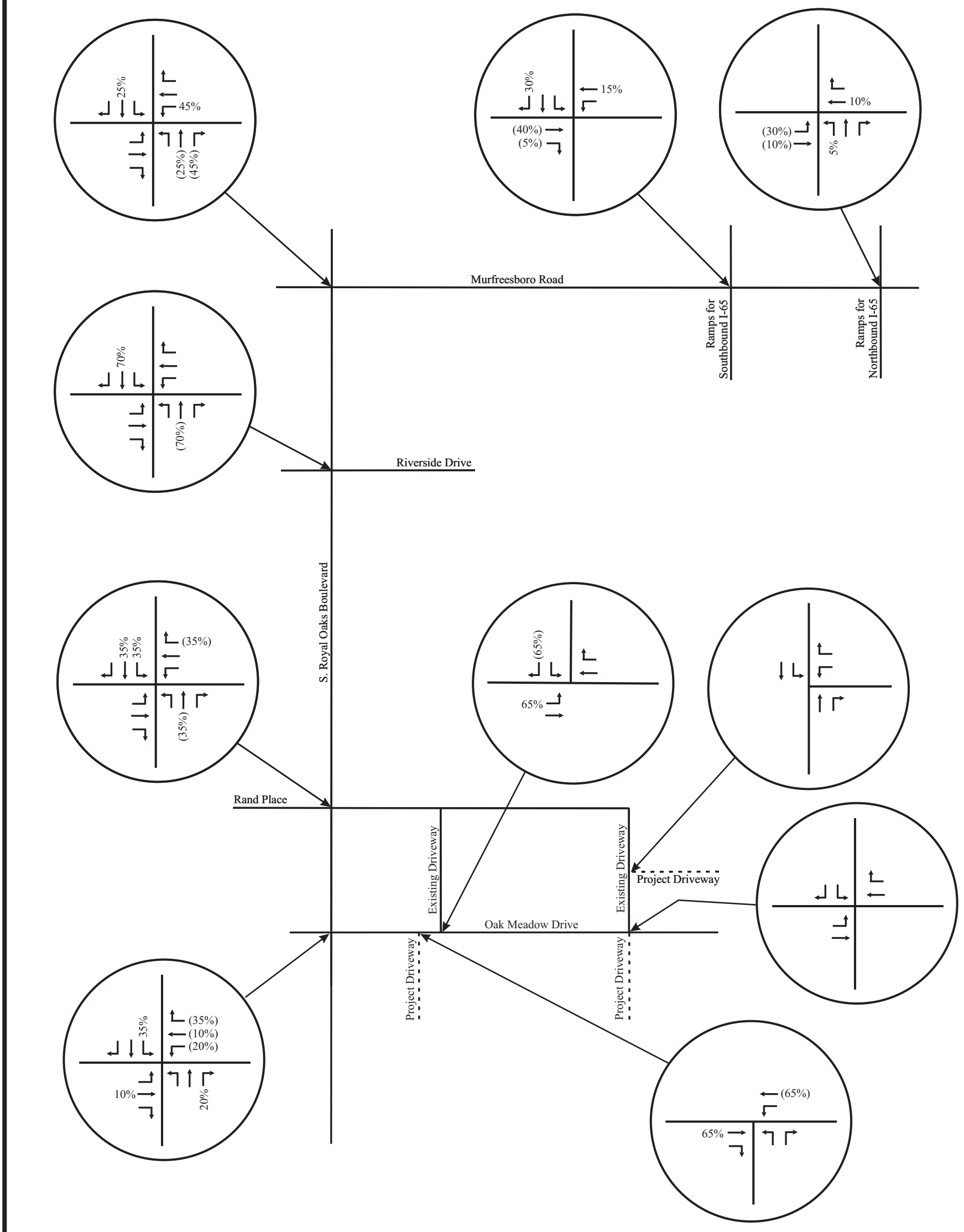
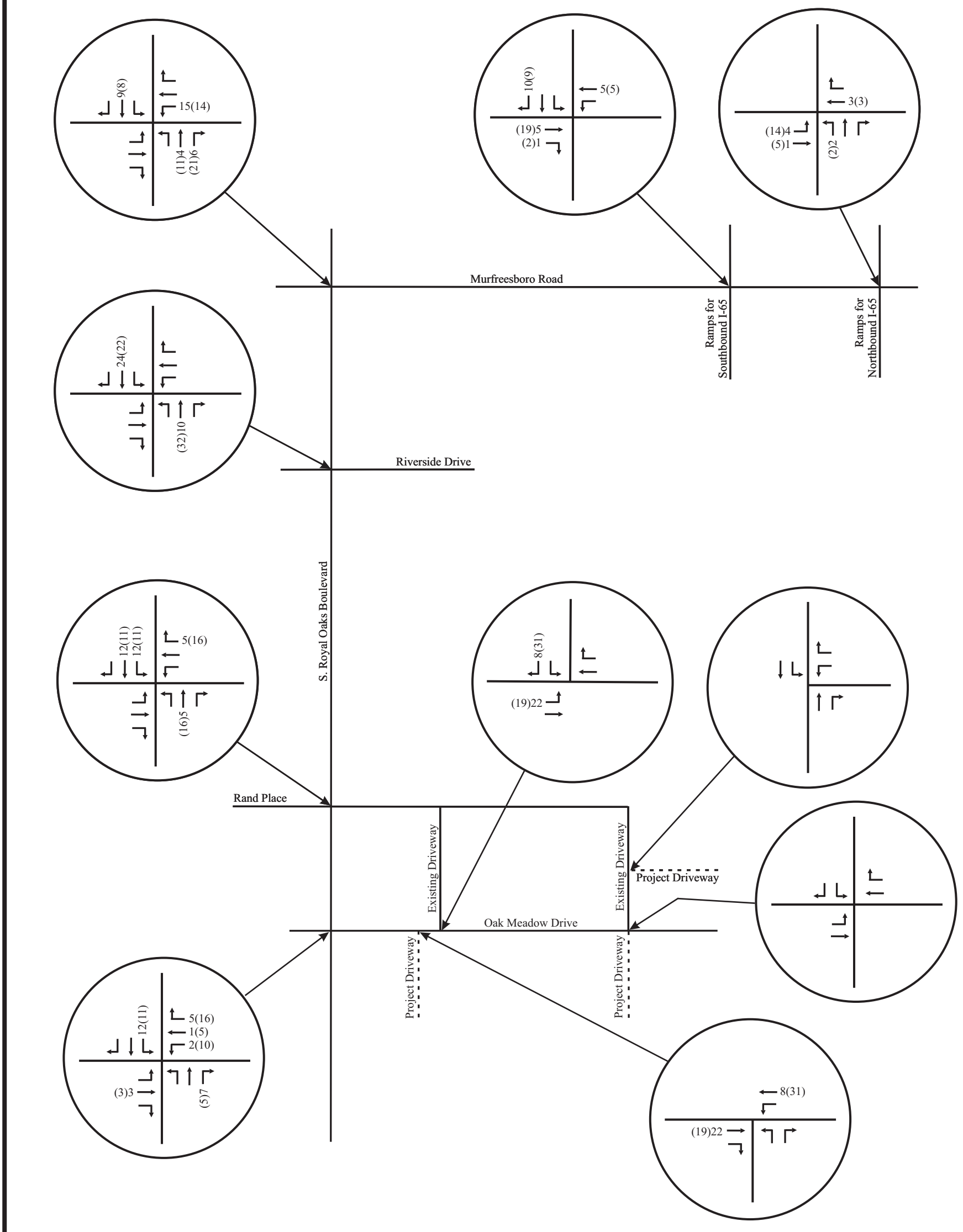



**Figure 5B.**
**Directional Distribution of Peak Hour Traffic Generated by the Somerby Assisted Living Facility**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning

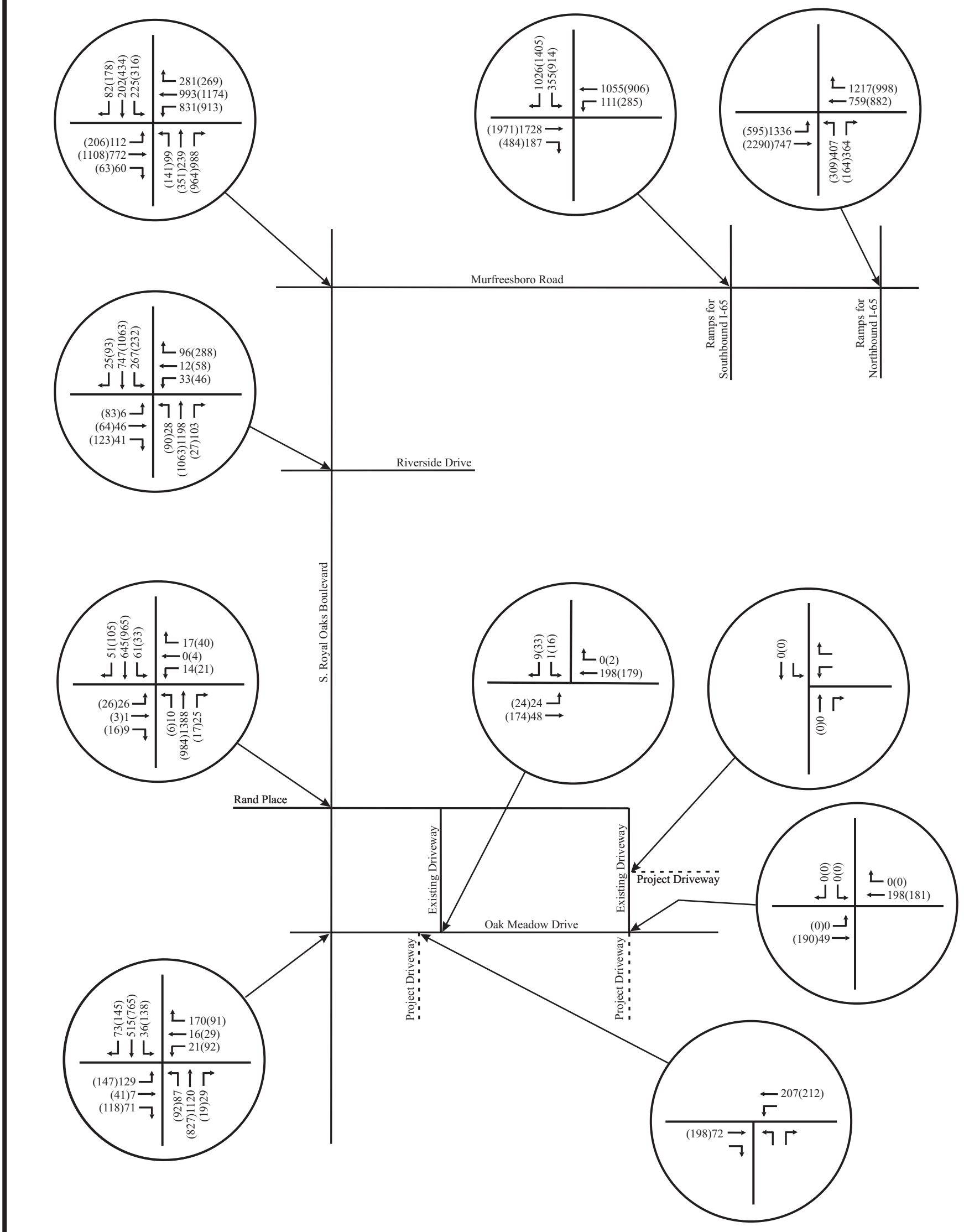



**No Scale**

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

**Figure 5C.**
**Peak Hour Traffic Generated by the Somerby Assisted Living Facility**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning




**No Scale**

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

**Figure 5D.**
**Final Background Peak Hour Traffic Volumes within the Study Area**

**TABLE 5. BACKGROUND PEAK HOUR LEVELS OF SERVICE**

| INTERSECTION | TURNING MOVEMENT | AM PEAK HOUR | | PM PEAK HOUR | |
|---|---|---|---|---|---|
| | | LEVEL OF SERVICE | 95TH %-ILE QUEUE | LEVEL OF SERVICE | 95TH %-ILE QUEUE |
| **Oak Meadow Drive and the Eastern Access for Home Depot** | Eastbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Southbound Left and Right Turns | LOS A | 1 veh | LOS A | 1 veh |
| **Oak Meadow Drive and the Western Access for Home Depot** | Eastbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Southbound Left and Right Turns | LOS A | 1 veh | LOS B | 1 veh |
| **S. Royal Oaks Boulevard and Oak Meadow Drive** (signalized) | Northbound Left Turns | LOS A | 35 feet | LOS C | 56 feet |
| | Northbound Thrus | LOS B | 351 feet | LOS B | 308 feet |
| | Northbound Right Turns | LOS A | 0 feet | LOS A | 0 feet |
| | Southbound Left Turns | LOS A | 18 feet | LOS B | 78 feet |
| | Southbound Thrus/Right Turns | LOS B | 147 feet | LOS C | 423 feet |
| | Eastbound Left Turns | LOS D | 127 feet | LOS D | 142 feet |
| | Eastbound Thrus/Right Turns | LOS B | 15 feet | LOS D | 80 feet |
| | Westbound Left Turns | LOS C | 30 feet | LOS D | 92 feet |
| | Westbound Thrus | LOS D | 27 feet | LOS D | 41 feet |
| | Westbound Right Turns | LOS B | 110 feet | LOS A | 37 feet |
| | **Overall Intersection** | **LOS B** | | **LOS C** | |
| **S. Royal Oaks Boulevard and Rand Place / Home Depot Access** | Northbound Left Turns | LOS A | 1 veh | LOS B | 1 veh |
| | Southbound Left Turns | LOS B | 1 veh | LOS B | 1 veh |
| | Eastbound Left Turns | LOS D | 1 veh | LOS D | 1 veh |
| | Eastbound Thrus/Right Turns | LOS B | 1 veh | LOS C | 1 veh |

| | | | | | |
|---|---|---|---|---|---|
| | Westbound Left Turns | LOS E | 1 veh | LOS D | 1 veh |
| | Westbound Thrus/Right Turns | LOS C | 1 veh | LOS B | 1 veh |
| **S. Royal Oaks Boulevard and Riverside Drive / Center Point Place** (signalized) | Northbound Left Turns | LOS A | 12 feet | LOS B | 59 feet |
| | Northbound Thrus | LOS B | 374 feet | LOS C | 538 feet |
| | Northbound Right Turns | LOS A | 31 feet | LOS A | 0 feet |
| | Southbound Left Turns | LOS E | 192 feet | LOS D | 112 feet |
| | Southbound Thrus/Right Turns | LOS A | 228 feet | LOS A | 351 feet |
| | Eastbound Left Turns | LOS D | 18 feet | LOS F | 217 feet |
| | Eastbound Thrus/Right Turns | LOS D | 114 feet | LOS C | 170 feet |
| | Westbound Left Turns | LOS E | 60 feet | LOS D | 74 veh |
| | Westbound Thrus/Right Turns | LOS B | 24 feet | LOS D | 289 veh |
| | **Overall Intersection** | **LOS B** | | **LOS C** | |
| **Murfreesboro Road and Royal Oaks Boulevard** (signalized) | Eastbound Left Turns | LOS E | 93 feet | LOS E | 155 feet |
| | Eastbound Thrus / Right Turns | LOS D | 338 feet | LOS D | 369 feet |
| | Westbound Left Turns | LOS E | 435 feet | LOS F | 521 feet |
| | Westbound Thrus | LOS D | 554 feet | LOS D | 521 feet |
| | Westbound Right Turns | LOS A | 109 feet | LOS B | 130 feet |
| | Northbound Left Turns | LOS D | 78 feet | LOS E | 109 feet |
| | Northbound Thrus | LOS D | 153 feet | LOS E | 236 feet |
| | Northbound Right Turns | LOS D | 655 feet | LOS D | 692 feet |
| | Southbound Left Turns | LOS E | 159 feet | LOS F | 272 feet |

| | | | | | |
|---|---|---|---|---|---|
| | Southbound Thrus / Right Turns | LOS D | 159 feet | LOS E | 465 feet |
| | **Overall Intersection** | **LOS D** | | **LOS E** | |
| **Murfreesboro Road and Ramps for Southbound I-65** (signalized) | Eastbound Thrus | LOS C | 388 feet | LOS E | 672 feet |
| | Eastbound Right Turns | LOS A | 50 feet | LOS C | 295 feet |
| | Westbound Left Turns | LOS E | 163 feet | LOS F | 520 feet |
| | Westbound Thrus | LOS B | 294 feet | LOS C | 407 feet |
| | Southbound Left Turns | LOS D | 178 feet | LOS D | 515 feet |
| | Southbound Right Turns | LOS F | 738 feet | LOS F | 1235 feet |
| | **Overall Intersection** | **LOS D** | | **LOS F** | |
| **Murfreesboro Road and Ramps for Northbound I-65** (signalized) | Eastbound Left Turns | LOS F | 1028 feet | LOS E | 340 feet |
| | Eastbound Thrus | LOS A | 76 feet | LOS C | 518 feet |
| | Westbound Thrus | LOS D | 372 feet | LOS C | 467 feet |
| | Westbound Right Turns | LOS C | 573 feet | LOS B | 311 feet |
| | Northbound Left Turns | LOS F | 337 feet | LOS E | 218 feet |
| | Northbound Right Turns | LOS D | 341 feet | LOS D | 190 feet |
| | **Overall Intersection** | **LOS F** | | **LOS C** | |

# 5. IMPACTS OF PROPOSED DEVELOPMENT

## 5.1 TRIP GENERATION

Trip generation calculations were conducted in order to identify how much traffic will be generated by the proposed project. Trip generation data for daily and peak hour trips were identified from Trip Generation, Ninth Edition, which was published by the Institute of Transportation Engineers (ITE) in 2012. Table 6A presents the daily and peak hour trip generations for proposed townhomes, and these calculations are included in Appendix D.

**TABLE 6A. TRIP GENERATION FOR THE PROPOSED PROJECT**

| LAND USE | SIZE | DAILY TRAFFIC | GENERATED TRAFFIC | | | |
|---|---|---|---|---|---|---|
| | | | AM PEAK HOUR | | PM PEAK HOUR | |
| | | | ENTER | EXIT | ENTER | EXIT |
| Multi-Family (LUC 220) **South Site** | 98 units | 652 | 10 | 40 | 39 | 21 |
| Multi-Family (LUC 220) **North Site** | 204 units | 1,356 | 21 | 83 | 82 | 44 |
| **TOTAL** | **302 units** | **2,008** | **31** | **123** | **121** | **65** |
| Future Commercial Development | 15,000 sq.ft. | 664 | 49 | 53 | 18 | 23 |

Also, trip generation calculations were conducted in order to identify how much traffic might be generated by office and retail land uses that could be developed on the project sites instead of multi-family residential. For purposes of these analyses, two land use scenarios were considered:

1. **40,000 sq.ft.** office space on the southern project site and **100,000 sq.ft** of office space on the northern project site

2. **30,000 sq.ft.** retail space on the southern project site and **60,000 sq.ft** of retail space on the northern project site

Table 6B presents the daily and peak hour trip generations for these alternative land uses.

## TABLE 6B. TRIP GENERATION FOR ALTERNATIVE LAND USES

| LAND USE | SIZE | DAILY TRAFFIC | GENERATED TRAFFIC | | | |
|---|---|---|---|---|---|---|
| | | | AM PEAK HOUR | | PM PEAK HOUR | |
| | | | ENTER | EXIT | ENTER | EXIT |
| Office (LUC 710) | 140,000 sq.ft. | 1,696 | 220 | 30 | 40 | 195 |
| Retail (LUC 820) | 90,000 sq.ft. | 6,342 | 91 | 56 | 268 | 290 |

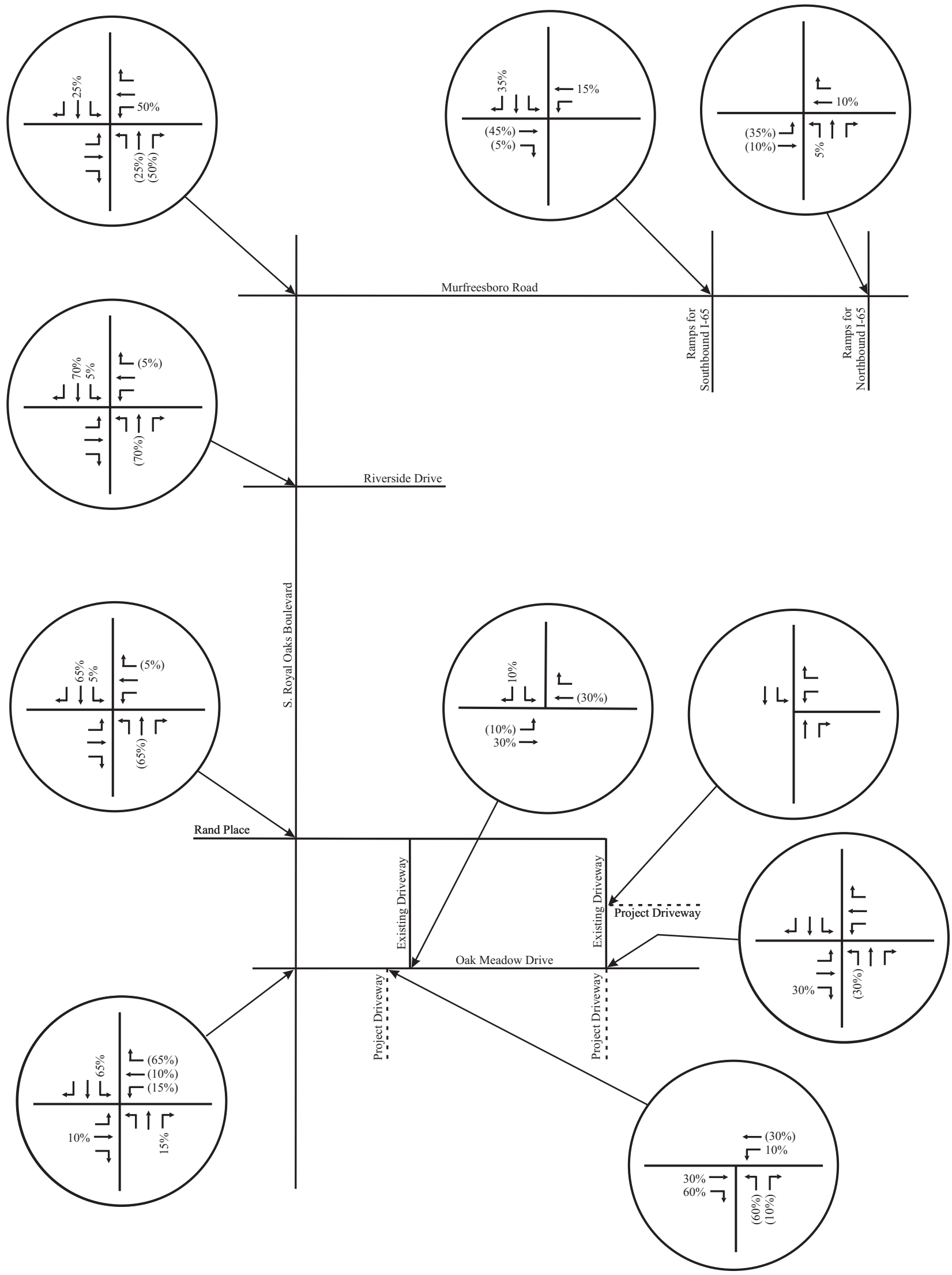
## 5.2 TRIP DISTRIBUTION AND TRAFFIC ASSIGNMENT

For the purposes of this study, it was estimated that the trips generated by the proposed project and the future commercial development will access the project site according to the directional distribution shown in Figures 6A, 6B, and 6C. It is important to note that these directional distributions were prepared with input and approval from the City of Franklin Engineering Department and their third-party private consultant, Neel-Schaffer, Inc. The development of these distributions was based on the following factors:

- existing land use characteristics,
- the directions of approach of the existing traffic,
- the access proposed for the project, and
- the locations of population centers in the area.

The peak hour trip generations and directional distributions were used to add the site-generated trips to the roadway system. Figures 7A, 7B, 7C, and 7D include the peak hour traffic volumes that are expected to be generated by the proposed project and the future commercial development.

F i s c h b a c h
Transportation Group, LLC
Traffic Engineering and Planning

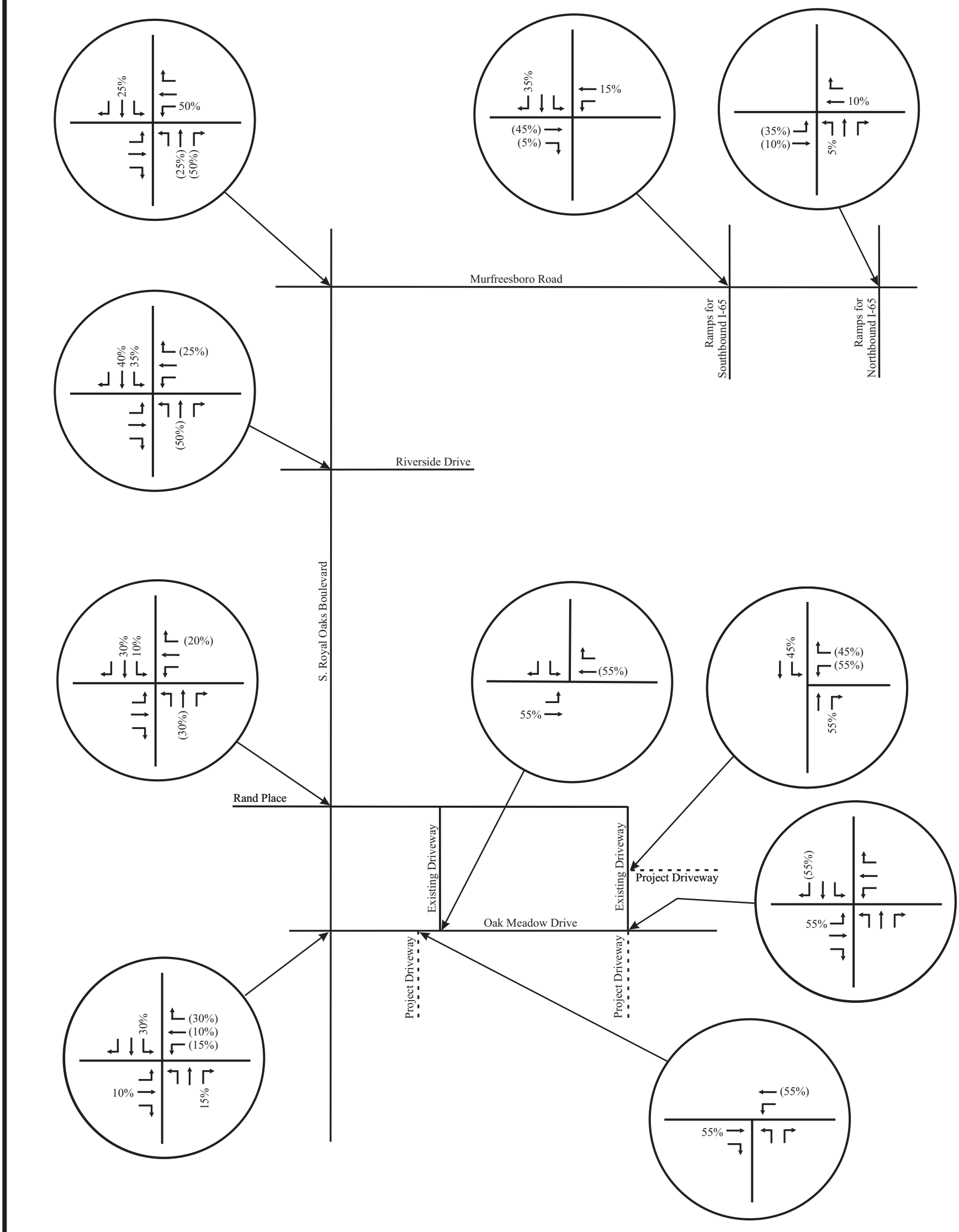



**No Scale**

XX - Entering Volumes
(XX) - Exiting Volumes

**Figure 6A.**
**Directional Distribution of Peak Hour Traffic Volumes Generated by the Proposed Apartments (Southern Site)**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning

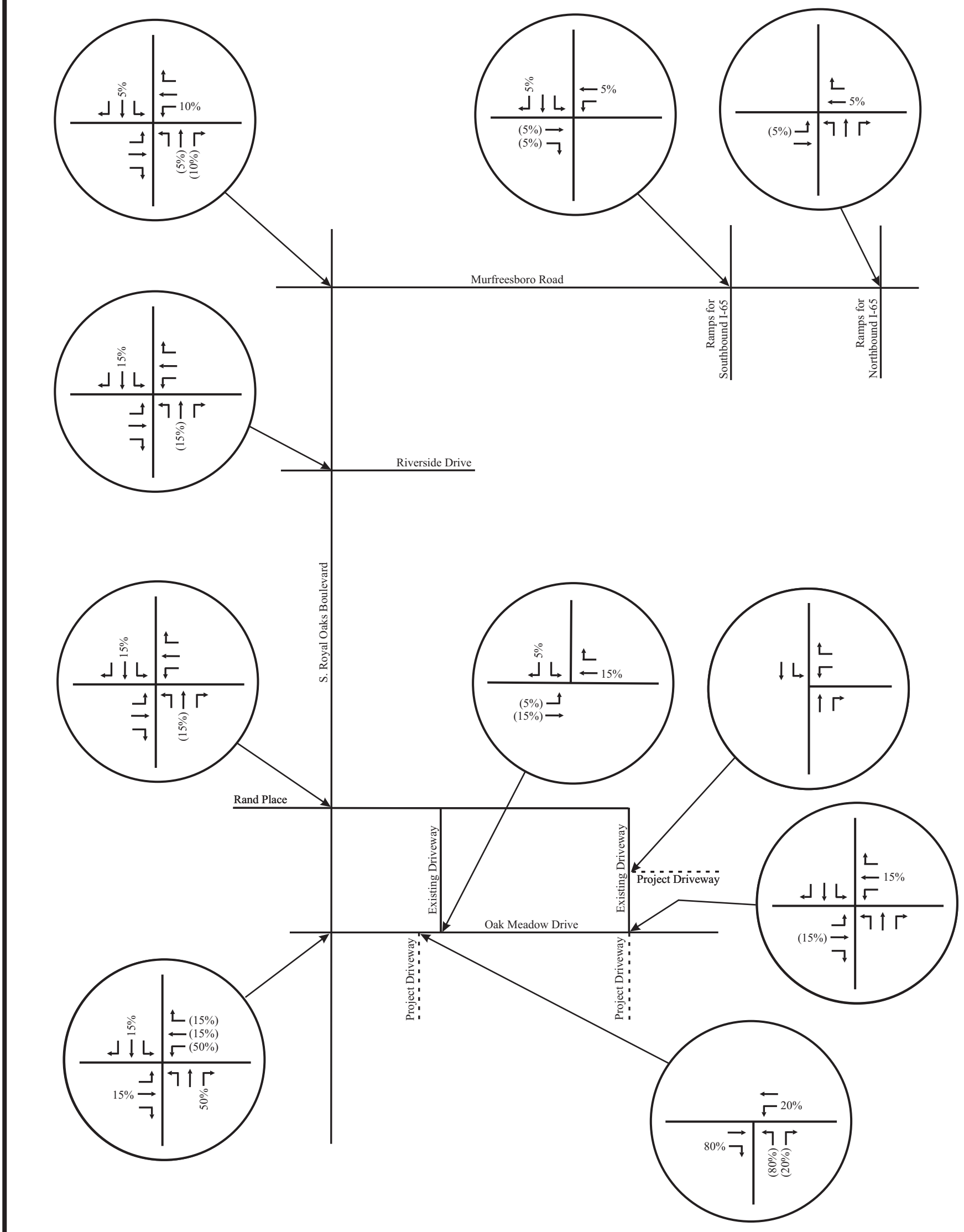



**No Scale**

XX - Entering Volumes
(XX) - Exiting Volumes

**Figure 6B.**
**Directional Distribution of Peak Hour Traffic Volumes Generated by the Proposed Apartments (Northern Site)**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning

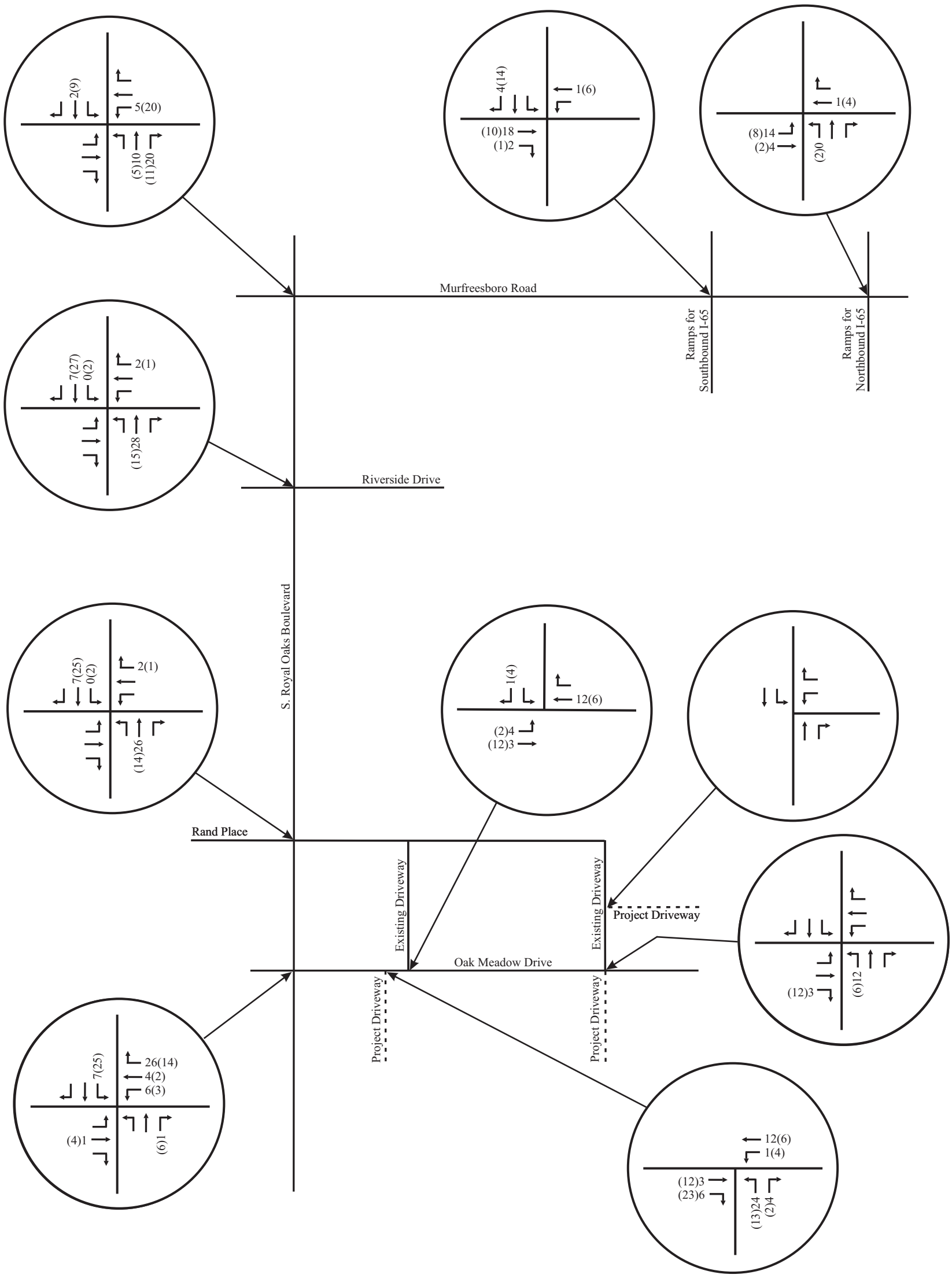



**No Scale**

XX - Entering Volumes
(XX) - Exiting Volumes

**Figure 6C.**
**Directional Distribution of Peak Hour Traffic Volumes Generated by the Future Retail Center**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning




**No Scale**

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

**Figure 7A.**
**Peak Hour Traffic Volumes Generated by the Proposed Apartments (Southern Site)**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning

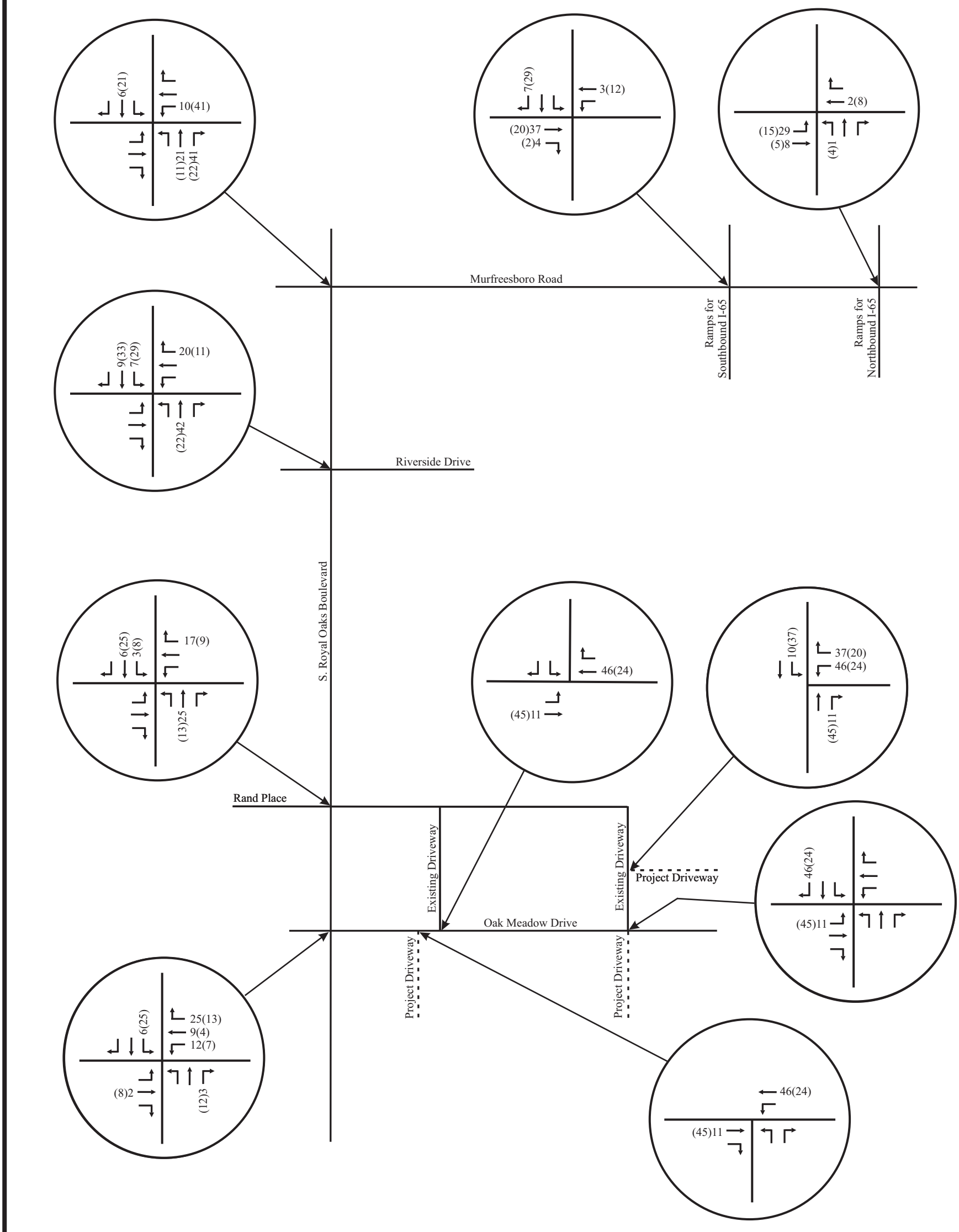
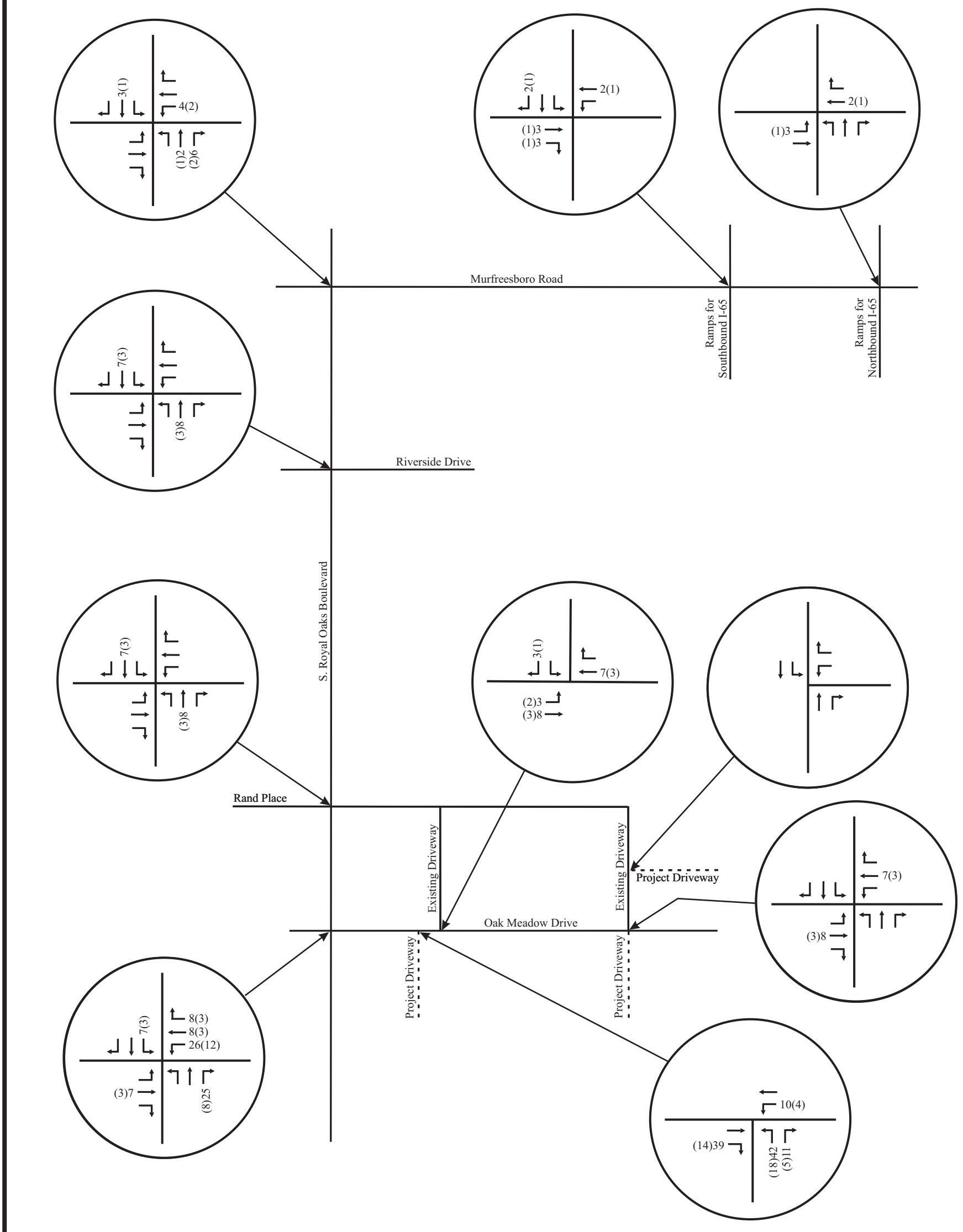



**Figure 7B.**
**Peak Hour Traffic Volumes Generated by the Proposed Apartments (Northern Site)**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning



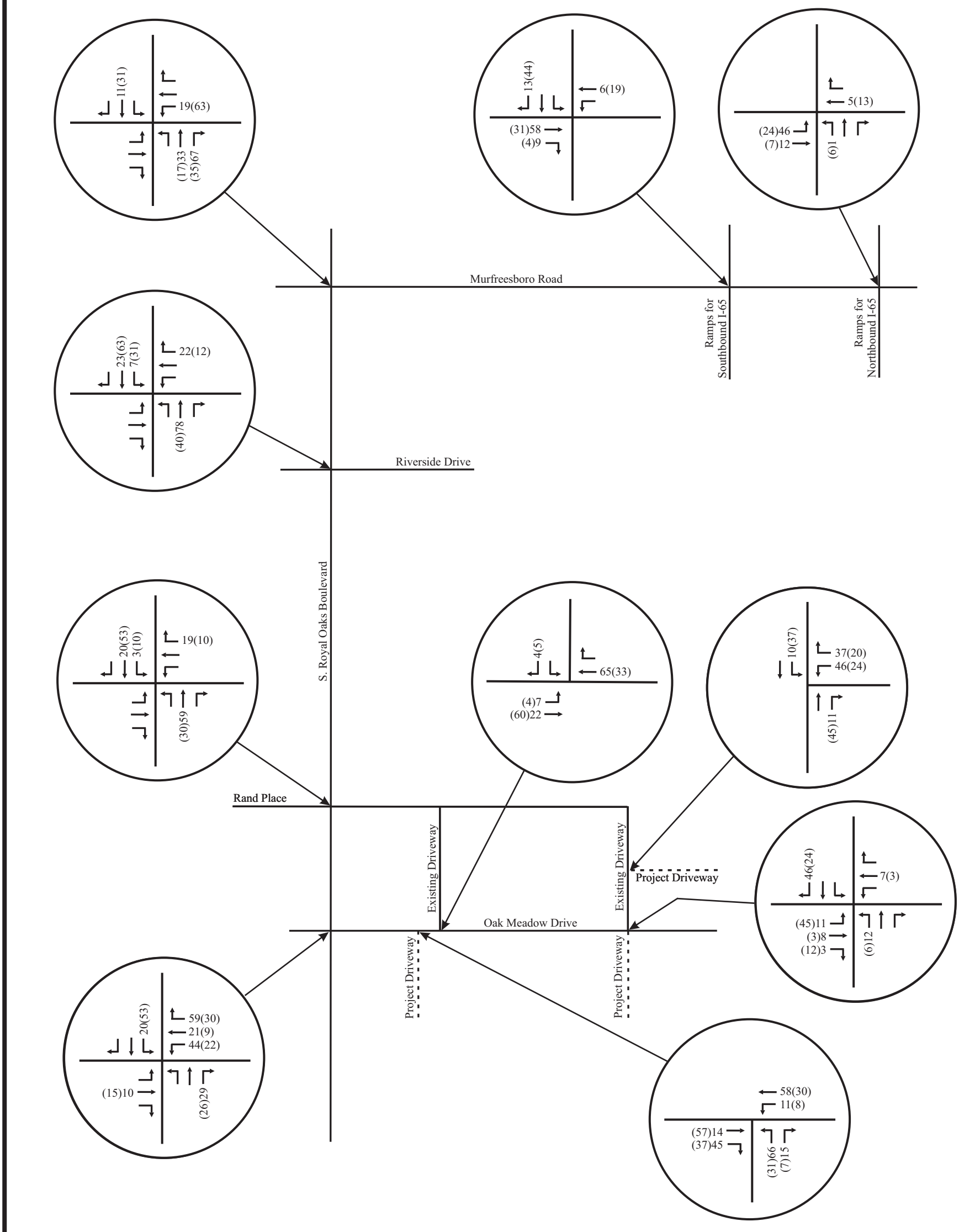

N

**No Scale**

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

**Figure 7C.**
**Peak Hour Traffic Volumes Generated by the Future Retail Center**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning




**No Scale**

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

**Figure 7D.**
**Total Peak Hour Traffic Volumes Generated by the Proposed Apartments (Total Both Sites) and Future Retail**

## 5.3 CAPACITY ANALYSES

In order to identify the projected peak hour traffic volumes at the completion of the proposed project, the trips generated by the project were added to the background peak hour traffic volumes. The resulting peak hour volumes are shown in Figure 8.

Using the total projected peak hour traffic volumes, capacity analyses were conducted in order to determine the impact of the project on the roadway system. Specifically, these capacity analyses were used to evaluate the need for roadway and traffic control improvements within the study area. For these analyses, the following assumptions were made:

- All existing laneage and traffic control will be maintained and no improvements will be provided.

- Each of the project accesses on Oak Meadow Drive will be constructed to include one entering lane and one exiting lane.

- The access on S. Royal Oaks Boulevard for the future commercial project will be constructed to include one entering lane and two exiting lanes, striped as a separate left turn lane and a shared through/right turn lane.

The results of the capacity analyses for the total projected peak hour traffic volumes are shown in Table 7, and Appendix C includes the capacity analyses worksheets. These analyses indicate that the total projected conditions with full build-out of the project are consistent with the existing and background conditions within the study area.

Also, additional analyses were conducted in order to identify how well the intersection of S. Royal Oaks Boulevard and Riverside Drive / Center Point Place would operate if the traffic signal were modified to include protected signal phases for eastbound and westbound motorists. The results of these analyses are shown in Table 7, and Appendix C includes the capacity analyses worksheets. As shown, the additional signal phases would marginally reduce the level of service at this intersection during the PM peak hour.

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning

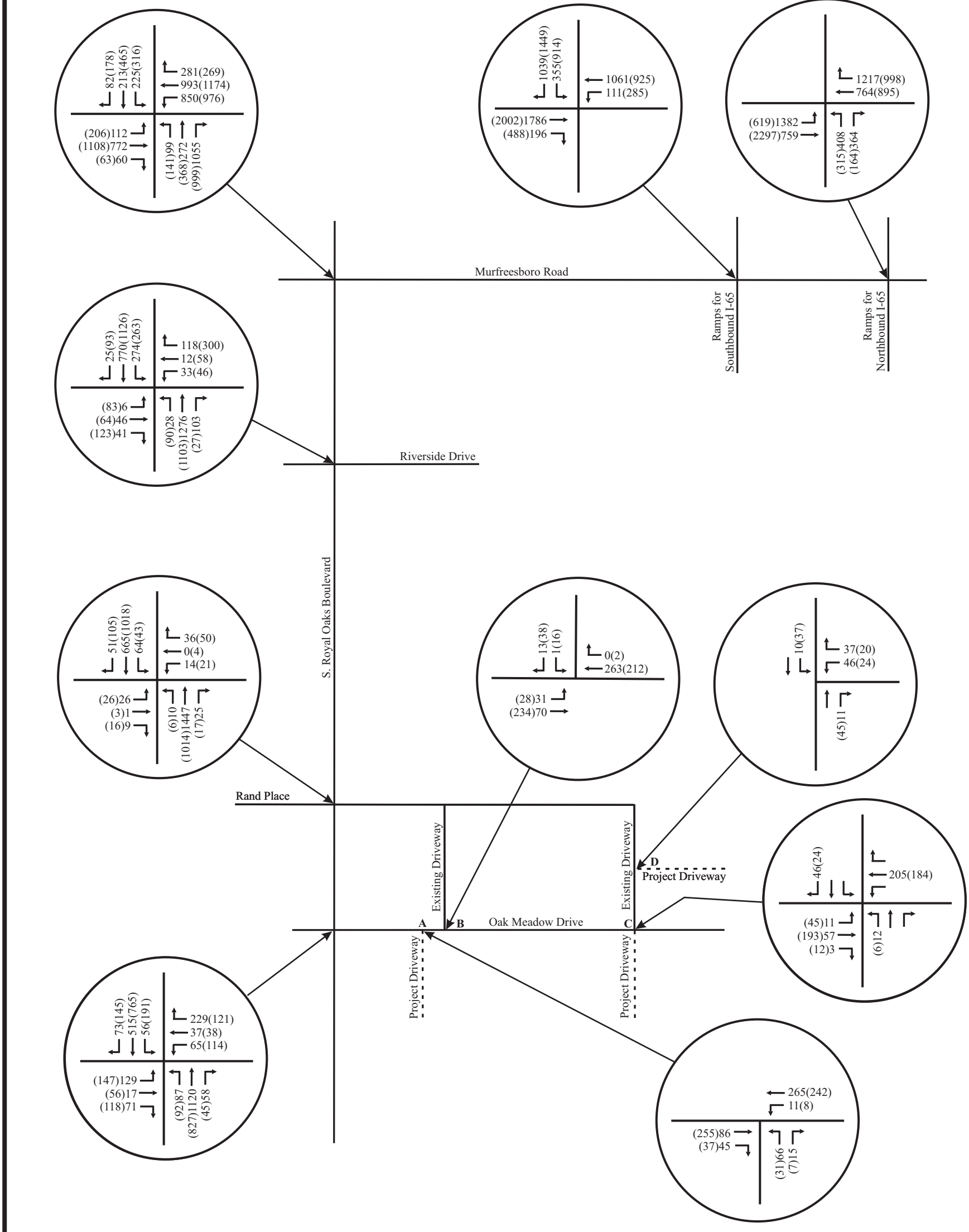



**Figure 8.**
**Total Projected Peak Hour Traffic Volumes at the Completion of the Proposed Apartments and Future Retail**

## TABLE 7. PROJECTED PEAK HOUR LEVELS OF SERVICE

| INTERSECTION | TURNING MOVEMENT | AM PEAK HOUR | | PM PEAK HOUR | |
|---|---|---|---|---|---|
| | | LEVEL OF SERVICE | 95TH %-ILE QUEUE | LEVEL OF SERVICE | 95TH %-ILE QUEUE |
| **A - Oak Meadow Drive and the Western Access for the Apartments / Retail** | Westbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Northbound Left and Right Turns | LOS B | 1 veh | LOS B | 1 veh |
| **B - Oak Meadow Drive and the Western Access for Home Depot** | Eastbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Southbound Left and Right Turns | LOS B | 1 veh | LOS B | 1 veh |
| **C - Oak Meadow Drive and the Eastern Access for Home Depot / Apartments** | Eastbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Westbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Northbound Left/Thru/Right Turns | LOS B | 1 veh | LOS B | 1 veh |
| | Southbound Left/Thru/Right Turns | LOS A | 1 veh | LOS A | 1 veh |
| **D - Eastern Access for Home Depot / Access for Northern Apartments** | Southbound Left Turns / Thrus | LOS A | 1 veh | LOS A | 1 veh |
| | Westbound Left and Right Turns | LOS A | 1 veh | LOS A | 1 veh |
| **S. Royal Oaks Boulevard and Oak Meadow Drive** (signalized) | Northbound Left Turns | LOS A | 37 feet | LOS C | 70 feet |
| | Northbound Thrus | LOS B | 362 feet | LOS C | 328 feet |
| | Northbound Right Turns | LOS A | 0 feet | LOS A | 0 feet |
| | Southbound Left Turns | LOS A | 26 feet | LOS C | 116 feet |
| | Southbound Thrus/Right Turns | LOS B | 152 feet | LOS C | 447 feet |
| | Eastbound Left Turns | LOS D | 124 feet | LOS C | 135 feet |
| | Eastbound Thrus/Right Turns | LOS B | 22 feet | LOS D | 108 feet |
| | Westbound Left Turns | LOS C | 69 feet | LOS D | 105 feet |
| | Westbound | LOS D | 48 feet | LOS D | 49 feet |

| | | | | | |
|---|---|---|---|---|---|
| | Thrus | | | | |
| | Westbound Right Turns | LOS C | 161 feet | LOS A | 40 feet |
| | **Overall Intersection** | **LOS B** | | **LOS C** | |
| **S. Royal Oaks Boulevard and Rand Place / Home Depot Access** | Northbound Left Turns | LOS A | 1 veh | LOS B | 1 veh |
| | Southbound Left Turns | LOS B | 1 veh | LOS B | 1 veh |
| | Eastbound Left Turns | LOS D | 1 veh | LOS E | 1 veh |
| | Eastbound Thrus/Right Turns | LOS B | 1 veh | LOS C | 1 veh |
| | Westbound Left Turns | LOS E | 1 veh | LOS D | 1 veh |
| | Westbound Thrus/Right Turns | LOS C | 1 veh | LOS B | 1 veh |
| **S. Royal Oaks Boulevard and Riverside Drive / Center Point Place** (signalized) | Northbound Left Turns | LOS A | 12 feet | LOS C | 59 feet |
| | Northbound Thrus | LOS B | 414 feet | LOS C | 567 feet |
| | Northbound Right Turns | LOS A | 31 feet | LOS A | 0 feet |
| | Southbound Left Turns | LOS F | 181 feet | LOS D | 133 feet |
| | Southbound Thrus/Right Turns | LOS A | 343 feet | LOS B | 599 feet |
| | Eastbound Left Turns | LOS E | 18 feet | LOS F | 217 feet |
| | Eastbound Thrus/Right Turns | LOS D | 114 feet | LOS C | 176 feet |
| | Westbound Left Turns | LOS E | 60 feet | LOS D | 74 veh |
| | Westbound Thrus/Right Turns | LOS B | 21 feet | LOS D | 300 veh |
| | **Overall Intersection** | **LOS C** | | **LOS C** | |
| **S. Royal Oaks Boulevard and Riverside Drive / Center Point Place** (signalized and with protected left turn signal | Northbound Left Turns | LOS A | 19 feet | LOS C | 70 feet |
| | Northbound Thrus | LOS B | 571 feet | LOS D | 636 feet |
| | Northbound | LOS A | 31 feet | LOS A | 0 feet |

| | | | | | |
|---|---|---|---|---|---|
| phases for eastbound and westbound motorists) | Right Turns | | | | |
| | Southbound Left Turns | LOS F | 405 feet | LOS F | 334 feet |
| | Southbound Thrus/Right Turns | LOS B | 262 feet | LOS C | 671 feet |
| | Eastbound Left Turns | LOS D | 14 feet | LOS D | 110 feet |
| | Eastbound Thrus/Right Turns | LOS E | 105 feet | LOS D | 181 feet |
| | Westbound Left Turns | LOS D | 52 feet | LOS D | 65 veh |
| | Westbound Thrus/Right Turns | LOS B | 21 feet | LOS D | 340 veh |
| | **Overall Intersection** | **LOS C** | | **LOS D** | |
| **Murfreesboro Road and Royal Oaks Boulevard** (signalized) | Eastbound Left Turns | LOS E | 93 feet | LOS E | 155 feet |
| | Eastbound Thrus / Right Turns | LOS D | 338 feet | LOS D | 368 feet |
| | Westbound Left Turns | LOS E | 446 feet | LOS F | 567 feet |
| | Westbound Thrus | LOS D | 544 feet | LOS D | 517 feet |
| | Westbound Right Turns | LOS A | 122 feet | LOS B | 125 feet |
| | Northbound Left Turns | LOS D | 76 feet | LOS E | 105 feet |
| | Northbound Thrus | LOS D | 174 feet | LOS E | 249 feet |
| | Northbound Right Turns | LOS D | 696 feet | LOS D | 716 feet |
| | Southbound Left Turns | LOS E | 159 feet | LOS F | 272 feet |
| | Southbound Thrus / Right Turns | LOS D | 167 feet | LOS F | 505 feet |
| | **Overall Intersection** | **LOS D** | | **LOS F** | |
| **Murfreesboro Road and Ramps for Southbound I-65** (signalized) | Eastbound Thrus | LOS C | 406 feet | LOS E | 692 feet |
| | Eastbound Right Turns | LOS A | 47 feet | LOS C | 295 feet |
| | Westbound | LOS E | 164 feet | LOS F | 521 feet |

| | | | | | |
|---|---|---|---|---|---|
| | Left Turns | | | | |
| | Westbound Thrus | LOS B | 297 feet | LOS C | 430 feet |
| | Southbound Left Turns | LOS D | 178 feet | LOS D | 515 feet |
| | Southbound Right Turns | LOS F | 754 feet | LOS F | 1297 feet |
| | **Overall Intersection** | **LOS D** | | **LOS F** | |
| **Murfreesboro Road and Ramps for Northbound I-65** (signalized) | Eastbound Left Turns | LOS F | 1078 feet | LOS E | 344 feet |
| | Eastbound Thrus | LOS A | 75 feet | LOS C | 499 feet |
| | Westbound Thrus | LOS D | 375 feet | LOS C | 485 feet |
| | Westbound Right Turns | LOS C | 573 feet | LOS B | 327 feet |
| | Northbound Left Turns | LOS F | 338 feet | LOS E | 222 feet |
| | Northbound Right Turns | LOS E | 351 feet | LOS D | 190 feet |
| | **Overall Intersection** | **LOS F** | | **LOS D** | |

## 5.4 CAPACITY ANALYSIS COMPARISON

The results of the capacity analyses for the existing, background, and total projected peak hour traffic volumes are included in Tables 8 and 9 for comparison purposes. Also, the levels of service that worsen from background conditions to total projected conditions with the proposed project are highlighted in red. Finally, additional analyses were conducted in order to identify how well the intersections within the study area would operate if a third northbound through lane were provided on S. Royal Oaks between Oak Meadow Drive and Murfreesboro Road. Specifically, for these analyses, the northbound right turn lanes at Oak Meadow Drive, Rand Place, and Riverside Drive were converted to shared through/right turn lanes. Also, the analyses included the modification of the existing traffic signal at the intersection of S. Royal Oaks Boulevard and Riverside Drive / Center Point Place to include protected signal phases for eastbound and westbound motorists. The results of these additional analyses are shown in Tables 8 and 9. These comparisons and analyses that reveal poor levels of service are described below:

**S. Royal Oaks Boulevard and Oak Meadow Drive**
This intersection operates at LOS B during the AM peak hour and LOS C during the PM peak hour under existing, background, and total projected conditions.

**S. Royal Oaks Boulevard and Riverside Drive / Center Point Place**
This intersection operates at LOS B during the AM peak hour and LOS C during the PM peak hour under existing and background conditions. With the proposed project, this intersection will operate at LOS C during both peak hours. Also, if the existing traffic signal were modified to include protected signal phases for eastbound and westbound motorists, this intersection would operate at LOS C during the AM peak hour and LOS D during the PM peak hour.

**Murfreesboro Road and Royal Oaks Boulevard**
This intersection operates poorly during the PM peak hour under existing, background, and total projected conditions. Specifically, the traffic volumes for the eastbound throughs, westbound throughs, westbound left turns, and northbound right turns are all approximately equal during both peak hours. Although some of these turning movements can operate during the same signal phases, the total time needed to serve all of the turning movements is significantly high. These conditions will persist unless the Murfreesboro Road corridor is widened to include three travel lanes in each direction.

**Murfreesboro Road and the Ramps for Southbound I-65**
This intersection operates poorly during the PM peak hour under existing, background, and total projected conditions. Specifically, the traffic volumes for the eastbound throughs, westbound throughs, and southbound right turns are all significantly high during both peak hours, and the traffic volume for the southbound left turns are significantly high during the PM peak hour. Although some of these turning movements can operate during the same signal phases, the total time needed to serve all of the turning movements is significantly high. These conditions will persist unless the Murfreesboro Road corridor is widened to include three travel lanes in each direction.

**Murfreesboro Road and the Ramps for Northbound I-65**

This intersection operates poorly during the AM peak hour under existing, background, and total projected conditions. Specifically, the traffic volumes for the eastbound left turns and westbound right turns are significantly high during the AM peak hour, and the traffic volumes for the eastbound throughs and westbound right turns are significantly high during the PM peak hour. These turning movements cannot operate during the same signal phases, and the total time needed to serve all of the turning movements is significantly high. These conditions will persist unless the Murfreesboro Road corridor is widened to include three travel lanes in each direction.

## TABLE 8. COMPARISON OF AM PEAK HOUR LEVELS OF SERVICE

| INTERSECTION | TURNING MOVEMENT | LEVELS OF SERVICE | | | |
|---|---|---|---|---|---|
| | | EXISTING CONDITIONS | BACKGROUND CONDITIONS | TOTAL PROJECTED CONDITIONS | WITH THIRD NORTHBOUND TRAVEL LANE |
| S. Royal Oaks Boulevard and Oak Meadow Drive | Overall Intersection | LOS B (13.9 sec/veh) | LOS B (15.4 sec/veh) | LOS B (17.6 sec/veh) | LOS B (16.0 sec/veh) |
| S. Royal Oaks Boulevard and Riverside Drive / Center Point Place | Overall Intersection | LOS B (14.0 sec/veh) | **LOS B** (17.3 sec/veh) | **LOS C** (20.5 sec/veh) | LOS C (30.8 sec/veh) |
| Murfreesboro Road and Royal Oaks Boulevard | Overall Intersection | LOS D (42.0 sec/veh) | LOS D (44.9 sec/veh) | LOS D (46.1 sec/veh) | LOS D (44.4 sec/veh) |
| Murfreesboro Road and Ramps for Southbound I-65 | Overall Intersection | LOS C (31.7 sec/veh) | LOS D (39.6 sec/veh) | LOS D (41.2 sec/veh) | LOS D (41.6 sec/veh) |
| Murfreesboro Road and Ramps for Northbound I-65 | Overall Intersection | LOS E (64.7 sec/veh) | LOS F (81.2 sec/veh) | LOS F (87.9 sec/veh) | LOS F (87.9 sec/veh) |

## TABLE 9. COMPARISON OF PM PEAK HOUR LEVELS OF SERVICE

| INTERSECTION | TURNING MOVEMENT | LEVELS OF SERVICE | | | |
|---|---|---|---|---|---|
| | | EXISTING CONDITIONS | BACKGROUND CONDITIONS | TOTAL PROJECTED CONDITIONS | WITH THIRD NORTHBOUND TRAVEL LANE |
| S. Royal Oaks Boulevard and Oak Meadow Drive | Overall Intersection | LOS C (21.9 sec/veh) | LOS C (25.3 sec/veh) | LOS C (28.1 sec/veh) | LOS C (26.9 sec/veh) |
| S. Royal Oaks Boulevard and Riverside Drive / Center Point Place | Overall Intersection | LOS C (27.4 sec/veh) | LOS C (29.0 sec/veh) | **LOS C** (31.3 sec/veh) | **LOS D** (36.8 sec/veh) |
| Murfreesboro Road and Royal Oaks Boulevard | Overall Intersection | LOS E (61.2 sec/veh) | **LOS E** (72.3 sec/veh) | **LOS F** (80.6 sec/veh) | LOS E (78.8 sec/veh) |
| Murfreesboro Road and Ramps for Southbound I-65 | Overall Intersection | LOS E (78.4 sec/veh) | LOS F (97.4 sec/veh) | LOS F (103.7 sec/veh) | LOS F (103.9 sec/veh) |
| Murfreesboro Road and Ramps for Northbound I-65 | Overall Intersection | LOS C (29.5 sec/veh) | **LOS C** (34.2 sec/veh) | **LOS D** (35.1 sec/veh) | LOS D (35.1 sec/veh) |

# 6. CONCLUSIONS AND RECOMMENDATIONS

The analyses presented in this study indicate the following information for the intersections that provide direct access to the project sites:

**Oak Meadow Drive and the Western Project Access**
At this intersection, the new project access should be constructed to include one entering lane and one exiting lane, and a stop sign should be installed on the northbound approach of the new access. The capacity analyses indicate that all of the vehicle queues and vehicle delays at this intersection will be very low.

The existing center turn lane on Oak Meadow Drive should be restriped to provide a dedicated westbound left turn lane with 50 feet of storage for motorists turning onto the project access.

In order to identify the sight distances that will be available at the project access, sight triangles should be provided in conjunction with construction documents for the proposed project. These sight triangles should be developed based on guidelines that are included in A Policy on Geometric Design of Highways and Streets, which is published by the American Association of State Highway and Transportation Officials (AASHTO) and commonly known as The Green Book. Specifically, The Green Book indicates that for a speed of 40 mph, the minimum stopping sight distance is 305 feet. This is the distance that a motorist on Oak Meadow Drive needs to come to a stop if a vehicle turning from the project access creates a conflict. Also, based on The Green Book, the minimum intersection sight distance is 445 feet. This is the distance that a motorist exiting the project access needs to safely complete turns onto Oak Meadow Drive.

**Oak Meadow Drive and the Western Home Depot Access**
The capacity analyses indicate that all of the vehicle queues and vehicle delays at this intersection will remain very low. However, double yellow pavement markings should be provided on the Home Depot access in order to delineate travel lanes. Also, the existing center turn lane on Oak Meadow Drive should be restriped to provide a dedicated eastbound left turn lane with 50 feet of storage for motorists turning onto the Home Depot access.

**Oak Meadow Drive and the Eastern Project Access / Home Depot Access**
At this intersection, the new project access should be constructed to include one entering lane and one exiting lane, and a stop sign should be installed on the northbound approach of the new access. The capacity analyses indicate that all of the vehicle queues and vehicle delays at this intersection will be very low.

At the completion of the proposed project, the existing double yellow pavement markings on the Home Depot access should be reapplied in order to delineate travel lanes. The existing center turn lane on Oak Meadow Drive should be restriped to provide a dedicated eastbound and westbound left turn lanes for motorists turning onto the Home Depot access and the project access. Each of these turn lanes should include at least 50 feet of storage.

In order to identify the sight distances that will be available at the project access, sight triangles should be provided in conjunction with construction documents for the proposed project. These sight triangles should be developed based on guidelines that are included in A Policy on Geometric Design of Highways and Streets, which is published by the American Association of State Highway and Transportation Officials (AASHTO) and commonly known as The Green Book. Specifically, The Green Book indicates that for a speed of 40 mph, the minimum stopping sight distance is 305 feet. This is the distance that a motorist on Oak Meadow Drive needs to come to a stop if a vehicle turning from the project access creates a conflict. Also, based on The Green Book, the minimum intersection sight distance is 445 feet. This is the distance that a motorist exiting the project access needs to safely complete turns onto Oak Meadow Drive.

Also, sight distance should be maximized for northbound/westbound motorists on Oak Meadow Drive by removing foliage and vegetation from the south side of Oak Meadow Drive.

**Eastern Home Depot Access and the Project Access for the Northern Apartments**

At this intersection, the new project access should be constructed to include one entering lane and one exiting lane, and a stop sign should be installed on the westbound approach of the new access. The capacity analyses indicate that all of the vehicle queues and vehicle delays at this intersection will be very low. At the completion of the proposed project, the existing double yellow pavement markings on the Home Depot access should be reapplied in order to delineate travel lanes.

**S. Royal Oaks Boulevard and Oak Meadow Drive**

The capacity analyses indicate that all of the turning movements at this intersection will operate at acceptable levels of service. Also, the existing lengths of the turn lanes are adequate to accommodate the total projected traffic volumes with the completion of the proposed project. Finally, it is important to note that the westbound approach of Oak Meadow Drive already includes separate left, through, and right turn lanes at the intersection with S. Royal Oaks Boulevard, and the existing traffic signal already includes a right turn overlap signal phase for westbound motorists. Therefore, there are no additional dedicated turn lanes or traffic control modifications that can be provided at this location. Field observations and traffic counts confirm that the northbound and southbound through volumes are significant, particularly the northbound through movement during the AM peak hour. However, the proposed project will have a minimal impact on these conditions.

**S. Royal Oaks Boulevard and Rand Place / Access for Home Depot**

The capacity analyses indicate that all of the critical turning movements at this unsignalized intersection will operate at acceptable levels of service. Also, the existing lengths of the turn lanes are adequate to accommodate the total projected traffic volumes with the completion of the proposed project. Field observations and traffic counts confirm that the northbound and southbound through volumes are significant, particularly the northbound through movement during the AM peak hour. In addition, the field observations and traffic counts confirm that the eastbound and westbound left turn volumes are relatively low, presumably because left turns are challenging when the northbound and southbound through volumes are high. Finally, the

eastbound and westbound motorists have access to the existing traffic signal at Oak Meadow Drive. It is important to note that proposed project will have a minimal impact on these conditions. Also, it is important to note that this intersection is not an appropriate location for a traffic signal installation because of its proximity to the existing traffic signal at Oak Meadow Drive.

At the completion of the proposed project, the existing pavement markings on the Home Depot access should be reapplied in order to delineate travel lanes. At that time, consideration should be given to restriping the westbound travel lanes in order to provide a shared left turn / through lane and a separate right turn lane. This modification would reduce delays for the westbound right turns, which occur approximately twice as frequently as the westbound left turns.

**S. Royal Oaks Boulevard and Riverside Drive / Center Point Place**

The capacity analyses indicate that several turning movements at this intersection will operate at LOS C or better during both peak hours under existing, background, and total projected conditions. If the existing traffic signal were modified to include protected signal phases for eastbound and westbound motorists, this intersection would operate at LOS C during the AM peak hour and LOS D during the PM peak hour. However, this modification would reduce the potential for vehicle conflicts for eastbound and westbound motorists.

Also, it is important to note that the analyses indicate that providing a third northbound through lane on S. Royal Oaks Boulevard would not significantly reduce delays at this intersection.

**Access for the Future Retail Site**

Currently, the future retail parcel is not included in the site plan for the proposed apartments. Since building sizes, land uses, parking provisions, and driveways have not be established for this future development, no recommendations are made for the number and location of driveways or the laneage and traffic control that will be needed at the intersections that will provide access to the future retail development.

**APPENDIX A**
**TRAFFIC IMPACT STUDY SCOPE PROVIDED BY**
**THE CITY OF FRANKLIN AND NEEL-SCHAFFER, INC.**

Exhibit B

City of Franklin
Engineering Department

# APPLICATION FORM
# REQUEST FOR APPROVED TRANSPORTATION IMPACT ANALYSIS REPORT

**APPROVED**
**By Carl Baughman at 4:26 pm, Jan 28, 2016**

| | | | |
|---|---|---|---|
| Applicant Name: | Crunk Engineering . | Applicant Name: | Epoch Residential . |
| Address: | 1894 Gen. George Patton. | Address: | 359 Carolina Avenue . |
| | Franklin, TN 37067 . | | Winter Park, FL 32789 . |
| Phone #: | (615) 873-1795 . | Phone #: | (321) 316-6005 . |
| e-mail address: | adam@crunkeng.com . | e-mail address: | mccarley@epochresidential.com . |

## PROCESS OVERVIEW

A Transportation Impact Analysis shall be prepared by the Applicant's Consultant or the City's Traffic Consultant using the standard format specified by the Institute of Transportation Engineers in accordance with the following:

(i) The applicant shall submit a completed *Request for Transportation Impact Analysis Application Form* to the Engineering Department.

(ii) Scope of Services
   a. Following initial review of the application form, the Engineering Department shall prepare and submit a Scope of Services and schedule to the Applicant. If necessary a meeting will be scheduled to review and discuss the Scope of Services in detail.
   b. Following approval the applicant will pay the City 90% of the estimated cost of the traffic impact study. At the completion of the study the City shall reimburse the applicant all remaining fees.

(iii) Transportation impact analyses shall be prepared utilizing traffic data that are consistent with:
   a. The land use and density data as referenced in the most current edition of Trip Generation, published by the Institute of Transportation Engineers;
   b. Current city and state traffic counts for surrounding streets;
   c. Any additional traffic counts performed as a part of preparing the study.

## Attachment A

City of Franklin Review Process for Transportation Impact Analysis

**Step 1 – Preliminary discussion with Consultant/Developer on project description including site plan.**
**Step 2 – Scoping of Transportation Impact Analysis between the City of Franklin and Consultant/Developer.**
**Step 3 – Consultant, Traffic Engineer and Director of Engineering execute a MOU (Fees may apply per COF Ordinance 2015-64.**
**Step 4 – Consultant/Developer pays review fee and submits Transportation Impact Analysis.**
**Step 5 – City of Franklin prepares initial comments on the transportation impact analysis, if necessary.**

**Step 6 – Consultant submits corrections/revisions to the transportation impact analysis, if necessary.**
**Step 7 – City of Franklin prepares initial comments on proposed mitigation measures, if necessary**
**Step 8 – Consultant submits corrections/revisions on proposed mitigation measures, if necessary and electronic copy of the transportation impact analysis.**
**Step 9 – City of Franklin issues an assessment letter**

# Attachment B

Transportation Impact Analysis – Memorandum of Understanding (MOU)

This MOU acknowledges that the transportation impact analysis for the following project will be prepared in accordance with the latest version of City of Franklin Zoning Ordinance.

Project Name: Epoch Franklin .
Project Address: Oak Meadow Drive, east of S. Royal Oaks Boulevard .
Project Description: 352 apartments (240 units on north side, 112 apts on the south side) .

Attach a site map and a trip generation table with a description of the proposed land uses, ITE rates, estimated daily, morning, midday and afternoon peak hour volumes (ins/outs/totals), proposed trip credits, etc.

Project Buildout Year: 2018 Ambient or CMP Growth Rate: : 4 % Per Yr.

Study Intersections:

| | |
|---|---|
| 1. Oak Meadow Drive and Private Road for Home Depot / western project access | 9. Oak Meadow Drive and the eastern project accesses |
| 2. S. Royal Oaks Blvd and Oak Meadow Dr | 10. |
| 3. S. Royal Oaks Blvd and Center Point Pl / Riverside Dr | 11. |
| 4. Highway 96E and Royal Oaks Blvd (for data collection and signal timing purposes only) | 12. |
| 5. Highway 96E and Ramps for SB I-65(for data collection and signal timing purposes only) | 13. |
| 6. Highway 96E and Ramps for NB I-65(for data collection and signal timing purposes only) | 14. |

Trip Credits: (Exact amount of credit subject to approval by City of Franklin)

| | Yes | No |
|---|---|---|
| Transit Usage | | X |
| Existing Active Land Use | | X |
| Previous Land Use | | X |
| Internal Trip | | X |
| Pass-By Trip | | X |

Exhibit B

| | | | |
|---|---|---|---|
| Consultant: | FTG, LLC | Developer: | Epoch Residential |
| Address: | PO Box 682736 | Address: | 359 Carolina Avenue |
| | Franklin, TN 37068 | | Winter Park, FL 32789 |
| Phone #: | (615) 771-8022 | Phone #: | (321) 316-6005 |
| e-mail address: | Gillian@FTGtraffic.com | e-mail address: | mccarley@epochresidential.com |

Approved By: _____ _____

City of Franklin Traffic Engineer Director of Engineering

**Reason for Request:** (Planned Unit Development, Site Plan, Rezoning)

site plan

**Description of Proposed Project** (Address, Map/Parcel Number, etc.) (Attach a conceptual development plans showing all access points and adjacent streets.):

079 08800 00009079

079 10105 00109079

**Existing Land Use** (be specific):

undeveloped

**Proposed Land Use** (be specific):

240 apartments on 13.06 acres (north) and 112 apartments on 18.87 acres (south)

**Potential Development Yield** (number of residential units; building square footage, projected number of employees, hours of operations):

352 apartments

**As applicant, I agree to pay to the City of Franklin 90% of the entire cost of the Transportation Impact Analysis.**

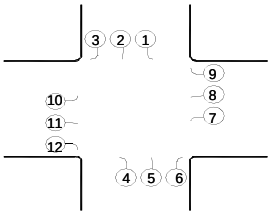
Property Owner Signature: _____

Property Owner Title: _____

Date: _____

The information above shall be submitted to the Engineering Department (109 3rd Ave South; Franklin, TN 37064) to review and provide estimated cost along with a proposed scope of services. All questions should be directed to Carl Baughman, Traffic Engineer III (615-791-3218).

**APPENDIX B**
**EXISTING TRAFFIC COUNTS**

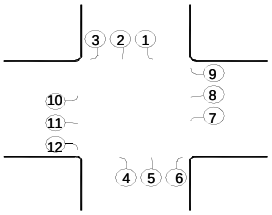



**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** Oak Meadow Dr and Eastern Home Depot Access
**DATE:** 23-Feb-16 Tue
**RECORDER:** FTG
**NOTES:** unsignalized

| LOCATION | S/B Home Depot Access | | | N/B | | | W/B Oak Meadow Dr | | | E/B Oak Meadow Dr | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TIME | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | |
| 6:30-6:45 | | | | | | | | 24 | | | 7 | | 209 | 31 |
| 6:45-7:00 | | | | | | | | **54** | | | **13** | | **228** | **67** |
| 7:00-7:15 | | | | | | | | **50** | | | **13** | | 209 | 63 |
| 7:15-7:30 | | | | | | | | **36** | | | **12** | | 189 | 48 |
| 7:30-7:45 | | | | | | | | **43** | | | **7** | | 179 | 50 |
| 7:45-8:00 | | | | | | | | 41 | | | 7 | | | 48 |
| 8:00-8:15 | | | | | | | | 33 | | | 10 | | | 43 |
| 8:15-8:30 | | | | | | | | 29 | | | 9 | | | 38 |
| | | | | | | | | | | | | | | |
| 4:30-4:45 | | | | | | | | **46** | | | **33** | | **344** | 79 |
| 4:45-5:00 | | | | | | | | **33** | | | **49** | | 336 | 82 |
| 5:00-5:15 | | | | | | | | **41** | | | **48** | | 346 | 89 |
| 5:15-5:30 | | | | | | | | **48** | | | **46** | | 329 | **94** |
| 5:30-5:45 | | | | | | | | 33 | | | 38 | | 309 | 71 |
| 5:45-6:00 | | | | | | | | 34 | | | 58 | | | 92 |
| 6:00-6:15 | | | | | | | | 25 | | | 47 | | | 72 |
| 6:15-6:30 | | | | | | | | 32 | | | 42 | | | 74 |
| **TOTAL** | | | | | | | | **602** | | | **439** | | | |
| **AM PK HR** | | | | | | | | 183 | | | 45 | | **6:45-7:45** | |
| **PM PK HR** | | | | | | | | 168 | | | 176 | | **4:30-5:30** | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | | | | | | | | 0.85 | | | 0.87 | | **0.85** |
| **PM PK PHF** | | | | | | | | 0.88 | | | 0.90 | | **0.91** |

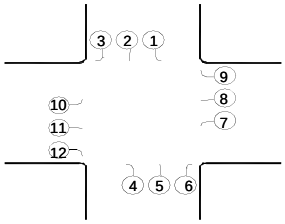



**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** Oak Meadow Dr and Western Home Depot Access
**DATE:** 23-Feb-16 Tue
**RECORDER:** FTG
**NOTES:** unsignalized

| LOCATION | S/B Home Depot Access | | | N/B | | | W/B Oak Meadow Dr | | | E/B Oak Meadow Dr | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TIME** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | | |
| 6:30-6:45 | | | 1 | | | | | 24 | | | 7 | | 213 | 32 |
| 6:45-7:00 | | | | | | | | **54** | | | **13** | | **231** | **67** |
| 7:00-7:15 | | | | | | | | **50** | | **1** | **13** | | 213 | 64 |
| 7:15-7:30 | | | **1** | | | | | **36** | | **1** | **12** | | 192 | 50 |
| 7:30-7:45 | **1** | | | | | | | **43** | | | **6** | | 180 | 50 |
| 7:45-8:00 | | | | | | | | 41 | | 1 | 7 | | | 49 |
| 8:00-8:15 | 1 | | | | | | | 33 | | | 9 | | | 43 |
| 8:15-8:30 | | | | | | | | 29 | | | 9 | | | 38 |
| | | | | | | | | | | | | | | |
| 4:30-4:45 | **3** | | | | | | | **46** | | **1** | **30** | | **351** | 80 |
| 4:45-5:00 | **4** | | | | | | | **33** | | **1** | **45** | | 343 | 83 |
| 5:00-5:15 | **3** | | **1** | | | | | **40** | **1** | **2** | **45** | | 354 | 92 |
| 5:15-5:30 | **5** | | **1** | | | | | **47** | **1** | **1** | **41** | | 335 | **96** |
| 5:30-5:45 | 3 | | | | | | | 33 | | 1 | 35 | | 314 | 72 |
| 5:45-6:00 | 6 | | | | | | | 34 | | 2 | 52 | | | 94 |
| 6:00-6:15 | 7 | | | | | | | 25 | | 1 | 40 | | | 73 |
| 6:15-6:30 | 5 | | | | | | | 32 | | 1 | 37 | | | 75 |
| **TOTAL** | **38** | | **4** | | | | | **600** | **2** | **13** | **401** | | | |
| **AM PK HR** | 1 | | 1 | | | | | 183 | | 2 | 44 | | **6:45-7:45** | |
| **PM PK HR** | 15 | | 2 | | | | | 166 | 2 | 5 | 161 | | **4:30-5:30** | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | 0.25 | | 0.25 | | | | | 0.85 | | 0.50 | 0.85 | | **0.86** |
| **PM PK PHF** | 0.75 | | 0.50 | | | | | 0.88 | 0.50 | 0.63 | 0.89 | | **0.91** |

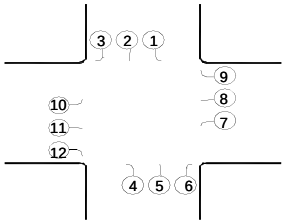



**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** S. Royal Oaks Blvd and Oak Meadow Dr
**DATE:** 4-Feb-16 Thu
**RECORDER:** Burns
**NOTES:** signalized

| LOCATION | S/B S. Royal Oaks Blvd | | | N/B S. Royal Oaks Blvd | | | W/B Oak Meadow Dr | | | E/B Oak Meadow Dr | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TIME | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| 6:30-6:45 | 1 | 96 | 15 | 17 | 231 | 2 | 2 | 2 | 21 | 28 | 4 | 9 | 1,978 |
| 6:45-7:00 | **4** | **88** | **17** | **17** | **270** | **7** | **1** | **4** | **49** | **31** | **2** | **12** | **2,078** |
| 7:00-7:15 | **6** | **115** | **15** | **14** | **300** | **6** | **5** | **2** | **43** | **26** | **2** | **16** | 2,071 |
| 7:15-7:30 | **9** | **117** | **15** | **23** | **242** | **4** | **4** | | **33** | **34** | | **17** | 1,995 |
| 7:30-7:45 | **3** | **157** | **21** | **27** | **225** | **3** | **7** | **8** | **28** | **28** | | **21** | 1,972 |
| 7:45-8:00 | 5 | 172 | 15 | 17 | 199 | 2 | 8 | 4 | 29 | 30 | 1 | 13 | |
| 8:00-8:15 | 3 | 123 | 22 | 22 | 214 | 4 | 8 | 8 | 17 | 29 | 2 | 22 | |
| 8:15-8:30 | 6 | 142 | 19 | 18 | 213 | 3 | 7 | 3 | 19 | 24 | | 21 | |
| | | | | | | | | | | | | | |
| 4:30-4:45 | **25** | **187** | **40** | **17** | **169** | | **20** | **9** | **17** | **44** | **6** | **26** | **2,272** |
| 4:45-5:00 | **29** | **179** | **29** | **18** | **200** | **6** | **17** | **2** | **14** | **25** | **11** | **31** | 2,225 |
| 5:00-5:15 | **32** | **170** | **33** | **28** | **222** | **5** | **19** | **5** | **17** | **35** | **10** | **29** | 2,170 |
| 5:15-5:30 | **32** | **172** | **32** | **22** | **175** | **2** | **21** | **6** | **21** | **32** | **8** | **23** | 2,016 |
| 5:30-5:45 | 27 | 150 | 29 | 16 | 188 | 4 | 14 | 3 | 16 | 33 | 5 | 28 | 1,932 |
| 5:45-6:00 | 33 | 158 | 33 | 8 | 162 | 11 | 12 | 7 | 15 | 35 | 10 | 22 | |
| 6:00-6:15 | 34 | 164 | 16 | 20 | 138 | 3 | 10 | 9 | 6 | 22 | 4 | 25 | |
| 6:15-6:30 | 33 | 175 | 18 | 9 | 148 | 1 | 17 | 6 | 9 | 23 | 4 | 19 | |
| **TOTAL** | **282** | **2,365** | **369** | **293** | **3,296** | **63** | **172** | **78** | **354** | **479** | **69** | **334** | |
| **AM PK HR** | 22 | 477 | 68 | 81 | 1,037 | 20 | 17 | 14 | 153 | 119 | 4 | 66 | **6:45-7:45** |
| **PM PK HR** | 118 | 708 | 134 | 85 | 766 | 13 | 77 | 22 | 69 | 136 | 35 | 109 | **4:30-5:30** |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | 0.61 | 0.76 | 0.81 | 0.75 | 0.86 | 0.71 | 0.61 | 0.44 | 0.78 | 0.88 | 0.50 | 0.79 | **0.94** |
| **PM PK PHF** | 0.92 | 0.95 | 0.84 | 0.76 | 0.86 | 0.54 | 0.92 | 0.61 | 0.82 | 0.77 | 0.80 | 0.88 | **0.94** |

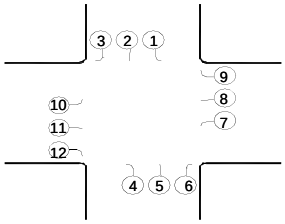



**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** S. Royal Oaks Blvd and Rand Place / Home Depot
**DATE:** 23-Feb-16 Tue
**RECORDER:** Burns
**NOTES:** unsignalized

| LOCATION | S/B S. Royal Oaks Blvd | | | N/B S. Royal Oaks Blvd | | | W/B Home Depot Access | | | E/B Rand Place | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TIME** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | |
| 6:30-6:45 | 13 | 93 | 10 | 3 | 279 | 11 | 2 | 1 | 2 | 6 | 1 | | 1,934 |
| 6:45-7:00 | **10** | **132** | **8** | **2** | **358** | **6** | **2** | | **1** | **5** | | **1** | **2,048** |
| 7:00-7:15 | **15** | **119** | **12** | | **364** | **5** | **1** | | **1** | **8** | **1** | **1** | 2,029 |
| 7:15-7:30 | **9** | **153** | **9** | **4** | **264** | **5** | **2** | | **7** | **4** | | **4** | 1,968 |
| 7:30-7:45 | **11** | **182** | **18** | **3** | **295** | **7** | **8** | | **2** | **7** | | **2** | 1,986 |
| 7:45-8:00 | 6 | 188 | 6 | 4 | 279 | 9 | 3 | | 5 | 2 | | 4 | |
| 8:00-8:15 | 13 | 172 | 14 | 4 | 240 | 6 | 2 | 1 | 3 | 5 | | 6 | |
| 8:15-8:30 | 11 | 123 | 11 | 7 | 307 | 7 | 2 | | 4 | 7 | | | |
| | | | | | | | | | | | | | |
| 4:30-4:45 | **5** | **207** | **19** | **1** | **218** | **5** | **11** | | **6** | **8** | **1** | **4** | **2,005** |
| 4:45-5:00 | **5** | **211** | **27** | **1** | **209** | **3** | **3** | | **8** | **6** | **1** | **6** | 1,987 |
| 5:00-5:15 | **5** | **228** | **26** | **2** | **235** | **4** | **4** | **3** | **3** | **5** | | **2** | 1,967 |
| 5:15-5:30 | **5** | **237** | **25** | **2** | **234** | **4** | **1** | **1** | **5** | **5** | **1** | **3** | 1,888 |
| 5:30-5:45 | 2 | 262 | 17 | 4 | 156 | 1 | 5 | 1 | 3 | 12 | | 4 | 1,720 |
| 5:45-6:00 | 3 | 211 | 23 | 4 | 196 | 2 | 3 | 1 | 4 | 7 | | 6 | |
| 6:00-6:15 | 3 | 213 | 18 | 2 | 168 | 3 | 5 | 1 | 4 | 12 | 2 | 7 | |
| 6:15-6:30 | 1 | 204 | 17 | 2 | 115 | 3 | 2 | | | 8 | | 3 | |
| **TOTAL** | **117** | **2,935** | **260** | **45** | **3,917** | **81** | **56** | **9** | **58** | **107** | **7** | **53** | |
| **AM PK HR** | 45 | 586 | 47 | 9 | 1,281 | 23 | 13 | | 11 | 24 | 1 | 8 | **6:45-7:45** |
| **PM PK HR** | 20 | 883 | 97 | 6 | 896 | 16 | 19 | 4 | 22 | 24 | 3 | 15 | **4:30-5:30** |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | 0.75 | 0.80 | 0.65 | 0.56 | 0.88 | 0.82 | 0.41 | | 0.39 | 0.75 | 0.25 | 0.50 | **0.97** |
| **PM PK PHF** | 1.00 | 0.93 | 0.90 | 0.75 | 0.95 | 0.80 | 0.43 | 0.33 | 0.69 | 0.75 | 0.75 | 0.63 | **0.96** |

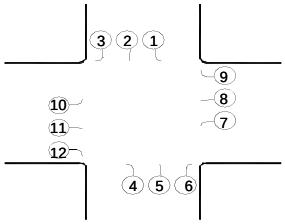



**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** S. Royal Oaks Blvd and Center Point Pl and Riverside Dr
**DATE:** 4-Feb-16 Thu
**RECORDER:** Burns
**NOTES:** signalized

| LOCATION | S/B S. Royal Oaks Blvd | | | N/B S. Royal Oaks Blvd | | | W/B Riverside Dr | | | E/B Cener Point Pl | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TIME** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | |
| 6:30-6:45 | 50 | 105 | 4 | 3 | 226 | 24 | 6 | 2 | 13 | 0 | 3 | 6 | 2,202 |
| 6:45-7:00 | 45 | 113 | 5 | 2 | 335 | 22 | 5 | 0 | 23 | 2 | 9 | 3 | 2,321 |
| 7:00-7:15 | **63** | **130** | **4** | **3** | **306** | **22** | **4** | **4** | **26** | **0** | **7** | **10** | **2,378** |
| 7:15-7:30 | **59** | **161** | **8** | **7** | **297** | **30** | **10** | **4** | **20** | **0** | **14** | **7** | 2,372 |
| 7:30-7:45 | **63** | **158** | **4** | **8** | **253** | **16** | **12** | **2** | **21** | **3** | **12** | **9** | 2,375 |
| 7:45-8:00 | **62** | **220** | **7** | **8** | **244** | **27** | **5** | **1** | **22** | **3** | **10** | **12** | |
| 8:00-8:15 | 74 | 161 | 8 | 7 | 232 | 19 | 11 | 3 | 33 | 4 | 14 | 7 | |
| 8:15-8:30 | 70 | 194 | 6 | 7 | 231 | 25 | 13 | 5 | 31 | 10 | 10 | 18 | |
| | | | | | | | | | | | | | |
| 4:30-4:45 | **56** | **255** | **24** | **19** | **240** | **6** | **11** | **15** | **59** | **21** | **14** | **38** | **2,942** |
| 4:45-5:00 | **48** | **243** | **16** | **30** | **228** | **4** | **13** | **14** | **67** | **15** | **15** | **29** | 2,865 |
| 5:00-5:15 | **47** | **233** | **28** | **12** | **247** | **7** | **11** | **20** | **71** | **28** | **13** | **30** | 2,829 |
| 5:15-5:30 | **64** | **233** | **18** | **22** | **240** | **8** | **8** | **5** | **70** | **13** | **17** | **17** | 2,730 |
| 5:30-5:45 | 60 | 223 | 25 | 14 | 221 | 9 | 8 | 8 | 47 | 15 | 29 | 22 | 2,571 |
| 5:45-6:00 | 55 | 206 | 23 | 20 | 228 | 13 | 6 | 7 | 52 | 25 | 22 | 29 | |
| 6:00-6:15 | 61 | 200 | 19 | 19 | 199 | 6 | 7 | 10 | 63 | 25 | 14 | 25 | |
| 6:15-6:30 | 37 | 184 | 21 | 17 | 166 | 6 | 11 | 10 | 33 | 25 | 17 | 29 | |
| **TOTAL** | **914** | **3,019** | **220** | **198** | **3,893** | **244** | **141** | **110** | **651** | **189** | **220** | **291** | |
| **AM PK HR** | 247 | 669 | 23 | 26 | 1,100 | 95 | 31 | 11 | 89 | 6 | 43 | 38 | **7:00-8:00** |
| **PM PK HR** | 215 | 964 | 86 | 83 | 955 | 25 | 43 | 54 | 267 | 77 | 59 | 114 | **4:30-5:30** |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | 0.98 | 0.76 | 0.72 | 0.81 | 0.90 | 0.79 | 0.65 | 0.69 | 0.86 | 0.50 | 0.77 | 0.79 | **0.96** |
| **PM PK PHF** | 0.84 | 0.95 | 0.77 | 0.69 | 0.97 | 0.78 | 0.83 | 0.68 | 0.94 | 0.69 | 0.87 | 0.75 | **0.97** |

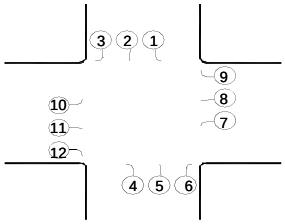



**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** Murfreesboro Road and Royal Oaks Blvd
**DATE:** 11-Feb-16 Thu
**RECORDER:** Burns
**NOTES:** signalized

| LOCATION | S/B N. Royal Oaks Blvd | | | N/B S. Royal Oaks Blvd | | | W/B Murfreesboro Road | | | E/B Murfreesboro Road | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TIME** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | |
| 6:30-6:45 | 21 | 26 | 8 | 14 | 38 | 211 | 99 | 137 | 37 | 4 | 118 | 7 | 3,669 |
| 6:45-7:00 | 29 | 17 | 4 | 24 | 80 | 244 | 123 | 193 | 43 | 15 | 168 | 8 | 4,005 |
| 7:00-7:15 | 48 | 27 | 5 | 28 | 119 | 253 | 107 | 159 | 37 | 20 | 166 | 13 | 4,252 |
| 7:15-7:30 | 51 | 25 | 14 | 22 | 53 | 236 | 160 | 204 | 57 | 21 | 163 | 13 | 4,384 |
| 7:30-7:45 | **53** | **39** | **18** | **25** | **70** | **213** | **162** | **210** | **58** | **29** | **165** | **14** | **4,492** |
| 7:45-8:00 | **50** | **43** | **20** | **26** | **56** | **267** | **210** | **234** | **72** | **25** | **181** | **11** | |
| 8:00-8:15 | **53** | **36** | **19** | **14** | **48** | **205** | **193** | **249** | **61** | **23** | **202** | **11** | |
| 8:15-8:30 | **52** | **61** | **19** | **27** | **44** | **224** | **191** | **226** | **69** | **27** | **167** | **20** | |
| | | | | | | | | | | | | | |
| 4:30-4:45 | **71** | **94** | **37** | **28** | **90** | **220** | **195** | **284** | **54** | **45** | **238** | **15** | **5,614** |
| 4:45-5:00 | **67** | **103** | **47** | **32** | **78** | **213** | **198** | **252** | **61** | **50** | **275** | **17** | 5,552 |
| 5:00-5:15 | **78** | **90** | **39** | **38** | **74** | **235** | **222** | **272** | **60** | **41** | **267** | **12** | 5,358 |
| 5:15-5:30 | **77** | **107** | **42** | **33** | **73** | **205** | **217** | **279** | **74** | **55** | **246** | **14** | 5,160 |
| 5:30-5:45 | 81 | 101 | 41 | 22 | 74 | 187 | 199 | 271 | 60 | 42 | 211 | 20 | 4,965 |
| 5:45-6:00 | 68 | 78 | 47 | 25 | 72 | 157 | 175 | 208 | 119 | 33 | 197 | 20 | |
| 6:00-6:15 | 80 | 89 | 44 | 32 | 65 | 169 | 169 | 234 | 60 | 42 | 229 | 17 | |
| 6:15-6:30 | 72 | 87 | 38 | 19 | 54 | 175 | 183 | 260 | 58 | 49 | 219 | 13 | |
| **TOTAL** | **951** | **1,023** | **442** | **409** | **1,088** | **3,414** | **2,803** | **3,672** | **980** | **521** | **3,212** | **225** | |
| **AM PK HR** | 208 | 179 | 76 | 92 | 218 | 909 | 756 | 919 | 260 | 104 | 715 | 56 | **7:30-8:30** |
| **PM PK HR** | 293 | 394 | 165 | 131 | 315 | 873 | 832 | 1,087 | 249 | 191 | 1,026 | 58 | **4:30-5:30** |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | 0.98 | 0.73 | 0.95 | 0.85 | 0.78 | 0.85 | 0.90 | 0.92 | 0.90 | 0.90 | 0.88 | 0.70 | **0.94** |
| **PM PK PHF** | 0.94 | 0.92 | 0.88 | 0.86 | 0.88 | 0.93 | 0.94 | 0.96 | 0.84 | 0.87 | 0.93 | 0.85 | **0.98** |

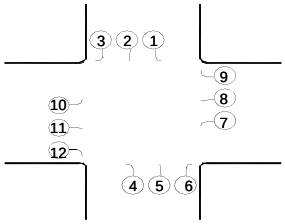



**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** Murfreesboro Road and the Ramps for Southbound I-65
**DATE:** 11-Feb-16 Thu
**RECORDER:** Burns
**NOTES:** signalized

| LOCATION | S/B Ramps | | | N/B | | | W/B Murfreesboro Road | | | E/B Murfreesboro Road | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TIME | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| 6:30-6:45 | 63 | | 148 | | | | 11 | | | | 369 | 34 | 2,929 |
| 6:45-7:00 | 69 | | 181 | | | | 31 | | | | 406 | 47 | 3,112 |
| 7:00-7:15 | 66 | | 139 | | | | 30 | | | | 471 | 49 | 3,159 |
| 7:15-7:30 | **73** | | **196** | | | | **37** | | | | **452** | **57** | **3,168** |
| 7:30-7:45 | **61** | | **237** | | | | **32** | | | | **432** | **46** | 3,140 |
| 7:45-8:00 | **91** | | **245** | | | | **18** | | | | **385** | **42** | |
| 8:00-8:15 | **86** | | **219** | | | | **29** | | | | **385** | **45** | |
| 8:15-8:30 | 91 | | 240 | | | | 24 | | | | 393 | 39 | |
| | | | | | | | | | | | | | |
| 4:30-4:45 | **205** | | **299** | | | | **71** | | | | **480** | **114** | **4,656** |
| 4:45-5:00 | **222** | | **322** | | | | **48** | | | | **388** | **95** | 4,524 |
| 5:00-5:15 | **197** | | **298** | | | | **76** | | | | **470** | **119** | 4,499 |
| 5:15-5:30 | **222** | | **374** | | | | **69** | | | | **469** | **118** | 4,376 |
| 5:30-5:45 | 175 | | 319 | | | | 56 | | | | 385 | 102 | 4,089 |
| 5:45-6:00 | 181 | | 349 | | | | 44 | | | | 383 | 93 | |
| 6:00-6:15 | 196 | | 290 | | | | 43 | | | | 408 | 100 | |
| 6:15-6:30 | 178 | | 256 | | | | 40 | | | | 414 | 77 | |
| **TOTAL** | **2,176** | | **4,112** | | | | **659** | | | | **6,690** | **1,177** | |
| **AM PK HR** | 311 | | 897 | | | | 116 | | | | 1,654 | 190 | **7:15-8:15** |
| **PM PK HR** | 846 | | 1,293 | | | | 264 | | | | 1,807 | 446 | **4:30-5:30** |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | 0.85 | | 0.92 | | | | 0.91 | | | | 0.96 | 1.03 | **0.97** |
| **PM PK PHF** | 0.95 | | 0.86 | | | | 0.87 | | | | 0.94 | 0.94 | **0.93** |




**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** Murfreesboro Road and the Ramps for Northbound I-65
**DATE:** 11-Feb-16 Thu
**RECORDER:** Burns
**NOTES:** signalized

| LOCATION | S/B Ramps | | | N/B | | | W/B Murfreesboro Road | | | E/B Murfreesboro Road | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TIME | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| 6:30-6:45 | | | | 74 | | 78 | | 144 | 286 | 278 | | | 3,695 |
| 6:45-7:00 | | | | **109** | | **94** | | **150** | **306** | **319** | | | **3,772** |
| 7:00-7:15 | | | | **65** | | **66** | | **183** | **306** | **331** | | | 3,689 |
| 7:15-7:30 | | | | **94** | | **92** | | **154** | **267** | **299** | | | 3,592 |
| 7:30-7:45 | | | | **107** | | **85** | | **213** | **248** | **284** | | | 3,508 |
| 7:45-8:00 | | | | 72 | | 101 | | 243 | 236 | 243 | | | |
| 8:00-8:15 | | | | 108 | | 82 | | 182 | 223 | 259 | | | |
| 8:15-8:30 | | | | 91 | | 67 | | 234 | 223 | 207 | | | |
| | | | | | | | | | | | | | |
| 4:30-4:45 | | | | **80** | | **40** | | **229** | **138** | **215** | | | **2,712** |
| 4:45-5:00 | | | | **75** | | **39** | | **231** | **134** | **187** | | | 2,597 |
| 5:00-5:15 | | | | **63** | | **39** | | **251** | **123** | **208** | | | 2,490 |
| 5:15-5:30 | | | | **66** | | **34** | | **213** | **143** | **204** | | | 2,376 |
| 5:30-5:45 | | | | 49 | | 40 | | 200 | 105 | 193 | | | 2,230 |
| 5:45-6:00 | | | | 79 | | 46 | | 161 | 101 | 172 | | | |
| 6:00-6:15 | | | | 71 | | 44 | | 183 | 106 | 166 | | | |
| 6:15-6:30 | | | | 52 | | 44 | | 176 | 89 | 153 | | | |
| **TOTAL** | | | | **1,255** | | **991** | | **1,503** | **3,034** | **3,718** | | | |
| **AM PK HR** | | | | 375 | | 337 | | 700 | 1,127 | 1,233 | | | **6:45-7:45** |
| **PM PK HR** | | | | 284 | | 152 | | 814 | 924 | 538 | | | **4:30-5:30** |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | | | | 0.86 | | 0.90 | | 0.82 | 0.92 | 0.93 | #DIV/0! | | **0.96** |
| **PM PK PHF** | | | | 0.89 | | 0.95 | | 0.95 | 0.92 | 0.94 | #DIV/0! | | **0.97** |

**APPENDIX C**
**CAPACITY ANALYSES**

## EXISTING CONDITIONS

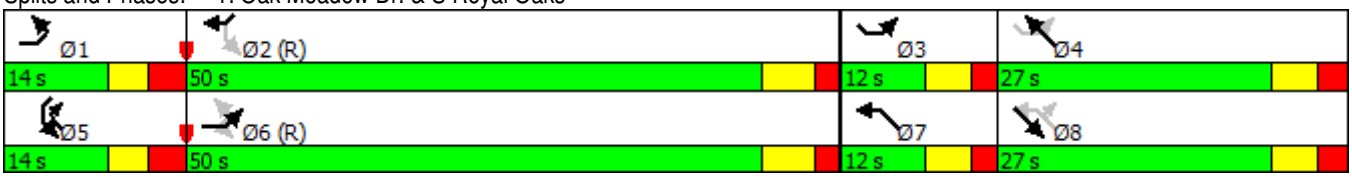
| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 81 | 1037 | 20 | 119 | 4 | 66 | 17 | 14 | 153 | 22 | 477 | 68 |
| Future Volume (vph) | 81 | 1037 | 20 | 119 | 4 | 66 | 17 | 14 | 153 | 22 | 477 | 68 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 3 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | | 0.850 | | 0.861 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.950 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 3319 | 1531 | 1711 | 1550 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.308 | 0.950 | | 0.742 | | | 0.583 | | | 0.208 | | |
| Satd. Flow (perm) | 497 | 3319 | 1531 | 1336 | 1550 | 0 | 1086 | 1925 | 1583 | 387 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 154 | | 90 | | | | 101 | | 154 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 552 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 12.5 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 121 | 1103 | 32 | 151 | 7 | 90 | 23 | 24 | 166 | 29 | 636 | 99 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 121 | 1103 | 32 | 151 | 97 | 0 | 23 | 24 | 166 | 29 | 735 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 30 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | 42 | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | 45 | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | Perm | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | 6 | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | 20.0 | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 13.0 | 26.0 | 26.0 | 12.5 | 20.0 | | 12.5 | 20.0 | 13.0 | 13.0 | 26.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 14.0 | 50.0 | 50.0 | 12.0 | 27.0 | | 12.0 | 27.0 | 14.0 | 14.0 | 50.0 | |
| Total Split (%) | 13.6% | 48.5% | 48.5% | 11.7% | 26.2% | | 11.7% | 26.2% | 13.6% | 13.6% | 48.5% | |
| Maximum Green (s) | 8.0 | 44.0 | 44.0 | 6.5 | 21.0 | | 6.5 | 21.0 | 8.0 | 8.0 | 44.0 | |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | -1.5 | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | 4.5 | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | 5.0 | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | C-Min | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 77.4 | 66.6 | 66.6 | 14.7 | 10.8 | | 14.7 | 10.8 | 21.2 | 76.9 | 66.4 | |
| Actuated g/C Ratio | 0.75 | 0.65 | 0.65 | 0.14 | 0.10 | | 0.14 | 0.10 | 0.21 | 0.75 | 0.64 | |
| v/c Ratio | 0.26 | 0.51 | 0.03 | 0.67 | 0.40 | | 0.11 | 0.12 | 0.41 | 0.07 | 0.40 | |
| Control Delay | 5.3 | 12.0 | 0.1 | 54.1 | 15.7 | | 34.1 | 42.2 | 16.9 | 4.5 | 8.6 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 5.3 | 12.0 | 0.1 | 54.1 | 15.7 | | 34.1 | 42.2 | 16.9 | 4.5 | 8.6 | |
| LOS | A | B | A | D | B | | C | D | B | A | A | |
| Approach Delay | | 11.1 | | | 39.0 | | | 21.6 | | 8.4 | | |
| Approach LOS | | B | | | D | | | C | | A | | |
| 90th %ile Green (s) | 8.0 | 54.3 | 54.3 | 6.5 | 11.7 | | 6.5 | 11.7 | 7.0 | 7.0 | 53.3 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Min | Min | Coord | |
| 70th %ile Green (s) | 7.3 | 57.4 | 57.4 | 6.5 | 8.6 | | 6.5 | 8.6 | 7.0 | 7.0 | 57.1 | |
| 70th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Min | Min | Coord | |
| 50th %ile Green (s) | 7.0 | 71.0 | 71.0 | 7.5 | 7.0 | | 0.0 | 0.0 | 7.0 | 7.0 | 71.0 | |
| 50th %ile Term Code | Min | Coord | Coord | Hold | Min | | Skip | Skip | Min | Min | Coord | |
| 30th %ile Green (s) | 7.0 | 71.0 | 71.0 | 7.5 | 7.0 | | 0.0 | 0.0 | 7.0 | 7.0 | 71.0 | |
| 30th %ile Term Code | Min | Coord | Coord | Hold | Min | | Skip | Skip | Min | Min | Coord | |
| 10th %ile Green (s) | 7.0 | 72.0 | 72.0 | 6.5 | 0.0 | | 0.0 | 0.0 | 7.0 | 7.0 | 72.0 | |
| 10th %ile Term Code | Min | Coord | Coord | Max | Skip | | Skip | Skip | Min | Min | Coord | |
| Stops (vph) | 21 | 538 | 0 | 110 | 17 | | 15 | 14 | 53 | 7 | 205 | |
| Fuel Used(gal) | 1 | 10 | 0 | 2 | 1 | | 0 | 0 | 2 | 0 | 9 | |
| CO Emissions (g/hr) | 39 | 697 | 6 | 172 | 50 | | 26 | 24 | 140 | 24 | 628 | |
| NOx Emissions (g/hr) | 8 | 136 | 1 | 33 | 10 | | 5 | 5 | 27 | 5 | 122 | |
| VOC Emissions (g/hr) | 9 | 162 | 1 | 40 | 12 | | 6 | 6 | 32 | 5 | 146 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 1 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 10 | 145 | 0 | 100 | 4 | | 14 | 15 | 35 | 2 | 71 | |
| Queue Length 95th (ft) | 32 | 308 | 0 | 120 | 13 | | 27 | 25 | 88 | 12 | 130 | |
| Internal Link Dist (ft) | | 472 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | 150 | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 482 | 2147 | 1044 | 224 | 423 | | 214 | 439 | 420 | 433 | 1850 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.25 | 0.51 | 0.03 | 0.67 | 0.23 | | 0.11 | 0.05 | 0.40 | 0.07 | 0.40 | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 103 | |

| | |
|---|---|
| Actuated Cycle Length: 103 | |
| Offset: 0 (0%), Referenced to phase 2:SWL and 6:EBL, Start of Green | |
| Natural Cycle: 75 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.67 | |
| Intersection Signal Delay: 13.9 | Intersection LOS: B |
| Intersection Capacity Utilization 59.1% | ICU Level of Service B |
| Analysis Period (min) 15 | |

Splits and Phases: 1: Oak Meadow Dr. & S Royal Oaks



| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 26 | 1100 | 95 | 247 | 669 | 23 | 6 | 43 | 38 | 31 | 11 | 89 |
| Future Volume (vph) | 26 | 1100 | 95 | 247 | 669 | 23 | 6 | 43 | 38 | 31 | 11 | 89 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 12 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | | 1% | | | -2% | | | -1% | | | 2% | |
| Storage Length (ft) | 80 | | 135 | 220 | | 0 | 100 | | 0 | 120 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | 0.993 | | | 0.934 | | | 0.871 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1676 | 3438 | 1607 | 1787 | 3428 | 0 | 1754 | 1624 | 0 | 1787 | 1523 | 0 |
| Flt Permitted | 0.377 | | | 0.182 | | | 0.489 | | | 0.520 | | |
| Satd. Flow (perm) | 665 | 3438 | 1607 | 342 | 3428 | 0 | 903 | 1624 | 0 | 978 | 1523 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 82 | | 5 | | | 30 | | | 103 | |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1624 | | | 792 | | | 957 | | | 515 | |
| Travel Time (s) | | 36.9 | | | 18.0 | | | 21.8 | | | 11.7 | |
| Peak Hour Factor | 0.63 | 0.92 | 0.87 | 0.80 | 0.99 | 0.67 | 0.58 | 0.68 | 0.77 | 0.67 | 0.63 | 0.86 |
| Heavy Vehicles (%) | 0% | 1% | 0% | 2% | 2% | 4% | 0% | 11% | 0% | 0% | 10% | 3% |
| Adj. Flow (vph) | 41 | 1196 | 109 | 309 | 676 | 34 | 10 | 63 | 49 | 46 | 17 | 103 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 41 | 1196 | 109 | 309 | 710 | 0 | 10 | 112 | 0 | 46 | 120 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 0.99 | 1.03 | 0.99 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 1 | 0 | 1 | 1 | | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | 0 | 42 | 226 | | 42 | 42 | | 42 | 42 | |
| Trailing Detector (ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | 50 | 45 | 6 | | 45 | 45 | | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | D.Pm | NA | | D.Pm | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | | 4 | | | 8 | |
| Permitted Phases | 6 | | 6 | 2 | | | 8 | | | 4 | | |
| Detector Phase | 1 | 6 | | 5 | 2 | | 8 | 4 | | 4 | 8 | |
| Switch Phase | | | | | | | | | | | | |

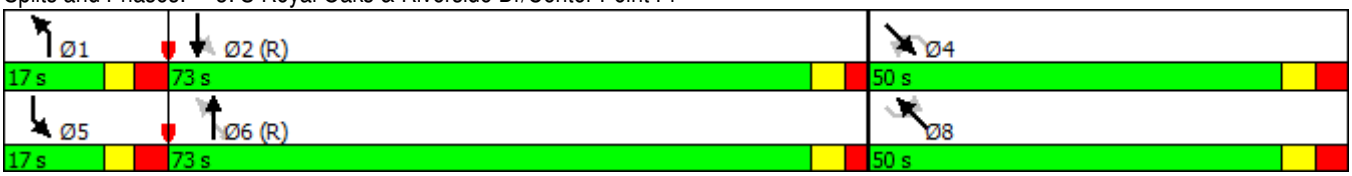
| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | |
| Minimum Split (s) | 17.0 | 73.0 | 73.0 | 17.0 | 73.0 | | 50.0 | 50.0 | | 50.0 | 50.0 | |
| Total Split (s) | 17.0 | 73.0 | 73.0 | 17.0 | 73.0 | | 50.0 | 50.0 | | 50.0 | 50.0 | |
| Total Split (%) | 12.1% | 52.1% | 52.1% | 12.1% | 52.1% | | 35.7% | 35.7% | | 35.7% | 35.7% | |
| Maximum Green (s) | 10.5 | 67.0 | 67.0 | 10.5 | 67.0 | | 43.0 | 43.0 | | 43.0 | 43.0 | |
| Yellow Time (s) | 3.0 | 3.5 | 3.5 | 3.0 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | 2.5 | 3.5 | 2.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | -3.0 | -1.0 | -3.0 | | -2.5 | -2.5 | | -2.5 | -2.5 | |
| Total Lost Time (s) | 5.5 | 3.0 | 3.0 | 5.5 | 3.0 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Recall Mode | None | C-Min | C-Min | None | C-Min | | None | None | | None | None | |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | | 8.0 | 8.0 | | 8.0 | 8.0 | |
| Flash Dont Walk (s) | | 16.0 | 16.0 | | 20.0 | | 35.0 | 32.0 | | 32.0 | 35.0 | |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 105.1 | 99.9 | 99.9 | 112.9 | 106.2 | | 15.6 | 15.6 | | 15.6 | 15.6 | |
| Actuated g/C Ratio | 0.75 | 0.71 | 0.71 | 0.81 | 0.76 | | 0.11 | 0.11 | | 0.11 | 0.11 | |
| v/c Ratio | 0.07 | 0.49 | 0.09 | 0.78 | 0.27 | | 0.10 | 0.54 | | 0.43 | 0.46 | |
| Control Delay | 3.6 | 10.1 | 2.5 | 37.9 | 2.9 | | 49.5 | 43.9 | | 68.5 | 19.4 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 3.6 | 10.1 | 2.5 | 37.9 | 2.9 | | 49.5 | 43.9 | | 68.5 | 19.4 | |
| LOS | A | B | A | D | A | | D | D | | E | B | |
| Approach Delay | | 9.2 | | | 13.5 | | | 44.3 | | | 33.0 | |
| Approach LOS | | A | | | B | | | D | | | C | |
| 90th %ile Green (s) | 7.6 | 90.9 | 90.9 | 10.5 | 93.8 | | 19.1 | 19.1 | | 19.1 | 19.1 | |
| 90th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 70th %ile Green (s) | 7.0 | 94.5 | 94.5 | 10.5 | 98.0 | | 15.5 | 15.5 | | 15.5 | 15.5 | |
| 70th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 50th %ile Green (s) | 6.6 | 96.9 | 96.9 | 10.5 | 100.8 | | 13.1 | 13.1 | | 13.1 | 13.1 | |
| 50th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 30th %ile Green (s) | 6.3 | 99.4 | 99.4 | 10.5 | 103.6 | | 10.6 | 10.6 | | 10.6 | 10.6 | |
| 30th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 10th %ile Green (s) | 0.0 | 102.9 | 102.9 | 10.5 | 119.9 | | 7.1 | 7.1 | | 7.1 | 7.1 | |
| 10th %ile Term Code | Skip | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| Stops (vph) | 6 | 463 | 9 | 181 | 127 | | 7 | 63 | | 28 | 22 | |
| Fuel Used(gal) | 0 | 19 | 1 | 4 | 5 | | 0 | 2 | | 1 | 1 | |
| CO Emissions (g/hr) | 27 | 1310 | 91 | 310 | 376 | | 10 | 117 | | 50 | 64 | |
| NOx Emissions (g/hr) | 5 | 255 | 18 | 60 | 73 | | 2 | 23 | | 10 | 12 | |
| VOC Emissions (g/hr) | 6 | 304 | 21 | 72 | 87 | | 2 | 27 | | 12 | 15 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 6 | 228 | 7 | 124 | 63 | | 9 | 77 | | 40 | 14 | |
| Queue Length 95th (ft) | 11 | 320 | 26 | m161 | m85 | | 18 | 99 | | 58 | 24 | |
| Internal Link Dist (ft) | | 1544 | | | 712 | | | 877 | | | 435 | |
| Turn Bay Length (ft) | 80 | | 135 | 220 | | | 100 | | | 120 | | |
| Base Capacity (vph) | 600 | 2453 | 1170 | 394 | 2601 | | 293 | 548 | | 317 | 564 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |

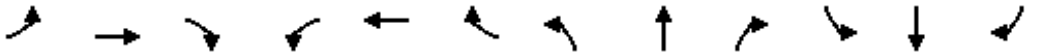
| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.07 | 0.49 | 0.09 | 0.78 | 0.27 | | 0.03 | 0.20 | | 0.15 | 0.21 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 139 (99%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.78 | | | |
| Intersection Signal Delay: 14.0 | | Intersection LOS: B | |
| Intersection Capacity Utilization 64.1% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |

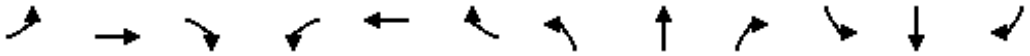
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: S Royal Oaks & Riverside Dr/Center Point Pl





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 104 | 715 | 56 | 756 | 919 | 260 | 92 | 218 | 909 | 208 | 179 | 76 |
| Future Volume (vph) | 104 | 715 | 56 | 756 | 919 | 260 | 92 | 218 | 909 | 208 | 179 | 76 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.988 | | | | 0.850 | | | 0.850 | | 0.958 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3232 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3232 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 10 | | | | 201 | | | | | 36 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 700 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 11.9 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.80 | 0.90 | 0.80 | 0.93 | 0.91 | 0.88 | 0.82 | 0.80 | 0.93 | 0.92 | 0.74 | 0.81 |
| Heavy Vehicles (%) | 3% | 6% | 2% | 3% | 6% | 3% | 4% | 2% | 2% | 2% | 4% | 2% |
| Adj. Flow (vph) | 130 | 794 | 70 | 813 | 1010 | 295 | 112 | 273 | 977 | 226 | 242 | 94 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 130 | 864 | 0 | 813 | 1010 | 295 | 112 | 273 | 977 | 226 | 336 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

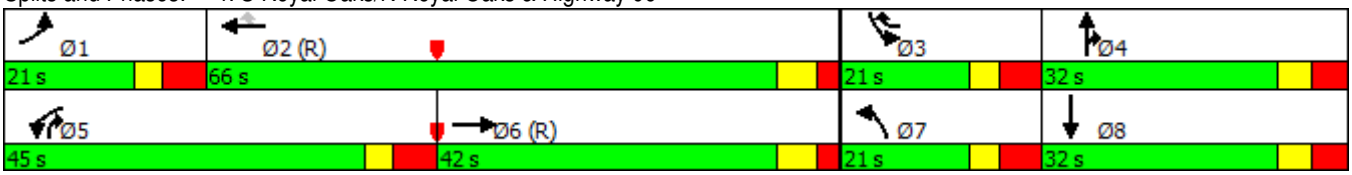


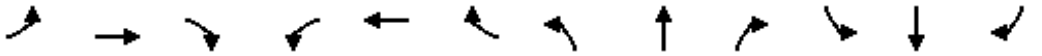
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (%) | 15.0% | 30.0% | | 32.1% | 47.1% | 15.0% | 15.0% | 22.9% | | 15.0% | 22.9% | |
| Maximum Green (s) | 13.5 | 35.5 | | 37.5 | 59.5 | 13.5 | 13.5 | 24.5 | | 13.5 | 24.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 13.2 | 38.9 | | 39.8 | 65.4 | 84.3 | 12.0 | 27.5 | 71.8 | 14.9 | 30.3 | |
| Actuated g/C Ratio | 0.09 | 0.28 | | 0.28 | 0.47 | 0.60 | 0.09 | 0.20 | 0.51 | 0.11 | 0.22 | |
| v/c Ratio | 0.40 | 0.66 | | 0.87 | 0.63 | 0.28 | 0.39 | 0.38 | 0.67 | 0.64 | 0.46 | |
| Control Delay | 77.5 | 38.6 | | 49.2 | 40.8 | 6.0 | 55.8 | 51.9 | 34.8 | 68.9 | 45.0 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 77.5 | 38.6 | | 49.2 | 40.8 | 6.0 | 55.8 | 51.9 | 34.8 | 68.9 | 45.0 | |
| LOS | E | D | | D | D | A | E | D | C | E | D | |
| Approach Delay | | 43.7 | | | 39.2 | | | 40.0 | | | 54.6 | |
| Approach LOS | | D | | | D | | | D | | | D | |
| 90th %ile Green (s) | 13.5 | 35.5 | | 37.5 | 59.5 | 13.5 | 12.9 | 24.5 | | 13.5 | 25.1 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 70th %ile Green (s) | 12.0 | 35.5 | | 37.5 | 61.0 | 13.5 | 11.2 | 24.5 | | 13.5 | 26.8 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 50th %ile Green (s) | 10.8 | 35.5 | | 37.5 | 62.2 | 13.5 | 10.0 | 24.5 | | 13.5 | 28.0 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 30th %ile Green (s) | 9.6 | 35.9 | | 37.5 | 63.8 | 13.1 | 8.9 | 24.5 | | 13.1 | 28.7 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | Gap | Gap | Max | | Gap | Hold | |
| 10th %ile Green (s) | 7.8 | 39.4 | | 36.4 | 68.0 | 10.7 | 7.2 | 24.5 | | 10.7 | 28.0 | |
| 10th %ile Term Code | Gap | Coord | | Gap | Coord | Gap | Gap | Max | | Gap | Hold | |
| Stops (vph) | 104 | 667 | | 657 | 884 | 60 | 85 | 201 | 635 | 196 | 196 | |
| Fuel Used(gal) | 3 | 16 | | 20 | 24 | 3 | 2 | 5 | 16 | 6 | 5 | |
| CO Emissions (g/hr) | 221 | 1137 | | 1407 | 1661 | 210 | 146 | 333 | 1088 | 389 | 373 | |
| NOx Emissions (g/hr) | 43 | 221 | | 274 | 323 | 41 | 28 | 65 | 212 | 76 | 73 | |
| VOC Emissions (g/hr) | 51 | 264 | | 326 | 385 | 49 | 34 | 77 | 252 | 90 | 86 | |
| Dilemma Vehicles (#) | 0 | 26 | | 0 | 34 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 63 | 260 | | 352 | 503 | 50 | 50 | 128 | 322 | 103 | 125 | |
| Queue Length 95th (ft) | 88 | 310 | | m412 | m539 | m80 | 73 | 146 | 567 | 148 | 141 | |
| Internal Link Dist (ft) | | 620 | | | 611 | | | 712 | | | 884 | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 388 | 1308 | | 938 | 1591 | 1061 | 370 | 714 | 1473 | 367 | 728 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.34 | 0.66 | | 0.87 | 0.63 | 0.28 | 0.30 | 0.38 | 0.66 | 0.62 | 0.46 | |

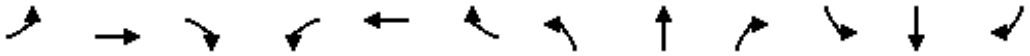
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 116 (83%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.87 | | | |
| Intersection Signal Delay: 42.0 | | Intersection LOS: D | |
| Intersection Capacity Utilization 66.7% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 4: S Royal Oaks/N Royal Oaks & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 1595 | 172 | 103 | 972 | 0 | 0 | 0 | 0 | 329 | 0 | 941 |
| Future Volume (vph) | 0 | 1595 | 172 | 103 | 972 | 0 | 0 | 0 | 0 | 329 | 0 | 941 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 181 | | | | | | | | | 147 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.91 | 0.90 | 0.86 | 0.87 | 1.00 | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 |
| Heavy Vehicles (%) | 2% | 3% | 7% | 1% | 3% | 2% | 2% | 2% | 2% | 6% | 2% | 3% |
| Adj. Flow (vph) | 0 | 1753 | 191 | 120 | 1117 | 0 | 0 | 0 | 0 | 387 | 0 | 1001 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 1753 | 191 | 120 | 1117 | 0 | 0 | 0 | 0 | 387 | 0 | 1001 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



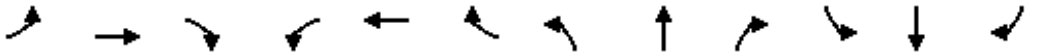
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (%) | | 44.3% | 44.3% | 16.4% | 60.7% | | | | | 39.3% | | 39.3% |
| Maximum Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 60.9 | 60.9 | 15.1 | 81.0 | | | | | 49.5 | | 49.5 |
| Actuated g/C Ratio | | 0.44 | 0.44 | 0.11 | 0.58 | | | | | 0.35 | | 0.35 |
| v/c Ratio | | 0.64 | 0.25 | 0.62 | 0.57 | | | | | 0.33 | | 0.97 |
| Control Delay | | 23.9 | 4.3 | 69.3 | 18.2 | | | | | 34.2 | | 59.3 |
| Queue Delay | | 0.1 | 0.0 | 0.0 | 0.3 | | | | | 1.2 | | 0.0 |
| Total Delay | | 24.0 | 4.3 | 69.3 | 18.5 | | | | | 35.3 | | 59.3 |
| LOS | | C | A | E | B | | | | | D | | E |
| Approach Delay | | 22.0 | | | 23.5 | | | | | | | |
| Approach LOS | | C | | | C | | | | | | | |
| 90th %ile Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| 90th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 70th %ile Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| 70th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 50th %ile Green (s) | | 58.2 | 58.2 | 14.8 | 79.0 | | | | | 47.5 | | 47.5 |
| 50th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| 30th %ile Green (s) | | 60.5 | 60.5 | 12.5 | 79.0 | | | | | 47.5 | | 47.5 |
| 30th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| 10th %ile Green (s) | | 63.7 | 63.7 | 9.3 | 79.0 | | | | | 47.5 | | 47.5 |
| 10th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| Stops (vph) | | 879 | 29 | 103 | 466 | | | | | 235 | | 753 |
| Fuel Used(gal) | | 29 | 2 | 3 | 12 | | | | | 6 | | 21 |
| CO Emissions (g/hr) | | 2048 | 128 | 199 | 828 | | | | | 397 | | 1494 |
| NOx Emissions (g/hr) | | 398 | 25 | 39 | 161 | | | | | 77 | | 291 |
| VOC Emissions (g/hr) | | 475 | 30 | 46 | 192 | | | | | 92 | | 346 |
| Dilemma Vehicles (#) | | 41 | 0 | 0 | 24 | | | | | 0 | | 0 |
| Queue Length 50th (ft) | | 231 | 16 | 116 | 273 | | | | | 132 | | 451 |
| Queue Length 95th (ft) | | 330 | 51 | m156 | m273 | | | | | 164 | | #617 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2759 | 758 | 229 | 1960 | | | | | 1162 | | 1033 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 305 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 150 | 0 | 0 | 0 | | | | | 537 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.67 | 0.25 | 0.52 | 0.67 | | | | | 0.62 | | 0.97 |

Intersection Summary

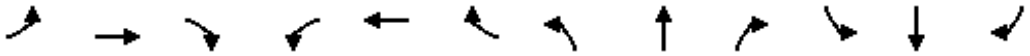
| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 106 (76%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.97 | | | |
| Intersection Signal Delay: 31.7 | | Intersection LOS: C | |
| Intersection Capacity Utilization 100.3% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Ent ramp to I-65/Exit ramp from I-65 & Highway 96



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1233 | 691 | 0 | 0 | 700 | 1127 | 375 | 0 | 337 | 0 | 0 | 0 |
| Future Volume (vph) | 1233 | 691 | 0 | 0 | 700 | 1127 | 375 | 0 | 337 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 23 | | | 289 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 311 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 5.3 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.88 | 0.86 | 0.95 | 1.00 | 0.95 | 0.98 | 0.95 | 0.25 | 0.92 | 1.00 | 1.00 | 0.95 |
| Heavy Vehicles (%) | 2% | 5% | 2% | 2% | 2% | 1% | 2% | 0% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 1401 | 803 | 0 | 0 | 737 | 1150 | 395 | 0 | 366 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 1401 | 803 | 0 | 0 | 737 | 1150 | 395 | 0 | 366 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (%) | 40.0% | 82.9% | | | 42.9% | | 17.1% | | 17.1% | | | |
| Maximum Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 50.0 | 110.0 | | | 53.5 | 79.5 | 16.5 | | 16.5 | | | |
| Actuated g/C Ratio | 0.36 | 0.79 | | | 0.38 | 0.57 | 0.12 | | 0.12 | | | |
| v/c Ratio | 1.19 | 0.31 | | | 0.55 | 0.72 | 1.02 | | 0.82 | | | |
| Control Delay | 144.4 | 2.7 | | | 35.6 | 24.7 | 109.7 | | 29.7 | | | |
| Queue Delay | 0.3 | 0.1 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 144.7 | 2.8 | | | 35.6 | 24.7 | 109.7 | | 29.7 | | | |
| LOS | F | A | | | D | C | F | | C | | | |
| Approach Delay | | 93.0 | | | 28.9 | | | | | | | |
| Approach LOS | | F | | | C | | | | | | | |
| 90th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 90th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 70th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 70th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 50th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 50th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 30th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 30th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 10th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 10th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| Stops (vph) | 894 | 79 | | | 533 | 785 | 332 | | 80 | | | |
| Fuel Used(gal) | 50 | 4 | | | 12 | 16 | 12 | | 4 | | | |
| CO Emissions (g/hr) | 3473 | 263 | | | 824 | 1101 | 827 | | 301 | | | |
| NOx Emissions (g/hr) | 676 | 51 | | | 160 | 214 | 161 | | 59 | | | |
| VOC Emissions (g/hr) | 805 | 61 | | | 191 | 255 | 192 | | 70 | | | |
| Dilemma Vehicles (#) | 0 | 18 | | | 25 | 0 | 0 | | 0 | | | |
| Queue Length 50th (ft) | ~756 | 47 | | | 273 | 409 | ~195 | | 66 | | | |
| Queue Length 95th (ft) | #913 | 71 | | | 337 | 502 | #302 | | #225 | | | |
| Internal Link Dist (ft) | | 476 | | | 231 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1179 | 2598 | | | 1352 | 1607 | 389 | | 446 | | | |
| Starvation Cap Reductn | 67 | 590 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 1.26 | 0.40 | | | 0.55 | 0.72 | 1.02 | | 0.82 | | | |

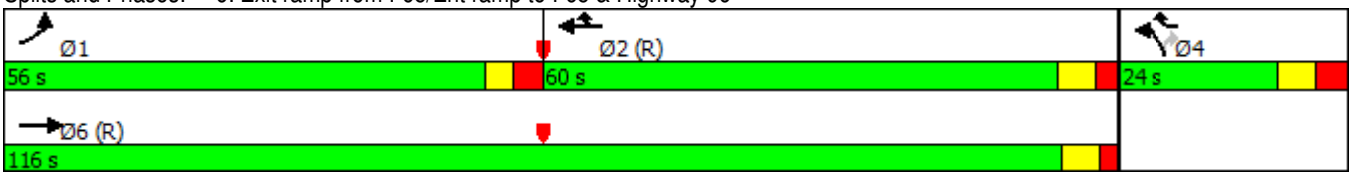
Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 122 (87%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.19 | | | |
| Intersection Signal Delay: 64.7 | | Intersection LOS: E | |
| Intersection Capacity Utilization 100.3% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 85 | 766 | 13 | 136 | 35 | 109 | 77 | 22 | 69 | 118 | 708 | 134 |
| Future Volume (vph) | 85 | 766 | 13 | 136 | 35 | 109 | 77 | 22 | 69 | 118 | 708 | 134 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 3 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | | 0.850 | | 0.893 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.950 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 3319 | 1531 | 1711 | 1608 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.128 | 0.950 | | 0.732 | | | 0.317 | | | 0.294 | | |
| Satd. Flow (perm) | 207 | 3319 | 1531 | 1318 | 1608 | 0 | 590 | 1925 | 1583 | 548 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 132 | | 101 | | | | 77 | | 132 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 552 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 12.5 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 127 | 815 | 21 | 172 | 60 | 149 | 103 | 38 | 75 | 157 | 944 | 194 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 127 | 815 | 21 | 172 | 209 | 0 | 103 | 38 | 75 | 157 | 1138 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 30 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | 42 | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | 45 | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | Perm | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | 6 | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | 20.0 | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 18.0 | 57.0 | 57.0 | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 18.0 | 57.0 | 57.0 | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |
| Total Split (%) | 15.0% | 47.5% | 47.5% | 11.7% | 29.2% | | 11.7% | 29.2% | 11.7% | 11.7% | 44.2% | |
| Maximum Green (s) | 12.0 | 51.0 | 51.0 | 8.5 | 29.0 | | 8.5 | 29.0 | 8.0 | 8.0 | 47.0 | |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | -1.5 | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | 4.5 | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | 5.0 | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | C-Min | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 80.5 | 67.8 | 67.8 | 29.4 | 17.1 | | 28.2 | 16.3 | 30.6 | 76.9 | 65.9 | |
| Actuated g/C Ratio | 0.67 | 0.56 | 0.56 | 0.24 | 0.14 | | 0.24 | 0.14 | 0.26 | 0.64 | 0.55 | |
| v/c Ratio | 0.47 | 0.43 | 0.02 | 0.46 | 0.66 | | 0.42 | 0.15 | 0.16 | 0.35 | 0.72 | |
| Control Delay | 13.5 | 17.0 | 0.1 | 39.6 | 34.2 | | 38.6 | 43.7 | 7.1 | 9.9 | 22.3 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 13.5 | 17.0 | 0.1 | 39.6 | 34.2 | | 38.6 | 43.7 | 7.1 | 9.9 | 22.3 | |
| LOS | B | B | A | D | C | | D | D | A | A | C | |
| Approach Delay | | 16.2 | | | 36.6 | | | 28.6 | | 20.8 | | |
| Approach LOS | | B | | | D | | | C | | C | | |
| 90th %ile Green (s) | 12.0 | 57.5 | 57.5 | 8.5 | 22.5 | | 8.5 | 22.5 | 8.0 | 8.0 | 53.5 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 70th %ile Green (s) | 11.6 | 62.2 | 62.2 | 8.5 | 17.8 | | 8.5 | 17.8 | 8.0 | 8.0 | 58.6 | |
| 70th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 50th %ile Green (s) | 9.2 | 65.9 | 65.9 | 8.5 | 14.5 | | 8.5 | 14.5 | 7.6 | 7.6 | 64.3 | |
| 50th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Gap | Gap | Coord | |
| 30th %ile Green (s) | 7.0 | 70.2 | 70.2 | 25.3 | 11.2 | | 8.1 | 0.0 | 7.0 | 7.0 | 70.2 | |
| 30th %ile Term Code | Min | Coord | Coord | Hold | Gap | | Gap | Skip | Min | Min | Coord | |
| 10th %ile Green (s) | 7.0 | 75.5 | 75.5 | 20.0 | 7.0 | | 7.0 | 0.0 | 7.0 | 7.0 | 75.5 | |
| 10th %ile Term Code | Min | Coord | Coord | Hold | Min | | Min | Skip | Min | Min | Coord | |
| Stops (vph) | 29 | 432 | 0 | 111 | 70 | | 58 | 19 | 10 | 44 | 562 | |
| Fuel Used(gal) | 1 | 8 | 0 | 2 | 2 | | 2 | 1 | 1 | 2 | 18 | |
| CO Emissions (g/hr) | 53 | 583 | 4 | 165 | 151 | | 116 | 36 | 44 | 138 | 1229 | |
| NOx Emissions (g/hr) | 10 | 113 | 1 | 32 | 29 | | 23 | 7 | 9 | 27 | 239 | |
| VOC Emissions (g/hr) | 12 | 135 | 1 | 38 | 35 | | 27 | 8 | 10 | 32 | 285 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 1 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 31 | 180 | 0 | 109 | 79 | | 63 | 26 | 0 | 38 | 318 | |
| Queue Length 95th (ft) | 47 | 268 | 0 | 137 | 63 | | 82 | 35 | 33 | 64 | 356 | |
| Internal Link Dist (ft) | | 472 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | 150 | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 302 | 1874 | 921 | 377 | 496 | | 248 | 505 | 467 | 460 | 1590 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.42 | 0.43 | 0.02 | 0.46 | 0.42 | | 0.42 | 0.08 | 0.16 | 0.34 | 0.72 | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 120 | |

| | |
|---|---|
| Actuated Cycle Length: 120 | |
| Offset: 117 (98%), Referenced to phase 2:SWL and 6:EBL, Start of Green | |
| Natural Cycle: 120 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.72 | |
| Intersection Signal Delay: 21.9 | Intersection LOS: C |
| Intersection Capacity Utilization 56.5% | ICU Level of Service B |
| Analysis Period (min) 15 | |

Splits and Phases: 1: Oak Meadow Dr. & S Royal Oaks

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 83 | 955 | 25 | 215 | 964 | 86 | 77 | 59 | 114 | 43 | 54 | 267 |
| Future Volume (vph) | 83 | 955 | 25 | 215 | 964 | 86 | 77 | 59 | 114 | 43 | 54 | 267 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 12 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | | 1% | | | -2% | | | -1% | | | 2% | |
| Storage Length (ft) | 80 | | 135 | 220 | | 0 | 100 | | 0 | 120 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | 0.986 | | | 0.906 | | | 0.877 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1676 | 3438 | 1575 | 1805 | 3444 | 0 | 1736 | 1672 | 0 | 1752 | 1595 | 0 |
| Flt Permitted | 0.192 | | | 0.198 | | | 0.147 | | | 0.385 | | |
| Satd. Flow (perm) | 339 | 3438 | 1575 | 376 | 3444 | 0 | 269 | 1672 | 0 | 710 | 1595 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 124 | | 12 | | | 57 | | | 159 | |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1624 | | | 792 | | | 957 | | | 515 | |
| Travel Time (s) | | 36.9 | | | 18.0 | | | 21.8 | | | 11.7 | |
| Peak Hour Factor | 0.79 | 0.95 | 0.64 | 0.75 | 0.90 | 0.76 | 0.86 | 0.71 | 0.82 | 0.75 | 0.88 | 0.94 |
| Heavy Vehicles (%) | 0% | 1% | 2% | 1% | 1% | 0% | 1% | 0% | 0% | 2% | 0% | 0% |
| Adj. Flow (vph) | 105 | 1005 | 39 | 287 | 1071 | 113 | 90 | 83 | 139 | 57 | 61 | 284 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 105 | 1005 | 39 | 287 | 1184 | 0 | 90 | 222 | 0 | 57 | 345 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 0.99 | 1.03 | 0.99 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 1 | 0 | 1 | 1 | | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | 0 | 42 | 226 | | 42 | 42 | | 42 | 42 | |
| Trailing Detector (ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | 50 | 45 | 6 | | 45 | 45 | | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | D.Pm | NA | | D.Pm | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | | 4 | | | 8 | |
| Permitted Phases | 6 | | 6 | 2 | | | 8 | | | 4 | | |
| Detector Phase | 1 | 6 | | 5 | 2 | | 8 | 4 | | 4 | 8 | |
| Switch Phase | | | | | | | | | | | | |

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | |
| Minimum Split (s) | 15.0 | 70.0 | 70.0 | 30.0 | 85.0 | | 50.0 | 50.0 | | 50.0 | 50.0 | |
| Total Split (s) | 14.0 | 72.0 | 72.0 | 29.0 | 87.0 | | 49.0 | 49.0 | | 49.0 | 49.0 | |
| Total Split (%) | 9.3% | 48.0% | 48.0% | 19.3% | 58.0% | | 32.7% | 32.7% | | 32.7% | 32.7% | |
| Maximum Green (s) | 7.5 | 66.0 | 66.0 | 22.5 | 81.0 | | 42.0 | 42.0 | | 42.0 | 42.0 | |
| Yellow Time (s) | 3.0 | 3.5 | 3.5 | 3.0 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | 2.5 | 3.5 | 2.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | -3.0 | -1.0 | -3.0 | | -2.5 | -2.5 | | -2.5 | -2.5 | |
| Total Lost Time (s) | 5.5 | 3.0 | 3.0 | 5.5 | 3.0 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Recall Mode | None | C-Min | C-Min | None | C-Min | | None | None | | None | None | |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | | 8.0 | 8.0 | | 8.0 | 8.0 | |
| Flash Dont Walk (s) | | 16.0 | 16.0 | | 20.0 | | 35.0 | 32.0 | | 32.0 | 35.0 | |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 94.1 | 88.3 | 88.3 | 107.0 | 96.6 | | 32.0 | 32.0 | | 32.0 | 32.0 | |
| Actuated g/C Ratio | 0.63 | 0.59 | 0.59 | 0.71 | 0.64 | | 0.21 | 0.21 | | 0.21 | 0.21 | |
| v/c Ratio | 0.37 | 0.50 | 0.04 | 0.67 | 0.53 | | 1.58 | 0.55 | | 0.38 | 0.74 | |
| Control Delay | 13.2 | 21.7 | 0.1 | 26.3 | 3.4 | | 363.3 | 32.8 | | 54.2 | 37.7 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 13.2 | 21.7 | 0.1 | 26.3 | 3.7 | | 363.3 | 32.8 | | 54.2 | 37.7 | |
| LOS | B | C | A | C | A | | F | C | | D | D | |
| Approach Delay | | 20.2 | | | 8.1 | | | 128.1 | | | 40.0 | |
| Approach LOS | | C | | | A | | | F | | | D | |
| 90th %ile Green (s) | 7.5 | 66.0 | 66.0 | 22.5 | 81.0 | | 42.0 | 42.0 | | 42.0 | 42.0 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Coord | | Max | Hold | | Hold | Max | |
| 70th %ile Green (s) | 7.5 | 73.1 | 73.1 | 20.4 | 86.0 | | 37.0 | 37.0 | | 37.0 | 37.0 | |
| 70th %ile Term Code | Max | Coord | Coord | Gap | Coord | | Gap | Hold | | Hold | Gap | |
| 50th %ile Green (s) | 7.5 | 84.8 | 84.8 | 15.1 | 92.4 | | 30.6 | 30.6 | | 30.6 | 30.6 | |
| 50th %ile Term Code | Max | Coord | Coord | Gap | Coord | | Gap | Hold | | Hold | Gap | |
| 30th %ile Green (s) | 7.5 | 94.9 | 94.9 | 11.6 | 99.0 | | 24.0 | 24.0 | | 24.0 | 24.0 | |
| 30th %ile Term Code | Max | Coord | Coord | Gap | Coord | | Gap | Hold | | Hold | Gap | |
| 10th %ile Green (s) | 6.6 | 107.5 | 107.5 | 8.9 | 109.8 | | 14.1 | 14.1 | | 14.1 | 14.1 | |
| 10th %ile Term Code | Gap | Coord | Coord | Gap | Coord | | Gap | Hold | | Hold | Gap | |
| Stops (vph) | 34 | 560 | 0 | 149 | 255 | | 56 | 115 | | 35 | 165 | |
| Fuel Used(gal) | 1 | 19 | 0 | 3 | 9 | | 7 | 3 | | 1 | 5 | |
| CO Emissions (g/hr) | 102 | 1356 | 22 | 231 | 603 | | 460 | 215 | | 59 | 326 | |
| NOx Emissions (g/hr) | 20 | 264 | 4 | 45 | 117 | | 89 | 42 | | 11 | 63 | |
| VOC Emissions (g/hr) | 24 | 314 | 5 | 54 | 140 | | 107 | 50 | | 14 | 76 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 29 | 292 | 0 | 101 | 33 | | ~122 | 118 | | 48 | 174 | |
| Queue Length 95th (ft) | 55 | 464 | 0 | m91 | m161 | | #214 | 141 | | 70 | 255 | |
| Internal Link Dist (ft) | | 1544 | | | 712 | | | 877 | | | 435 | |
| Turn Bay Length (ft) | 80 | | 135 | 220 | | | 100 | | | 120 | | |
| Base Capacity (vph) | 288 | 2022 | 977 | 494 | 2222 | | 79 | 536 | | 210 | 585 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 423 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.36 | 0.50 | 0.04 | 0.58 | 0.66 | | 1.14 | 0.41 | | 0.27 | 0.59 | |

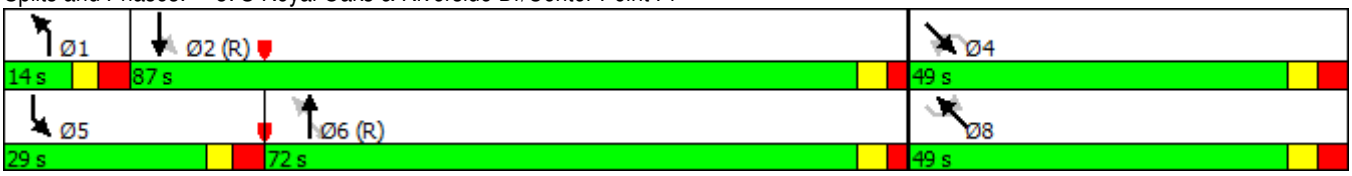
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 123 (82%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.58 | | | |
| Intersection Signal Delay: 27.4 | | Intersection LOS: C | |
| Intersection Capacity Utilization 78.9% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

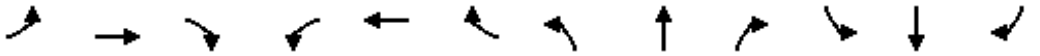
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

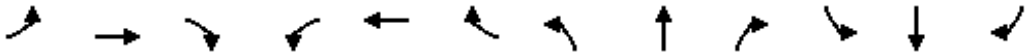
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: S Royal Oaks & Riverside Dr/Center Point Pl





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 191 | 1026 | 58 | 832 | 1087 | 249 | 131 | 315 | 873 | 293 | 394 | 165 |
| Future Volume (vph) | 191 | 1026 | 58 | 832 | 1087 | 249 | 131 | 315 | 873 | 293 | 394 | 165 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.991 | | | | 0.850 | | | 0.850 | | 0.950 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3315 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3315 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 7 | | | | 106 | | | | | 51 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 700 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 11.9 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.92 | 0.93 | 0.81 | 0.87 | 0.91 | 0.89 | 0.74 | 0.83 | 0.89 | 0.83 | 0.95 | 0.80 |
| Heavy Vehicles (%) | 1% | 1% | 0% | 1% | 2% | 1% | 0% | 0% | 1% | 0% | 0% | 0% |
| Adj. Flow (vph) | 208 | 1103 | 72 | 956 | 1195 | 280 | 177 | 380 | 981 | 353 | 415 | 206 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 208 | 1175 | 0 | 956 | 1195 | 280 | 177 | 380 | 981 | 353 | 621 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

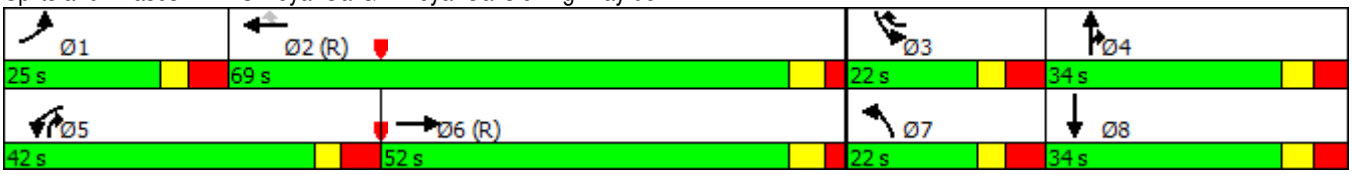


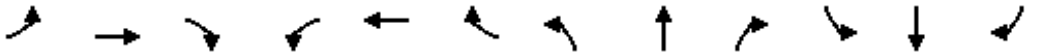
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (%) | 16.7% | 34.7% | | 28.0% | 46.0% | 14.7% | 14.7% | 22.7% | | 14.7% | 22.7% | |
| Maximum Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 16.7 | 48.0 | | 37.0 | 68.3 | 88.8 | 14.5 | 29.5 | 71.0 | 16.5 | 31.5 | |
| Actuated g/C Ratio | 0.11 | 0.32 | | 0.25 | 0.46 | 0.59 | 0.10 | 0.20 | 0.47 | 0.11 | 0.21 | |
| v/c Ratio | 0.54 | 0.74 | | 1.16 | 0.74 | 0.27 | 0.53 | 0.52 | 0.72 | 0.95 | 0.84 | |
| Control Delay | 68.8 | 41.9 | | 119.7 | 46.5 | 14.5 | 65.6 | 61.5 | 39.5 | 100.9 | 63.9 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.5 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 68.8 | 41.9 | | 119.7 | 46.9 | 14.5 | 65.7 | 61.5 | 39.5 | 100.9 | 63.9 | |
| LOS | E | D | | F | D | B | E | E | D | F | E | |
| Approach Delay | | 45.9 | | | 71.8 | | | 47.9 | | | 77.3 | |
| Approach LOS | | D | | | E | | | D | | | E | |
| 90th %ile Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | Max | Max | Max | | Max | Max | |
| 70th %ile Green (s) | 15.9 | 45.5 | | 34.5 | 64.1 | 14.5 | 14.4 | 26.5 | | 14.5 | 26.6 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 50th %ile Green (s) | 14.4 | 45.5 | | 34.5 | 65.6 | 14.5 | 12.9 | 26.5 | | 14.5 | 28.1 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 30th %ile Green (s) | 12.8 | 45.5 | | 34.5 | 67.2 | 14.5 | 11.5 | 26.5 | | 14.5 | 29.5 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 10th %ile Green (s) | 10.5 | 45.5 | | 34.5 | 69.5 | 14.5 | 9.4 | 26.5 | | 14.5 | 31.6 | |
| 10th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| Stops (vph) | 177 | 770 | | 714 | 982 | 166 | 124 | 280 | 638 | 266 | 474 | |
| Fuel Used(gal) | 5 | 22 | | 34 | 29 | 4 | 3 | 7 | 16 | 10 | 14 | |
| CO Emissions (g/hr) | 372 | 1535 | | 2378 | 2008 | 306 | 227 | 520 | 1114 | 677 | 985 | |
| NOx Emissions (g/hr) | 72 | 299 | | 463 | 391 | 60 | 44 | 101 | 217 | 132 | 192 | |
| VOC Emissions (g/hr) | 86 | 356 | | 551 | 465 | 71 | 53 | 120 | 258 | 157 | 228 | |
| Dilemma Vehicles (#) | 0 | 41 | | 0 | 37 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 100 | 266 | | ~580 | 551 | 113 | 85 | 202 | 283 | 179 | 287 | |
| Queue Length 95th (ft) | m144 | 336 | | m#499 | m492 | m120 | m103 | m218 | m617 | #242 | #398 | |
| Internal Link Dist (ft) | | 620 | | | 611 | | | 712 | | | 884 | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 462 | 1580 | | 826 | 1610 | 1021 | 383 | 730 | 1369 | 372 | 735 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 1 | | 0 | 114 | 0 | 9 | 0 | 0 | 0 | 1 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.45 | 0.74 | | 1.16 | 0.80 | 0.27 | 0.47 | 0.52 | 0.72 | 0.95 | 0.85 | |

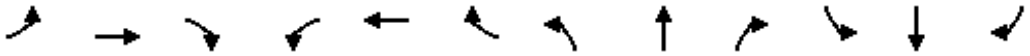
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 133 (89%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.16 | | | |
| Intersection Signal Delay: 61.2 | | Intersection LOS: E | |
| Intersection Capacity Utilization 81.9% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |
| ~ Volume exceeds capacity, queue is theoretically infinite. | | | |
| Queue shown is maximum after two cycles. | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | |
| Queue shown is maximum after two cycles. | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 4: S Royal Oaks/N Royal Oaks & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 1807 | 446 | 264 | 834 | 0 | 0 | 0 | 0 | 846 | 0 | 1293 |
| Future Volume (vph) | 0 | 1807 | 446 | 264 | 834 | 0 | 0 | 0 | 0 | 846 | 0 | 1293 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 405 | | | | | | | | | 177 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.93 | 0.78 | 0.71 | 0.86 | 1.00 | 1.00 | 1.00 | 1.00 | 0.87 | 1.00 | 0.88 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 1% | 1% | 2% | 2% | 2% | 2% | 1% | 2% | 1% |
| Adj. Flow (vph) | 0 | 1943 | 572 | 372 | 970 | 0 | 0 | 0 | 0 | 972 | 0 | 1469 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 1943 | 572 | 372 | 970 | 0 | 0 | 0 | 0 | 972 | 0 | 1469 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (%) | | 36.7% | 36.7% | 20.0% | 56.7% | | | | | 43.3% | | 43.3% |
| Maximum Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 51.0 | 51.0 | 25.0 | 81.0 | | | | | 59.5 | | 59.5 |
| Actuated g/C Ratio | | 0.34 | 0.34 | 0.17 | 0.54 | | | | | 0.40 | | 0.40 |
| v/c Ratio | | 0.89 | 0.71 | 1.25 | 0.52 | | | | | 0.71 | | 1.24 |
| Control Delay | | 63.2 | 26.8 | 190.8 | 21.8 | | | | | 41.5 | | 151.8 |
| Queue Delay | | 0.0 | 0.0 | 0.0 | 0.3 | | | | | 0.2 | | 0.0 |
| Total Delay | | 63.2 | 26.8 | 190.8 | 22.1 | | | | | 41.8 | | 151.8 |
| LOS | | E | C | F | C | | | | | D | | F |
| Approach Delay | | 54.9 | | | 68.9 | | | | | | | |
| Approach LOS | | D | | | E | | | | | | | |
| 90th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 90th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 70th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 70th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 50th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 50th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 30th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 30th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 10th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 10th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| Stops (vph) | | 1693 | 363 | 205 | 393 | | | | | 695 | | 956 |
| Fuel Used(gal) | | 54 | 10 | 13 | 11 | | | | | 16 | | 53 |
| CO Emissions (g/hr) | | 3809 | 671 | 927 | 748 | | | | | 1134 | | 3733 |
| NOx Emissions (g/hr) | | 741 | 131 | 180 | 146 | | | | | 221 | | 726 |
| VOC Emissions (g/hr) | | 883 | 156 | 215 | 173 | | | | | 263 | | 865 |
| Dilemma Vehicles (#) | | 108 | 0 | 0 | 34 | | | | | 0 | | 0 |
| Queue Length 50th (ft) | | 565 | 221 | ~464 | 239 | | | | | 409 | | ~953 |
| Queue Length 95th (ft) | | m609 | 265 | #465 | 337 | | | | | 465 | | #1065 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2178 | 805 | 297 | 1865 | | | | | 1368 | | 1180 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 353 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 57 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.89 | 0.71 | 1.25 | 0.64 | | | | | 0.74 | | 1.24 |

Intersection Summary

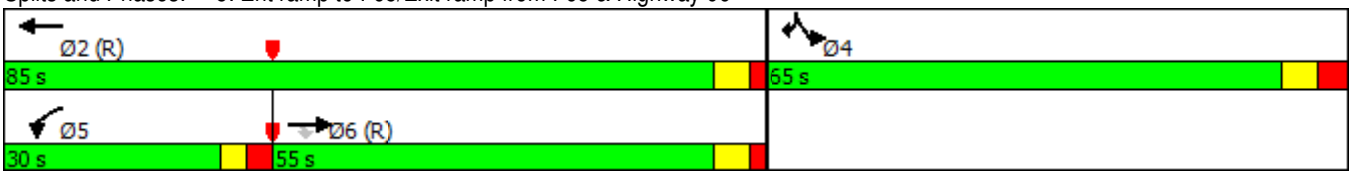
| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 104 (69%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.25 | | | |
| Intersection Signal Delay: 78.4 | | Intersection LOS: E | |
| Intersection Capacity Utilization 79.1% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

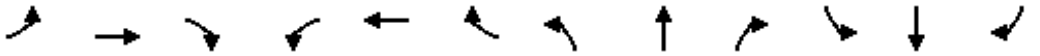
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

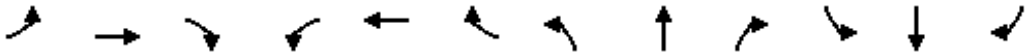
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Ent ramp to I-65/Exit ramp from I-65 & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 538 | 2115 | 0 | 0 | 814 | 924 | 284 | 0 | 152 | 0 | 0 | 0 |
| Future Volume (vph) | 538 | 2115 | 0 | 0 | 814 | 924 | 284 | 0 | 152 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 301 | | | 69 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 1845 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 31.4 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.97 | 0.98 | 1.00 | 0.25 | 0.91 | 0.93 | 0.92 | 1.00 | 0.87 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 3% | 3% | 2% | 0% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 2% |
| Adj. Flow (vph) | 555 | 2158 | 0 | 0 | 895 | 994 | 309 | 0 | 175 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 555 | 2158 | 0 | 0 | 895 | 994 | 309 | 0 | 175 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |

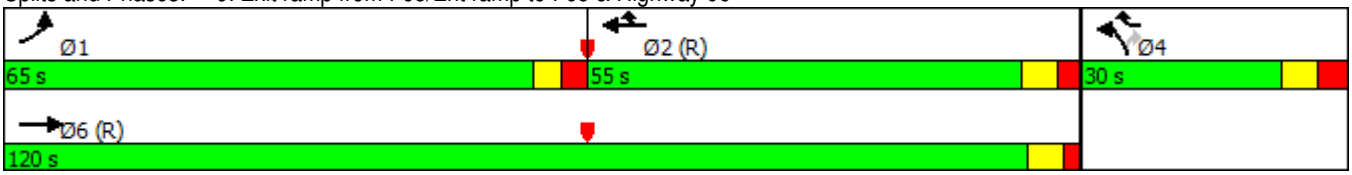


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (%) | 43.3% | 80.0% | | | 36.7% | | 20.0% | | 20.0% | | | |
| Maximum Green (s) | 59.0 | 114.0 | | | 48.5 | | 22.5 | | 22.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 33.1 | 115.2 | | | 75.6 | 106.4 | 21.3 | | 21.3 | | | |
| Actuated g/C Ratio | 0.22 | 0.77 | | | 0.50 | 0.71 | 0.14 | | 0.14 | | | |
| v/c Ratio | 0.77 | 0.83 | | | 0.50 | 0.48 | 0.66 | | 0.61 | | | |
| Control Delay | 78.2 | 19.8 | | | 27.0 | 7.5 | 68.0 | | 45.7 | | | |
| Queue Delay | 0.0 | 1.5 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 78.2 | 21.3 | | | 27.0 | 7.5 | 68.0 | | 45.7 | | | |
| LOS | E | C | | | C | A | E | | D | | | |
| Approach Delay | | 33.0 | | | 16.8 | | | | | | | |
| Approach LOS | | C | | | B | | | | | | | |
| 90th %ile Green (s) | 40.9 | 114.0 | | | 66.6 | | 22.5 | | 22.5 | | | |
| 90th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 70th %ile Green (s) | 36.1 | 114.0 | | | 71.4 | | 22.5 | | 22.5 | | | |
| 70th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 50th %ile Green (s) | 33.3 | 114.0 | | | 74.2 | | 22.5 | | 22.5 | | | |
| 50th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 30th %ile Green (s) | 29.6 | 114.7 | | | 78.6 | | 21.8 | | 21.8 | | | |
| 30th %ile Term Code | Gap | Coord | | | Coord | | Gap | | Gap | | | |
| 10th %ile Green (s) | 25.4 | 119.3 | | | 87.4 | | 17.2 | | 17.2 | | | |
| 10th %ile Term Code | Gap | Coord | | | Coord | | Gap | | Gap | | | |
| Stops (vph) | 537 | 1521 | | | 532 | 278 | 266 | | 86 | | | |
| Fuel Used(gal) | 16 | 31 | | | 20 | 16 | 7 | | 3 | | | |
| CO Emissions (g/hr) | 1110 | 2200 | | | 1390 | 1099 | 462 | | 184 | | | |
| NOx Emissions (g/hr) | 216 | 428 | | | 270 | 214 | 90 | | 36 | | | |
| VOC Emissions (g/hr) | 257 | 510 | | | 322 | 255 | 107 | | 43 | | | |
| Dilemma Vehicles (#) | 0 | 77 | | | 27 | 0 | 0 | | 0 | | | |
| Queue Length 50th (ft) | 297 | 362 | | | 305 | 150 | 148 | | 97 | | | |
| Queue Length 95th (ft) | m341 | 370 | | | 406 | 234 | 201 | | 172 | | | |
| Internal Link Dist (ft) | | 476 | | | 1765 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1286 | 2588 | | | 1784 | 2085 | 495 | | 298 | | | |
| Starvation Cap Reductn | 0 | 244 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 0.43 | 0.92 | | | 0.50 | 0.48 | 0.62 | | 0.59 | | | |

Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 138 (92%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.83 | | | |
| Intersection Signal Delay: 29.5 | | Intersection LOS: C | |
| Intersection Capacity Utilization 79.1% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 6: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



# HCS 2010 Two-Way Stop Control Summary Report

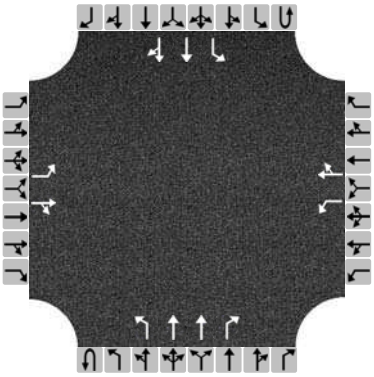
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Existing) |

## Site Information

| | |
|---|---|
| Intersection | S. Royal Oaks and Rand |
| Jurisdiction | Franklin, TN |
| East/West Street | Rand Pl / Home Depot |
| North/South Street | S. Royal Oaks Blvd |
| Peak Hour Factor | 0.97 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 1 | 1 | 0 | | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 2 | 0 |
| Configuration | | L | | TR | | L | | TR | | L | T | R | | L | T | TR |
| Volume (veh/h) | | 24 | 1 | 8 | | 13 | 0 | 11 | | 9 | 1281 | 23 | | 45 | 586 | 47 |
| Percent Heavy Vehicles | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left + Thru | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 25 | | 9 | | 13 | | 11 | | 9 | | | | 46 | | |
| Capacity | | 203 | | 461 | | 130 | | 410 | | 944 | | | | 519 | | |
| v/c Ratio | | 0.12 | | 0.02 | | 0.10 | | 0.03 | | 0.01 | | | | 0.09 | | |
| 95% Queue Length | | 0.4 | | 0.1 | | 0.3 | | 0.1 | | 0.0 | | | | 0.3 | | |
| Control Delay (s/veh) | | 25.2 | | 13.0 | | 35.8 | | 14.0 | | 8.8 | | | | 12.6 | | |
| Level of Service (LOS) | | D | | B | | E | | B | | A | | | | B | | |
| Approach Delay (s/veh) | 21.9 | | | | 25.8 | | | | 0.1 | | | | 0.8 | | | |
| Approach LOS | C | | | | D | | | | A | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

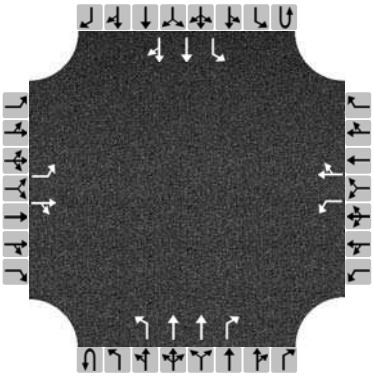
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Existing) |

## Site Information

| | |
|---|---|
| Intersection | S. Royal Oaks and Rand |
| Jurisdiction | Franklin, TN |
| East/West Street | Rand Pl / Home Depot |
| North/South Street | S. Royal Oaks Blvd |
| Peak Hour Factor | 0.96 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 1 | 1 | 0 | | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 2 | 0 |
| Configuration | | L | | TR | | L | | TR | | L | T | R | | L | T | TR |
| Volume (veh/h) | | 24 | 3 | 15 | | 19 | 4 | 22 | | 6 | 896 | 16 | | 20 | 883 | 97 |
| Percent Heavy Vehicles | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left + Thru | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 25 | | 19 | | 20 | | 27 | | 6 | | | | 21 | | |
| Capacity | | 183 | | 391 | | 199 | | 411 | | 688 | | | | 731 | | |
| v/c Ratio | | 0.14 | | 0.05 | | 0.10 | | 0.07 | | 0.01 | | | | 0.03 | | |
| 95% Queue Length | | 0.5 | | 0.2 | | 0.3 | | 0.2 | | 0.0 | | | | 0.1 | | |
| Control Delay (s/veh) | | 27.7 | | 14.7 | | 25.1 | | 14.4 | | 10.3 | | | | 10.1 | | |
| Level of Service (LOS) | | D | | B | | D | | B | | B | | | | B | | |
| Approach Delay (s/veh) | 22.1 | | | | 18.9 | | | | 0.1 | | | | 0.2 | | | |
| Approach LOS | C | | | | C | | | | A | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

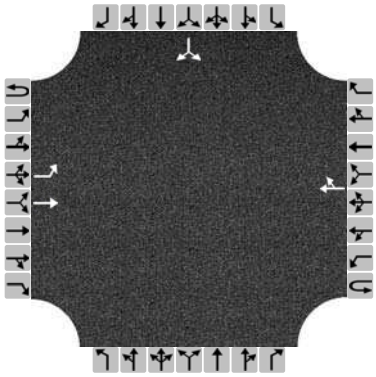
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Existing) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and dwy |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Western Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 2 | 44 | | | | 183 | 0 | | | | | | 1 | | 1 |
| Percent Heavy Vehicles | | 0 | | | | | | | | | | | | 0 | | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 2 | | | | | | | | | | | | | 2 | |
| Capacity | | 1351 | | | | | | | | | | | | | 761 | |
| v/c Ratio | | 0.00 | | | | | | | | | | | | | 0.00 | |
| 95% Queue Length | | 0.0 | | | | | | | | | | | | | 0.0 | |
| Control Delay (s/veh) | | 7.7 | | | | | | | | | | | | | 9.7 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | A | |
| Approach Delay (s/veh) | 0.3 | | | | | | | | | | | | 9.7 | | | |
| Approach LOS | A | | | | | | | | | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

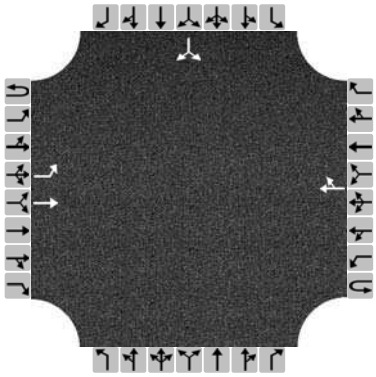
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Existing) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and dwy |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Western Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 5 | 161 | | | | 166 | 2 | | | | | | 15 | | 2 |
| Percent Heavy Vehicles | | 0 | | | | | | | | | | | | 0 | | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 6 | | | | | | | | | | | | | 21 | |
| Capacity | | 1373 | | | | | | | | | | | | | 660 | |
| v/c Ratio | | 0.00 | | | | | | | | | | | | | 0.03 | |
| 95% Queue Length | | 0.0 | | | | | | | | | | | | | 0.1 | |
| Control Delay (s/veh) | | 7.6 | | | | | | | | | | | | | 10.6 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | B | |
| Approach Delay (s/veh) | 0.2 | | | | | | | | | | | | 10.6 | | | |
| Approach LOS | A | | | | | | | | | | | | B | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

## BACKGROUND CONDITIONS

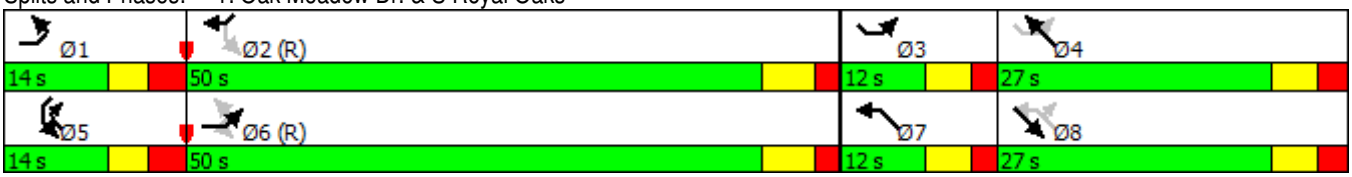
| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 87 | 1120 | 29 | 129 | 7 | 71 | 21 | 16 | 170 | 36 | 515 | 73 |
| Future Volume (vph) | 87 | 1120 | 29 | 129 | 7 | 71 | 21 | 16 | 170 | 36 | 515 | 73 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 3 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | | 0.850 | | 0.867 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.950 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 3319 | 1531 | 1711 | 1561 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.278 | 0.950 | | 0.739 | | | 0.540 | | | 0.177 | | |
| Satd. Flow (perm) | 449 | 3319 | 1531 | 1331 | 1561 | 0 | 1006 | 1925 | 1583 | 330 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 154 | | 97 | | | | 90 | | 154 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 552 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 12.5 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 130 | 1191 | 46 | 163 | 12 | 97 | 28 | 28 | 185 | 48 | 687 | 106 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 130 | 1191 | 46 | 163 | 109 | 0 | 28 | 28 | 185 | 48 | 793 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 30 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | 42 | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | 45 | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | Perm | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | 6 | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | 20.0 | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 13.0 | 26.0 | 26.0 | 12.5 | 20.0 | | 12.5 | 20.0 | 13.0 | 13.0 | 26.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 14.0 | 50.0 | 50.0 | 12.0 | 27.0 | | 12.0 | 27.0 | 14.0 | 14.0 | 50.0 | |
| Total Split (%) | 13.6% | 48.5% | 48.5% | 11.7% | 26.2% | | 11.7% | 26.2% | 13.6% | 13.6% | 48.5% | |
| Maximum Green (s) | 8.0 | 44.0 | 44.0 | 6.5 | 21.0 | | 6.5 | 21.0 | 8.0 | 8.0 | 44.0 | |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | -1.5 | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | 4.5 | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | 5.0 | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | C-Min | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 74.6 | 63.7 | 63.7 | 17.0 | 11.1 | | 17.0 | 11.1 | 24.1 | 73.9 | 63.4 | |
| Actuated g/C Ratio | 0.72 | 0.62 | 0.62 | 0.17 | 0.11 | | 0.17 | 0.11 | 0.23 | 0.72 | 0.62 | |
| v/c Ratio | 0.30 | 0.58 | 0.05 | 0.64 | 0.43 | | 0.12 | 0.14 | 0.42 | 0.13 | 0.45 | |
| Control Delay | 6.5 | 14.4 | 0.1 | 48.7 | 16.3 | | 32.2 | 42.1 | 19.9 | 5.6 | 10.3 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 6.5 | 14.4 | 0.1 | 48.7 | 16.3 | | 32.2 | 42.1 | 19.9 | 5.6 | 10.3 | |
| LOS | A | B | A | D | B | | C | D | B | A | B | |
| Approach Delay | | 13.2 | | | 35.7 | | | 23.9 | | 10.0 | | |
| Approach LOS | | B | | | D | | | C | | A | | |
| 90th %ile Green (s) | 8.0 | 53.7 | 53.7 | 6.5 | 12.3 | | 6.5 | 12.3 | 7.0 | 7.0 | 52.7 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Min | Min | Coord | |
| 70th %ile Green (s) | 7.6 | 57.0 | 57.0 | 6.5 | 9.0 | | 6.5 | 9.0 | 7.0 | 7.0 | 56.4 | |
| 70th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Min | Min | Coord | |
| 50th %ile Green (s) | 7.0 | 58.5 | 58.5 | 6.5 | 7.5 | | 6.5 | 7.5 | 7.0 | 7.0 | 58.5 | |
| 50th %ile Term Code | Min | Coord | Coord | Max | Hold | | Max | Gap | Min | Min | Coord | |
| 30th %ile Green (s) | 7.0 | 71.0 | 71.0 | 7.5 | 7.0 | | 0.0 | 0.0 | 7.0 | 7.0 | 71.0 | |
| 30th %ile Term Code | Min | Coord | Coord | Hold | Min | | Skip | Skip | Min | Min | Coord | |
| 10th %ile Green (s) | 7.0 | 71.0 | 71.0 | 7.5 | 7.0 | | 0.0 | 0.0 | 7.0 | 7.0 | 71.0 | |
| 10th %ile Term Code | Min | Coord | Coord | Hold | Min | | Skip | Skip | Min | Min | Coord | |
| Stops (vph) | 25 | 656 | 0 | 116 | 19 | | 17 | 15 | 74 | 11 | 250 | |
| Fuel Used(gal) | 1 | 12 | 0 | 3 | 1 | | 0 | 0 | 2 | 1 | 10 | |
| CO Emissions (g/hr) | 44 | 821 | 9 | 176 | 57 | | 30 | 27 | 173 | 39 | 703 | |
| NOx Emissions (g/hr) | 9 | 160 | 2 | 34 | 11 | | 6 | 5 | 34 | 8 | 137 | |
| VOC Emissions (g/hr) | 10 | 190 | 2 | 41 | 13 | | 7 | 6 | 40 | 9 | 163 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 1 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 23 | 246 | 0 | 93 | 7 | | 15 | 17 | 52 | 8 | 125 | |
| Queue Length 95th (ft) | 35 | 351 | 0 | 127 | 15 | | 30 | 27 | 110 | 18 | 147 | |
| Internal Link Dist (ft) | | 472 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | 150 | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 438 | 2054 | 1006 | 254 | 431 | | 232 | 439 | 453 | 386 | 1775 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.30 | 0.58 | 0.05 | 0.64 | 0.25 | | 0.12 | 0.06 | 0.41 | 0.12 | 0.45 | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 103 | |

| | |
|---|---|
| Actuated Cycle Length: 103 | |
| Offset: 0 (0%), Referenced to phase 2:SWL and 6:EBL, Start of Green | |
| Natural Cycle: 80 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.64 | |
| Intersection Signal Delay: 15.4 | Intersection LOS: B |
| Intersection Capacity Utilization 62.0% | ICU Level of Service B |
| Analysis Period (min) 15 | |

Splits and Phases: 1: Oak Meadow Dr. & S Royal Oaks



| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 28 | 1198 | 103 | 267 | 747 | 25 | 6 | 46 | 41 | 33 | 12 | 96 |
| Future Volume (vph) | 28 | 1198 | 103 | 267 | 747 | 25 | 6 | 46 | 41 | 33 | 12 | 96 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 12 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | | 1% | | | -2% | | | -1% | | | 2% | |
| Storage Length (ft) | 80 | | 135 | 220 | | 0 | 100 | | 0 | 120 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | 0.993 | | | 0.934 | | | 0.872 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1676 | 3438 | 1607 | 1787 | 3428 | 0 | 1754 | 1624 | 0 | 1787 | 1524 | 0 |
| Flt Permitted | 0.341 | | | 0.156 | | | 0.460 | | | 0.497 | | |
| Satd. Flow (perm) | 602 | 3438 | 1607 | 293 | 3428 | 0 | 849 | 1624 | 0 | 935 | 1524 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 82 | | 5 | | | 30 | | | 112 | |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1624 | | | 792 | | | 957 | | | 515 | |
| Travel Time (s) | | 36.9 | | | 18.0 | | | 21.8 | | | 11.7 | |
| Peak Hour Factor | 0.63 | 0.92 | 0.87 | 0.80 | 0.99 | 0.67 | 0.58 | 0.68 | 0.77 | 0.67 | 0.63 | 0.86 |
| Heavy Vehicles (%) | 0% | 1% | 0% | 2% | 2% | 4% | 0% | 11% | 0% | 0% | 10% | 3% |
| Adj. Flow (vph) | 44 | 1302 | 118 | 334 | 755 | 37 | 10 | 68 | 53 | 49 | 19 | 112 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 44 | 1302 | 118 | 334 | 792 | 0 | 10 | 121 | 0 | 49 | 131 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 0.99 | 1.03 | 0.99 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 1 | 0 | 1 | 1 | | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | 0 | 42 | 226 | | 42 | 42 | | 42 | 42 | |
| Trailing Detector (ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | 50 | 45 | 6 | | 45 | 45 | | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | D.Pm | NA | | D.Pm | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | | 4 | | | 8 | |
| Permitted Phases | 6 | | 6 | 2 | | | 8 | | | 4 | | |
| Detector Phase | 1 | 6 | | 5 | 2 | | 8 | 4 | | 4 | 8 | |
| Switch Phase | | | | | | | | | | | | |

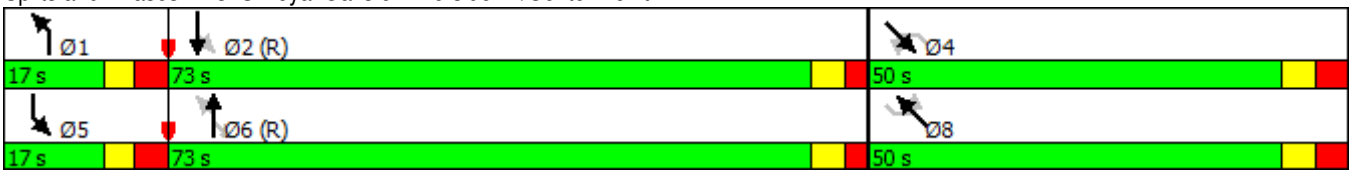
| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | |
| Minimum Split (s) | 17.0 | 73.0 | 73.0 | 17.0 | 73.0 | | 50.0 | 50.0 | | 50.0 | 50.0 | |
| Total Split (s) | 17.0 | 73.0 | 73.0 | 17.0 | 73.0 | | 50.0 | 50.0 | | 50.0 | 50.0 | |
| Total Split (%) | 12.1% | 52.1% | 52.1% | 12.1% | 52.1% | | 35.7% | 35.7% | | 35.7% | 35.7% | |
| Maximum Green (s) | 10.5 | 67.0 | 67.0 | 10.5 | 67.0 | | 43.0 | 43.0 | | 43.0 | 43.0 | |
| Yellow Time (s) | 3.0 | 3.5 | 3.5 | 3.0 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | 2.5 | 3.5 | 2.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | -3.0 | -1.0 | -3.0 | | -2.5 | -2.5 | | -2.5 | -2.5 | |
| Total Lost Time (s) | 5.5 | 3.0 | 3.0 | 5.5 | 3.0 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Recall Mode | None | C-Min | C-Min | None | C-Min | | None | None | | None | None | |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | | 8.0 | 8.0 | | 8.0 | 8.0 | |
| Flash Dont Walk (s) | | 16.0 | 16.0 | | 20.0 | | 35.0 | 32.0 | | 32.0 | 35.0 | |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 104.4 | 99.1 | 99.1 | 112.1 | 105.4 | | 16.4 | 16.4 | | 16.4 | 16.4 | |
| Actuated g/C Ratio | 0.75 | 0.71 | 0.71 | 0.80 | 0.75 | | 0.12 | 0.12 | | 0.12 | 0.12 | |
| v/c Ratio | 0.09 | 0.53 | 0.10 | 0.94 | 0.31 | | 0.10 | 0.56 | | 0.45 | 0.47 | |
| Control Delay | 3.9 | 11.1 | 2.9 | 57.5 | 4.9 | | 52.5 | 47.4 | | 69.1 | 18.8 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 3.9 | 11.1 | 2.9 | 57.5 | 4.9 | | 52.5 | 47.4 | | 69.1 | 18.8 | |
| LOS | A | B | A | E | A | | D | D | | E | B | |
| Approach Delay | | 10.2 | | | 20.5 | | | 47.8 | | | 32.5 | |
| Approach LOS | | B | | | C | | | D | | | C | |
| 90th %ile Green (s) | 7.7 | 89.8 | 89.8 | 10.5 | 92.6 | | 20.2 | 20.2 | | 20.2 | 20.2 | |
| 90th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 70th %ile Green (s) | 7.1 | 93.6 | 93.6 | 10.5 | 97.0 | | 16.4 | 16.4 | | 16.4 | 16.4 | |
| 70th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 50th %ile Green (s) | 6.7 | 96.1 | 96.1 | 10.5 | 99.9 | | 13.9 | 13.9 | | 13.9 | 13.9 | |
| 50th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 30th %ile Green (s) | 6.3 | 98.7 | 98.7 | 10.5 | 102.9 | | 11.3 | 11.3 | | 11.3 | 11.3 | |
| 30th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 10th %ile Green (s) | 0.0 | 102.4 | 102.4 | 10.5 | 119.4 | | 7.6 | 7.6 | | 7.6 | 7.6 | |
| 10th %ile Term Code | Skip | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| Stops (vph) | 7 | 543 | 11 | 209 | 252 | | 7 | 68 | | 30 | 24 | |
| Fuel Used(gal) | 0 | 21 | 1 | 6 | 7 | | 0 | 2 | | 1 | 1 | |
| CO Emissions (g/hr) | 29 | 1459 | 100 | 414 | 485 | | 10 | 130 | | 53 | 69 | |
| NOx Emissions (g/hr) | 6 | 284 | 19 | 81 | 94 | | 2 | 25 | | 10 | 13 | |
| VOC Emissions (g/hr) | 7 | 338 | 23 | 96 | 112 | | 2 | 30 | | 12 | 16 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 6 | 267 | 9 | 156 | 75 | | 9 | 83 | | 42 | 16 | |
| Queue Length 95th (ft) | 12 | 374 | 31 | m#192 | m228 | | 18 | 114 | | 60 | 24 | |
| Internal Link Dist (ft) | | 1544 | | | 712 | | | 877 | | | 435 | |
| Turn Bay Length (ft) | 80 | | 135 | 220 | | | 100 | | | 120 | | |
| Base Capacity (vph) | 553 | 2434 | 1161 | 357 | 2581 | | 275 | 548 | | 303 | 570 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |

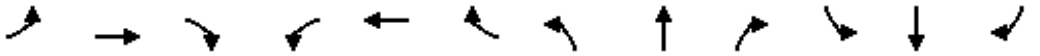
| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.08 | 0.53 | 0.10 | 0.94 | 0.31 | | 0.04 | 0.22 | | 0.16 | 0.23 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 139 (99%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.94 | | | |
| Intersection Signal Delay: 17.3 | | Intersection LOS: B | |
| Intersection Capacity Utilization 68.1% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |

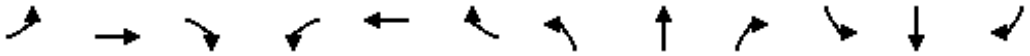
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: S Royal Oaks & Riverside Dr/Center Point Pl





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 112 | 772 | 60 | 831 | 993 | 281 | 99 | 239 | 988 | 225 | 202 | 82 |
| Future Volume (vph) | 112 | 772 | 60 | 831 | 993 | 281 | 99 | 239 | 988 | 225 | 202 | 82 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.988 | | | | 0.850 | | | 0.850 | | 0.959 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3235 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3235 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 10 | | | | 173 | | | | | 34 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 700 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 11.9 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.80 | 0.90 | 0.80 | 0.93 | 0.91 | 0.88 | 0.82 | 0.80 | 0.93 | 0.92 | 0.74 | 0.81 |
| Heavy Vehicles (%) | 3% | 6% | 2% | 3% | 6% | 3% | 4% | 2% | 2% | 2% | 4% | 2% |
| Adj. Flow (vph) | 140 | 858 | 75 | 894 | 1091 | 319 | 121 | 299 | 1062 | 245 | 273 | 101 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 140 | 933 | 0 | 894 | 1091 | 319 | 121 | 299 | 1062 | 245 | 374 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

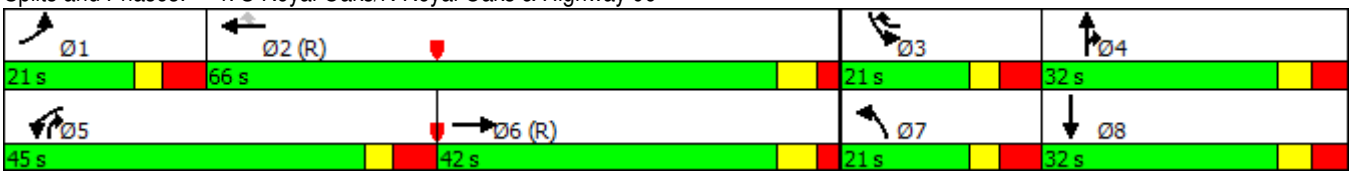


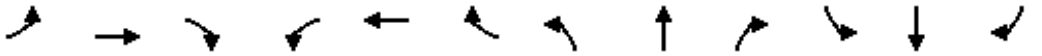
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (%) | 15.0% | 30.0% | | 32.1% | 47.1% | 15.0% | 15.0% | 22.9% | | 15.0% | 22.9% | |
| Maximum Green (s) | 13.5 | 35.5 | | 37.5 | 59.5 | 13.5 | 13.5 | 24.5 | | 13.5 | 24.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 13.5 | 38.4 | | 40.0 | 64.9 | 84.0 | 12.4 | 27.5 | 72.0 | 15.1 | 30.2 | |
| Actuated g/C Ratio | 0.10 | 0.27 | | 0.29 | 0.46 | 0.60 | 0.09 | 0.20 | 0.51 | 0.11 | 0.22 | |
| v/c Ratio | 0.43 | 0.72 | | 0.95 | 0.69 | 0.31 | 0.41 | 0.42 | 0.72 | 0.69 | 0.52 | |
| Control Delay | 76.9 | 41.3 | | 57.0 | 40.9 | 7.8 | 54.7 | 49.3 | 39.6 | 70.7 | 47.1 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 76.9 | 41.3 | | 57.0 | 40.9 | 7.8 | 54.7 | 49.3 | 39.6 | 70.7 | 47.1 | |
| LOS | E | D | | E | D | A | D | D | D | E | D | |
| Approach Delay | | 45.9 | | | 42.6 | | | 42.8 | | | 56.4 | |
| Approach LOS | | D | | | D | | | D | | | E | |
| 90th %ile Green (s) | 13.5 | 35.5 | | 37.5 | 59.5 | 13.5 | 13.3 | 24.5 | | 13.5 | 24.7 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 70th %ile Green (s) | 12.4 | 35.5 | | 37.5 | 60.6 | 13.5 | 11.6 | 24.5 | | 13.5 | 26.4 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 50th %ile Green (s) | 11.2 | 35.5 | | 37.5 | 61.8 | 13.5 | 10.4 | 24.5 | | 13.5 | 27.6 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 30th %ile Green (s) | 9.9 | 35.5 | | 37.5 | 63.1 | 13.5 | 9.2 | 24.5 | | 13.5 | 28.8 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 10th %ile Green (s) | 8.1 | 37.6 | | 37.5 | 67.0 | 11.4 | 7.5 | 24.5 | | 11.4 | 28.4 | |
| 10th %ile Term Code | Gap | Coord | | Max | Coord | Gap | Gap | Max | | Gap | Hold | |
| Stops (vph) | 110 | 737 | | 736 | 955 | 86 | 92 | 218 | 750 | 214 | 225 | |
| Fuel Used(gal) | 3 | 18 | | 24 | 26 | 4 | 2 | 5 | 18 | 6 | 6 | |
| CO Emissions (g/hr) | 235 | 1271 | | 1650 | 1796 | 249 | 155 | 355 | 1273 | 427 | 427 | |
| NOx Emissions (g/hr) | 46 | 247 | | 321 | 349 | 48 | 30 | 69 | 248 | 83 | 83 | |
| VOC Emissions (g/hr) | 55 | 295 | | 382 | 416 | 58 | 36 | 82 | 295 | 99 | 99 | |
| Dilemma Vehicles (#) | 0 | 28 | | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 69 | 284 | | 409 | 535 | 65 | 55 | 140 | 395 | 112 | 144 | |
| Queue Length 95th (ft) | 93 | 338 | | m435 | m554 | m109 | 78 | 153 | 655 | 159 | 159 | |
| Internal Link Dist (ft) | | 620 | | | 611 | | | 712 | | | 884 | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 388 | 1293 | | 938 | 1578 | 1045 | 370 | 714 | 1473 | 367 | 724 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.36 | 0.72 | | 0.95 | 0.69 | 0.31 | 0.33 | 0.42 | 0.72 | 0.67 | 0.52 | |

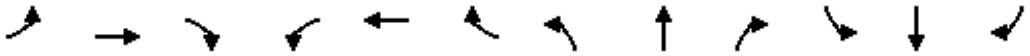
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 116 (83%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.95 | | | |
| Intersection Signal Delay: 44.9 | | Intersection LOS: D | |
| Intersection Capacity Utilization 70.5% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 4: S Royal Oaks/N Royal Oaks & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 1728 | 187 | 111 | 1055 | 0 | 0 | 0 | 0 | 355 | 0 | 1026 |
| Future Volume (vph) | 0 | 1728 | 187 | 111 | 1055 | 0 | 0 | 0 | 0 | 355 | 0 | 1026 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 182 | | | | | | | | | 117 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.91 | 0.90 | 0.86 | 0.87 | 1.00 | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 |
| Heavy Vehicles (%) | 2% | 3% | 7% | 1% | 3% | 2% | 2% | 2% | 2% | 6% | 2% | 3% |
| Adj. Flow (vph) | 0 | 1899 | 208 | 129 | 1213 | 0 | 0 | 0 | 0 | 418 | 0 | 1091 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 1899 | 208 | 129 | 1213 | 0 | 0 | 0 | 0 | 418 | 0 | 1091 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (%) | | 44.3% | 44.3% | 16.4% | 60.7% | | | | | 39.3% | | 39.3% |
| Maximum Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 60.5 | 60.5 | 15.5 | 81.0 | | | | | 49.5 | | 49.5 |
| Actuated g/C Ratio | | 0.43 | 0.43 | 0.11 | 0.58 | | | | | 0.35 | | 0.35 |
| v/c Ratio | | 0.69 | 0.28 | 0.65 | 0.62 | | | | | 0.36 | | 1.08 |
| Control Delay | | 25.9 | 4.8 | 71.1 | 19.1 | | | | | 34.6 | | 89.4 |
| Queue Delay | | 0.5 | 0.0 | 0.0 | 0.3 | | | | | 2.1 | | 0.0 |
| Total Delay | | 26.3 | 4.8 | 71.1 | 19.4 | | | | | 36.7 | | 89.4 |
| LOS | | C | A | E | B | | | | | D | | F |
| Approach Delay | | 24.2 | | | 24.3 | | | | | | | |
| Approach LOS | | C | | | C | | | | | | | |
| 90th %ile Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| 90th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 70th %ile Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| 70th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 50th %ile Green (s) | | 57.6 | 57.6 | 15.4 | 79.0 | | | | | 47.5 | | 47.5 |
| 50th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| 30th %ile Green (s) | | 59.8 | 59.8 | 13.2 | 79.0 | | | | | 47.5 | | 47.5 |
| 30th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| 10th %ile Green (s) | | 63.2 | 63.2 | 9.8 | 79.0 | | | | | 47.5 | | 47.5 |
| 10th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| Stops (vph) | | 1020 | 34 | 111 | 500 | | | | | 256 | | 827 |
| Fuel Used(gal) | | 33 | 2 | 3 | 13 | | | | | 6 | | 30 |
| CO Emissions (g/hr) | | 2313 | 142 | 218 | 908 | | | | | 431 | | 2069 |
| NOx Emissions (g/hr) | | 450 | 28 | 42 | 177 | | | | | 84 | | 403 |
| VOC Emissions (g/hr) | | 536 | 33 | 50 | 211 | | | | | 100 | | 480 |
| Dilemma Vehicles (#) | | 50 | 0 | 0 | 33 | | | | | 0 | | 0 |
| Queue Length 50th (ft) | | 295 | 20 | 125 | 282 | | | | | 144 | | ~586 |
| Queue Length 95th (ft) | | 388 | m50 | m163 | m294 | | | | | 178 | | #738 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2743 | 755 | 229 | 1960 | | | | | 1162 | | 1014 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 217 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 376 | 0 | 0 | 0 | | | | | 581 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.80 | 0.28 | 0.56 | 0.70 | | | | | 0.72 | | 1.08 |

Intersection Summary

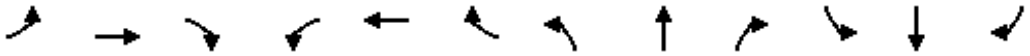
| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 106 (76%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.08 | | | |
| Intersection Signal Delay: 39.6 | | Intersection LOS: D | |
| Intersection Capacity Utilization 107.3% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

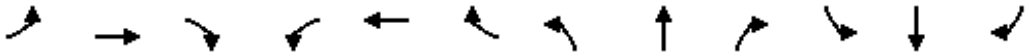
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Ent ramp to I-65/Exit ramp from I-65 & Highway 96



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1336 | 747 | 0 | 0 | 759 | 1217 | 407 | 0 | 364 | 0 | 0 | 0 |
| Future Volume (vph) | 1336 | 747 | 0 | 0 | 759 | 1217 | 407 | 0 | 364 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 23 | | | 258 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 311 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 5.3 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.88 | 0.86 | 0.95 | 1.00 | 0.95 | 0.98 | 0.95 | 0.25 | 0.92 | 1.00 | 1.00 | 0.95 |
| Heavy Vehicles (%) | 2% | 5% | 2% | 2% | 2% | 1% | 2% | 0% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 1518 | 869 | 0 | 0 | 799 | 1242 | 428 | 0 | 396 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 1518 | 869 | 0 | 0 | 799 | 1242 | 428 | 0 | 396 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (%) | 40.0% | 82.9% | | | 42.9% | | 17.1% | | 17.1% | | | |
| Maximum Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 50.0 | 110.0 | | | 53.5 | 79.5 | 16.5 | | 16.5 | | | |
| Actuated g/C Ratio | 0.36 | 0.79 | | | 0.38 | 0.57 | 0.12 | | 0.12 | | | |
| v/c Ratio | 1.29 | 0.33 | | | 0.59 | 0.77 | 1.10 | | 0.95 | | | |
| Control Delay | 186.0 | 3.2 | | | 36.7 | 27.0 | 131.0 | | 53.3 | | | |
| Queue Delay | 0.7 | 0.1 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 186.7 | 3.3 | | | 36.7 | 27.0 | 131.0 | | 53.3 | | | |
| LOS | F | A | | | D | C | F | | D | | | |
| Approach Delay | | 119.9 | | | 30.8 | | | | | | | |
| Approach LOS | | F | | | C | | | | | | | |
| 90th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 90th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 70th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 70th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 50th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 50th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 30th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 30th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 10th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 10th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| Stops (vph) | 979 | 101 | | | 591 | 899 | 348 | | 115 | | | |
| Fuel Used(gal) | 65 | 4 | | | 13 | 18 | 15 | | 7 | | | |
| CO Emissions (g/hr) | 4561 | 300 | | | 914 | 1264 | 1018 | | 455 | | | |
| NOx Emissions (g/hr) | 887 | 58 | | | 178 | 246 | 198 | | 89 | | | |
| VOC Emissions (g/hr) | 1057 | 70 | | | 212 | 293 | 236 | | 105 | | | |
| Dilemma Vehicles (#) | 0 | 17 | | | 27 | 0 | 0 | | 0 | | | |
| Queue Length 50th (ft) | ~899 | 68 | | | 303 | 468 | ~227 | | 135 | | | |
| Queue Length 95th (ft) | #1028 | 76 | | | 372 | 573 | #337 | | #341 | | | |
| Internal Link Dist (ft) | | 476 | | | 231 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1179 | 2598 | | | 1352 | 1607 | 389 | | 419 | | | |
| Starvation Cap Reductn | 163 | 612 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 1.49 | 0.44 | | | 0.59 | 0.77 | 1.10 | | 0.95 | | | |

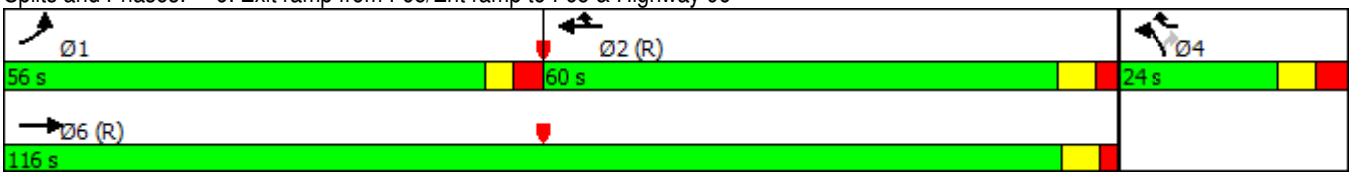
Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 122 (87%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.29 | | | |
| Intersection Signal Delay: 81.2 | | Intersection LOS: F | |
| Intersection Capacity Utilization 107.3% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 92 | 827 | 19 | 147 | 41 | 118 | 92 | 29 | 91 | 138 | 765 | 145 |
| Future Volume (vph) | 92 | 827 | 19 | 147 | 41 | 118 | 92 | 29 | 91 | 138 | 765 | 145 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 3 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | | 0.850 | | 0.896 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.950 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 3319 | 1531 | 1711 | 1613 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.097 | 0.950 | | 0.724 | | | 0.278 | | | 0.265 | | |
| Satd. Flow (perm) | 157 | 3319 | 1531 | 1304 | 1613 | 0 | 518 | 1925 | 1583 | 494 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 132 | | 93 | | | | 99 | | 132 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 552 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 12.5 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 137 | 880 | 30 | 186 | 71 | 162 | 123 | 50 | 99 | 184 | 1020 | 210 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 137 | 880 | 30 | 186 | 233 | 0 | 123 | 50 | 99 | 184 | 1230 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 30 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | 42 | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | 45 | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | Perm | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | 6 | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | 20.0 | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 18.0 | 57.0 | 57.0 | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 18.0 | 57.0 | 57.0 | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |
| Total Split (%) | 15.0% | 47.5% | 47.5% | 11.7% | 29.2% | | 11.7% | 29.2% | 11.7% | 11.7% | 44.2% | |
| Maximum Green (s) | 12.0 | 51.0 | 51.0 | 8.5 | 29.0 | | 8.5 | 29.0 | 8.0 | 8.0 | 47.0 | |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | -1.5 | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | 4.5 | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | 5.0 | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | C-Min | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 78.4 | 65.3 | 65.3 | 31.2 | 19.4 | | 30.6 | 19.1 | 33.0 | 74.3 | 63.1 | |
| Actuated g/C Ratio | 0.65 | 0.54 | 0.54 | 0.26 | 0.16 | | 0.26 | 0.16 | 0.28 | 0.62 | 0.53 | |
| v/c Ratio | 0.56 | 0.49 | 0.03 | 0.48 | 0.69 | | 0.51 | 0.16 | 0.20 | 0.45 | 0.80 | |
| Control Delay | 22.4 | 19.3 | 0.1 | 38.4 | 38.0 | | 39.3 | 41.7 | 6.4 | 12.4 | 27.4 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 22.4 | 19.3 | 0.1 | 38.4 | 38.0 | | 39.3 | 41.7 | 6.4 | 12.4 | 27.4 | |
| LOS | C | B | A | D | D | | D | D | A | B | C | |
| Approach Delay | | 19.1 | | | 38.2 | | | 27.8 | | 25.5 | | |
| Approach LOS | | B | | | D | | | C | | C | | |
| 90th %ile Green (s) | 12.0 | 54.9 | 54.9 | 8.5 | 25.1 | | 8.5 | 25.1 | 8.0 | 8.0 | 50.9 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 70th %ile Green (s) | 12.0 | 59.7 | 59.7 | 8.5 | 20.3 | | 8.5 | 20.3 | 8.0 | 8.0 | 55.7 | |
| 70th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 50th %ile Green (s) | 10.3 | 63.1 | 63.1 | 8.5 | 16.9 | | 8.5 | 16.9 | 8.0 | 8.0 | 60.8 | |
| 50th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 30th %ile Green (s) | 7.7 | 67.2 | 67.2 | 8.5 | 13.5 | | 8.5 | 13.5 | 7.3 | 7.3 | 66.8 | |
| 30th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Gap | Gap | Coord | |
| 10th %ile Green (s) | 7.0 | 73.9 | 73.9 | 21.6 | 8.6 | | 7.0 | 0.0 | 7.0 | 7.0 | 73.9 | |
| 10th %ile Term Code | Min | Coord | Coord | Hold | Gap | | Min | Skip | Min | Min | Coord | |
| Stops (vph) | 40 | 507 | 0 | 118 | 89 | | 69 | 23 | 12 | 56 | 640 | |
| Fuel Used(gal) | 1 | 10 | 0 | 3 | 3 | | 2 | 1 | 1 | 2 | 20 | |
| CO Emissions (g/hr) | 72 | 671 | 6 | 175 | 178 | | 139 | 46 | 56 | 168 | 1408 | |
| NOx Emissions (g/hr) | 14 | 131 | 1 | 34 | 35 | | 27 | 9 | 11 | 33 | 274 | |
| VOC Emissions (g/hr) | 17 | 156 | 1 | 41 | 41 | | 32 | 11 | 13 | 39 | 326 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 1 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 36 | 211 | 0 | 116 | 103 | | 74 | 34 | 0 | 49 | 395 | |
| Queue Length 95th (ft) | 56 | 308 | 0 | 142 | 80 | | 92 | 41 | 37 | 78 | 423 | |
| Internal Link Dist (ft) | | 472 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | 150 | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 270 | 1804 | 892 | 385 | 492 | | 248 | 505 | 512 | 418 | 1528 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.51 | 0.49 | 0.03 | 0.48 | 0.47 | | 0.50 | 0.10 | 0.19 | 0.44 | 0.80 | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 120 | |

| | |
|---|---|
| Actuated Cycle Length: 120 | |
| Offset: 117 (98%), Referenced to phase 2:SWL and 6:EBL, Start of Green | |
| Natural Cycle: 120 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.80 | |
| Intersection Signal Delay: 25.3 | Intersection LOS: C |
| Intersection Capacity Utilization 60.2% | ICU Level of Service B |
| Analysis Period (min) 15 | |

Splits and Phases: 1: Oak Meadow Dr. & S Royal Oaks

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 90 | 1063 | 27 | 232 | 1063 | 93 | 83 | 64 | 123 | 46 | 58 | 288 |
| Future Volume (vph) | 90 | 1063 | 27 | 232 | 1063 | 93 | 83 | 64 | 123 | 46 | 58 | 288 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 12 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | | 1% | | | -2% | | | -1% | | | 2% | |
| Storage Length (ft) | 80 | | 135 | 220 | | 0 | 100 | | 0 | 120 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | 0.986 | | | 0.906 | | | 0.877 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1676 | 3438 | 1575 | 1805 | 3444 | 0 | 1736 | 1672 | 0 | 1752 | 1595 | 0 |
| Flt Permitted | 0.156 | | | 0.144 | | | 0.168 | | | 0.392 | | |
| Satd. Flow (perm) | 275 | 3438 | 1575 | 274 | 3444 | 0 | 307 | 1672 | 0 | 723 | 1595 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 124 | | 12 | | | 57 | | | 158 | |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1624 | | | 792 | | | 957 | | | 515 | |
| Travel Time (s) | | 36.9 | | | 18.0 | | | 21.8 | | | 11.7 | |
| Peak Hour Factor | 0.79 | 0.95 | 0.64 | 0.75 | 0.90 | 0.76 | 0.86 | 0.71 | 0.82 | 0.75 | 0.88 | 0.94 |
| Heavy Vehicles (%) | 0% | 1% | 2% | 1% | 1% | 0% | 1% | 0% | 0% | 2% | 0% | 0% |
| Adj. Flow (vph) | 114 | 1119 | 42 | 309 | 1181 | 122 | 97 | 90 | 150 | 61 | 66 | 306 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 114 | 1119 | 42 | 309 | 1303 | 0 | 97 | 240 | 0 | 61 | 372 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 0.99 | 1.03 | 0.99 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 1 | 0 | 1 | 1 | | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | 0 | 42 | 226 | | 42 | 42 | | 42 | 42 | |
| Trailing Detector (ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | 50 | 45 | 6 | | 45 | 45 | | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | D.Pm | NA | | D.Pm | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | | 4 | | | 8 | |
| Permitted Phases | 6 | | 6 | 2 | | | 8 | | | 4 | | |
| Detector Phase | 1 | 6 | | 5 | 2 | | 8 | 4 | | 4 | 8 | |
| Switch Phase | | | | | | | | | | | | |

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | |
| Minimum Split (s) | 15.0 | 70.0 | 70.0 | 30.0 | 85.0 | | 50.0 | 50.0 | | 50.0 | 50.0 | |
| Total Split (s) | 14.0 | 72.0 | 72.0 | 29.0 | 87.0 | | 49.0 | 49.0 | | 49.0 | 49.0 | |
| Total Split (%) | 9.3% | 48.0% | 48.0% | 19.3% | 58.0% | | 32.7% | 32.7% | | 32.7% | 32.7% | |
| Maximum Green (s) | 7.5 | 66.0 | 66.0 | 22.5 | 81.0 | | 42.0 | 42.0 | | 42.0 | 42.0 | |
| Yellow Time (s) | 3.0 | 3.5 | 3.5 | 3.0 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | 2.5 | 3.5 | 2.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | -3.0 | -1.0 | -3.0 | | -2.5 | -2.5 | | -2.5 | -2.5 | |
| Total Lost Time (s) | 5.5 | 3.0 | 3.0 | 5.5 | 3.0 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Recall Mode | None | C-Min | C-Min | None | C-Min | | None | None | | None | None | |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | | 8.0 | 8.0 | | 8.0 | 8.0 | |
| Flash Dont Walk (s) | | 16.0 | 16.0 | | 20.0 | | 35.0 | 32.0 | | 32.0 | 35.0 | |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 86.2 | 80.3 | 80.3 | 103.3 | 92.2 | | 36.4 | 36.4 | | 36.4 | 36.4 | |
| Actuated g/C Ratio | 0.57 | 0.54 | 0.54 | 0.69 | 0.61 | | 0.24 | 0.24 | | 0.24 | 0.24 | |
| v/c Ratio | 0.49 | 0.61 | 0.05 | 0.78 | 0.61 | | 1.31 | 0.53 | | 0.35 | 0.73 | |
| Control Delay | 18.9 | 28.2 | 0.1 | 40.9 | 7.1 | | 246.3 | 34.1 | | 49.9 | 37.3 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 18.9 | 28.2 | 0.1 | 40.9 | 8.2 | | 246.3 | 34.1 | | 49.9 | 37.3 | |
| LOS | B | C | A | D | A | | F | C | | D | D | |
| Approach Delay | | 26.4 | | | 14.5 | | | 95.2 | | | 39.1 | |
| Approach LOS | | C | | | B | | | F | | | D | |
| 90th %ile Green (s) | 7.5 | 66.0 | 66.0 | 22.5 | 81.0 | | 42.0 | 42.0 | | 42.0 | 42.0 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Coord | | Max | Hold | | Hold | Max | |
| 70th %ile Green (s) | 7.5 | 66.0 | 66.0 | 22.5 | 81.0 | | 42.0 | 42.0 | | 42.0 | 42.0 | |
| 70th %ile Term Code | Max | Coord | Coord | Max | Coord | | Max | Hold | | Hold | Max | |
| 50th %ile Green (s) | 7.5 | 70.5 | 70.5 | 22.5 | 85.5 | | 37.5 | 37.5 | | 37.5 | 37.5 | |
| 50th %ile Term Code | Max | Coord | Coord | Max | Coord | | Gap | Hold | | Hold | Gap | |
| 30th %ile Green (s) | 7.5 | 82.8 | 82.8 | 17.8 | 93.1 | | 29.9 | 29.9 | | 29.9 | 29.9 | |
| 30th %ile Term Code | Max | Coord | Coord | Gap | Coord | | Gap | Hold | | Hold | Gap | |
| 10th %ile Green (s) | 6.8 | 101.4 | 101.4 | 10.8 | 105.4 | | 18.3 | 18.3 | | 18.3 | 18.3 | |
| 10th %ile Term Code | Gap | Coord | Coord | Gap | Coord | | Gap | Hold | | Hold | Gap | |
| Stops (vph) | 41 | 735 | 0 | 224 | 525 | | 67 | 124 | | 37 | 188 | |
| Fuel Used(gal) | 2 | 24 | 0 | 5 | 12 | | 5 | 3 | | 1 | 5 | |
| CO Emissions (g/hr) | 120 | 1651 | 24 | 322 | 819 | | 360 | 236 | | 60 | 353 | |
| NOx Emissions (g/hr) | 23 | 321 | 5 | 63 | 159 | | 70 | 46 | | 12 | 69 | |
| VOC Emissions (g/hr) | 28 | 383 | 6 | 75 | 190 | | 83 | 55 | | 14 | 82 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 37 | 427 | 0 | 146 | 64 | | ~113 | 157 | | 48 | 193 | |
| Queue Length 95th (ft) | 59 | 538 | 0 | m112 | m351 | | #217 | 170 | | 74 | 289 | |
| Internal Link Dist (ft) | | 1544 | | | 712 | | | 877 | | | 435 | |
| Turn Bay Length (ft) | 80 | | 135 | 220 | | | 100 | | | 120 | | |
| Base Capacity (vph) | 237 | 1841 | 900 | 429 | 2121 | | 91 | 536 | | 214 | 584 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 527 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.48 | 0.61 | 0.05 | 0.72 | 0.82 | | 1.07 | 0.45 | | 0.29 | 0.64 | |

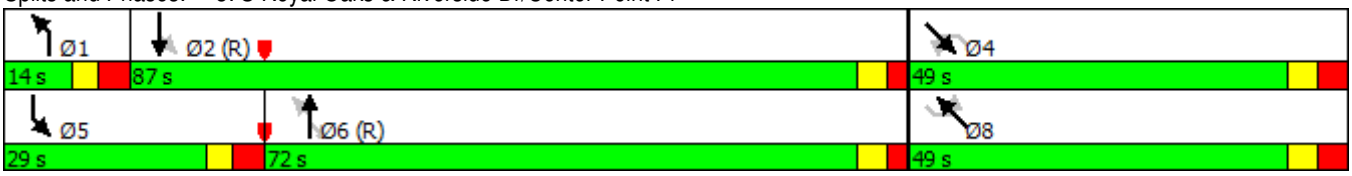
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 123 (82%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.31 | | | |
| Intersection Signal Delay: 29.0 | | Intersection LOS: C | |
| Intersection Capacity Utilization 84.3% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

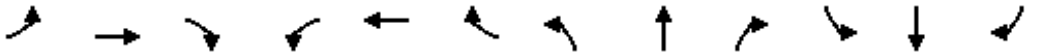
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

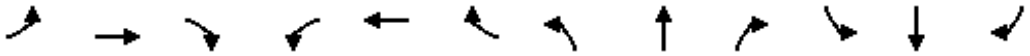
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: S Royal Oaks & Riverside Dr/Center Point Pl





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 206 | 1108 | 63 | 913 | 1174 | 269 | 141 | 351 | 964 | 316 | 434 | 178 |
| Future Volume (vph) | 206 | 1108 | 63 | 913 | 1174 | 269 | 141 | 351 | 964 | 316 | 434 | 178 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.991 | | | | 0.850 | | | 0.850 | | 0.951 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3319 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3319 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 7 | | | | 87 | | | | | 49 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 700 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 11.9 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.92 | 0.93 | 0.81 | 0.87 | 0.91 | 0.89 | 0.74 | 0.83 | 0.89 | 0.83 | 0.95 | 0.80 |
| Heavy Vehicles (%) | 1% | 1% | 0% | 1% | 2% | 1% | 0% | 0% | 1% | 0% | 0% | 0% |
| Adj. Flow (vph) | 224 | 1191 | 78 | 1049 | 1290 | 302 | 191 | 423 | 1083 | 381 | 457 | 223 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 224 | 1269 | 0 | 1049 | 1290 | 302 | 191 | 423 | 1083 | 381 | 680 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

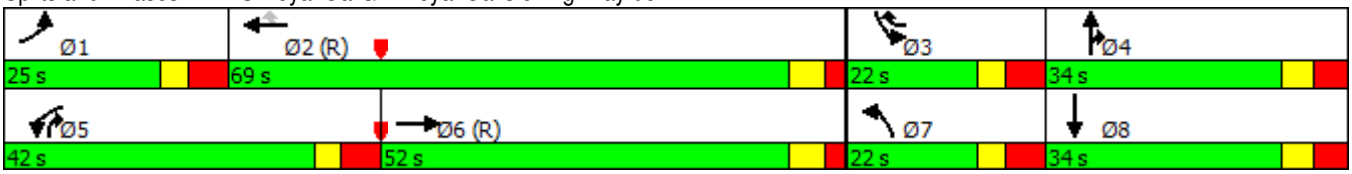


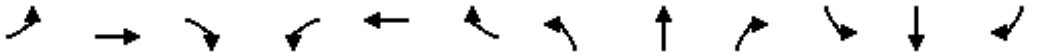
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (%) | 16.7% | 34.7% | | 28.0% | 46.0% | 14.7% | 14.7% | 22.7% | | 14.7% | 22.7% | |
| Maximum Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 17.3 | 48.0 | | 37.0 | 67.7 | 88.2 | 14.9 | 29.5 | 71.0 | 16.5 | 31.1 | |
| Actuated g/C Ratio | 0.12 | 0.32 | | 0.25 | 0.45 | 0.59 | 0.10 | 0.20 | 0.47 | 0.11 | 0.21 | |
| v/c Ratio | 0.56 | 0.80 | | 1.27 | 0.81 | 0.30 | 0.55 | 0.58 | 0.79 | 1.02 | 0.94 | |
| Control Delay | 68.7 | 44.7 | | 163.5 | 48.8 | 16.5 | 60.9 | 58.9 | 49.2 | 117.0 | 74.6 | |
| Queue Delay | 0.0 | 0.2 | | 0.2 | 0.6 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.3 | |
| Total Delay | 68.7 | 44.9 | | 163.7 | 49.4 | 16.5 | 61.1 | 58.9 | 49.2 | 117.0 | 74.9 | |
| LOS | E | D | | F | D | B | E | E | D | F | E | |
| Approach Delay | | 48.5 | | | 91.1 | | | 53.0 | | | 90.0 | |
| Approach LOS | | D | | | F | | | D | | | F | |
| 90th %ile Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | Max | Max | Max | | Max | Max | |
| 70th %ile Green (s) | 16.7 | 45.5 | | 34.5 | 63.3 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | Max | Max | Max | | Max | Max | |
| 50th %ile Green (s) | 15.1 | 45.5 | | 34.5 | 64.9 | 14.5 | 13.5 | 26.5 | | 14.5 | 27.5 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 30th %ile Green (s) | 13.4 | 45.5 | | 34.5 | 66.6 | 14.5 | 12.0 | 26.5 | | 14.5 | 29.0 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 10th %ile Green (s) | 11.1 | 45.5 | | 34.5 | 68.9 | 14.5 | 9.8 | 26.5 | | 14.5 | 31.2 | |
| 10th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| Stops (vph) | 191 | 937 | | 743 | 1069 | 205 | 134 | 321 | 787 | 280 | 514 | |
| Fuel Used(gal) | 6 | 25 | | 45 | 32 | 5 | 3 | 8 | 20 | 11 | 17 | |
| CO Emissions (g/hr) | 401 | 1777 | | 3150 | 2214 | 356 | 235 | 570 | 1395 | 800 | 1171 | |
| NOx Emissions (g/hr) | 78 | 346 | | 613 | 431 | 69 | 46 | 111 | 271 | 156 | 228 | |
| VOC Emissions (g/hr) | 93 | 412 | | 730 | 513 | 83 | 54 | 132 | 323 | 185 | 271 | |
| Dilemma Vehicles (#) | 0 | 44 | | 0 | 44 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 107 | 315 | | ~680 | 582 | 137 | 94 | 220 | 490 | ~203 | 327 | |
| Queue Length 95th (ft) | 155 | 369 | | m#521 | m521 | m130 | m109 | m236 | m692 | #272 | #465 | |
| Internal Link Dist (ft) | | 620 | | | 611 | | | 712 | | | 884 | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 462 | 1580 | | 826 | 1598 | 1007 | 383 | 730 | 1369 | 372 | 727 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 34 | | 29 | 84 | 0 | 10 | 0 | 0 | 0 | 2 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.48 | 0.82 | | 1.32 | 0.85 | 0.30 | 0.51 | 0.58 | 0.79 | 1.02 | 0.94 | |

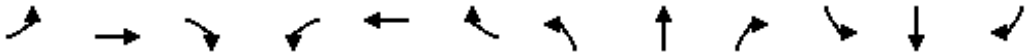
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 133 (89%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.27 | | | |
| Intersection Signal Delay: 72.3 | | Intersection LOS: E | |
| Intersection Capacity Utilization 87.4% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |
| ~ Volume exceeds capacity, queue is theoretically infinite. | | | |
| Queue shown is maximum after two cycles. | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | |
| Queue shown is maximum after two cycles. | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 4: S Royal Oaks/N Royal Oaks & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 1971 | 484 | 285 | 906 | 0 | 0 | 0 | 0 | 914 | 0 | 1405 |
| Future Volume (vph) | 0 | 1971 | 484 | 285 | 906 | 0 | 0 | 0 | 0 | 914 | 0 | 1405 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 403 | | | | | | | | | 143 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.93 | 0.78 | 0.71 | 0.86 | 1.00 | 1.00 | 1.00 | 1.00 | 0.87 | 1.00 | 0.88 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 1% | 1% | 2% | 2% | 2% | 2% | 1% | 2% | 1% |
| Adj. Flow (vph) | 0 | 2119 | 621 | 401 | 1053 | 0 | 0 | 0 | 0 | 1051 | 0 | 1597 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 2119 | 621 | 401 | 1053 | 0 | 0 | 0 | 0 | 1051 | 0 | 1597 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (%) | | 36.7% | 36.7% | 20.0% | 56.7% | | | | | 43.3% | | 43.3% |
| Maximum Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 51.0 | 51.0 | 25.0 | 81.0 | | | | | 59.5 | | 59.5 |
| Actuated g/C Ratio | | 0.34 | 0.34 | 0.17 | 0.54 | | | | | 0.40 | | 0.40 |
| v/c Ratio | | 0.97 | 0.77 | 1.35 | 0.56 | | | | | 0.77 | | 1.38 |
| Control Delay | | 69.9 | 30.6 | 226.6 | 25.0 | | | | | 43.9 | | 207.9 |
| Queue Delay | | 0.8 | 0.0 | 0.0 | 0.7 | | | | | 1.7 | | 0.0 |
| Total Delay | | 70.7 | 30.6 | 226.6 | 25.7 | | | | | 45.6 | | 207.9 |
| LOS | | E | C | F | C | | | | | D | | F |
| Approach Delay | | 61.6 | | | 81.1 | | | | | | | |
| Approach LOS | | E | | | F | | | | | | | |
| 90th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 90th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 70th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 70th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 50th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 50th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 30th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 30th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 10th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 10th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| Stops (vph) | | 1855 | 462 | 222 | 472 | | | | | 776 | | 985 |
| Fuel Used(gal) | | 62 | 11 | 16 | 13 | | | | | 18 | | 74 |
| CO Emissions (g/hr) | | 4349 | 802 | 1147 | 886 | | | | | 1262 | | 5163 |
| NOx Emissions (g/hr) | | 846 | 156 | 223 | 172 | | | | | 246 | | 1005 |
| VOC Emissions (g/hr) | | 1008 | 186 | 266 | 205 | | | | | 292 | | 1197 |
| Dilemma Vehicles (#) | | 105 | 0 | 0 | 45 | | | | | 0 | | 0 |
| Queue Length 50th (ft) | | 619 | 296 | ~524 | 272 | | | | | 457 | | ~1127 |
| Queue Length 95th (ft) | | m#672 | m295 | #520 | 407 | | | | | 515 | | #1235 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2178 | 804 | 297 | 1865 | | | | | 1368 | | 1160 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 446 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 14 | 0 | 0 | 0 | | | | | 166 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.98 | 0.77 | 1.35 | 0.74 | | | | | 0.87 | | 1.38 |

Intersection Summary

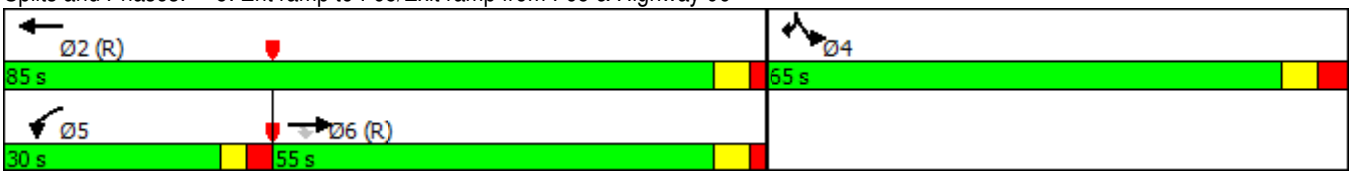
| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 104 (69%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.38 | | | |
| Intersection Signal Delay: 97.4 | | Intersection LOS: F | |
| Intersection Capacity Utilization 84.7% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

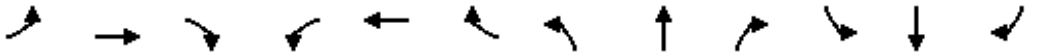
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

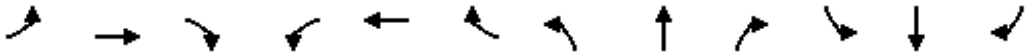
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Ent ramp to I-65/Exit ramp from I-65 & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 595 | 2290 | 0 | 0 | 882 | 998 | 309 | 0 | 164 | 0 | 0 | 0 |
| Future Volume (vph) | 595 | 2290 | 0 | 0 | 882 | 998 | 309 | 0 | 164 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 246 | | | 69 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 1845 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 31.4 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.97 | 0.98 | 1.00 | 0.25 | 0.91 | 0.93 | 0.92 | 1.00 | 0.87 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 3% | 3% | 2% | 0% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 2% |
| Adj. Flow (vph) | 613 | 2337 | 0 | 0 | 969 | 1073 | 336 | 0 | 189 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 613 | 2337 | 0 | 0 | 969 | 1073 | 336 | 0 | 189 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |

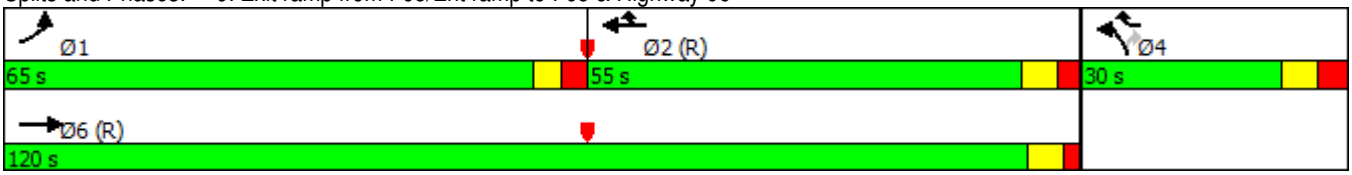


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (%) | 43.3% | 80.0% | | | 36.7% | | 20.0% | | 20.0% | | | |
| Maximum Green (s) | 59.0 | 114.0 | | | 48.5 | | 22.5 | | 22.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 35.9 | 114.7 | | | 72.3 | 103.6 | 21.8 | | 21.8 | | | |
| Actuated g/C Ratio | 0.24 | 0.76 | | | 0.48 | 0.69 | 0.15 | | 0.15 | | | |
| v/c Ratio | 0.78 | 0.91 | | | 0.57 | 0.54 | 0.70 | | 0.65 | | | |
| Control Delay | 79.7 | 23.8 | | | 30.4 | 10.0 | 69.4 | | 49.0 | | | |
| Queue Delay | 0.0 | 4.8 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 79.7 | 28.6 | | | 30.4 | 10.0 | 69.4 | | 49.0 | | | |
| LOS | E | C | | | C | B | E | | D | | | |
| Approach Delay | | 39.2 | | | 19.7 | | | | | | | |
| Approach LOS | | D | | | B | | | | | | | |
| 90th %ile Green (s) | 43.9 | 114.0 | | | 63.6 | | 22.5 | | 22.5 | | | |
| 90th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 70th %ile Green (s) | 39.0 | 114.0 | | | 68.5 | | 22.5 | | 22.5 | | | |
| 70th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 50th %ile Green (s) | 36.0 | 114.0 | | | 71.5 | | 22.5 | | 22.5 | | | |
| 50th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 30th %ile Green (s) | 33.0 | 114.0 | | | 74.5 | | 22.5 | | 22.5 | | | |
| 30th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 10th %ile Green (s) | 27.8 | 117.5 | | | 83.2 | | 19.0 | | 19.0 | | | |
| 10th %ile Term Code | Gap | Coord | | | Coord | | Gap | | Gap | | | |
| Stops (vph) | 588 | 1844 | | | 621 | 375 | 290 | | 100 | | | |
| Fuel Used(gal) | 18 | 38 | | | 23 | 18 | 7 | | 3 | | | |
| CO Emissions (g/hr) | 1236 | 2645 | | | 1580 | 1273 | 509 | | 208 | | | |
| NOx Emissions (g/hr) | 240 | 515 | | | 307 | 248 | 99 | | 40 | | | |
| VOC Emissions (g/hr) | 286 | 613 | | | 366 | 295 | 118 | | 48 | | | |
| Dilemma Vehicles (#) | 0 | 83 | | | 29 | 0 | 0 | | 0 | | | |
| Queue Length 50th (ft) | 329 | 582 | | | 353 | 205 | 162 | | 112 | | | |
| Queue Length 95th (ft) | m340 | m518 | | | 467 | 311 | 218 | | 190 | | | |
| Internal Link Dist (ft) | | 476 | | | 1765 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1286 | 2577 | | | 1704 | 2012 | 495 | | 298 | | | |
| Starvation Cap Reductn | 0 | 197 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 0.48 | 0.98 | | | 0.57 | 0.53 | 0.68 | | 0.63 | | | |

Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 138 (92%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.91 | | | |
| Intersection Signal Delay: 34.2 | | Intersection LOS: C | |
| Intersection Capacity Utilization 84.7% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 6: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



# HCS 2010 Two-Way Stop Control Summary Report

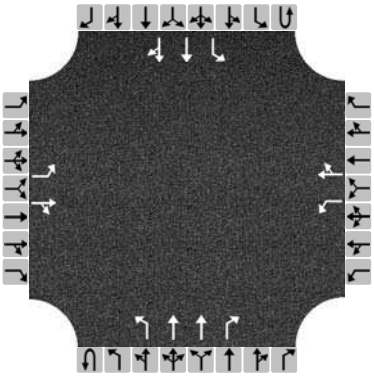
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Background) |

## Site Information

| | |
|---|---|
| Intersection | S. Royal Oaks and Rand |
| Jurisdiction | Franklin, TN |
| East/West Street | Rand Pl / Home Depot |
| North/South Street | S. Royal Oaks Blvd |
| Peak Hour Factor | 0.97 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 1 | 1 | 0 | | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 2 | 0 |
| Configuration | | L | | TR | | L | | TR | | L | T | R | | L | T | TR |
| Volume (veh/h) | | 26 | 1 | 9 | | 14 | 0 | 17 | | 10 | 1388 | 25 | | 61 | 645 | 51 |
| Percent Heavy Vehicles | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left + Thru | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 27 | | 10 | | 14 | | 18 | | 10 | | | | 63 | | |
| Capacity | | 165 | | 416 | | 108 | | 377 | | 893 | | | | 470 | | |
| v/c Ratio | | 0.16 | | 0.02 | | 0.13 | | 0.05 | | 0.01 | | | | 0.13 | | |
| 95% Queue Length | | 0.6 | | 0.1 | | 0.4 | | 0.1 | | 0.0 | | | | 0.5 | | |
| Control Delay (s/veh) | | 31.0 | | 13.9 | | 43.1 | | 15.0 | | 9.1 | | | | 13.8 | | |
| Level of Service (LOS) | | D | | B | | E | | C | | A | | | | B | | |
| Approach Delay (s/veh) | 26.4 | | | | 27.3 | | | | 0.1 | | | | 1.1 | | | |
| Approach LOS | D | | | | D | | | | A | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

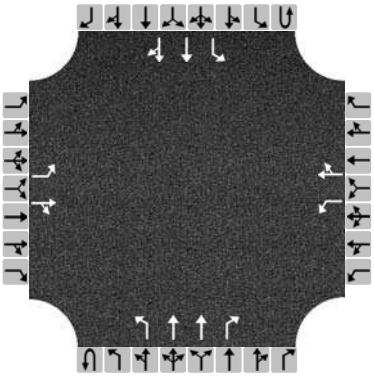
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Background) |

## Site Information

| | |
|---|---|
| Intersection | S. Royal Oaks and Rand |
| Jurisdiction | Franklin, TN |
| East/West Street | Rand Pl / Home Depot |
| North/South Street | S. Royal Oaks Blvd |
| Peak Hour Factor | 0.96 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 1 | 1 | 0 | | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 2 | 0 |
| Configuration | | L | | TR | | L | | TR | | L | T | R | | L | T | TR |
| Volume (veh/h) | | 26 | 3 | 16 | | 21 | 4 | 40 | | 6 | 984 | 17 | | 33 | 965 | 105 |
| Percent Heavy Vehicles | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left + Thru | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 27 | | 20 | | 22 | | 46 | | 6 | | | | 34 | | |
| Capacity | | 150 | | 355 | | 170 | | 419 | | 635 | | | | 675 | | |
| v/c Ratio | | 0.18 | | 0.06 | | 0.13 | | 0.11 | | 0.01 | | | | 0.05 | | |
| 95% Queue Length | | 0.6 | | 0.2 | | 0.4 | | 0.4 | | 0.0 | | | | 0.2 | | |
| Control Delay (s/veh) | | 34.1 | | 15.7 | | 29.2 | | 14.7 | | 10.7 | | | | 10.6 | | |
| Level of Service (LOS) | | D | | C | | D | | B | | B | | | | B | | |
| Approach Delay (s/veh) | 26.3 | | | | 19.4 | | | | 0.1 | | | | 0.3 | | | |
| Approach LOS | D | | | | C | | | | A | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

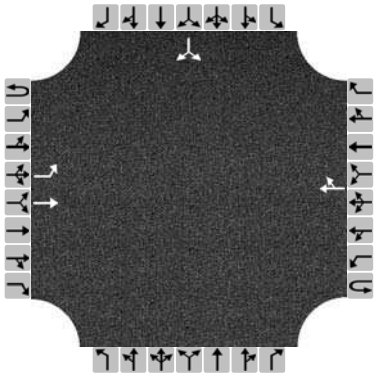
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Background) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and dwy |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Western Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 24 | 48 | | | | 198 | 0 | | | | | | 1 | | 9 |
| Percent Heavy Vehicles | | 0 | | | | | | | | | | | | 0 | | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

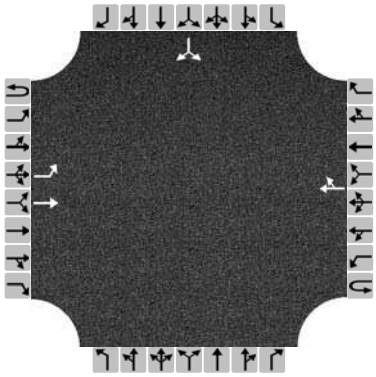
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 30 | | | | | | | | | | | | | 12 | |
| Capacity | | 1330 | | | | | | | | | | | | | 782 | |
| v/c Ratio | | 0.02 | | | | | | | | | | | | | 0.02 | |
| 95% Queue Length | | 0.1 | | | | | | | | | | | | | 0.0 | |
| Control Delay (s/veh) | | 7.8 | | | | | | | | | | | | | 9.7 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | A | |
| Approach Delay (s/veh) | 2.6 | | | | | | | | | | | | 9.7 | | | |
| Approach LOS | A | | | | | | | | | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | FTG | Intersection | Oak Meadow Dr and dwy |
| Agency/Co. | FTG | Jurisdiction | Franklin, TN |
| Date Performed | Mar 2016 | East/West Street | Oak Meadow Drive |
| Analysis Year | 2016 | North/South Street | Western Home Depot dwy |
| Time Analyzed | PM Peak Hour | Peak Hour Factor | 0.80 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | 10728 (Background) | | |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 24 | 174 | | | | 179 | 2 | | | | | | 16 | | 33 |
| Percent Heavy Vehicles | | 0 | | | | | | | | | | | | 0 | | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 30 | | | | | | | | | | | | | 61 | |
| Capacity | | 1355 | | | | | | | | | | | | | 726 | |
| v/c Ratio | | 0.02 | | | | | | | | | | | | | 0.08 | |
| 95% Queue Length | | 0.1 | | | | | | | | | | | | | 0.3 | |
| Control Delay (s/veh) | | 7.7 | | | | | | | | | | | | | 10.4 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | B | |
| Approach Delay (s/veh) | 0.9 | | | | | | | | | | | | 10.4 | | | |
| Approach LOS | A | | | | | | | | | | | | B | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

## TOTAL PROJECTED CONDITIONS

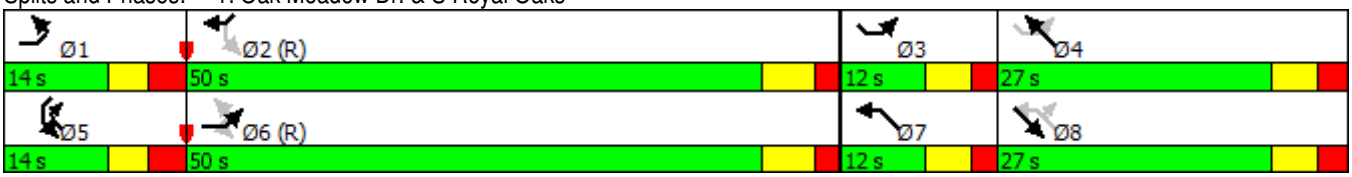
| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 87 | 1120 | 58 | 129 | 17 | 71 | 65 | 37 | 229 | 56 | 515 | 73 |
| Future Volume (vph) | 87 | 1120 | 58 | 129 | 17 | 71 | 65 | 37 | 229 | 56 | 515 | 73 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 3 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | | 0.850 | | 0.885 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.950 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 3319 | 1531 | 1711 | 1594 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.271 | 0.950 | | 0.715 | | | 0.495 | | | 0.170 | | |
| Satd. Flow (perm) | 437 | 3319 | 1531 | 1287 | 1594 | 0 | 922 | 1925 | 1583 | 317 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 154 | | 97 | | | | 90 | | 154 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 552 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 12.5 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 130 | 1191 | 92 | 163 | 29 | 97 | 87 | 64 | 249 | 75 | 687 | 106 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 130 | 1191 | 92 | 163 | 126 | 0 | 87 | 64 | 249 | 75 | 793 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 30 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | 42 | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | 45 | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | Perm | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | 6 | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | 20.0 | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 13.0 | 26.0 | 26.0 | 12.5 | 20.0 | | 12.5 | 20.0 | 13.0 | 13.0 | 26.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 14.0 | 50.0 | 50.0 | 12.0 | 27.0 | | 12.0 | 27.0 | 14.0 | 14.0 | 50.0 | |
| Total Split (%) | 13.6% | 48.5% | 48.5% | 11.7% | 26.2% | | 11.7% | 26.2% | 13.6% | 13.6% | 48.5% | |
| Maximum Green (s) | 8.0 | 44.0 | 44.0 | 6.5 | 21.0 | | 6.5 | 21.0 | 8.0 | 8.0 | 44.0 | |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | -1.5 | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | 4.5 | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | 5.0 | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | C-Min | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 71.0 | 60.1 | 60.1 | 20.0 | 12.3 | | 20.0 | 12.3 | 25.3 | 70.3 | 59.8 | |
| Actuated g/C Ratio | 0.69 | 0.58 | 0.58 | 0.19 | 0.12 | | 0.19 | 0.12 | 0.25 | 0.68 | 0.58 | |
| v/c Ratio | 0.32 | 0.61 | 0.10 | 0.57 | 0.46 | | 0.34 | 0.28 | 0.55 | 0.21 | 0.47 | |
| Control Delay | 7.7 | 16.8 | 0.5 | 41.9 | 18.6 | | 34.8 | 43.6 | 25.6 | 7.0 | 11.8 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 7.7 | 16.8 | 0.5 | 41.9 | 18.6 | | 34.8 | 43.6 | 25.6 | 7.0 | 11.8 | |
| LOS | A | B | A | D | B | | C | D | C | A | B | |
| Approach Delay | | 14.9 | | | 31.7 | | | 30.5 | | 11.4 | | |
| Approach LOS | | B | | | C | | | C | | B | | |
| 90th %ile Green (s) | 8.0 | 52.3 | 52.3 | 6.5 | 13.7 | | 6.5 | 13.7 | 7.0 | 7.0 | 51.3 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Min | Min | Coord | |
| 70th %ile Green (s) | 7.8 | 55.3 | 55.3 | 6.5 | 10.7 | | 6.5 | 10.7 | 7.0 | 7.0 | 54.5 | |
| 70th %ile Term Code | Gap | Coord | Coord | Max | Hold | | Max | Gap | Min | Min | Coord | |
| 50th %ile Green (s) | 7.0 | 56.6 | 56.6 | 6.5 | 9.4 | | 6.5 | 9.4 | 7.0 | 7.0 | 56.6 | |
| 50th %ile Term Code | Min | Coord | Coord | Max | Hold | | Max | Gap | Min | Min | Coord | |
| 30th %ile Green (s) | 7.0 | 57.9 | 57.9 | 6.5 | 8.1 | | 6.5 | 8.1 | 7.0 | 7.0 | 57.9 | |
| 30th %ile Term Code | Min | Coord | Coord | Max | Hold | | Max | Gap | Min | Min | Coord | |
| 10th %ile Green (s) | 7.0 | 71.0 | 71.0 | 7.5 | 7.0 | | 0.0 | 0.0 | 7.0 | 7.0 | 71.0 | |
| 10th %ile Term Code | Min | Coord | Coord | Hold | Min | | Skip | Skip | Min | Min | Coord | |
| Stops (vph) | 27 | 714 | 1 | 112 | 27 | | 51 | 33 | 126 | 18 | 271 | |
| Fuel Used(gal) | 1 | 13 | 0 | 2 | 1 | | 1 | 1 | 4 | 1 | 10 | |
| CO Emissions (g/hr) | 46 | 880 | 18 | 162 | 68 | | 96 | 62 | 270 | 62 | 724 | |
| NOx Emissions (g/hr) | 9 | 171 | 4 | 32 | 13 | | 19 | 12 | 52 | 12 | 141 | |
| VOC Emissions (g/hr) | 11 | 204 | 4 | 38 | 16 | | 22 | 14 | 63 | 14 | 168 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 2 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 25 | 258 | 0 | 91 | 17 | | 46 | 39 | 90 | 14 | 131 | |
| Queue Length 95th (ft) | 37 | 362 | 0 | 124 | 22 | | 69 | 48 | 161 | 26 | 152 | |
| Internal Link Dist (ft) | | 472 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | 150 | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 415 | 1937 | 957 | 287 | 438 | | 253 | 439 | 470 | 367 | 1681 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.31 | 0.61 | 0.10 | 0.57 | 0.29 | | 0.34 | 0.15 | 0.53 | 0.20 | 0.47 | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 103 | |

| | |
|---|---|
| Actuated Cycle Length: 103 | |
| Offset: 0 (0%), Referenced to phase 2:SWL and 6:EBL, Start of Green | |
| Natural Cycle: 80 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.61 | |
| Intersection Signal Delay: 17.6 | Intersection LOS: B |
| Intersection Capacity Utilization 62.0% | ICU Level of Service B |
| Analysis Period (min) 15 | |

Splits and Phases: 1: Oak Meadow Dr. & S Royal Oaks



| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 28 | 1276 | 103 | 274 | 770 | 25 | 6 | 46 | 41 | 33 | 12 | 118 |
| Future Volume (vph) | 28 | 1276 | 103 | 274 | 770 | 25 | 6 | 46 | 41 | 33 | 12 | 118 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 12 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | | 1% | | | -2% | | | -1% | | | 2% | |
| Storage Length (ft) | 80 | | 135 | 220 | | 0 | 100 | | 0 | 120 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | 0.993 | | | 0.934 | | | 0.868 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1676 | 3438 | 1607 | 1787 | 3428 | 0 | 1754 | 1624 | 0 | 1787 | 1520 | 0 |
| Flt Permitted | 0.332 | | | 0.138 | | | 0.368 | | | 0.497 | | |
| Satd. Flow (perm) | 586 | 3438 | 1607 | 260 | 3428 | 0 | 679 | 1624 | 0 | 935 | 1520 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 82 | | 5 | | | 30 | | | 137 | |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1624 | | | 792 | | | 957 | | | 515 | |
| Travel Time (s) | | 36.9 | | | 18.0 | | | 21.8 | | | 11.7 | |
| Peak Hour Factor | 0.63 | 0.92 | 0.87 | 0.80 | 0.99 | 0.67 | 0.58 | 0.68 | 0.77 | 0.67 | 0.63 | 0.86 |
| Heavy Vehicles (%) | 0% | 1% | 0% | 2% | 2% | 4% | 0% | 11% | 0% | 0% | 10% | 3% |
| Adj. Flow (vph) | 44 | 1387 | 118 | 343 | 778 | 37 | 10 | 68 | 53 | 49 | 19 | 137 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 44 | 1387 | 118 | 343 | 815 | 0 | 10 | 121 | 0 | 49 | 156 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 0.99 | 1.03 | 0.99 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 1 | 0 | 1 | 1 | | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | 0 | 42 | 226 | | 42 | 42 | | 42 | 42 | |
| Trailing Detector (ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | 50 | 45 | 6 | | 45 | 45 | | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | D.Pm | NA | | D.Pm | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | | 4 | | | 8 | |
| Permitted Phases | 6 | | 6 | 2 | | | 8 | | | 4 | | |
| Detector Phase | 1 | 6 | | 5 | 2 | | 8 | 4 | | 4 | 8 | |
| Switch Phase | | | | | | | | | | | | |

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | |
| Minimum Split (s) | 17.0 | 73.0 | 73.0 | 17.0 | 73.0 | | 50.0 | 50.0 | | 50.0 | 50.0 | |
| Total Split (s) | 17.0 | 73.0 | 73.0 | 17.0 | 73.0 | | 50.0 | 50.0 | | 50.0 | 50.0 | |
| Total Split (%) | 12.1% | 52.1% | 52.1% | 12.1% | 52.1% | | 35.7% | 35.7% | | 35.7% | 35.7% | |
| Maximum Green (s) | 10.5 | 67.0 | 67.0 | 10.5 | 67.0 | | 43.0 | 43.0 | | 43.0 | 43.0 | |
| Yellow Time (s) | 3.0 | 3.5 | 3.5 | 3.0 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | 2.5 | 3.5 | 2.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | -3.0 | -1.0 | -3.0 | | -2.5 | -2.5 | | -2.5 | -2.5 | |
| Total Lost Time (s) | 5.5 | 3.0 | 3.0 | 5.5 | 3.0 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Recall Mode | None | C-Min | C-Min | None | C-Min | | None | None | | None | None | |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | | 8.0 | 8.0 | | 8.0 | 8.0 | |
| Flash Dont Walk (s) | | 16.0 | 16.0 | | 20.0 | | 35.0 | 32.0 | | 32.0 | 35.0 | |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 104.4 | 99.1 | 99.1 | 112.1 | 105.4 | | 16.4 | 16.4 | | 16.4 | 16.4 | |
| Actuated g/C Ratio | 0.75 | 0.71 | 0.71 | 0.80 | 0.75 | | 0.12 | 0.12 | | 0.12 | 0.12 | |
| v/c Ratio | 0.09 | 0.57 | 0.10 | 1.03 | 0.32 | | 0.13 | 0.56 | | 0.45 | 0.52 | |
| Control Delay | 3.9 | 11.7 | 2.9 | 80.0 | 6.7 | | 55.7 | 49.1 | | 69.1 | 18.2 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 3.9 | 11.7 | 2.9 | 80.0 | 6.7 | | 55.7 | 49.1 | | 69.1 | 18.2 | |
| LOS | A | B | A | F | A | | E | D | | E | B | |
| Approach Delay | | 10.8 | | | 28.4 | | | 49.6 | | | 30.4 | |
| Approach LOS | | B | | | C | | | D | | | C | |
| 90th %ile Green (s) | 7.7 | 89.8 | 89.8 | 10.5 | 92.6 | | 20.2 | 20.2 | | 20.2 | 20.2 | |
| 90th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 70th %ile Green (s) | 7.1 | 93.6 | 93.6 | 10.5 | 97.0 | | 16.4 | 16.4 | | 16.4 | 16.4 | |
| 70th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 50th %ile Green (s) | 6.7 | 96.1 | 96.1 | 10.5 | 99.9 | | 13.9 | 13.9 | | 13.9 | 13.9 | |
| 50th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 30th %ile Green (s) | 6.3 | 98.7 | 98.7 | 10.5 | 102.9 | | 11.3 | 11.3 | | 11.3 | 11.3 | |
| 30th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 10th %ile Green (s) | 0.0 | 102.4 | 102.4 | 10.5 | 119.4 | | 7.6 | 7.6 | | 7.6 | 7.6 | |
| 10th %ile Term Code | Skip | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| Stops (vph) | 7 | 603 | 11 | 227 | 286 | | 7 | 68 | | 30 | 26 | |
| Fuel Used(gal) | 0 | 23 | 1 | 7 | 8 | | 0 | 2 | | 1 | 1 | |
| CO Emissions (g/hr) | 29 | 1574 | 100 | 518 | 529 | | 11 | 132 | | 53 | 80 | |
| NOx Emissions (g/hr) | 6 | 306 | 19 | 101 | 103 | | 2 | 26 | | 10 | 16 | |
| VOC Emissions (g/hr) | 7 | 365 | 23 | 120 | 123 | | 2 | 31 | | 12 | 19 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 6 | 296 | 9 | ~180 | 83 | | 9 | 82 | | 42 | 16 | |
| Queue Length 95th (ft) | 12 | 414 | 31 | m#181 | m343 | | 18 | 114 | | 60 | 21 | |
| Internal Link Dist (ft) | | 1544 | | | 712 | | | 877 | | | 435 | |
| Turn Bay Length (ft) | 80 | | 135 | 220 | | | 100 | | | 120 | | |
| Base Capacity (vph) | 542 | 2434 | 1161 | 333 | 2581 | | 220 | 548 | | 303 | 586 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.08 | 0.57 | 0.10 | 1.03 | 0.32 | | 0.05 | 0.22 | | 0.16 | 0.27 | |

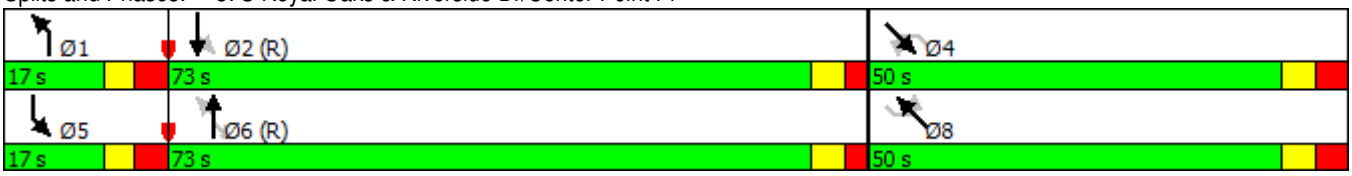
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 139 (99%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.03 | | | |
| Intersection Signal Delay: 20.5 | | Intersection LOS: C | |
| Intersection Capacity Utilization 70.6% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |

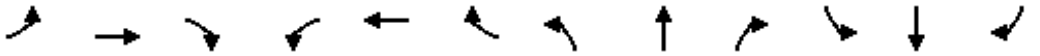
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

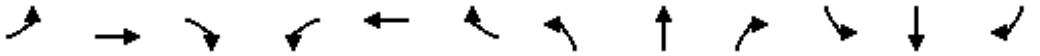
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: S Royal Oaks & Riverside Dr/Center Point Pl





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 112 | 772 | 60 | 850 | 993 | 281 | 99 | 272 | 1055 | 225 | 213 | 82 |
| Future Volume (vph) | 112 | 772 | 60 | 850 | 993 | 281 | 99 | 272 | 1055 | 225 | 213 | 82 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.988 | | | | 0.850 | | | 0.850 | | 0.961 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3241 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3241 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 10 | | | | 149 | | | | | 31 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 700 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 11.9 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.80 | 0.90 | 0.80 | 0.93 | 0.91 | 0.88 | 0.82 | 0.80 | 0.93 | 0.92 | 0.74 | 0.81 |
| Heavy Vehicles (%) | 3% | 6% | 2% | 3% | 6% | 3% | 4% | 2% | 2% | 2% | 4% | 2% |
| Adj. Flow (vph) | 140 | 858 | 75 | 914 | 1091 | 319 | 121 | 340 | 1134 | 245 | 288 | 101 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 140 | 933 | 0 | 914 | 1091 | 319 | 121 | 340 | 1134 | 245 | 389 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

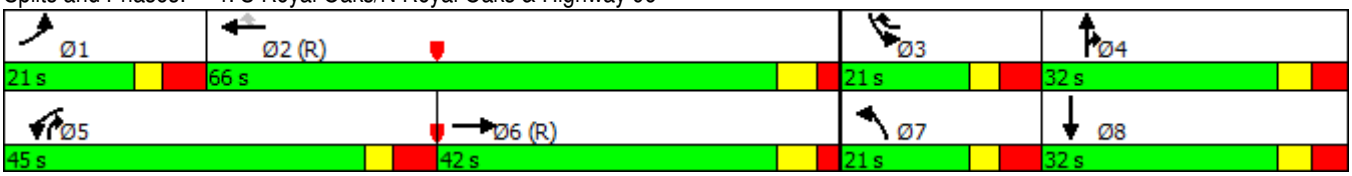


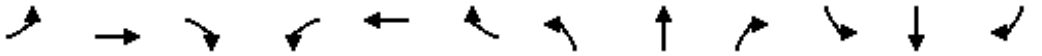
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (%) | 15.0% | 30.0% | | 32.1% | 47.1% | 15.0% | 15.0% | 22.9% | | 15.0% | 22.9% | |
| Maximum Green (s) | 13.5 | 35.5 | | 37.5 | 59.5 | 13.5 | 13.5 | 24.5 | | 13.5 | 24.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 13.5 | 38.4 | | 40.0 | 64.9 | 84.0 | 12.4 | 27.5 | 72.0 | 15.1 | 30.2 | |
| Actuated g/C Ratio | 0.10 | 0.27 | | 0.29 | 0.46 | 0.60 | 0.09 | 0.20 | 0.51 | 0.11 | 0.22 | |
| v/c Ratio | 0.43 | 0.72 | | 0.97 | 0.69 | 0.31 | 0.41 | 0.48 | 0.77 | 0.69 | 0.54 | |
| Control Delay | 76.9 | 41.3 | | 61.0 | 40.4 | 8.7 | 54.2 | 48.5 | 43.0 | 70.7 | 48.2 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 76.9 | 41.3 | | 61.0 | 40.4 | 8.7 | 54.2 | 48.5 | 43.0 | 70.7 | 48.2 | |
| LOS | E | D | | E | D | A | D | D | D | E | D | |
| Approach Delay | | 45.9 | | | 44.1 | | | 45.0 | | | 56.9 | |
| Approach LOS | | D | | | D | | | D | | | E | |
| 90th %ile Green (s) | 13.5 | 35.5 | | 37.5 | 59.5 | 13.5 | 13.3 | 24.5 | | 13.5 | 24.7 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 70th %ile Green (s) | 12.4 | 35.5 | | 37.5 | 60.6 | 13.5 | 11.6 | 24.5 | | 13.5 | 26.4 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 50th %ile Green (s) | 11.2 | 35.5 | | 37.5 | 61.8 | 13.5 | 10.4 | 24.5 | | 13.5 | 27.6 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 30th %ile Green (s) | 9.9 | 35.5 | | 37.5 | 63.1 | 13.5 | 9.2 | 24.5 | | 13.5 | 28.8 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 10th %ile Green (s) | 8.1 | 37.6 | | 37.5 | 67.0 | 11.4 | 7.5 | 24.5 | | 11.4 | 28.4 | |
| 10th %ile Term Code | Gap | Coord | | Max | Coord | Gap | Gap | Max | | Gap | Hold | |
| Stops (vph) | 110 | 736 | | 759 | 947 | 98 | 92 | 248 | 849 | 214 | 238 | |
| Fuel Used(gal) | 3 | 18 | | 25 | 25 | 4 | 2 | 6 | 20 | 6 | 6 | |
| CO Emissions (g/hr) | 235 | 1270 | | 1740 | 1782 | 261 | 155 | 401 | 1428 | 427 | 449 | |
| NOx Emissions (g/hr) | 46 | 247 | | 338 | 347 | 51 | 30 | 78 | 278 | 83 | 87 | |
| VOC Emissions (g/hr) | 55 | 294 | | 403 | 413 | 60 | 36 | 93 | 331 | 99 | 104 | |
| Dilemma Vehicles (#) | 0 | 28 | | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 69 | 284 | | 419 | 535 | 78 | 54 | 156 | 475 | 112 | 153 | |
| Queue Length 95th (ft) | 93 | 338 | | m#446 | m544 | m122 | 76 | 174 | 696 | 159 | 167 | |
| Internal Link Dist (ft) | | 620 | | | 611 | | | 712 | | | 884 | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 388 | 1293 | | 938 | 1578 | 1035 | 370 | 714 | 1473 | 367 | 723 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.36 | 0.72 | | 0.97 | 0.69 | 0.31 | 0.33 | 0.48 | 0.77 | 0.67 | 0.54 | |

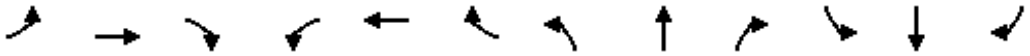
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 116 (83%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.97 | | | |
| Intersection Signal Delay: 46.1 | | Intersection LOS: D | |
| Intersection Capacity Utilization 71.7% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | |
| Queue shown is maximum after two cycles. | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 4: S Royal Oaks/N Royal Oaks & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 1786 | 196 | 111 | 1061 | 0 | 0 | 0 | 0 | 355 | 0 | 1039 |
| Future Volume (vph) | 0 | 1786 | 196 | 111 | 1061 | 0 | 0 | 0 | 0 | 355 | 0 | 1039 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 184 | | | | | | | | | 115 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.91 | 0.90 | 0.86 | 0.87 | 1.00 | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 |
| Heavy Vehicles (%) | 2% | 3% | 7% | 1% | 3% | 2% | 2% | 2% | 2% | 6% | 2% | 3% |
| Adj. Flow (vph) | 0 | 1963 | 218 | 129 | 1220 | 0 | 0 | 0 | 0 | 418 | 0 | 1105 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 1963 | 218 | 129 | 1220 | 0 | 0 | 0 | 0 | 418 | 0 | 1105 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (%) | | 44.3% | 44.3% | 16.4% | 60.7% | | | | | 39.3% | | 39.3% |
| Maximum Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 60.5 | 60.5 | 15.5 | 81.0 | | | | | 49.5 | | 49.5 |
| Actuated g/C Ratio | | 0.43 | 0.43 | 0.11 | 0.58 | | | | | 0.35 | | 0.35 |
| v/c Ratio | | 0.72 | 0.29 | 0.65 | 0.62 | | | | | 0.36 | | 1.09 |
| Control Delay | | 26.6 | 4.9 | 71.8 | 19.3 | | | | | 34.6 | | 94.9 |
| Queue Delay | | 0.8 | 0.0 | 0.0 | 0.3 | | | | | 2.1 | | 0.0 |
| Total Delay | | 27.3 | 4.9 | 71.8 | 19.5 | | | | | 36.7 | | 94.9 |
| LOS | | C | A | E | B | | | | | D | | F |
| Approach Delay | | 25.1 | | | 24.5 | | | | | | | |
| Approach LOS | | C | | | C | | | | | | | |
| 90th %ile Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| 90th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 70th %ile Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| 70th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 50th %ile Green (s) | | 57.6 | 57.6 | 15.4 | 79.0 | | | | | 47.5 | | 47.5 |
| 50th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| 30th %ile Green (s) | | 59.8 | 59.8 | 13.2 | 79.0 | | | | | 47.5 | | 47.5 |
| 30th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| 10th %ile Green (s) | | 63.2 | 63.2 | 9.8 | 79.0 | | | | | 47.5 | | 47.5 |
| 10th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| Stops (vph) | | 1114 | 37 | 111 | 497 | | | | | 256 | | 836 |
| Fuel Used(gal) | | 35 | 2 | 3 | 13 | | | | | 6 | | 31 |
| CO Emissions (g/hr) | | 2450 | 150 | 219 | 912 | | | | | 431 | | 2177 |
| NOx Emissions (g/hr) | | 477 | 29 | 43 | 177 | | | | | 84 | | 423 |
| VOC Emissions (g/hr) | | 568 | 35 | 51 | 211 | | | | | 100 | | 504 |
| Dilemma Vehicles (#) | | 50 | 0 | 0 | 34 | | | | | 0 | | 0 |
| Queue Length 50th (ft) | | 324 | 26 | 124 | 283 | | | | | 144 | | ~602 |
| Queue Length 95th (ft) | | 406 | m47 | m164 | m297 | | | | | 178 | | #754 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2743 | 756 | 229 | 1960 | | | | | 1162 | | 1012 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 215 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 420 | 0 | 0 | 0 | | | | | 581 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.85 | 0.29 | 0.56 | 0.70 | | | | | 0.72 | | 1.09 |

Intersection Summary

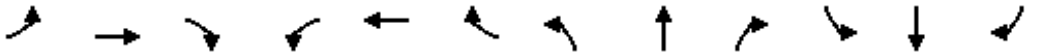
| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 106 (76%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.09 | | | |
| Intersection Signal Delay: 41.2 | | Intersection LOS: D | |
| Intersection Capacity Utilization 108.6% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

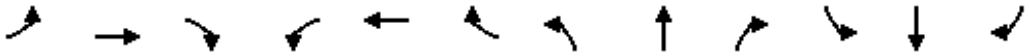
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Ent ramp to I-65/Exit ramp from I-65 & Highway 96



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1382 | 759 | 0 | 0 | 764 | 1217 | 408 | 0 | 364 | 0 | 0 | 0 |
| Future Volume (vph) | 1382 | 759 | 0 | 0 | 764 | 1217 | 408 | 0 | 364 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 23 | | | 252 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 311 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 5.3 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.88 | 0.86 | 0.95 | 1.00 | 0.95 | 0.98 | 0.95 | 0.25 | 0.92 | 1.00 | 1.00 | 0.95 |
| Heavy Vehicles (%) | 2% | 5% | 2% | 2% | 2% | 1% | 2% | 0% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 1570 | 883 | 0 | 0 | 804 | 1242 | 429 | 0 | 396 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 1570 | 883 | 0 | 0 | 804 | 1242 | 429 | 0 | 396 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (%) | 40.0% | 82.9% | | | 42.9% | | 17.1% | | 17.1% | | | |
| Maximum Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 50.0 | 110.0 | | | 53.5 | 79.5 | 16.5 | | 16.5 | | | |
| Actuated g/C Ratio | 0.36 | 0.79 | | | 0.38 | 0.57 | 0.12 | | 0.12 | | | |
| v/c Ratio | 1.33 | 0.34 | | | 0.59 | 0.77 | 1.10 | | 0.96 | | | |
| Control Delay | 204.9 | 3.4 | | | 36.8 | 27.0 | 131.8 | | 56.6 | | | |
| Queue Delay | 0.7 | 0.1 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 205.5 | 3.5 | | | 36.8 | 27.0 | 131.8 | | 56.6 | | | |
| LOS | F | A | | | D | C | F | | E | | | |
| Approach Delay | | 132.8 | | | 30.8 | | | | | | | |
| Approach LOS | | F | | | C | | | | | | | |
| 90th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 90th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 70th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 70th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 50th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 50th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 30th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 30th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 10th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 10th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| Stops (vph) | 1007 | 107 | | | 597 | 899 | 350 | | 119 | | | |
| Fuel Used(gal) | 73 | 4 | | | 13 | 18 | 15 | | 7 | | | |
| CO Emissions (g/hr) | 5085 | 310 | | | 923 | 1264 | 1025 | | 474 | | | |
| NOx Emissions (g/hr) | 989 | 60 | | | 180 | 246 | 200 | | 92 | | | |
| VOC Emissions (g/hr) | 1179 | 72 | | | 214 | 293 | 238 | | 110 | | | |
| Dilemma Vehicles (#) | 0 | 18 | | | 27 | 0 | 0 | | 0 | | | |
| Queue Length 50th (ft) | ~952 | 67 | | | 306 | 468 | ~228 | | 142 | | | |
| Queue Length 95th (ft) | #1078 | 75 | | | 375 | 573 | #338 | | #351 | | | |
| Internal Link Dist (ft) | | 476 | | | 231 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1179 | 2598 | | | 1352 | 1607 | 389 | | 414 | | | |
| Starvation Cap Reductn | 163 | 623 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 1.55 | 0.45 | | | 0.59 | 0.77 | 1.10 | | 0.96 | | | |

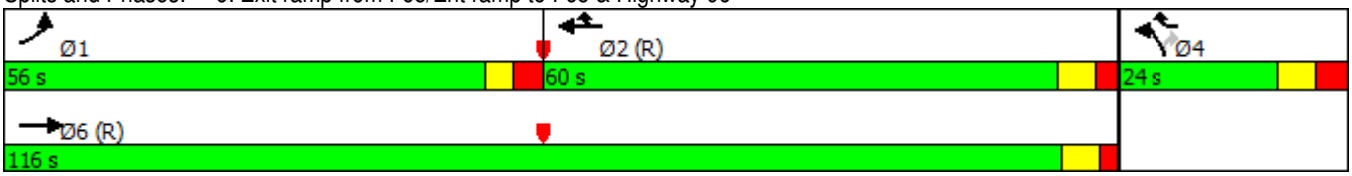
Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 122 (87%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.33 | | | |
| Intersection Signal Delay: 87.9 | | Intersection LOS: F | |
| Intersection Capacity Utilization 108.6% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 92 | 827 | 45 | 147 | 56 | 118 | 114 | 38 | 121 | 191 | 765 | 145 |
| Future Volume (vph) | 92 | 827 | 45 | 147 | 56 | 118 | 114 | 38 | 121 | 191 | 765 | 145 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 3 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | | 0.850 | | 0.906 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.950 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 3319 | 1531 | 1711 | 1631 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.083 | 0.950 | | 0.704 | | | 0.285 | | | 0.252 | | |
| Satd. Flow (perm) | 134 | 3319 | 1531 | 1268 | 1631 | 0 | 531 | 1925 | 1583 | 469 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 132 | | 68 | | | | 132 | | 132 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 552 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 12.5 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 137 | 880 | 71 | 186 | 97 | 162 | 152 | 66 | 132 | 255 | 1020 | 210 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 137 | 880 | 71 | 186 | 259 | 0 | 152 | 66 | 132 | 255 | 1230 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 30 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | 42 | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | 45 | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | Perm | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | 6 | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | 20.0 | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 18.0 | 57.0 | 57.0 | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 18.0 | 57.0 | 57.0 | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |
| Total Split (%) | 15.0% | 47.5% | 47.5% | 11.7% | 29.2% | | 11.7% | 29.2% | 11.7% | 11.7% | 44.2% | |
| Maximum Green (s) | 12.0 | 51.0 | 51.0 | 8.5 | 29.0 | | 8.5 | 29.0 | 8.0 | 8.0 | 47.0 | |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | -1.5 | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | 4.5 | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | 5.0 | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | C-Min | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 74.5 | 61.4 | 61.4 | 34.8 | 22.9 | | 34.2 | 21.9 | 36.8 | 70.9 | 59.5 | |
| Actuated g/C Ratio | 0.62 | 0.51 | 0.51 | 0.29 | 0.19 | | 0.28 | 0.18 | 0.31 | 0.59 | 0.50 | |
| v/c Ratio | 0.61 | 0.52 | 0.08 | 0.44 | 0.71 | | 0.58 | 0.19 | 0.23 | 0.65 | 0.85 | |
| Control Delay | 29.2 | 22.0 | 0.2 | 34.6 | 43.2 | | 39.1 | 39.7 | 5.3 | 20.8 | 31.8 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 29.2 | 22.0 | 0.2 | 34.6 | 43.2 | | 39.1 | 39.7 | 5.3 | 20.8 | 31.8 | |
| LOS | C | C | A | C | D | | D | D | A | C | C | |
| Approach Delay | | 21.5 | | | 39.6 | | | 26.5 | | 29.9 | | |
| Approach LOS | | C | | | D | | | C | | C | | |
| 90th %ile Green (s) | 12.0 | 51.3 | 51.3 | 8.5 | 28.7 | | 8.5 | 28.7 | 8.0 | 8.0 | 47.3 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 70th %ile Green (s) | 12.0 | 56.1 | 56.1 | 8.5 | 23.9 | | 8.5 | 23.9 | 8.0 | 8.0 | 52.1 | |
| 70th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 50th %ile Green (s) | 10.3 | 59.6 | 59.6 | 8.5 | 20.4 | | 8.5 | 20.4 | 8.0 | 8.0 | 57.3 | |
| 50th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 30th %ile Green (s) | 7.7 | 63.0 | 63.0 | 8.5 | 17.0 | | 8.5 | 17.0 | 8.0 | 8.0 | 63.3 | |
| 30th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 10th %ile Green (s) | 7.0 | 69.4 | 69.4 | 25.5 | 11.9 | | 7.6 | 0.0 | 7.6 | 7.6 | 70.0 | |
| 10th %ile Term Code | Min | Coord | Coord | Hold | Gap | | Gap | Skip | Gap | Gap | Coord | |
| Stops (vph) | 47 | 542 | 0 | 112 | 120 | | 84 | 31 | 14 | 89 | 658 | |
| Fuel Used(gal) | 1 | 10 | 0 | 2 | 3 | | 2 | 1 | 1 | 4 | 21 | |
| CO Emissions (g/hr) | 84 | 717 | 14 | 165 | 215 | | 171 | 59 | 71 | 260 | 1472 | |
| NOx Emissions (g/hr) | 16 | 139 | 3 | 32 | 42 | | 33 | 12 | 14 | 51 | 286 | |
| VOC Emissions (g/hr) | 19 | 166 | 3 | 38 | 50 | | 40 | 14 | 17 | 60 | 341 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 2 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 42 | 226 | 0 | 111 | 140 | | 88 | 43 | 0 | 78 | 422 | |
| Queue Length 95th (ft) | 70 | 328 | 0 | 135 | 108 | | 105 | 49 | 40 | 116 | 447 | |
| Internal Link Dist (ft) | | 472 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | 150 | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 254 | 1697 | 847 | 421 | 478 | | 265 | 505 | 578 | 391 | 1448 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.54 | 0.52 | 0.08 | 0.44 | 0.54 | | 0.57 | 0.13 | 0.23 | 0.65 | 0.85 | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 120 | |

| | |
|---|---|
| Actuated Cycle Length: 120 | |
| Offset: 117 (98%), Referenced to phase 2:SWL and 6:EBL, Start of Green | |
| Natural Cycle: 120 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.85 | |
| Intersection Signal Delay: 28.1 | Intersection LOS: C |
| Intersection Capacity Utilization 64.4% | ICU Level of Service C |
| Analysis Period (min) 15 | |

Splits and Phases: 1: Oak Meadow Dr. & S Royal Oaks

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 90 | 1103 | 27 | 263 | 1126 | 93 | 83 | 64 | 123 | 46 | 58 | 300 |
| Future Volume (vph) | 90 | 1103 | 27 | 263 | 1126 | 93 | 83 | 64 | 123 | 46 | 58 | 300 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 12 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | | 1% | | | -2% | | | -1% | | | 2% | |
| Storage Length (ft) | 80 | | 135 | 220 | | 0 | 100 | | 0 | 120 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | 0.987 | | | 0.906 | | | 0.876 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1676 | 3438 | 1575 | 1805 | 3447 | 0 | 1736 | 1672 | 0 | 1752 | 1593 | 0 |
| Flt Permitted | 0.138 | | | 0.121 | | | 0.168 | | | 0.405 | | |
| Satd. Flow (perm) | 243 | 3438 | 1575 | 230 | 3447 | 0 | 307 | 1672 | 0 | 747 | 1593 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 124 | | 11 | | | 57 | | | 165 | |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1624 | | | 792 | | | 957 | | | 515 | |
| Travel Time (s) | | 36.9 | | | 18.0 | | | 21.8 | | | 11.7 | |
| Peak Hour Factor | 0.79 | 0.95 | 0.64 | 0.75 | 0.90 | 0.76 | 0.86 | 0.71 | 0.82 | 0.75 | 0.88 | 0.94 |
| Heavy Vehicles (%) | 0% | 1% | 2% | 1% | 1% | 0% | 1% | 0% | 0% | 2% | 0% | 0% |
| Adj. Flow (vph) | 114 | 1161 | 42 | 351 | 1251 | 122 | 97 | 90 | 150 | 61 | 66 | 319 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 114 | 1161 | 42 | 351 | 1373 | 0 | 97 | 240 | 0 | 61 | 385 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 0.99 | 1.03 | 0.99 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 1 | 0 | 1 | 1 | | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | 0 | 42 | 226 | | 42 | 42 | | 42 | 42 | |
| Trailing Detector (ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | 50 | 45 | 6 | | 45 | 45 | | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | D.Pm | NA | | D.Pm | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | | 4 | | | 8 | |
| Permitted Phases | 6 | | 6 | 2 | | | 8 | | | 4 | | |
| Detector Phase | 1 | 6 | | 5 | 2 | | 8 | 4 | | 4 | 8 | |
| Switch Phase | | | | | | | | | | | | |

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | |
| Minimum Split (s) | 15.0 | 70.0 | 70.0 | 30.0 | 85.0 | | 50.0 | 50.0 | | 50.0 | 50.0 | |
| Total Split (s) | 14.0 | 72.0 | 72.0 | 29.0 | 87.0 | | 49.0 | 49.0 | | 49.0 | 49.0 | |
| Total Split (%) | 9.3% | 48.0% | 48.0% | 19.3% | 58.0% | | 32.7% | 32.7% | | 32.7% | 32.7% | |
| Maximum Green (s) | 7.5 | 66.0 | 66.0 | 22.5 | 81.0 | | 42.0 | 42.0 | | 42.0 | 42.0 | |
| Yellow Time (s) | 3.0 | 3.5 | 3.5 | 3.0 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | 2.5 | 3.5 | 2.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | -3.0 | -1.0 | -3.0 | | -2.5 | -2.5 | | -2.5 | -2.5 | |
| Total Lost Time (s) | 5.5 | 3.0 | 3.0 | 5.5 | 3.0 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Recall Mode | None | C-Min | C-Min | None | C-Min | | None | None | | None | None | |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | | 8.0 | 8.0 | | 8.0 | 8.0 | |
| Flash Dont Walk (s) | | 16.0 | 16.0 | | 20.0 | | 35.0 | 32.0 | | 32.0 | 35.0 | |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 82.2 | 76.3 | 76.3 | 102.1 | 90.7 | | 37.9 | 37.9 | | 37.9 | 37.9 | |
| Actuated g/C Ratio | 0.55 | 0.51 | 0.51 | 0.68 | 0.60 | | 0.25 | 0.25 | | 0.25 | 0.25 | |
| v/c Ratio | 0.54 | 0.66 | 0.05 | 0.89 | 0.66 | | 1.26 | 0.52 | | 0.32 | 0.73 | |
| Control Delay | 22.5 | 31.3 | 0.1 | 50.6 | 9.5 | | 225.4 | 33.3 | | 48.0 | 36.4 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 22.5 | 31.3 | 0.1 | 50.6 | 11.9 | | 225.4 | 33.3 | | 48.0 | 36.4 | |
| LOS | C | C | A | D | B | | F | C | | D | D | |
| Approach Delay | | 29.5 | | | 19.8 | | | 88.6 | | | 38.0 | |
| Approach LOS | | C | | | B | | | F | | | D | |
| 90th %ile Green (s) | 7.5 | 66.0 | 66.0 | 22.5 | 81.0 | | 42.0 | 42.0 | | 42.0 | 42.0 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Coord | | Max | Hold | | Hold | Max | |
| 70th %ile Green (s) | 7.5 | 66.0 | 66.0 | 22.5 | 81.0 | | 42.0 | 42.0 | | 42.0 | 42.0 | |
| 70th %ile Term Code | Max | Coord | Coord | Max | Coord | | Max | Hold | | Hold | Max | |
| 50th %ile Green (s) | 7.5 | 67.5 | 67.5 | 22.5 | 82.5 | | 40.5 | 40.5 | | 40.5 | 40.5 | |
| 50th %ile Term Code | Max | Coord | Coord | Max | Coord | | Gap | Hold | | Hold | Gap | |
| 30th %ile Green (s) | 7.5 | 75.6 | 75.6 | 22.5 | 90.6 | | 32.4 | 32.4 | | 32.4 | 32.4 | |
| 30th %ile Term Code | Max | Coord | Coord | Max | Coord | | Gap | Hold | | Hold | Gap | |
| 10th %ile Green (s) | 6.9 | 91.3 | 91.3 | 19.2 | 103.6 | | 20.0 | 20.0 | | 20.0 | 20.0 | |
| 10th %ile Term Code | Gap | Coord | Coord | Gap | Coord | | Gap | Hold | | Hold | Gap | |
| Stops (vph) | 43 | 813 | 0 | 282 | 618 | | 68 | 125 | | 35 | 193 | |
| Fuel Used(gal) | 2 | 25 | 0 | 6 | 13 | | 5 | 3 | | 1 | 5 | |
| CO Emissions (g/hr) | 125 | 1781 | 24 | 412 | 929 | | 336 | 234 | | 58 | 360 | |
| NOx Emissions (g/hr) | 24 | 347 | 5 | 80 | 181 | | 65 | 46 | | 11 | 70 | |
| VOC Emissions (g/hr) | 29 | 413 | 6 | 95 | 215 | | 78 | 54 | | 13 | 84 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 40 | 471 | 0 | 205 | 162 | | ~107 | 158 | | 47 | 194 | |
| Queue Length 95th (ft) | 59 | 567 | 0 | m133 | m599 | | #217 | 176 | | 74 | 300 | |
| Internal Link Dist (ft) | | 1544 | | | 712 | | | 877 | | | 435 | |
| Turn Bay Length (ft) | 80 | | 135 | 220 | | | 100 | | | 120 | | |
| Base Capacity (vph) | 214 | 1748 | 861 | 403 | 2089 | | 91 | 536 | | 221 | 588 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 562 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.53 | 0.66 | 0.05 | 0.87 | 0.90 | | 1.07 | 0.45 | | 0.28 | 0.65 | |

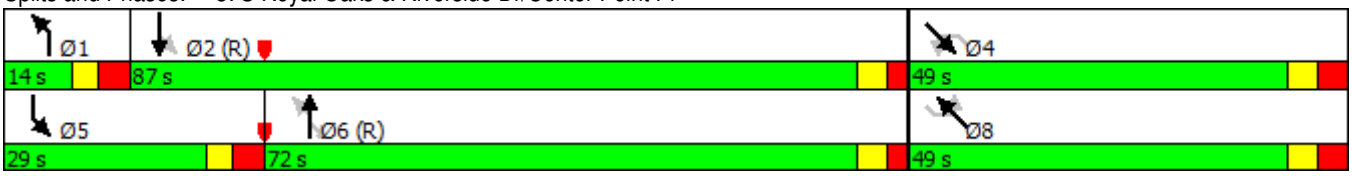
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 123 (82%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.26 | | | |
| Intersection Signal Delay: 31.3 | | Intersection LOS: C | |
| Intersection Capacity Utilization 87.9% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

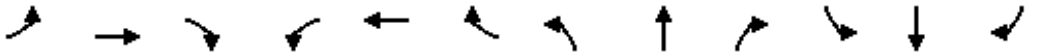
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

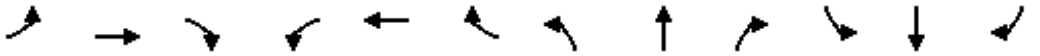
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: S Royal Oaks & Riverside Dr/Center Point Pl





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 206 | 1108 | 63 | 976 | 1174 | 269 | 141 | 368 | 999 | 316 | 465 | 178 |
| Future Volume (vph) | 206 | 1108 | 63 | 976 | 1174 | 269 | 141 | 368 | 999 | 316 | 465 | 178 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.991 | | | | 0.850 | | | 0.850 | | 0.953 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3326 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3326 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 7 | | | | 87 | | | | | 44 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 700 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 11.9 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.92 | 0.93 | 0.81 | 0.87 | 0.91 | 0.89 | 0.74 | 0.83 | 0.89 | 0.83 | 0.95 | 0.80 |
| Heavy Vehicles (%) | 1% | 1% | 0% | 1% | 2% | 1% | 0% | 0% | 1% | 0% | 0% | 0% |
| Adj. Flow (vph) | 224 | 1191 | 78 | 1122 | 1290 | 302 | 191 | 443 | 1122 | 381 | 489 | 223 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 224 | 1269 | 0 | 1122 | 1290 | 302 | 191 | 443 | 1122 | 381 | 712 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

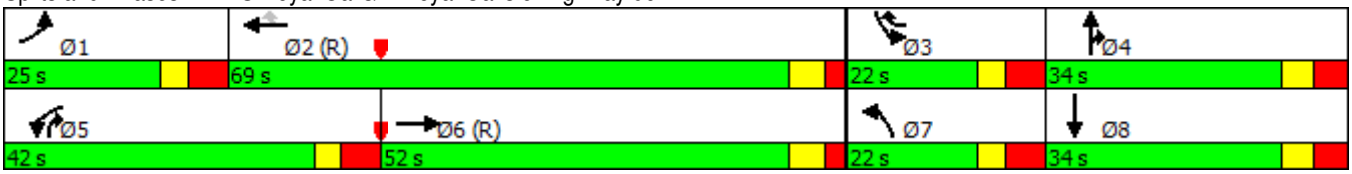


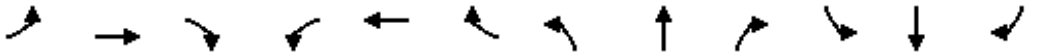
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (%) | 16.7% | 34.7% | | 28.0% | 46.0% | 14.7% | 14.7% | 22.7% | | 14.7% | 22.7% | |
| Maximum Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 17.3 | 48.0 | | 37.0 | 67.7 | 88.2 | 14.9 | 29.5 | 71.0 | 16.5 | 31.1 | |
| Actuated g/C Ratio | 0.12 | 0.32 | | 0.25 | 0.45 | 0.59 | 0.10 | 0.20 | 0.47 | 0.11 | 0.21 | |
| v/c Ratio | 0.56 | 0.80 | | 1.36 | 0.81 | 0.30 | 0.55 | 0.61 | 0.82 | 1.02 | 0.98 | |
| Control Delay | 68.7 | 44.7 | | 200.8 | 49.2 | 16.6 | 58.5 | 59.9 | 52.2 | 117.0 | 84.1 | |
| Queue Delay | 0.0 | 0.3 | | 0.3 | 0.6 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.5 | |
| Total Delay | 68.7 | 45.0 | | 201.1 | 49.8 | 16.6 | 58.6 | 59.9 | 52.3 | 117.0 | 84.6 | |
| LOS | E | D | | F | D | B | E | E | D | F | F | |
| Approach Delay | | 48.6 | | | 108.6 | | | 54.9 | | | 95.9 | |
| Approach LOS | | D | | | F | | | D | | | F | |
| 90th %ile Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | Max | Max | Max | | Max | Max | |
| 70th %ile Green (s) | 16.7 | 45.5 | | 34.5 | 63.3 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | Max | Max | Max | | Max | Max | |
| 50th %ile Green (s) | 15.1 | 45.5 | | 34.5 | 64.9 | 14.5 | 13.5 | 26.5 | | 14.5 | 27.5 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 30th %ile Green (s) | 13.4 | 45.5 | | 34.5 | 66.6 | 14.5 | 12.0 | 26.5 | | 14.5 | 29.0 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 10th %ile Green (s) | 11.1 | 45.5 | | 34.5 | 68.9 | 14.5 | 9.8 | 26.5 | | 14.5 | 31.2 | |
| 10th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| Stops (vph) | 191 | 938 | | 759 | 1064 | 208 | 133 | 346 | 815 | 280 | 539 | |
| Fuel Used(gal) | 6 | 25 | | 55 | 32 | 5 | 3 | 9 | 21 | 11 | 19 | |
| CO Emissions (g/hr) | 401 | 1778 | | 3861 | 2216 | 359 | 230 | 606 | 1488 | 800 | 1315 | |
| NOx Emissions (g/hr) | 78 | 346 | | 751 | 431 | 70 | 45 | 118 | 289 | 156 | 256 | |
| VOC Emissions (g/hr) | 93 | 412 | | 895 | 514 | 83 | 53 | 140 | 345 | 185 | 305 | |
| Dilemma Vehicles (#) | 0 | 44 | | 0 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 107 | 316 | | ~759 | 580 | 139 | 94 | 228 | 581 | ~203 | ~352 | |
| Queue Length 95th (ft) | 155 | 368 | | m#567 | m517 | m125 | m105 | m249 | m716 | #272 | #505 | |
| Internal Link Dist (ft) | | 620 | | | 611 | | | 712 | | | 884 | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 462 | 1580 | | 826 | 1598 | 1007 | 383 | 730 | 1369 | 372 | 725 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 48 | | 46 | 84 | 0 | 10 | 0 | 0 | 0 | 2 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.48 | 0.83 | | 1.44 | 0.85 | 0.30 | 0.51 | 0.61 | 0.83 | 1.02 | 0.98 | |

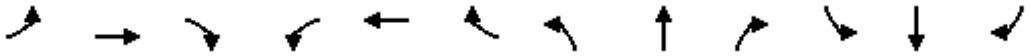
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 133 (89%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.36 | | | |
| Intersection Signal Delay: 80.6 | | Intersection LOS: F | |
| Intersection Capacity Utilization 90.0% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |
| ~ Volume exceeds capacity, queue is theoretically infinite. | | | |
| Queue shown is maximum after two cycles. | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | |
| Queue shown is maximum after two cycles. | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 4: S Royal Oaks/N Royal Oaks & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 2002 | 488 | 285 | 925 | 0 | 0 | 0 | 0 | 914 | 0 | 1449 |
| Future Volume (vph) | 0 | 2002 | 488 | 285 | 925 | 0 | 0 | 0 | 0 | 914 | 0 | 1449 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 400 | | | | | | | | | 135 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.93 | 0.78 | 0.71 | 0.86 | 1.00 | 1.00 | 1.00 | 1.00 | 0.87 | 1.00 | 0.88 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 1% | 1% | 2% | 2% | 2% | 2% | 1% | 2% | 1% |
| Adj. Flow (vph) | 0 | 2153 | 626 | 401 | 1076 | 0 | 0 | 0 | 0 | 1051 | 0 | 1647 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 2153 | 626 | 401 | 1076 | 0 | 0 | 0 | 0 | 1051 | 0 | 1647 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (%) | | 36.7% | 36.7% | 20.0% | 56.7% | | | | | 43.3% | | 43.3% |
| Maximum Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 51.0 | 51.0 | 25.0 | 81.0 | | | | | 59.5 | | 59.5 |
| Actuated g/C Ratio | | 0.34 | 0.34 | 0.17 | 0.54 | | | | | 0.40 | | 0.40 |
| v/c Ratio | | 0.99 | 0.78 | 1.35 | 0.58 | | | | | 0.77 | | 1.43 |
| Control Delay | | 71.6 | 30.4 | 226.4 | 26.5 | | | | | 43.9 | | 229.0 |
| Queue Delay | | 1.3 | 0.0 | 0.0 | 0.9 | | | | | 1.8 | | 0.0 |
| Total Delay | | 72.9 | 30.4 | 226.4 | 27.4 | | | | | 45.7 | | 229.0 |
| LOS | | E | C | F | C | | | | | D | | F |
| Approach Delay | | 63.3 | | | 81.4 | | | | | | | |
| Approach LOS | | E | | | F | | | | | | | |
| 90th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 90th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 70th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 70th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 50th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 50th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 30th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 30th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 10th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 10th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| Stops (vph) | | 1873 | 465 | 222 | 498 | | | | | 776 | | 998 |
| Fuel Used(gal) | | 64 | 12 | 16 | 13 | | | | | 18 | | 82 |
| CO Emissions (g/hr) | | 4459 | 807 | 1146 | 935 | | | | | 1262 | | 5755 |
| NOx Emissions (g/hr) | | 868 | 157 | 223 | 182 | | | | | 246 | | 1120 |
| VOC Emissions (g/hr) | | 1033 | 187 | 266 | 217 | | | | | 292 | | 1334 |
| Dilemma Vehicles (#) | | 105 | 0 | 0 | 51 | | | | | 0 | | 0 |
| Queue Length 50th (ft) | | 634 | 325 | ~525 | 287 | | | | | 457 | | ~1192 |
| Queue Length 95th (ft) | | m#692 | m295 | #521 | 430 | | | | | 515 | | #1297 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2178 | 802 | 297 | 1865 | | | | | 1368 | | 1155 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 464 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 14 | 0 | 0 | 0 | | | | | 172 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.99 | 0.78 | 1.35 | 0.77 | | | | | 0.88 | | 1.43 |

Intersection Summary

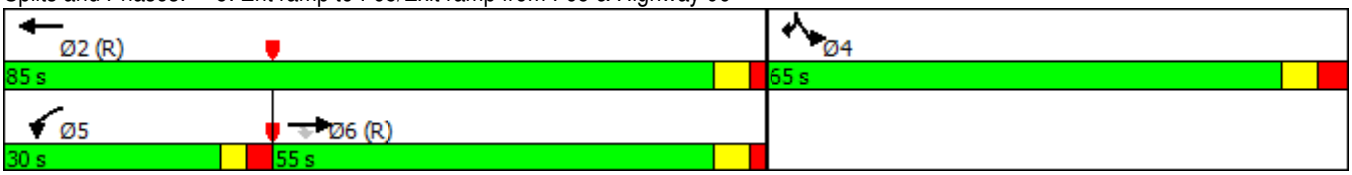
| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 104 (69%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.43 | | | |
| Intersection Signal Delay: 103.7 | | Intersection LOS: F | |
| Intersection Capacity Utilization 84.9% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

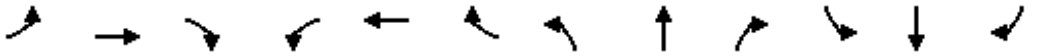
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

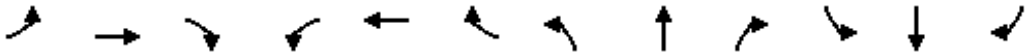
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Ent ramp to I-65/Exit ramp from I-65 & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 619 | 2297 | 0 | 0 | 895 | 998 | 315 | 0 | 164 | 0 | 0 | 0 |
| Future Volume (vph) | 619 | 2297 | 0 | 0 | 895 | 998 | 315 | 0 | 164 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 226 | | | 69 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 1845 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 31.4 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.97 | 0.98 | 1.00 | 0.25 | 0.91 | 0.93 | 0.92 | 1.00 | 0.87 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 3% | 3% | 2% | 0% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 2% |
| Adj. Flow (vph) | 638 | 2344 | 0 | 0 | 984 | 1073 | 342 | 0 | 189 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 638 | 2344 | 0 | 0 | 984 | 1073 | 342 | 0 | 189 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |

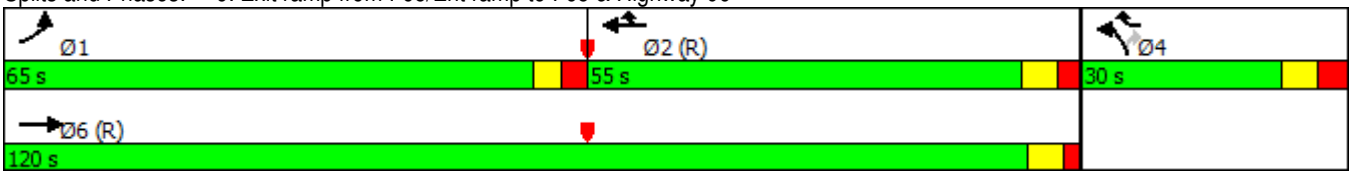


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (%) | 43.3% | 80.0% | | | 36.7% | | 20.0% | | 20.0% | | | |
| Maximum Green (s) | 59.0 | 114.0 | | | 48.5 | | 22.5 | | 22.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 37.2 | 114.6 | | | 70.9 | 102.3 | 21.9 | | 21.9 | | | |
| Actuated g/C Ratio | 0.25 | 0.76 | | | 0.47 | 0.68 | 0.15 | | 0.15 | | | |
| v/c Ratio | 0.79 | 0.91 | | | 0.59 | 0.54 | 0.71 | | 0.65 | | | |
| Control Delay | 79.7 | 23.9 | | | 31.8 | 10.9 | 69.9 | | 48.9 | | | |
| Queue Delay | 0.0 | 5.4 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 79.7 | 29.3 | | | 31.8 | 10.9 | 69.9 | | 48.9 | | | |
| LOS | E | C | | | C | B | E | | D | | | |
| Approach Delay | | 40.1 | | | 20.9 | | | | | | | |
| Approach LOS | | D | | | C | | | | | | | |
| 90th %ile Green (s) | 45.2 | 114.0 | | | 62.3 | | 22.5 | | 22.5 | | | |
| 90th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 70th %ile Green (s) | 40.9 | 114.0 | | | 66.6 | | 22.5 | | 22.5 | | | |
| 70th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 50th %ile Green (s) | 37.2 | 114.0 | | | 70.3 | | 22.5 | | 22.5 | | | |
| 50th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 30th %ile Green (s) | 34.1 | 114.0 | | | 73.4 | | 22.5 | | 22.5 | | | |
| 30th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 10th %ile Green (s) | 28.8 | 117.2 | | | 81.9 | | 19.3 | | 19.3 | | | |
| 10th %ile Term Code | Gap | Coord | | | Coord | | Gap | | Gap | | | |
| Stops (vph) | 610 | 1847 | | | 646 | 395 | 295 | | 100 | | | |
| Fuel Used(gal) | 18 | 38 | | | 23 | 19 | 7 | | 3 | | | |
| CO Emissions (g/hr) | 1284 | 2656 | | | 1632 | 1299 | 521 | | 208 | | | |
| NOx Emissions (g/hr) | 250 | 517 | | | 317 | 253 | 101 | | 40 | | | |
| VOC Emissions (g/hr) | 298 | 615 | | | 378 | 301 | 121 | | 48 | | | |
| Dilemma Vehicles (#) | 0 | 83 | | | 30 | 0 | 0 | | 0 | | | |
| Queue Length 50th (ft) | 342 | 589 | | | 366 | 218 | 165 | | 112 | | | |
| Queue Length 95th (ft) | m344 | m499 | | | 485 | 327 | 222 | | 190 | | | |
| Internal Link Dist (ft) | | 476 | | | 1765 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1286 | 2575 | | | 1672 | 1982 | 495 | | 298 | | | |
| Starvation Cap Reductn | 0 | 199 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 0.50 | 0.99 | | | 0.59 | 0.54 | 0.69 | | 0.63 | | | |

Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 138 (92%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.91 | | | |
| Intersection Signal Delay: 35.1 | | Intersection LOS: D | |
| Intersection Capacity Utilization 84.9% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 6: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



# HCS 2010 Two-Way Stop Control Summary Report

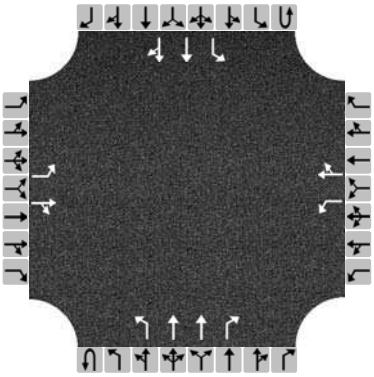
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | May 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | S. Royal Oaks and Rand |
| Jurisdiction | Franklin, TN |
| East/West Street | Rand Pl / Home Depot |
| North/South Street | S. Royal Oaks Blvd |
| Peak Hour Factor | 0.97 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 1 | 1 | 0 | | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 2 | 0 |
| Configuration | | L | | TR | | L | | TR | | L | T | R | | L | T | TR |
| Volume (veh/h) | | 26 | 1 | 9 | | 14 | 0 | 36 | | 10 | 1447 | 25 | | 64 | 665 | 51 |
| Percent Heavy Vehicles | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left + Thru | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 27 | | 10 | | 14 | | 37 | | 10 | | | | 66 | | |
| Capacity | | 148 | | 392 | | 99 | | 361 | | 877 | | | | 446 | | |
| v/c Ratio | | 0.18 | | 0.03 | | 0.14 | | 0.10 | | 0.01 | | | | 0.15 | | |
| 95% Queue Length | | 0.6 | | 0.1 | | 0.5 | | 0.3 | | 0.0 | | | | 0.5 | | |
| Control Delay (s/veh) | | 34.6 | | 14.4 | | 47.0 | | 16.1 | | 9.2 | | | | 14.5 | | |
| Level of Service (LOS) | | D | | B | | E | | C | | A | | | | B | | |
| Approach Delay (s/veh) | 29.2 | | | | 24.6 | | | | 0.1 | | | | 1.2 | | | |
| Approach LOS | D | | | | C | | | | A | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

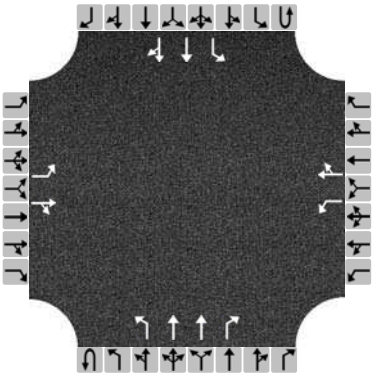
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | May 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | S. Royal Oaks and Rand |
| Jurisdiction | Franklin, TN |
| East/West Street | Rand Pl / Home Depot |
| North/South Street | S. Royal Oaks Blvd |
| Peak Hour Factor | 0.96 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 1 | 1 | 0 | | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 2 | 0 |
| Configuration | | L | | TR | | L | | TR | | L | T | R | | L | T | TR |
| Volume (veh/h) | | 26 | 3 | 16 | | 21 | 4 | 50 | | 6 | 1014 | 17 | | 43 | 1018 | 105 |
| Percent Heavy Vehicles | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left + Thru | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 27 | | 20 | | 22 | | 56 | | 6 | | | | 45 | | |
| Capacity | | 132 | | 333 | | 158 | | 417 | | 605 | | | | 657 | | |
| v/c Ratio | | 0.20 | | 0.06 | | 0.14 | | 0.13 | | 0.01 | | | | 0.07 | | |
| 95% Queue Length | | 0.7 | | 0.2 | | 0.5 | | 0.5 | | 0.0 | | | | 0.2 | | |
| Control Delay (s/veh) | | 39.0 | | 16.5 | | 31.4 | | 15.0 | | 11.0 | | | | 10.9 | | |
| Level of Service (LOS) | | E | | C | | D | | B | | B | | | | B | | |
| Approach Delay (s/veh) | 29.4 | | | | 19.6 | | | | 0.1 | | | | 0.4 | | | |
| Approach LOS | D | | | | C | | | | A | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

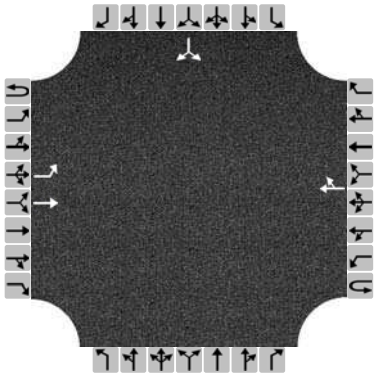
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | May 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and dwy |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Western Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 31 | 70 | | | | 263 | 0 | | | | | | 1 | | 13 |
| Percent Heavy Vehicles | | 0 | | | | | | | | | | | | 0 | | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 39 | | | | | | | | | | | | | 17 | |
| Capacity | | 1242 | | | | | | | | | | | | | 708 | |
| v/c Ratio | | 0.03 | | | | | | | | | | | | | 0.02 | |
| 95% Queue Length | | 0.1 | | | | | | | | | | | | | 0.1 | |
| Control Delay (s/veh) | | 8.0 | | | | | | | | | | | | | 10.2 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | B | |
| Approach Delay (s/veh) | 2.5 | | | | | | | | | | | | 10.2 | | | |
| Approach LOS | A | | | | | | | | | | | | B | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

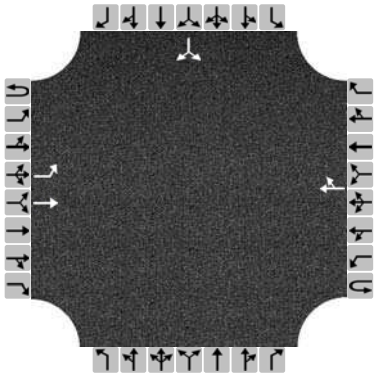
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | May 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and dwy |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Western Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 28 | 234 | | | | 212 | 2 | | | | | | 16 | | 38 |
| Percent Heavy Vehicles | | 0 | | | | | | | | | | | | 0 | | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 35 | | | | | | | | | | | | | 68 | |
| Capacity | | 1309 | | | | | | | | | | | | | 681 | |
| v/c Ratio | | 0.03 | | | | | | | | | | | | | 0.10 | |
| 95% Queue Length | | 0.1 | | | | | | | | | | | | | 0.3 | |
| Control Delay (s/veh) | | 7.8 | | | | | | | | | | | | | 10.9 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | B | |
| Approach Delay (s/veh) | 0.8 | | | | | | | | | | | | 10.9 | | | |
| Approach LOS | A | | | | | | | | | | | | B | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

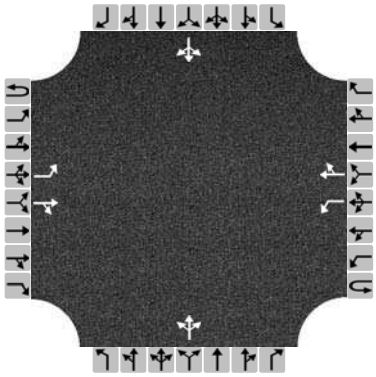
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | May 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and east dw |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Eastern Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | | 0 | 1 | 0 | | 0 | 1 | 0 |
| Configuration | | L | | TR | | L | | TR | | | LTR | | | | LTR | |
| Volume (veh/h) | | 11 | 57 | 3 | | 0 | 205 | 0 | | 12 | 0 | 0 | | 0 | 0 | 46 |
| Percent Heavy Vehicles | | 0 | | | | 0 | | | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 14 | | | | | | | | | 15 | | | | 58 | |
| Capacity | | 1321 | | | | 1537 | | | | | 571 | | | | 788 | |
| v/c Ratio | | 0.01 | | | | | | | | | 0.03 | | | | 0.07 | |
| 95% Queue Length | | 0.0 | | | | | | | | | 0.1 | | | | 0.2 | |
| Control Delay (s/veh) | | 7.8 | | | | 7.3 | | | | | 11.5 | | | | 9.9 | |
| Level of Service (LOS) | | A | | | | A | | | | | B | | | | A | |
| Approach Delay (s/veh) | 1.2 | | | | | | | | 11.5 | | | | 9.9 | | | |
| Approach LOS | A | | | | | | | | B | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

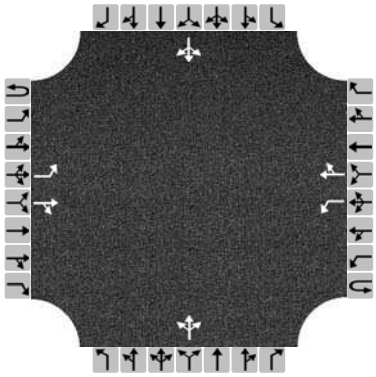
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | May 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and east dw |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Eastern Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | | 0 | 1 | 0 | | 0 | 1 | 0 |
| Configuration | | L | | TR | | L | | TR | | | LTR | | | | LTR | |
| Volume (veh/h) | | 45 | 193 | 12 | | 0 | 184 | 0 | | 6 | 0 | 0 | | 0 | 0 | 24 |
| Percent Heavy Vehicles | | 0 | | | | 0 | | | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 56 | | | | | | | | | 8 | | | | 30 | |
| Capacity | | 1350 | | | | 1321 | | | | | 475 | | | | 814 | |
| v/c Ratio | | 0.04 | | | | | | | | | 0.02 | | | | 0.04 | |
| 95% Queue Length | | 0.1 | | | | | | | | | 0.1 | | | | 0.1 | |
| Control Delay (s/veh) | | 7.8 | | | | 7.7 | | | | | 12.7 | | | | 9.6 | |
| Level of Service (LOS) | | A | | | | A | | | | | B | | | | A | |
| Approach Delay (s/veh) | 1.4 | | | | | | | | 12.7 | | | | 9.6 | | | |
| Approach LOS | A | | | | | | | | B | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

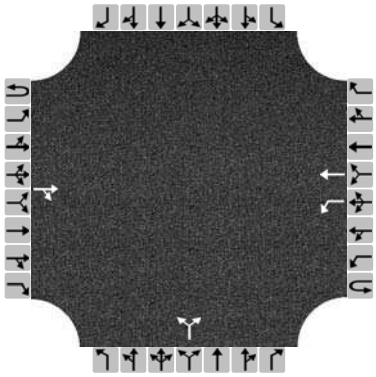
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | May 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and west dw |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Western project dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Configuration | | | | TR | | L | T | | | | LR | | | | | |
| Volume (veh/h) | | | 86 | 45 | | 11 | 265 | | | 66 | | 15 | | | | |
| Percent Heavy Vehicles | | | | | | 0 | | | | 0 | | 0 | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | | | | | 14 | | | | | 101 | | | | | |
| Capacity | | | | | | 1427 | | | | | 596 | | | | | |
| v/c Ratio | | | | | | 0.01 | | | | | 0.17 | | | | | |
| 95% Queue Length | | | | | | 0.0 | | | | | 0.6 | | | | | |
| Control Delay (s/veh) | | | | | | 7.5 | | | | | 12.3 | | | | | |
| Level of Service (LOS) | | | | | | A | | | | | B | | | | | |
| Approach Delay (s/veh) | | | | | 0.3 | | | | 12.3 | | | | | | | |
| Approach LOS | | | | | A | | | | B | | | | | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

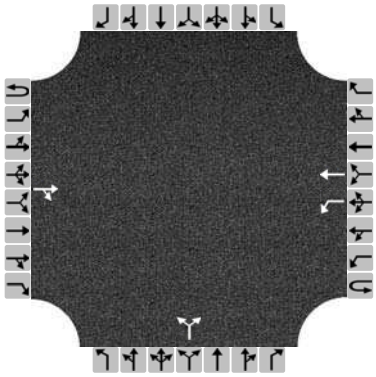
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | May 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and west dw |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Western project dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Configuration | | | | TR | | L | T | | | | LR | | | | | |
| Volume (veh/h) | | | 255 | 37 | | 8 | 242 | | | 31 | | 7 | | | | |
| Percent Heavy Vehicles | | | | | | 0 | | | | 0 | | 0 | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | | | | | 10 | | | | | 48 | | | | | |
| Capacity | | | | | | 1205 | | | | | 513 | | | | | |
| v/c Ratio | | | | | | 0.01 | | | | | 0.09 | | | | | |
| 95% Queue Length | | | | | | 0.0 | | | | | 0.3 | | | | | |
| Control Delay (s/veh) | | | | | | 8.0 | | | | | 12.7 | | | | | |
| Level of Service (LOS) | | | | | | A | | | | | B | | | | | |
| Approach Delay (s/veh) | | | | | 0.3 | | | | 12.7 | | | | | | | |
| Approach LOS | | | | | A | | | | B | | | | | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

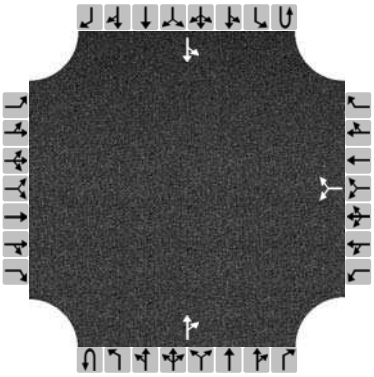
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | May 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | Home Depot and Apt Dwy |
| Jurisdiction | Franklin, TN |
| East/West Street | Project Driveway |
| North/South Street | Home Depot Access |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| Configuration | | | | | | | LR | | | | | TR | | LT | | |
| Volume (veh/h) | | | | | | 46 | | 37 | | | 0 | 11 | | 10 | 0 | |
| Percent Heavy Vehicles | | | | | | 0 | | 0 | | | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Undivided | | | | | | | | | | | | | | | |
| Median Storage | | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | | | | | | 104 | | | | | | | 12 | | |
| Capacity | | | | | | | 1023 | | | | | | | 1618 | | |
| v/c Ratio | | | | | | | 0.10 | | | | | | | 0.01 | | |
| 95% Queue Length | | | | | | | 0.3 | | | | | | | 0.0 | | |
| Control Delay (s/veh) | | | | | | | 8.9 | | | | | | | 7.2 | | |
| Level of Service (LOS) | | | | | | | A | | | | | | | A | | |
| Approach Delay (s/veh) | | | | | 8.9 | | | | | | | | 7.2 | | | |
| Approach LOS | | | | | A | | | | | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

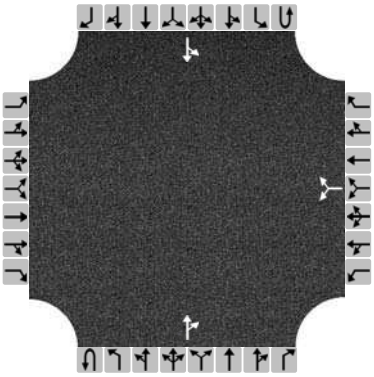
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | May 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | Home Depot and Apt Dwy |
| Jurisdiction | Franklin, TN |
| East/West Street | Project Driveway |
| North/South Street | Home Depot Access |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| Configuration | | | | | | | LR | | | | | TR | | LT | | |
| Volume (veh/h) | | | | | | 24 | | 20 | | | 0 | 45 | | 37 | 0 | |
| Percent Heavy Vehicles | | | | | | 0 | | 0 | | | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Undivided | | | | | | | | | | | | | | | |
| Median Storage | | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | | | | | | 55 | | | | | | | 46 | | |
| Capacity | | | | | | | 935 | | | | | | | 1562 | | |
| v/c Ratio | | | | | | | 0.06 | | | | | | | 0.03 | | |
| 95% Queue Length | | | | | | | 0.2 | | | | | | | 0.1 | | |
| Control Delay (s/veh) | | | | | | | 9.1 | | | | | | | 7.4 | | |
| Level of Service (LOS) | | | | | | | A | | | | | | | A | | |
| Approach Delay (s/veh) | | | | | 9.1 | | | | | | | | 7.4 | | | |
| Approach LOS | | | | | A | | | | | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

**TOTAL PROJECTED CONDITIONS**
**With a third northbound through lane**

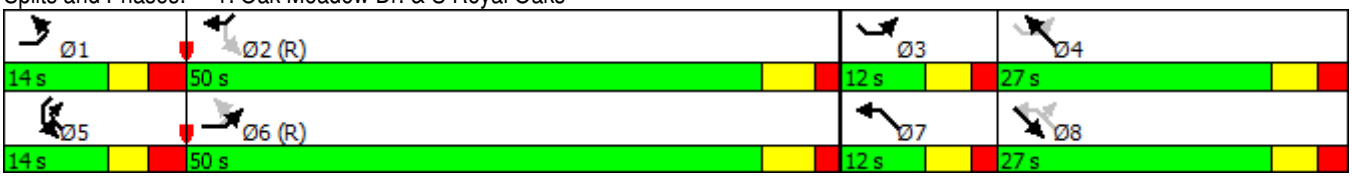
| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 87 | 1120 | 58 | 129 | 17 | 71 | 65 | 37 | 229 | 56 | 515 | 73 |
| Future Volume (vph) | 87 | 1120 | 58 | 129 | 17 | 71 | 65 | 37 | 229 | 56 | 515 | 73 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 2 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.94 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | 0.989 | | | 0.885 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.956 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 4801 | 0 | 1711 | 1594 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.271 | 0.956 | | 0.715 | | | 0.495 | | | 0.177 | | |
| Satd. Flow (perm) | 437 | 4801 | 0 | 1287 | 1594 | 0 | 922 | 1925 | 1583 | 330 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 154 | | | 97 | | | | 90 | | 154 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 552 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 12.5 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 130 | 1191 | 92 | 163 | 29 | 97 | 87 | 64 | 249 | 75 | 687 | 106 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 130 | 1283 | 0 | 163 | 126 | 0 | 87 | 64 | 249 | 75 | 793 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 41 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 13.0 | 26.0 | | 12.5 | 20.0 | | 12.5 | 20.0 | 13.0 | 13.0 | 26.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 14.0 | 50.0 | | 12.0 | 27.0 | | 12.0 | 27.0 | 14.0 | 14.0 | 50.0 | |
| Total Split (%) | 13.6% | 48.5% | | 11.7% | 26.2% | | 11.7% | 26.2% | 13.6% | 13.6% | 48.5% | |
| Maximum Green (s) | 8.0 | 44.0 | | 6.5 | 21.0 | | 6.5 | 21.0 | 8.0 | 8.0 | 44.0 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 71.0 | 60.1 | | 20.0 | 12.3 | | 20.0 | 12.3 | 25.3 | 70.3 | 59.8 | |
| Actuated g/C Ratio | 0.69 | 0.58 | | 0.19 | 0.12 | | 0.19 | 0.12 | 0.25 | 0.68 | 0.58 | |
| v/c Ratio | 0.32 | 0.45 | | 0.57 | 0.46 | | 0.34 | 0.28 | 0.55 | 0.21 | 0.47 | |
| Control Delay | 7.7 | 11.8 | | 41.9 | 18.6 | | 34.8 | 43.6 | 25.6 | 6.9 | 11.8 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 7.7 | 11.8 | | 41.9 | 18.6 | | 34.8 | 43.6 | 25.6 | 6.9 | 11.8 | |
| LOS | A | B | | D | B | | C | D | C | A | B | |
| Approach Delay | | 11.4 | | | 31.7 | | | 30.5 | | 11.4 | | |
| Approach LOS | | B | | | C | | | C | | B | | |
| 90th %ile Green (s) | 8.0 | 52.3 | | 6.5 | 13.7 | | 6.5 | 13.7 | 7.0 | 7.0 | 51.3 | |
| 90th %ile Term Code | Max | Coord | | Max | Gap | | Max | Hold | Min | Min | Coord | |
| 70th %ile Green (s) | 7.8 | 55.3 | | 6.5 | 10.7 | | 6.5 | 10.7 | 7.0 | 7.0 | 54.5 | |
| 70th %ile Term Code | Gap | Coord | | Max | Hold | | Max | Gap | Min | Min | Coord | |
| 50th %ile Green (s) | 7.0 | 56.6 | | 6.5 | 9.4 | | 6.5 | 9.4 | 7.0 | 7.0 | 56.6 | |
| 50th %ile Term Code | Min | Coord | | Max | Hold | | Max | Gap | Min | Min | Coord | |
| 30th %ile Green (s) | 7.0 | 57.9 | | 6.5 | 8.1 | | 6.5 | 8.1 | 7.0 | 7.0 | 57.9 | |
| 30th %ile Term Code | Min | Coord | | Max | Hold | | Max | Gap | Min | Min | Coord | |
| 10th %ile Green (s) | 7.0 | 71.0 | | 7.5 | 7.0 | | 0.0 | 0.0 | 7.0 | 7.0 | 71.0 | |
| 10th %ile Term Code | Min | Coord | | Hold | Min | | Skip | Skip | Min | Min | Coord | |
| Stops (vph) | 27 | 567 | | 112 | 27 | | 51 | 33 | 126 | 18 | 271 | |
| Fuel Used(gal) | 1 | 11 | | 2 | 1 | | 1 | 1 | 4 | 1 | 10 | |
| CO Emissions (g/hr) | 46 | 771 | | 162 | 68 | | 96 | 62 | 270 | 62 | 724 | |
| NOx Emissions (g/hr) | 9 | 150 | | 32 | 13 | | 19 | 12 | 52 | 12 | 141 | |
| VOC Emissions (g/hr) | 11 | 179 | | 38 | 16 | | 22 | 14 | 63 | 14 | 168 | |
| Dilemma Vehicles (#) | 0 | 0 | | 0 | 0 | | 0 | 2 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 25 | 144 | | 91 | 17 | | 46 | 39 | 90 | 14 | 131 | |
| Queue Length 95th (ft) | 37 | 198 | | 124 | 22 | | 69 | 48 | 161 | 26 | 152 | |
| Internal Link Dist (ft) | | 472 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 415 | 2866 | | 287 | 438 | | 253 | 439 | 470 | 374 | 1681 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.31 | 0.45 | | 0.57 | 0.29 | | 0.34 | 0.15 | 0.53 | 0.20 | 0.47 | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 103 | |

| | |
|---|---|
| Actuated Cycle Length: 103 | |
| Offset: 0 (0%), Referenced to phase 2:SWL and 6:EBL, Start of Green | |
| Natural Cycle: 75 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.57 | |
| Intersection Signal Delay: 16.0 | Intersection LOS: B |
| Intersection Capacity Utilization 52.6% | ICU Level of Service A |
| Analysis Period (min) 15 | |

Splits and Phases: 1: Oak Meadow Dr. & S Royal Oaks



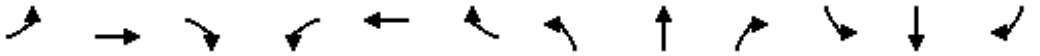
| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 28 | 1276 | 103 | 274 | 770 | 25 | 6 | 46 | 41 | 33 | 12 | 118 |
| Future Volume (vph) | 28 | 1276 | 103 | 274 | 770 | 25 | 6 | 46 | 41 | 33 | 12 | 118 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 12 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | | 1% | | | -2% | | | -1% | | | 2% | |
| Storage Length (ft) | 80 | | 135 | 220 | | 0 | 100 | | 0 | 120 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.91 | 0.91 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.988 | | | 0.993 | | | 0.934 | | | 0.868 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1676 | 4884 | 0 | 1787 | 3428 | 0 | 1754 | 1624 | 0 | 1787 | 1520 | 0 |
| Flt Permitted | 0.315 | | | 0.119 | | | 0.552 | | | 0.463 | | |
| Satd. Flow (perm) | 556 | 4884 | 0 | 224 | 3428 | 0 | 1019 | 1624 | 0 | 871 | 1520 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 12 | | | 4 | | | 27 | | | 137 | |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1624 | | | 792 | | | 957 | | | 515 | |
| Travel Time (s) | | 36.9 | | | 18.0 | | | 21.8 | | | 11.7 | |
| Peak Hour Factor | 0.63 | 0.92 | 0.87 | 0.80 | 0.99 | 0.67 | 0.58 | 0.68 | 0.77 | 0.67 | 0.63 | 0.86 |
| Heavy Vehicles (%) | 0% | 1% | 0% | 2% | 2% | 4% | 0% | 11% | 0% | 0% | 10% | 3% |
| Adj. Flow (vph) | 44 | 1387 | 118 | 343 | 778 | 37 | 10 | 68 | 53 | 49 | 19 | 137 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 44 | 1505 | 0 | 343 | 815 | 0 | 10 | 121 | 0 | 49 | 156 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 0.99 | 1.03 | 0.99 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | 1 | 1 | | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | | 42 | 226 | | 42 | 42 | | 42 | 42 | |
| Trailing Detector (ft) | -3 | 220 | | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 220 | | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | | 45 | 45 | | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | pm+pt | NA | | pm+pt | NA | | pm+pt | NA | | pm+pt | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | 6 | | | 2 | | | 4 | | | 8 | | |
| Detector Phase | 1 | 6 | | 5 | 2 | | 7 | 4 | | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | | 5.0 | 10.0 | | 6.0 | 7.0 | | 6.0 | 7.0 | |
| Minimum Split (s) | 17.0 | 73.0 | | 17.0 | 73.0 | | 10.0 | 50.0 | | 10.0 | 50.0 | |
| Total Split (s) | 17.0 | 73.0 | | 17.0 | 73.0 | | 10.0 | 50.0 | | 10.0 | 50.0 | |
| Total Split (%) | 11.3% | 48.7% | | 11.3% | 48.7% | | 6.7% | 33.3% | | 6.7% | 33.3% | |
| Maximum Green (s) | 10.5 | 67.0 | | 10.5 | 67.0 | | 6.0 | 43.0 | | 6.0 | 43.0 | |
| Yellow Time (s) | 3.0 | 3.5 | | 3.0 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | | 3.5 | 2.5 | | 0.5 | 3.5 | | 0.5 | 3.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | | -1.0 | -3.0 | | -2.5 | -2.5 | | -2.5 | -2.5 | |
| Total Lost Time (s) | 5.5 | 3.0 | | 5.5 | 3.0 | | 1.5 | 4.5 | | 1.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.0 | 3.5 | | 3.0 | 3.5 | |
| Recall Mode | None | C-Min | | None | C-Min | | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 8.0 | | | 8.0 | |
| Flash Dont Walk (s) | | 16.0 | | | 20.0 | | | 32.0 | | | 35.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 103.4 | 97.8 | | 110.4 | 103.7 | | 27.4 | 17.2 | | 30.7 | 23.3 | |
| Actuated g/C Ratio | 0.69 | 0.65 | | 0.74 | 0.69 | | 0.18 | 0.11 | | 0.20 | 0.16 | |
| v/c Ratio | 0.10 | 0.47 | | 1.21 | 0.34 | | 0.04 | 0.58 | | 0.20 | 0.44 | |
| Control Delay | 7.4 | 14.7 | | 144.4 | 11.7 | | 42.7 | 58.7 | | 46.7 | 15.6 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 7.4 | 14.7 | | 144.4 | 11.7 | | 42.7 | 58.7 | | 46.7 | 15.6 | |
| LOS | A | B | | F | B | | D | E | | D | B | |
| Approach Delay | | 14.5 | | | 51.0 | | | 57.5 | | | 23.0 | |
| Approach LOS | | B | | | D | | | E | | | C | |
| 90th %ile Green (s) | 8.6 | 83.8 | | 10.5 | 85.7 | | 7.3 | 21.2 | | 11.0 | 24.9 | |
| 90th %ile Term Code | Gap | Coord | | Max | Coord | | Gap | Gap | | Gap | Hold | |
| 70th %ile Green (s) | 7.6 | 89.2 | | 10.5 | 92.1 | | 6.6 | 17.3 | | 9.5 | 20.2 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | | Gap | Gap | | Gap | Hold | |
| 50th %ile Green (s) | 7.0 | 92.8 | | 10.5 | 96.3 | | 0.0 | 14.7 | | 8.5 | 27.2 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | | Skip | Gap | | Gap | Hold | |
| 30th %ile Green (s) | 6.5 | 96.5 | | 10.5 | 100.5 | | 0.0 | 12.1 | | 7.4 | 23.5 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | | Skip | Gap | | Gap | Hold | |
| 10th %ile Green (s) | 0.0 | 111.7 | | 10.5 | 128.7 | | 0.0 | 8.3 | | 0.0 | 8.3 | |
| 10th %ile Term Code | Skip | Coord | | Max | Coord | | Skip | Gap | | Skip | Hold | |
| Stops (vph) | 9 | 673 | | 99 | 323 | | 5 | 63 | | 26 | 25 | |
| Fuel Used(gal) | 0 | 25 | | 10 | 9 | | 0 | 2 | | 1 | 1 | |
| CO Emissions (g/hr) | 31 | 1769 | | 720 | 601 | | 9 | 142 | | 41 | 75 | |
| NOx Emissions (g/hr) | 6 | 344 | | 140 | 117 | | 2 | 28 | | 8 | 15 | |
| VOC Emissions (g/hr) | 7 | 410 | | 167 | 139 | | 2 | 33 | | 10 | 17 | |
| Dilemma Vehicles (#) | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 11 | 264 | | ~167 | 174 | | 8 | 88 | | 39 | 15 | |
| Queue Length 95th (ft) | 19 | 354 | | #399 | 261 | | 14 | 105 | | 52 | 21 | |
| Internal Link Dist (ft) | | 1544 | | | 712 | | | 877 | | | 435 | |
| Turn Bay Length (ft) | 80 | | | 220 | | | 100 | | | 120 | | |
| Base Capacity (vph) | 481 | 3188 | | 284 | 2370 | | 229 | 511 | | 245 | 556 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |

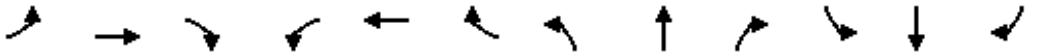
| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.09 | 0.47 | | 1.21 | 0.34 | | 0.04 | 0.24 | | 0.20 | 0.28 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 139 (93%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.21 | | | |
| Intersection Signal Delay: 30.8 | | Intersection LOS: C | |
| Intersection Capacity Utilization 62.3% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |
| ~ Volume exceeds capacity, queue is theoretically infinite. | | | |
| Queue shown is maximum after two cycles. | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | |
| Queue shown is maximum after two cycles. | | | |

Splits and Phases: 3: S Royal Oaks & Riverside Dr/Center Point Pl



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 112 | 772 | 60 | 850 | 993 | 281 | 99 | 272 | 1055 | 225 | 213 | 82 |
| Future Volume (vph) | 112 | 772 | 60 | 850 | 993 | 281 | 99 | 272 | 1055 | 225 | 213 | 82 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.988 | | | | 0.850 | | | 0.850 | | 0.961 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3241 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3241 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 10 | | | | 149 | | | | | 31 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 700 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 11.9 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.80 | 0.90 | 0.80 | 0.93 | 0.91 | 0.88 | 0.82 | 0.80 | 0.93 | 0.92 | 0.74 | 0.81 |
| Heavy Vehicles (%) | 3% | 6% | 2% | 3% | 6% | 3% | 4% | 2% | 2% | 2% | 4% | 2% |
| Adj. Flow (vph) | 140 | 858 | 75 | 914 | 1091 | 319 | 121 | 340 | 1134 | 245 | 288 | 101 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 140 | 933 | 0 | 914 | 1091 | 319 | 121 | 340 | 1134 | 245 | 389 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

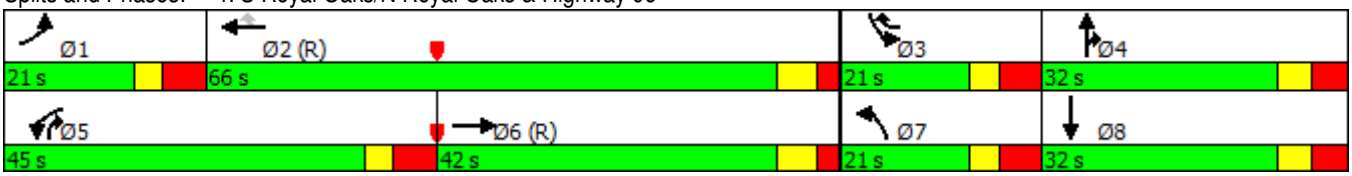


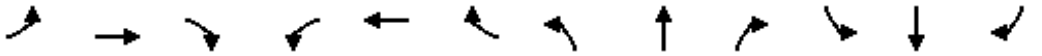
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (%) | 15.0% | 30.0% | | 32.1% | 47.1% | 15.0% | 15.0% | 22.9% | | 15.0% | 22.9% | |
| Maximum Green (s) | 13.5 | 35.5 | | 37.5 | 59.5 | 13.5 | 13.5 | 24.5 | | 13.5 | 24.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 13.5 | 38.4 | | 40.0 | 64.9 | 84.0 | 12.4 | 27.5 | 72.0 | 15.1 | 30.2 | |
| Actuated g/C Ratio | 0.10 | 0.27 | | 0.29 | 0.46 | 0.60 | 0.09 | 0.20 | 0.51 | 0.11 | 0.22 | |
| v/c Ratio | 0.43 | 0.72 | | 0.97 | 0.69 | 0.31 | 0.41 | 0.48 | 0.77 | 0.69 | 0.54 | |
| Control Delay | 76.8 | 41.3 | | 61.0 | 40.4 | 8.7 | 64.1 | 52.4 | 31.8 | 70.7 | 48.2 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 76.8 | 41.3 | | 61.0 | 40.4 | 8.7 | 64.1 | 52.4 | 31.8 | 70.7 | 48.2 | |
| LOS | E | D | | E | D | A | E | D | C | E | D | |
| Approach Delay | | 46.0 | | | 44.1 | | | 38.6 | | | 56.9 | |
| Approach LOS | | D | | | D | | | D | | | E | |
| 90th %ile Green (s) | 13.5 | 35.5 | | 37.5 | 59.5 | 13.5 | 13.3 | 24.5 | | 13.5 | 24.7 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 70th %ile Green (s) | 12.4 | 35.5 | | 37.5 | 60.6 | 13.5 | 11.6 | 24.5 | | 13.5 | 26.4 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 50th %ile Green (s) | 11.2 | 35.5 | | 37.5 | 61.8 | 13.5 | 10.4 | 24.5 | | 13.5 | 27.6 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 30th %ile Green (s) | 9.9 | 35.5 | | 37.5 | 63.1 | 13.5 | 9.2 | 24.5 | | 13.5 | 28.8 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 10th %ile Green (s) | 8.1 | 37.6 | | 37.5 | 67.0 | 11.4 | 7.5 | 24.5 | | 11.4 | 28.4 | |
| 10th %ile Term Code | Gap | Coord | | Max | Coord | Gap | Gap | Max | | Gap | Hold | |
| Stops (vph) | 110 | 737 | | 759 | 947 | 98 | 92 | 236 | 829 | 214 | 238 | |
| Fuel Used(gal) | 3 | 18 | | 25 | 25 | 4 | 2 | 6 | 18 | 6 | 6 | |
| CO Emissions (g/hr) | 235 | 1272 | | 1740 | 1782 | 261 | 169 | 412 | 1253 | 427 | 449 | |
| NOx Emissions (g/hr) | 46 | 247 | | 338 | 347 | 51 | 33 | 80 | 244 | 83 | 87 | |
| VOC Emissions (g/hr) | 54 | 295 | | 403 | 413 | 60 | 39 | 95 | 290 | 99 | 104 | |
| Dilemma Vehicles (#) | 0 | 28 | | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 69 | 285 | | 419 | 535 | 78 | 54 | 145 | 459 | 112 | 153 | |
| Queue Length 95th (ft) | 93 | 338 | | m#446 | m544 | m122 | 78 | 172 | 561 | 159 | 167 | |
| Internal Link Dist (ft) | | 620 | | | 611 | | | 712 | | | 884 | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 388 | 1293 | | 938 | 1578 | 1035 | 370 | 714 | 1473 | 367 | 723 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.36 | 0.72 | | 0.97 | 0.69 | 0.31 | 0.33 | 0.48 | 0.77 | 0.67 | 0.54 | |

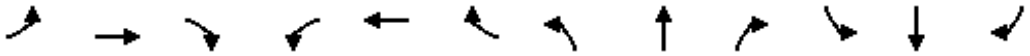
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 116 (83%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.97 | | | |
| Intersection Signal Delay: 44.4 | | Intersection LOS: D | |
| Intersection Capacity Utilization 71.7% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | |
| Queue shown is maximum after two cycles. | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 4: S Royal Oaks/N Royal Oaks & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 1786 | 196 | 111 | 1061 | 0 | 0 | 0 | 0 | 355 | 0 | 1039 |
| Future Volume (vph) | 0 | 1786 | 196 | 111 | 1061 | 0 | 0 | 0 | 0 | 355 | 0 | 1039 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 184 | | | | | | | | | 115 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.91 | 0.90 | 0.86 | 0.87 | 1.00 | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 |
| Heavy Vehicles (%) | 2% | 3% | 7% | 1% | 3% | 2% | 2% | 2% | 2% | 6% | 2% | 3% |
| Adj. Flow (vph) | 0 | 1963 | 218 | 129 | 1220 | 0 | 0 | 0 | 0 | 418 | 0 | 1105 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 1963 | 218 | 129 | 1220 | 0 | 0 | 0 | 0 | 418 | 0 | 1105 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (%) | | 44.3% | 44.3% | 16.4% | 60.7% | | | | | 39.3% | | 39.3% |
| Maximum Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 60.5 | 60.5 | 15.5 | 81.0 | | | | | 49.5 | | 49.5 |
| Actuated g/C Ratio | | 0.43 | 0.43 | 0.11 | 0.58 | | | | | 0.35 | | 0.35 |
| v/c Ratio | | 0.72 | 0.29 | 0.65 | 0.62 | | | | | 0.36 | | 1.09 |
| Control Delay | | 27.6 | 5.1 | 71.8 | 19.3 | | | | | 34.6 | | 94.9 |
| Queue Delay | | 0.8 | 0.0 | 0.0 | 0.3 | | | | | 2.1 | | 0.0 |
| Total Delay | | 28.3 | 5.1 | 71.8 | 19.5 | | | | | 36.7 | | 94.9 |
| LOS | | C | A | E | B | | | | | D | | F |
| Approach Delay | | 26.0 | | | 24.5 | | | | | | | |
| Approach LOS | | C | | | C | | | | | | | |
| 90th %ile Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| 90th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 70th %ile Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| 70th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 50th %ile Green (s) | | 57.6 | 57.6 | 15.4 | 79.0 | | | | | 47.5 | | 47.5 |
| 50th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| 30th %ile Green (s) | | 59.8 | 59.8 | 13.2 | 79.0 | | | | | 47.5 | | 47.5 |
| 30th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| 10th %ile Green (s) | | 63.2 | 63.2 | 9.8 | 79.0 | | | | | 47.5 | | 47.5 |
| 10th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| Stops (vph) | | 1165 | 39 | 111 | 497 | | | | | 256 | | 836 |
| Fuel Used(gal) | | 36 | 2 | 3 | 13 | | | | | 6 | | 31 |
| CO Emissions (g/hr) | | 2510 | 152 | 219 | 912 | | | | | 431 | | 2177 |
| NOx Emissions (g/hr) | | 488 | 30 | 43 | 177 | | | | | 84 | | 423 |
| VOC Emissions (g/hr) | | 582 | 35 | 51 | 211 | | | | | 100 | | 504 |
| Dilemma Vehicles (#) | | 50 | 0 | 0 | 34 | | | | | 0 | | 0 |
| Queue Length 50th (ft) | | 346 | 27 | 124 | 283 | | | | | 144 | | ~602 |
| Queue Length 95th (ft) | | 406 | m47 | m164 | m297 | | | | | 178 | | #754 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2743 | 756 | 229 | 1960 | | | | | 1162 | | 1012 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 215 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 420 | 0 | 0 | 0 | | | | | 581 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.85 | 0.29 | 0.56 | 0.70 | | | | | 0.72 | | 1.09 |

Intersection Summary

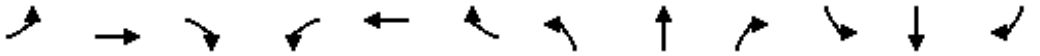
| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 106 (76%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.09 | | | |
| Intersection Signal Delay: 41.6 | | Intersection LOS: D | |
| Intersection Capacity Utilization 108.6% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

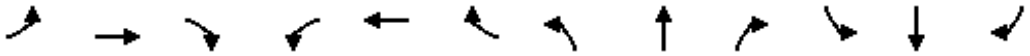
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Ent ramp to I-65/Exit ramp from I-65 & Highway 96



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1382 | 759 | 0 | 0 | 764 | 1217 | 408 | 0 | 364 | 0 | 0 | 0 |
| Future Volume (vph) | 1382 | 759 | 0 | 0 | 764 | 1217 | 408 | 0 | 364 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 23 | | | 252 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 311 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 5.3 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.88 | 0.86 | 0.95 | 1.00 | 0.95 | 0.98 | 0.95 | 0.25 | 0.92 | 1.00 | 1.00 | 0.95 |
| Heavy Vehicles (%) | 2% | 5% | 2% | 2% | 2% | 1% | 2% | 0% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 1570 | 883 | 0 | 0 | 804 | 1242 | 429 | 0 | 396 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 1570 | 883 | 0 | 0 | 804 | 1242 | 429 | 0 | 396 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (%) | 40.0% | 82.9% | | | 42.9% | | 17.1% | | 17.1% | | | |
| Maximum Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 50.0 | 110.0 | | | 53.5 | 79.5 | 16.5 | | 16.5 | | | |
| Actuated g/C Ratio | 0.36 | 0.79 | | | 0.38 | 0.57 | 0.12 | | 0.12 | | | |
| v/c Ratio | 1.33 | 0.34 | | | 0.59 | 0.77 | 1.10 | | 0.96 | | | |
| Control Delay | 204.9 | 3.4 | | | 36.8 | 27.0 | 131.8 | | 56.6 | | | |
| Queue Delay | 0.7 | 0.1 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 205.5 | 3.5 | | | 36.8 | 27.0 | 131.8 | | 56.6 | | | |
| LOS | F | A | | | D | C | F | | E | | | |
| Approach Delay | | 132.8 | | | 30.8 | | | | | | | |
| Approach LOS | | F | | | C | | | | | | | |
| 90th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 90th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 70th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 70th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 50th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 50th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 30th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 30th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 10th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 10th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| Stops (vph) | 1003 | 107 | | | 597 | 899 | 350 | | 119 | | | |
| Fuel Used(gal) | 73 | 4 | | | 13 | 18 | 15 | | 7 | | | |
| CO Emissions (g/hr) | 5083 | 310 | | | 923 | 1264 | 1025 | | 474 | | | |
| NOx Emissions (g/hr) | 989 | 60 | | | 180 | 246 | 200 | | 92 | | | |
| VOC Emissions (g/hr) | 1178 | 72 | | | 214 | 293 | 238 | | 110 | | | |
| Dilemma Vehicles (#) | 0 | 18 | | | 27 | 0 | 0 | | 0 | | | |
| Queue Length 50th (ft) | ~951 | 67 | | | 306 | 468 | ~228 | | 142 | | | |
| Queue Length 95th (ft) | #1078 | 75 | | | 375 | 573 | #338 | | #351 | | | |
| Internal Link Dist (ft) | | 476 | | | 231 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1179 | 2598 | | | 1352 | 1607 | 389 | | 414 | | | |
| Starvation Cap Reductn | 163 | 623 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 1.55 | 0.45 | | | 0.59 | 0.77 | 1.10 | | 0.96 | | | |

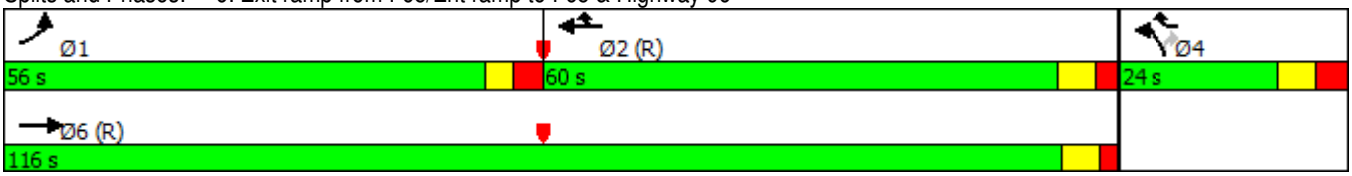
Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 122 (87%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.33 | | | |
| Intersection Signal Delay: 87.9 | | Intersection LOS: F | |
| Intersection Capacity Utilization 108.6% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 92 | 827 | 45 | 147 | 56 | 118 | 114 | 38 | 121 | 191 | 765 | 145 |
| Future Volume (vph) | 92 | 827 | 45 | 147 | 56 | 118 | 114 | 38 | 121 | 191 | 765 | 145 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 2 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.94 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | 0.989 | | | 0.906 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.956 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 4801 | 0 | 1711 | 1631 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.083 | 0.956 | | 0.704 | | | 0.285 | | | 0.261 | | |
| Satd. Flow (perm) | 134 | 4801 | 0 | 1268 | 1631 | 0 | 531 | 1925 | 1583 | 486 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 132 | | | 68 | | | | 132 | | 132 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 552 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 12.5 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 137 | 880 | 71 | 186 | 97 | 162 | 152 | 66 | 132 | 255 | 1020 | 210 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 137 | 951 | 0 | 186 | 259 | 0 | 152 | 66 | 132 | 255 | 1230 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 41 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 18.0 | 57.0 | | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 18.0 | 57.0 | | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |
| Total Split (%) | 15.0% | 47.5% | | 11.7% | 29.2% | | 11.7% | 29.2% | 11.7% | 11.7% | 44.2% | |
| Maximum Green (s) | 12.0 | 51.0 | | 8.5 | 29.0 | | 8.5 | 29.0 | 8.0 | 8.0 | 47.0 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 74.5 | 61.4 | | 34.8 | 22.9 | | 34.2 | 21.9 | 36.7 | 70.9 | 59.5 | |
| Actuated g/C Ratio | 0.62 | 0.51 | | 0.29 | 0.19 | | 0.28 | 0.18 | 0.31 | 0.59 | 0.50 | |
| v/c Ratio | 0.61 | 0.38 | | 0.44 | 0.71 | | 0.58 | 0.19 | 0.23 | 0.64 | 0.85 | |
| Control Delay | 29.2 | 16.3 | | 34.6 | 43.2 | | 39.1 | 39.7 | 5.3 | 20.1 | 31.8 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 29.2 | 16.3 | | 34.6 | 43.2 | | 39.1 | 39.7 | 5.3 | 20.1 | 31.8 | |
| LOS | C | B | | C | D | | D | D | A | C | C | |
| Approach Delay | | 17.9 | | | 39.6 | | | 26.5 | | 29.8 | | |
| Approach LOS | | B | | | D | | | C | | C | | |
| 90th %ile Green (s) | 12.0 | 51.3 | | 8.5 | 28.7 | | 8.5 | 28.7 | 8.0 | 8.0 | 47.3 | |
| 90th %ile Term Code | Max | Coord | | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 70th %ile Green (s) | 12.0 | 56.1 | | 8.5 | 23.9 | | 8.5 | 23.9 | 8.0 | 8.0 | 52.1 | |
| 70th %ile Term Code | Max | Coord | | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 50th %ile Green (s) | 10.3 | 59.6 | | 8.5 | 20.4 | | 8.5 | 20.4 | 8.0 | 8.0 | 57.3 | |
| 50th %ile Term Code | Gap | Coord | | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 30th %ile Green (s) | 7.7 | 63.0 | | 8.5 | 17.0 | | 8.5 | 17.0 | 8.0 | 8.0 | 63.3 | |
| 30th %ile Term Code | Gap | Coord | | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 10th %ile Green (s) | 7.0 | 69.7 | | 25.5 | 11.9 | | 7.6 | 0.0 | 7.3 | 7.3 | 70.0 | |
| 10th %ile Term Code | Min | Coord | | Hold | Gap | | Gap | Skip | Gap | Gap | Coord | |
| Stops (vph) | 47 | 445 | | 112 | 120 | | 84 | 31 | 14 | 91 | 658 | |
| Fuel Used(gal) | 1 | 9 | | 2 | 3 | | 2 | 1 | 1 | 4 | 21 | |
| CO Emissions (g/hr) | 84 | 637 | | 165 | 215 | | 171 | 59 | 71 | 259 | 1472 | |
| NOx Emissions (g/hr) | 16 | 124 | | 32 | 42 | | 33 | 12 | 14 | 50 | 286 | |
| VOC Emissions (g/hr) | 19 | 148 | | 38 | 50 | | 40 | 14 | 17 | 60 | 341 | |
| Dilemma Vehicles (#) | 0 | 0 | | 0 | 0 | | 0 | 2 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 42 | 130 | | 111 | 140 | | 88 | 43 | 0 | 78 | 422 | |
| Queue Length 95th (ft) | 70 | 188 | | 135 | 108 | | 105 | 49 | 40 | 116 | 447 | |
| Internal Link Dist (ft) | | 472 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 254 | 2522 | | 421 | 478 | | 265 | 505 | 578 | 400 | 1448 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.54 | 0.38 | | 0.44 | 0.54 | | 0.57 | 0.13 | 0.23 | 0.64 | 0.85 | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 120 | |

| | |
|---|---|
| Actuated Cycle Length: 120 | |
| Offset: 117 (98%), Referenced to phase 2:SWL and 6:EBL, Start of Green | |
| Natural Cycle: 120 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.85 | |
| Intersection Signal Delay: 26.9 | Intersection LOS: C |
| Intersection Capacity Utilization 58.8% | ICU Level of Service B |
| Analysis Period (min) 15 | |

Splits and Phases: 1: Oak Meadow Dr. & S Royal Oaks

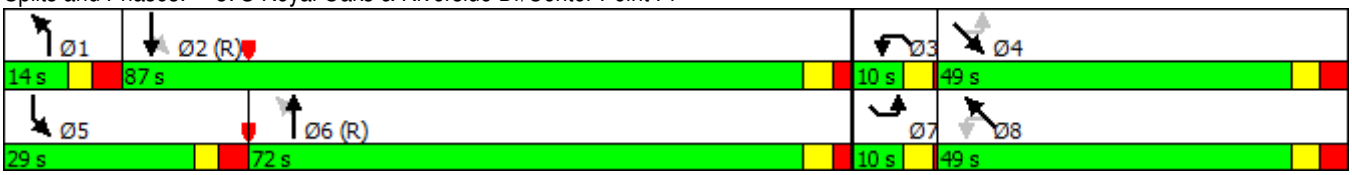
| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 90 | 1103 | 27 | 263 | 1126 | 93 | 83 | 64 | 123 | 46 | 58 | 300 |
| Future Volume (vph) | 90 | 1103 | 27 | 263 | 1126 | 93 | 83 | 64 | 123 | 46 | 58 | 300 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 12 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | | 1% | | | -2% | | | -1% | | | 2% | |
| Storage Length (ft) | 80 | | 135 | 220 | | 0 | 100 | | 0 | 120 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.91 | 0.91 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.995 | | | 0.987 | | | 0.906 | | | 0.876 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1676 | 4913 | 0 | 1805 | 3447 | 0 | 1736 | 1672 | 0 | 1752 | 1593 | 0 |
| Flt Permitted | 0.116 | | | 0.138 | | | 0.111 | | | 0.421 | | |
| Satd. Flow (perm) | 205 | 4913 | 0 | 262 | 3447 | 0 | 203 | 1672 | 0 | 776 | 1593 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 4 | | | 10 | | | 52 | | | 151 | |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1624 | | | 792 | | | 957 | | | 515 | |
| Travel Time (s) | | 36.9 | | | 18.0 | | | 21.8 | | | 11.7 | |
| Peak Hour Factor | 0.79 | 0.95 | 0.64 | 0.75 | 0.90 | 0.76 | 0.86 | 0.71 | 0.82 | 0.75 | 0.88 | 0.94 |
| Heavy Vehicles (%) | 0% | 1% | 2% | 1% | 1% | 0% | 1% | 0% | 0% | 2% | 0% | 0% |
| Adj. Flow (vph) | 114 | 1161 | 42 | 351 | 1251 | 122 | 97 | 90 | 150 | 61 | 66 | 319 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 114 | 1203 | 0 | 351 | 1373 | 0 | 97 | 240 | 0 | 61 | 385 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 0.99 | 1.03 | 0.99 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | 1 | 1 | | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | | 42 | 226 | | 42 | 42 | | 42 | 42 | |
| Trailing Detector (ft) | -3 | 220 | | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 220 | | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | | 45 | 45 | | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | pm+pt | NA | | pm+pt | NA | | pm+pt | NA | | pm+pt | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | 6 | | | 2 | | | 4 | | | 8 | | |
| Detector Phase | 1 | 6 | | 5 | 2 | | 7 | 4 | | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |

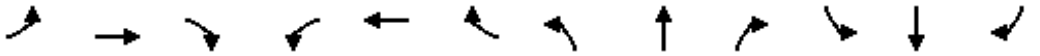
| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | | 5.0 | 10.0 | | 6.0 | 7.0 | | 6.0 | 7.0 | |
| Minimum Split (s) | 15.0 | 70.0 | | 30.0 | 85.0 | | 10.0 | 50.0 | | 10.0 | 50.0 | |
| Total Split (s) | 14.0 | 72.0 | | 29.0 | 87.0 | | 10.0 | 49.0 | | 10.0 | 49.0 | |
| Total Split (%) | 8.8% | 45.0% | | 18.1% | 54.4% | | 6.3% | 30.6% | | 6.3% | 30.6% | |
| Maximum Green (s) | 7.5 | 66.0 | | 22.5 | 81.0 | | 6.0 | 42.0 | | 6.0 | 42.0 | |
| Yellow Time (s) | 3.0 | 3.5 | | 3.0 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | | 3.5 | 2.5 | | 0.5 | 3.5 | | 0.5 | 3.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | | -1.0 | -3.0 | | -2.5 | -2.5 | | -2.5 | -2.5 | |
| Total Lost Time (s) | 5.5 | 3.0 | | 5.5 | 3.0 | | 1.5 | 4.5 | | 1.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.0 | 3.5 | | 3.0 | 3.5 | |
| Recall Mode | None | C-Min | | None | C-Min | | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 8.0 | | | 8.0 | |
| Flash Dont Walk (s) | | 16.0 | | | 20.0 | | | 32.0 | | | 35.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 82.3 | 76.3 | | 101.9 | 90.4 | | 50.8 | 38.1 | | 47.3 | 33.7 | |
| Actuated g/C Ratio | 0.51 | 0.48 | | 0.64 | 0.56 | | 0.32 | 0.24 | | 0.30 | 0.21 | |
| v/c Ratio | 0.62 | 0.51 | | 0.91 | 0.70 | | 0.52 | 0.55 | | 0.21 | 0.85 | |
| Control Delay | 33.6 | 31.2 | | 56.7 | 28.8 | | 47.7 | 45.7 | | 37.6 | 53.0 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 1.2 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 33.6 | 31.2 | | 56.7 | 30.0 | | 47.7 | 45.7 | | 37.6 | 53.0 | |
| LOS | C | C | | E | C | | D | D | | D | D | |
| Approach Delay | | 31.4 | | | 35.4 | | | 46.2 | | | 50.9 | |
| Approach LOS | | C | | | D | | | D | | | D | |
| 90th %ile Green (s) | 7.5 | 65.5 | | 22.5 | 80.5 | | 6.5 | 42.0 | | 6.5 | 42.0 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | | Max | Hold | | Max | Max | |
| 70th %ile Green (s) | 7.5 | 62.9 | | 22.5 | 77.9 | | 14.1 | 40.7 | | 10.4 | 37.0 | |
| 70th %ile Term Code | Max | Coord | | Max | Coord | | Gap | Hold | | Gap | Gap | |
| 50th %ile Green (s) | 7.5 | 69.8 | | 22.5 | 84.8 | | 12.4 | 34.9 | | 9.3 | 31.8 | |
| 50th %ile Term Code | Max | Coord | | Max | Coord | | Gap | Hold | | Gap | Gap | |
| 30th %ile Green (s) | 7.5 | 76.8 | | 22.5 | 91.8 | | 10.8 | 29.1 | | 8.1 | 26.4 | |
| 30th %ile Term Code | Max | Coord | | Max | Coord | | Gap | Hold | | Gap | Gap | |
| 10th %ile Green (s) | 7.5 | 91.6 | | 17.8 | 101.9 | | 8.5 | 31.1 | | 0.0 | 18.6 | |
| 10th %ile Term Code | Max | Coord | | Gap | Coord | | Gap | Hold | | Skip | Gap | |
| Stops (vph) | 47 | 770 | | 142 | 868 | | 57 | 127 | | 30 | 220 | |
| Fuel Used(gal) | 2 | 26 | | 5 | 19 | | 2 | 4 | | 1 | 7 | |
| CO Emissions (g/hr) | 141 | 1800 | | 381 | 1361 | | 122 | 268 | | 49 | 456 | |
| NOx Emissions (g/hr) | 27 | 350 | | 74 | 265 | | 24 | 52 | | 10 | 89 | |
| VOC Emissions (g/hr) | 33 | 417 | | 88 | 315 | | 28 | 62 | | 11 | 106 | |
| Dilemma Vehicles (#) | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 47 | 327 | | 224 | 547 | | 72 | 175 | | 44 | 248 | |
| Queue Length 95th (ft) | 70 | 394 | | 262 | 676 | | 110 | 181 | | 65 | 340 | |
| Internal Link Dist (ft) | | 1544 | | | 712 | | | 877 | | | 435 | |
| Turn Bay Length (ft) | 80 | | | 220 | | | 100 | | | 120 | | |
| Base Capacity (vph) | 183 | 2367 | | 393 | 1967 | | 188 | 502 | | 294 | 552 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 349 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.62 | 0.51 | | 0.89 | 0.85 | | 0.52 | 0.48 | | 0.21 | 0.70 | |

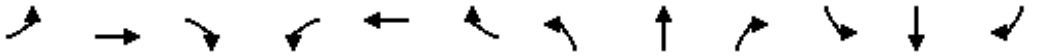
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 160 | | | |
| Actuated Cycle Length: 160 | | | |
| Offset: 123 (77%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green | | | |
| Natural Cycle: 160 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.91 | | | |
| Intersection Signal Delay: 36.8 | | Intersection LOS: D | |
| Intersection Capacity Utilization 80.6% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 3: S Royal Oaks & Riverside Dr/Center Point Pl





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 206 | 1108 | 63 | 976 | 1174 | 269 | 141 | 368 | 999 | 316 | 465 | 178 |
| Future Volume (vph) | 206 | 1108 | 63 | 976 | 1174 | 269 | 141 | 368 | 999 | 316 | 465 | 178 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.991 | | | | 0.850 | | | 0.850 | | 0.953 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3326 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3326 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 7 | | | | 87 | | | | | 44 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 700 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 11.9 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.92 | 0.93 | 0.81 | 0.87 | 0.91 | 0.89 | 0.74 | 0.83 | 0.89 | 0.83 | 0.95 | 0.80 |
| Heavy Vehicles (%) | 1% | 1% | 0% | 1% | 2% | 1% | 0% | 0% | 1% | 0% | 0% | 0% |
| Adj. Flow (vph) | 224 | 1191 | 78 | 1122 | 1290 | 302 | 191 | 443 | 1122 | 381 | 489 | 223 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 224 | 1269 | 0 | 1122 | 1290 | 302 | 191 | 443 | 1122 | 381 | 712 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

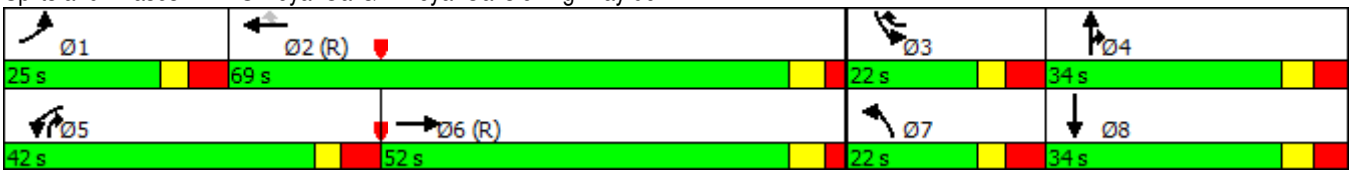


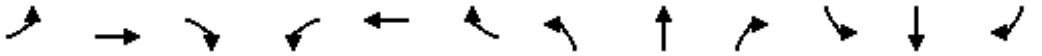
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (%) | 16.7% | 34.7% | | 28.0% | 46.0% | 14.7% | 14.7% | 22.7% | | 14.7% | 22.7% | |
| Maximum Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 17.3 | 48.0 | | 37.0 | 67.7 | 88.2 | 14.9 | 29.5 | 71.0 | 16.5 | 31.1 | |
| Actuated g/C Ratio | 0.12 | 0.32 | | 0.25 | 0.45 | 0.59 | 0.10 | 0.20 | 0.47 | 0.11 | 0.21 | |
| v/c Ratio | 0.56 | 0.80 | | 1.36 | 0.81 | 0.30 | 0.55 | 0.61 | 0.82 | 1.02 | 0.98 | |
| Control Delay | 68.7 | 44.7 | | 200.8 | 49.2 | 16.6 | 70.5 | 59.0 | 40.1 | 117.0 | 84.1 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.6 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | |
| Total Delay | 68.7 | 44.7 | | 200.8 | 49.8 | 16.6 | 70.7 | 59.0 | 40.3 | 117.0 | 84.1 | |
| LOS | E | D | | F | D | B | E | E | D | F | F | |
| Approach Delay | | 48.3 | | | 108.5 | | | 48.3 | | | 95.5 | |
| Approach LOS | | D | | | F | | | D | | | F | |
| 90th %ile Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | Max | Max | Max | | Max | Max | |
| 70th %ile Green (s) | 16.7 | 45.5 | | 34.5 | 63.3 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | Max | Max | Max | | Max | Max | |
| 50th %ile Green (s) | 15.1 | 45.5 | | 34.5 | 64.9 | 14.5 | 13.5 | 26.5 | | 14.5 | 27.5 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 30th %ile Green (s) | 13.4 | 45.5 | | 34.5 | 66.6 | 14.5 | 12.0 | 26.5 | | 14.5 | 29.0 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 10th %ile Green (s) | 11.1 | 45.5 | | 34.5 | 68.9 | 14.5 | 9.8 | 26.5 | | 14.5 | 31.2 | |
| 10th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| Stops (vph) | 191 | 938 | | 759 | 1064 | 208 | 131 | 330 | 843 | 280 | 539 | |
| Fuel Used(gal) | 6 | 25 | | 55 | 32 | 5 | 4 | 9 | 19 | 11 | 19 | |
| CO Emissions (g/hr) | 401 | 1778 | | 3861 | 2216 | 359 | 253 | 595 | 1327 | 800 | 1315 | |
| NOx Emissions (g/hr) | 78 | 346 | | 751 | 431 | 70 | 49 | 116 | 258 | 156 | 256 | |
| VOC Emissions (g/hr) | 93 | 412 | | 895 | 514 | 83 | 59 | 138 | 308 | 185 | 305 | |
| Dilemma Vehicles (#) | 0 | 44 | | 0 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 107 | 316 | | ~759 | 580 | 139 | 92 | 210 | 528 | ~203 | ~352 | |
| Queue Length 95th (ft) | 155 | 368 | | m#567 | m517 | m125 | 108 | 246 | 624 | #272 | #505 | |
| Internal Link Dist (ft) | | 620 | | | 611 | | | 712 | | | 884 | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 462 | 1580 | | 826 | 1598 | 1007 | 383 | 730 | 1369 | 372 | 725 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 84 | 0 | 10 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.48 | 0.80 | | 1.36 | 0.85 | 0.30 | 0.51 | 0.61 | 0.83 | 1.02 | 0.98 | |

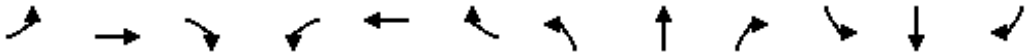
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 133 (89%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.36 | | | |
| Intersection Signal Delay: 78.8 | | Intersection LOS: E | |
| Intersection Capacity Utilization 90.0% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |
| ~ Volume exceeds capacity, queue is theoretically infinite. | | | |
| Queue shown is maximum after two cycles. | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | |
| Queue shown is maximum after two cycles. | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 4: S Royal Oaks/N Royal Oaks & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 2002 | 488 | 285 | 925 | 0 | 0 | 0 | 0 | 914 | 0 | 1449 |
| Future Volume (vph) | 0 | 2002 | 488 | 285 | 925 | 0 | 0 | 0 | 0 | 914 | 0 | 1449 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 400 | | | | | | | | | 135 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.93 | 0.78 | 0.71 | 0.86 | 1.00 | 1.00 | 1.00 | 1.00 | 0.87 | 1.00 | 0.88 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 1% | 1% | 2% | 2% | 2% | 2% | 1% | 2% | 1% |
| Adj. Flow (vph) | 0 | 2153 | 626 | 401 | 1076 | 0 | 0 | 0 | 0 | 1051 | 0 | 1647 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 2153 | 626 | 401 | 1076 | 0 | 0 | 0 | 0 | 1051 | 0 | 1647 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (%) | | 36.7% | 36.7% | 20.0% | 56.7% | | | | | 43.3% | | 43.3% |
| Maximum Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 51.0 | 51.0 | 25.0 | 81.0 | | | | | 59.5 | | 59.5 |
| Actuated g/C Ratio | | 0.34 | 0.34 | 0.17 | 0.54 | | | | | 0.40 | | 0.40 |
| v/c Ratio | | 0.99 | 0.78 | 1.35 | 0.58 | | | | | 0.77 | | 1.43 |
| Control Delay | | 72.0 | 30.6 | 226.4 | 26.5 | | | | | 43.9 | | 229.0 |
| Queue Delay | | 1.3 | 0.0 | 0.0 | 0.9 | | | | | 1.8 | | 0.0 |
| Total Delay | | 73.3 | 30.6 | 226.4 | 27.4 | | | | | 45.7 | | 229.0 |
| LOS | | E | C | F | C | | | | | D | | F |
| Approach Delay | | 63.7 | | | 81.4 | | | | | | | |
| Approach LOS | | E | | | F | | | | | | | |
| 90th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 90th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 70th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 70th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 50th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 50th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 30th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 30th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 10th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 10th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| Stops (vph) | | 1876 | 474 | 222 | 498 | | | | | 776 | | 998 |
| Fuel Used(gal) | | 64 | 12 | 16 | 13 | | | | | 18 | | 82 |
| CO Emissions (g/hr) | | 4472 | 814 | 1146 | 935 | | | | | 1262 | | 5755 |
| NOx Emissions (g/hr) | | 870 | 158 | 223 | 182 | | | | | 246 | | 1120 |
| VOC Emissions (g/hr) | | 1036 | 189 | 266 | 217 | | | | | 292 | | 1334 |
| Dilemma Vehicles (#) | | 105 | 0 | 0 | 51 | | | | | 0 | | 0 |
| Queue Length 50th (ft) | | 637 | 324 | ~525 | 287 | | | | | 457 | | ~1192 |
| Queue Length 95th (ft) | | m#693 | m295 | #521 | 430 | | | | | 515 | | #1297 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2178 | 802 | 297 | 1865 | | | | | 1368 | | 1155 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 464 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 14 | 0 | 0 | 0 | | | | | 172 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.99 | 0.78 | 1.35 | 0.77 | | | | | 0.88 | | 1.43 |

Intersection Summary

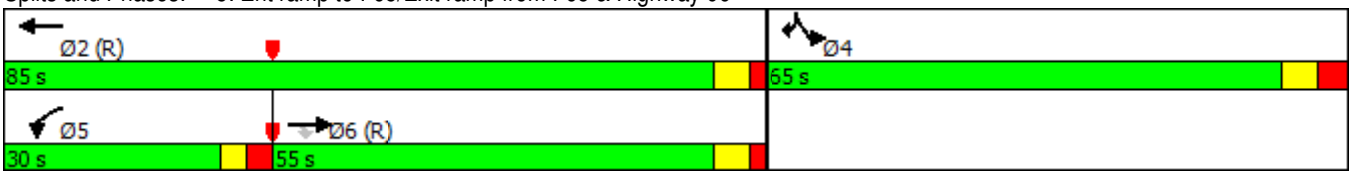
| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 104 (69%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.43 | | | |
| Intersection Signal Delay: 103.9 | | Intersection LOS: F | |
| Intersection Capacity Utilization 84.9% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

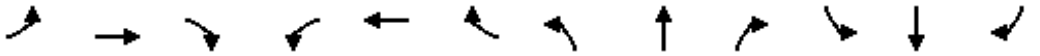
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

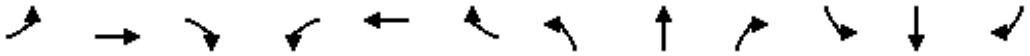
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Ent ramp to I-65/Exit ramp from I-65 & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 619 | 2297 | 0 | 0 | 895 | 998 | 315 | 0 | 164 | 0 | 0 | 0 |
| Future Volume (vph) | 619 | 2297 | 0 | 0 | 895 | 998 | 315 | 0 | 164 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 226 | | | 69 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 1845 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 31.4 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.97 | 0.98 | 1.00 | 0.25 | 0.91 | 0.93 | 0.92 | 1.00 | 0.87 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 3% | 3% | 2% | 0% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 2% |
| Adj. Flow (vph) | 638 | 2344 | 0 | 0 | 984 | 1073 | 342 | 0 | 189 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 638 | 2344 | 0 | 0 | 984 | 1073 | 342 | 0 | 189 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |

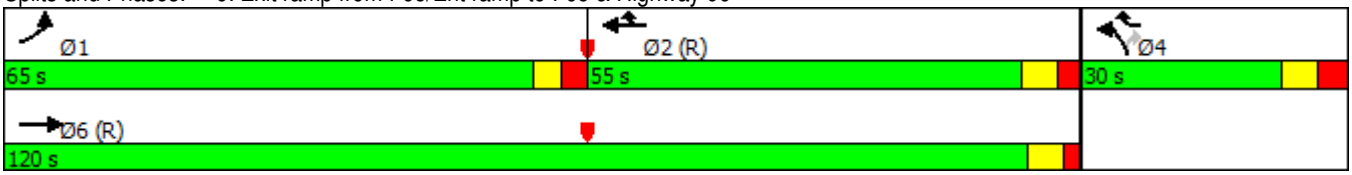


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (%) | 43.3% | 80.0% | | | 36.7% | | 20.0% | | 20.0% | | | |
| Maximum Green (s) | 59.0 | 114.0 | | | 48.5 | | 22.5 | | 22.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 37.2 | 114.6 | | | 70.9 | 102.3 | 21.9 | | 21.9 | | | |
| Actuated g/C Ratio | 0.25 | 0.76 | | | 0.47 | 0.68 | 0.15 | | 0.15 | | | |
| v/c Ratio | 0.79 | 0.91 | | | 0.59 | 0.54 | 0.71 | | 0.65 | | | |
| Control Delay | 79.7 | 23.9 | | | 31.8 | 10.9 | 69.9 | | 48.9 | | | |
| Queue Delay | 0.0 | 5.4 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 79.7 | 29.3 | | | 31.8 | 10.9 | 69.9 | | 48.9 | | | |
| LOS | E | C | | | C | B | E | | D | | | |
| Approach Delay | | 40.1 | | | 20.9 | | | | | | | |
| Approach LOS | | D | | | C | | | | | | | |
| 90th %ile Green (s) | 45.2 | 114.0 | | | 62.3 | | 22.5 | | 22.5 | | | |
| 90th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 70th %ile Green (s) | 40.9 | 114.0 | | | 66.6 | | 22.5 | | 22.5 | | | |
| 70th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 50th %ile Green (s) | 37.2 | 114.0 | | | 70.3 | | 22.5 | | 22.5 | | | |
| 50th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 30th %ile Green (s) | 34.1 | 114.0 | | | 73.4 | | 22.5 | | 22.5 | | | |
| 30th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 10th %ile Green (s) | 28.8 | 117.2 | | | 81.9 | | 19.3 | | 19.3 | | | |
| 10th %ile Term Code | Gap | Coord | | | Coord | | Gap | | Gap | | | |
| Stops (vph) | 610 | 1847 | | | 646 | 395 | 295 | | 100 | | | |
| Fuel Used(gal) | 18 | 38 | | | 23 | 19 | 7 | | 3 | | | |
| CO Emissions (g/hr) | 1284 | 2656 | | | 1632 | 1299 | 521 | | 208 | | | |
| NOx Emissions (g/hr) | 250 | 517 | | | 317 | 253 | 101 | | 40 | | | |
| VOC Emissions (g/hr) | 298 | 615 | | | 378 | 301 | 121 | | 48 | | | |
| Dilemma Vehicles (#) | 0 | 83 | | | 30 | 0 | 0 | | 0 | | | |
| Queue Length 50th (ft) | 342 | 589 | | | 366 | 218 | 165 | | 112 | | | |
| Queue Length 95th (ft) | m344 | m499 | | | 485 | 327 | 222 | | 190 | | | |
| Internal Link Dist (ft) | | 476 | | | 1765 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1286 | 2575 | | | 1672 | 1982 | 495 | | 298 | | | |
| Starvation Cap Reductn | 0 | 199 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 0.50 | 0.99 | | | 0.59 | 0.54 | 0.69 | | 0.63 | | | |

Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 138 (92%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.91 | | | |
| Intersection Signal Delay: 35.1 | | Intersection LOS: D | |
| Intersection Capacity Utilization 84.9% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 6: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



**APPENDIX D**
**TRIP GENERATION**

**TRIP GENERATION CALCULATIONS – Assisted Living**

The following calculations are based on the data compiled for ITE Land Use Code 254.

**Average Daily Traffic**

T = 2.74 (X)
T = 2.74 (**208**)
T = 570 vehicles

Enter = 0.50 (570) = 285 vehicles
Exit = 0.50 (570) = 285 vehicles

**AM traffic during peak hour of adjacent street**

T = 0.23 (X)
T = 0.23 (**208**)
T = 47 vehicles

Enter = 0.72 (47) = 34 vehicles
Exit = 0.28 (47) = 13 vehicles

**PM traffic during peak hour of adjacent street**

T = 0.37 (X)
T = 0.37 (**208**)
T = 77 vehicles

Enter = 0.39 (77) = 30 vehicles
Exit = 0.61 (77) = 47 vehicles

**TRIP GENERATION CALCULATIONS – Multi-Family (South)**

The following calculations are based on the data compiled for ITE Land Use Code 220.

**Average Daily Traffic**

T = 6.65 (X)
T = 6.65 (**98**)
T = 652 vehicle-trips

Enter = 0.50 (652) = 326 vehicles
Exit = 0.50 (652) = 326 vehicles

**A.M. traffic during peak hour of adjacent street**

T = 0.51 (X)
T = 0.51 (**98**)
T = 50 vehicle-trips

Enter = 0.20 (50) = 10 vehicles
Exit = 0.80 (50) = 40 vehicles

**P.M. traffic during peak hour of adjacent street**

T = 0.62 (X)
T = 0.62 (**98**)
T = 60 vehicle-trips

Enter = 0.65 (60) = 39 vehicles
Exit = 0.35 (60) = 21 vehicles

**TRIP GENERATION CALCULATIONS – Multi-Family (North)**

The following calculations are based on the data compiled for ITE Land Use Code 220.

**Average Daily Traffic**

T = 6.65 (X)
T = 6.65 (**204**)
T = 1,356 vehicle-trips

Enter = 0.50 (1,356) = 678 vehicles
Exit = 0.50 (1,356) = 678 vehicles

**A.M. traffic during peak hour of adjacent street**

T = 0.51 (X)
T = 0.51 (**204**)
T = 104 vehicle-trips

Enter = 0.20 (104) = 21 vehicles
Exit = 0.80 (104) = 83 vehicles

**P.M. traffic during peak hour of adjacent street**

T = 0.62 (X)
T = 0.62 (**204**)
T = 126 vehicle-trips

Enter = 0.65 (126) = 82 vehicles
Exit = 0.35 (126) = 44 vehicles

**TRIP GENERATION CALCULATIONS – Specialty Retail**

The following calculations are based on the data compiled for ITE Land Use Code 826.

**Average Daily Traffic**

T = 44.32 (X)
T = 44.32 (**15.000**)
T = 664 vehicle-trips

Enter = 0.50 (664) = 332 vehicles
Exit = 0.50 (664) = 332 vehicles

**A.M. traffic during peak hour of adjacent street**

T = 6.84 (X)
T = 6.84 (**15.000**)
T = 102 vehicle-trips

Enter = 0.48 (102) = 49 vehicles
Exit = 0.52 (102) = 53 vehicles

**P.M. traffic during peak hour of adjacent street**

T = 2.71 (X)
T = 2.71 (**15.000**)
T = 41 vehicle-trips

Enter = 0.44 (41) = 18 vehicles
Exit = 0.56 (41) = 23 vehicles

HISTORIC FRANKLIN TENNESSEE

# MEMORANDUM

**DATE:** April 20, 2016

**TO:** Franklin Municipal Planning Commission

**FROM:** Amy Diaz-Barriga, Current Planning Supervisor
Bob Martin, Interim Director of Planning and Sustainability

## Subject

..title

Consideration Of Ordinance 2016-008, To Be Entitled, "An Ordinance To Rezone 30.39 Acres From General Commercial (GC) District To Specific Development-Residential (SD-R 11.7) District For The Property Located West Of Interstate 65, At 840 And 880 Oak Meadow Drive."

..body

## Project Information

**COF Project Number: 6085**
**Applicant:** **Adam Crunk, Crunk Engineering**
**Owner:** **Warner Bass**

## Background/Staff Comments

Any request for an SD zoning district is required to be accompanied by a PUD Development Plan. Neither the Planning nor Engineering Departments support the PUD Development Plan associated with this rezoning, and therefore cannot support this rezoning request. There are conceptual flaws on the site design of the Development Plan. The plan will cater to cars and not residents, and will have little regard for creating open spaces and a site experience to benefit its residents. Engineering is skeptical that the conceptual design of its stormwater detention and water quality will be sufficient in size to handle the run-off of the site.

Further, the proposed use at the requested density will ignite traffic concerns for the area, which at this point are unresolved in the applicant's provided traffic study. The intersection of South Royal Oaks Boulevard and Riverside Drive is currently at an unacceptable level, and the applicant's study is lacking the documentation and analysis of how their proposed off-site improvements will alleviate some of the current congestion. Without data to support the study's claims, this rezoning request seems premature.

## Project Considerations

*Project Considerations are not conditions of this approval, but are intended to highlight issues that should be considered in the overall site design or may be required when more detailed plans are submitted for review. These items are not meant to be exhaustive and all City requirements and ordinances must be met with each plan submittal.*

Regarding the requested analysis for South Royal Oaks & Center Point/Riverside to investigate protected/permitted left turn phasing for the side streets, this was not performed. Furthermore, the Synchro technical analyses using permitted left turns on the side streets show errors. The applicant shall correct the errors and investigate the protected/permitted left turn phasing for the side streets. Staff has informed the applicant that the City of Franklin's preliminary investigation of such phasing shows improvements in intersection operations. The applicant shall also address the 3rd party review comments as approved by the City Traffic Engineer and uploaded into IDT.

**Recommendation**

..recommendation

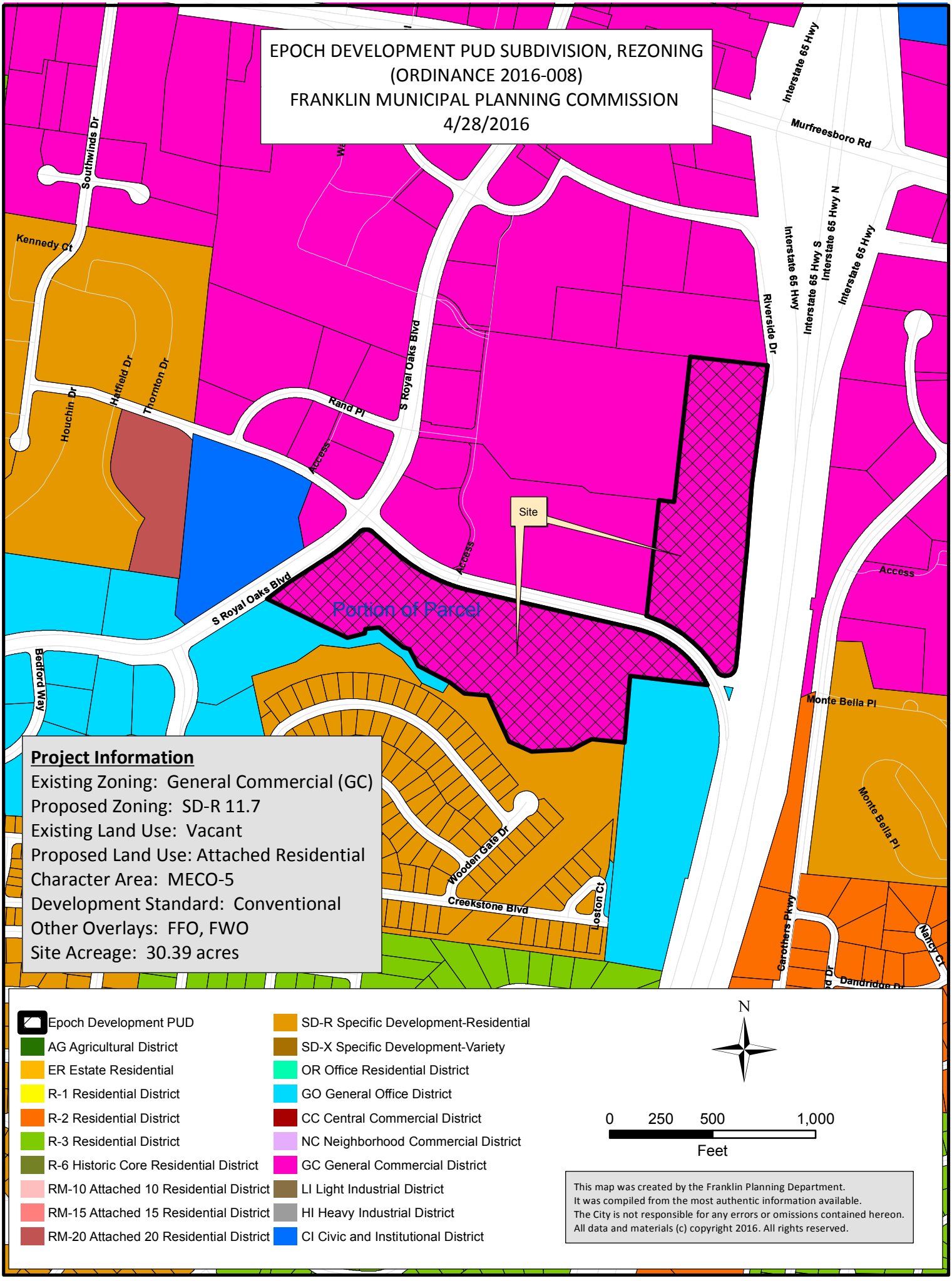
**Disapproval.**

..end

See attached pages for a list of staff recommended conditions of approval.

**PROCEDURAL REQUIREMENTS:**

1. The city's project identification number shall be included on all correspondence with any city department relative to this project.


EPOCH DEVELOPMENT PUD SUBDIVISION, REZONING
(ORDINANCE 2016-008)
FRANKLIN MUNICIPAL PLANNING COMMISSION
4/28/2016
Project Information
Existing Zoning: General Commercial (GC)
Proposed Zoning: SD-R 11.7
Existing Land Use: Vacant
Proposed Land Use: Attached Residential
Character Area: MECO-5
Development Standard: Conventional
Other Overlays: FFO, FWO
Site Acreage: 30.39 acres
Site
Portion of Parcel
Southwinds Dr
Kennedy Ct
Houchin Dr
Hatfield Dr
Thornton Dr
Rand Pl
S Royal Oaks Blvd
Access
Bedford Way
Murfreesboro Rd
Interstate 65 Hwy
Interstate 65 Hwy S
Interstate 65 Hwy N
Riverside Dr
Monte Bella Pl
Wooden Gate Dr
Creekstone Blvd
Loston Ct
Carothers Pkwy
Nancy Ct
Dandridge Dr
Epoch Development PUD
AG Agricultural District
ER Estate Residential
R-1 Residential District
R-2 Residential District
R-3 Residential District
R-6 Historic Core Residential District
RM-10 Attached 10 Residential District
RM-15 Attached 15 Residential District
RM-20 Attached 20 Residential District
SD-R Specific Development-Residential
SD-X Specific Development-Variety
OR Office Residential District
GO General Office District
CC Central Commercial District
NC Neighborhood Commercial District
GC General Commercial District
LI Light Industrial District
HI Heavy Industrial District
CI Civic and Institutional District
N
0 250 500 1,000
Feet
This map was created by the Franklin Planning Department.
It was compiled from the most authentic information available.
The City is not responsible for any errors or omissions contained hereon.
All data and materials (c) copyright 2016. All rights reserved.

**ORDINANCE 2016-008**

**TO BE ENTITLED, "AN ORDINANCE TO REZONE 30.39 ACRES FROM GENERAL COMMERCIAL (GC) DISTRICT TO SPECIFIC DEVELOPMENT-RESIDENTIAL (SD-R 12) DISTRICT FOR THE PROPERTY LOCATED WEST OF INTERSTATE 65, AT 840 AND 880 OAK MEADOW DRIVE."**

**WHEREAS,** the City of Franklin, Tennessee, encourages responsible growth and the sensible transition of land uses and densities; and

**WHEREAS**, the Specific Development-Residential district provides zoning for land uses compatible with both the Franklin Land Use Plan and surrounding development; and

**WHEREAS,** the Board of Mayor and Alderman (BOMA) of the City of Franklin, Tennessee, adopted Resolution 2016-20, approving a Plan Unit Development (PUD) Development Plan as required by the Franklin Zoning Ordinance; and

**WHEREAS,** the zoning has been reviewed and approved by BOMA after a public hearing and a recommendation by the Franklin Municipal Planning Commission.

**NOW THEREFORE BE IT ORDAINED BY THE BOARD OF MAYOR AND ALDERMAN OF THE CITY OF FRANKLIN, TENNESSEE, AS FOLLOWS:**

**SECTION I.** That the following described property shall be, and is hereby, rezoned from its present zoning classification of **GC** District to **SD-R (12.0)** District:

PREMISES CONSIDERED

| Map-Parcel | Acres |
|---|---|
| 79-88 (portion of) | 13.06 |
| 79-101.19 | 17.33 |
| Total | 30.39 |

**LOT 24**
**MAP 79, PORTION OF PARCEL 88.00**
**SURVEY TRACT 1**

A TRACT OF LAND IN THE NINTH CIVIL DISTRICT OF WILLIAMSON COUNTY, CITY OF FRANKLIN, TENNESSEE AND BEING GENERALLY BOUNDED ON THE NORTH BY OAK MEADOW DRIVE, (RIGHT-OF-WAY WIDTH VARIES), ON THE EAST BY NASHVILLE LODGE NO. 72, B.P.O. ELKS, RECORDED IN DEED BOOK 1708, PAGE 12, REGISTER'S OFFICE FOR WILLIAMSON COUNTY, TENNESSEE (R.O.W.C.,T.) ON THE SOUTH BY OPEN SPACE LOT 808 AS SHOWN ON THE PLAN ENTITLED "CREEKSTONE COMMONS, P.U.D SUBDIVISION, SECTION FOUR" OF RECORD IN PLAT BOOK P58, PAGE 10, R.O.W.C.,T. AND LOT 27 AS SHOWN ON THE PLAN ENTITLED "CREEKSTONE COMMONS, REVISION FOUR" OF RECORD IN PLAT BOOK P49, PAGE 110, R.O.W.C.,T. AND ON THE WEST BY THE REMAINDER OF LOT 24 OF FINAL PLAN OF WATSON GLEN SUBDIVISION, SECTION 1, REVISION 10, OF RECORD IN PLAT BOOK 29, PAGE 139, R.O.W.C.T AND BEING DESCRIBED ACCORDING TO A SURVEY DATED OCTOBER 15, 2015 AND PREPARED BY KEVIN L. BIRDWELL, R.L.S. NO. 1797 WHOSE ADDRESS IS RAGAN SMITH ASSOCIATES, 315 WOODLAND STREET, NASHVILLE, TN 37206 AND BEING MORE

PARTICULARLY DESCRIBED AS FOLLOWS:
COMMENCING IN THE EAST RIGHT-OF-WAY LINE OF SOUTH ROYAL OAKS BOULEVARD AND BEING THE SOUTH END OF A CURVE AT THE INTERSECTION OF THE EAST RIGHT-OF-WAY LINE OF SOUTH ROYAL OAKS BOULEVARD AND THE SOUTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE AND PROCEEDING AS FOLLOWS:
THENCE, WITH A CURVE TO THE RIGHT HAVING A RADIUS OF 50.00 FEET, AN ARC LENGTH OF 72.76 FEET, A CENTRAL ANGLE OF 83 DEGREES 22 MINUTES 19 SECONDS, AND A CHORD BEARING AND DISTANCE OF NORTH 89 DEGREES 31 MINUTES 21 SECONDS EAST, 66.50 FEET TO AN IRON ROD (NEW) WITH CAP STAMPED (RSA) IN THE SOUTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE;
THENCE, WITH THE SOUTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE THE FOLLOWING TWO CALLS:
1. SOUTH 48 DEGREES 47 MINUTES 29 SECONDS EAST, 121.81 FEET;
2. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 820.00 FEET, AN ARC LENGTH OF 71.61 FEET, A CENTRAL ANGLE OF 05 DEGREES 00 MINUTES 12 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 51 DEGREES 17 MINUTES 35 SECONDS EAST, 71.58 FEET TO AN IRON ROD (NEW) WITH CAP STAMPED (RSA), THE **POINT OF BEGINNING** OF THE HEREIN DESCRIBED TRACT OF LAND AND PROCEEEDING AS FOLLOWS:
THENCE, WITH SAID SOUTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE THE FOLLOWING THREE CALLS:
1. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 820.00 FEET, AN ARC LENGTH OF 330.94 FEET, A CENTRAL ANGLE OF 23 DEGREES 07 MINUTES 24 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 65 DEGREES 21 MINUTES 21 SECONDS EAST, 328.69 FEET TO AN IRON ROD (OLD) WITH CAP STAMPED (RSA);
2. SOUTH 76 DEGREES 55 MINUTES 03 SECONDS EAST, 834.46 FEET TO AN IRON ROD (NEW)WITH CAP STAMPED (RSA);
3. WITH A CURVE TO THE RIGHT HAVING A RADIUS OF 537.96 FEET, AN ARC LENGTH OF 464.57 FEET, A CENTRAL ANGLE OF 49 DEGREES 28 MINUTES 46 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 52 DEGREES 10 MINUTES 40 SECONDS EAST, 450.27 FEET TO AN IRON ROD (NEW)WITH CAP STAMPED (RSA);
THENCE, LEAVING THE SOUTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE AND WITH THE NORTH LINE OF THE NASHVILLE LODGE NO. 72, B.P.O. ELKS PROPERTY, NORTH 83 DEGREES 59 MINUTES 15 SECONDS WEST, 376.29 FEET TO A 1/2 INCH DIAMETER IRON ROD (OLD),
THENCE, WITH THE WEST LINE OF THE NASHVILLE LODGE NO. 72, B.P.O. ELKS PROPERTY, SOUTH 05 DEGREES 14 MINUTES 00 SECONDS WEST, PASSING A WITNESS IRON ROD (NEW) ON THE NORTH SIDE OF WATSON BRANCH AT A DISTANCE OF 298.26 AND A TOTAL DISTANCE OF 323.26 FEET TO A POINT IN THE CENTER OF WATSON BRANCH, SAID POINT BEING THE NORTHEAST CORNER OF LOT 808 ON SAID PLAN OF CREEKSTONE COMMONS P.U.D. SUDIVISION, SECTION FOUR;
THENCE, WITH THE CENTERLINE OF WATSON BRANCH AND THE NORTH LINE OF LOT 808 OF SAID CREEKSTONE COMMONS P.U.D. SUBDIVISION, SECTION FOUR AND THE NORTH LINE OF LOT 27 ON SAID PLAN OF CREEKSTONE COMMONS SUBDIVISION, REVISION 4 THE FOLLOWING SIXTEEN BEARINGS AND DISTANCES:
1. NORTH 83 DEGREES 48 MINUTES 10 SECONDS WEST, 161.22 FEET;
2. SOUTH 61 DEGREES 46 MINUTES 08 SECONDS WEST, 106.65 FEET;
3. SOUTH 86 DEGREES 48 MINUTES 30 SECONDS WEST, 198.12 FEET;
4. NORTH 65 DEGREES 28 MINUTES 52 SECONDS WEST, 120.02 FEET;
5. NORTH 24 DEGREES 43 MINUTES 04 SECONDS WEST, 244.21 FEET;
6. NORTH 84 DEGREES 36 MINUTES 00 SECONDS WEST, 115.35 FEET;
7. NORTH 52 DEGREES 04 MINUTES 01 SECONDS WEST, 87.70 FEET;
8. NORTH 57 DEGREES 18 MINUTES 12 SECONDS WEST, 163.19 FEET;
9. NORTH 29 DEGREES 52 MINUTES 55 SECONDS WEST, 101.80 FEET;
10. NORTH 74 DEGREES 02 MINUTES 09 SECONDS WEST, 41.15 FEET;
11. NORTH 48 DEGREES 56 MINUTES 27 SECONDS WEST, 137.25 FEET;
12. SOUTH 88 DEGREES 57 MINUTES 25 SECONDS WEST, 67.60 FEET,

13. SOUTH 10 DEGREES 32 MINUTES 54 SECONDS WEST, 26.12 FEET,
14. SOUTH 74 DEGREES 19 MINUTES 35 SECONDS WEST, 89.75 FEET,
15. NORTH 75 DEGREES 22 MINUTES 06 SECONDS WEST, 55.08 FEET,
16. NORTH 62 DEGREES 35 MINUTES 03 SECONDS WEST, 10.27 FEET,
THENCE, LEAVING WATSON BRANCH WITH A THE CENTERLINE OF A DRAINAGE DITCH AND SEVERING SAID LOT 24 OF FINAL PLAN OF WATSON GLEN SUBDIVISION, SECTION 1, REVISION 10, THE FOLLOWING SEVEN BEARINGS AND DISTANCES:
1. NORTH 39 DEGREES 40 MINUTES 55 SECONDS EAST, 27.30 FEET,
2. SOUTH 89 DEGREES 07 MINUTES 57 SECONDS EAST, 31.47 FEET,
3. NORTH 25 DEGREES 32 MINUTES 12 SECONDS EAST, 70.78 FEET,
4. NORTH 10 DEGREES 00 MINUTES 40 SECONDS WEST, 49.37 FEET,
5. NORTH 54 DEGREES 59 MINUTES 41 SECONDS EAST, 103.02 FEET,
6. NORTH 40 DEGREES 36 MINUTES 36 SECONDS EAST, 74.71 FEET,
7. NORTH 53 DEGREES 28 MINUTES 05 SECONDS EAST, 164.68 FEET TO THE POINT OF BEGINNING AND CONTAINING 754,942 SQUARE FEET OR 17.33 ACRES, MORE OR LESS.

**and**

## LOT 32
## MAP 79, PARCEL 101.00

A TRACT OF LAND IN THE NINTH CIVIL DISTRICT OF WILLIAMSON COUNTY, CITY OF FRANKLIN, TENNESSEE, AND BEING LOT 32 AS SHOWN ON THE FINAL PLAT ENTITLED “WATSON GLEN SUBDIVISION, SECTION 2, REVISION 1, RESUBDIVISION OF LOT 31” OF RECORD IN PLAT BOOK P62, PAGE 45, REGISTER'S OFFICE FOR WILLIAMSON COUNTY TENNESSEE (R.O.W.C.T.). AND BEING GENERALLY BOUNDED ON THE NORTH BY LOT 10 AS SHOWN ON PLAN ENTITLED “WATSON GLEN SUBDIVISION, SECTION 2” OF RECORD IN PLAT BOOK 13, PAGE 85, R.O.W.C.T., ON THE EAST BY RIVERSIDE DRIVE (IMPROVED AND UNIMPROVED ROAD, RIGHT-OF-WAY WIDTH VARIES), ON THE SOUTH BY OAK MEADOW DRIVE (RIGHT-OF-WAY WITH VARIES), AND ON THE WEST BY LOT 2 AS SHOWN ON THE PLAN ENTITLED “WATSON GLEN SUBDIVISION, SECTION 1, REVISION 10, (RESUBDIVISION OF LOT 2 AND OF RIVERSIDE BUSINESS PARK SUBDIVISION, SECTION 1, REVISION 4, LOT 11) OF RECORD IN PLAT BOOK 29, PAGE 139, R.O.W.C.T. AND LOT 31 ON SAID PLAN ENTITLED “WATSON GLEN SUBDIVISION, SECTION 2, REVISION 1, RESUBDIVISION OF LOT 31” OF RECORD IN PLAT BOOK P62, PAGE 45, R.OW.C.T., AND BEING DESCRIBED ACCORDING TO A SURVEY DATED OCTOBER 15, 2015 AND PREPARED BY KEVIN L BIRDWELL, R.L.S. NO. 1797 WHOSE ADDRESS IS RAGAN SMITH ASSOCIATES, 315 WOODLAND STREET, NASHVILLE, TN 37206 AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:
**COMMENCING** AT AN IRON ROD (OLD) WITH CAP STAMPED “RAGAN-SMITH ASSOCIATES” (RSA), SAID PIN BEING IN THE EASTERLY RIGHT-OF-WAY OF SOUTH ROYAL OAKS BOULEVARD AND BEING THE NORTH END OF A CURVE AT THE INTERSECTION OF THE EAST RIGHT-OF-WAY LINE OF SOUTH ROYAL OAKS BOULEVARD AND THE NORTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE AND BEING A WESTERLY CORNER OF LOT 30 OF THE FINAL PLAT ENTITLED “WATSON GLEN SUBDIVISION, SECTION 2 OF RECORD IN PLAT BOOK P43, PAGE 40, R.O.W.C.T.;
THENCE, WITH A CURVE TO THE LEFT HAVING A RADIUS OF 50.00 FEET, AN ARC LENGTH OF 73.83 FEET, A CENTRAL ANGLE OF 84 DEGREES 35 MINUTES 53 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 06 DEGREES 29 MINUTES 38 SECONDS EAST, 67.30 FEET TO AN IRON ROD (OLD) WITH CAP STAMPED (RSA) IN THE NORTHERLY RIGHT-OF-WAY OF OAK MEADOW DRIVE (RIGHT-OF-WAY WIDTH VARIES);
THENCE, CONTINUING WITH SAID RIGHT-OF-WAY AND WITH THE SOUTHERLY LINE OF SAID LOT 30 THE FOLLOWING TWO CALLS:
1. SOUTH 48 DEGREES 47 MINUTES 29 SECONDS EAST, 157.42 FEET IRON ROD (OLD) WITH CAP STAMPED (RSA);
2. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 750.00 FEET, AN ARC LENGTH OF 251.97 FEET, A CENTRAL ANGLE OF 19 DEGREES 14 MINUTES 55 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 58 DEGREES 24 MINUTES 57 SECONDS EAST, 250.78 FEET TO AN IRON ROD (OLD) WITH CAP STAMPED (RSA) AT THE SOUTHWEST CORNER OF LOT 31 ON THE PLAN ENTITLED “WATSON GLEN SUBDIVISION, SECTION 2, REVISON 1, RESUBDIVISION OF LOT 31” OF RECORD IN PLAT BOOK P62, PAGE 45, R.O.W.C.T.;
THENCE, CONTINUING WITH SAID RIGHT-OF-WAY AND WITH THE SOUTHERLY LINE OF SAID LOT 31 THE FOLLOWING THREE CALLS:
1. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 750.00 FEET, AN ARC LENGTH OF 116.20 FEET,

A CENTRAL ANGLE OF 08 DEGREES 52 MINUTES 38 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 72 DEGREES 28 MINUTES 44 SECONDS EAST, 116.09 FEET TO AN IRON ROD (OLD) WITH CAP STAMPED (RSA);
2. SOUTH 76 DEGREES 55 MINUTES 03 SECONDS EAST, 811.13 FEET TO AN IRON ROD (OLD);
3. WITH A CURVE TO THE RIGHT HAVING A RADIUS OF 607.96 FEET, AN ARC LENGTH OF 43.08 FEET, A CENTRAL ANGLE OF 04 DEGREES 03 MINUTES 37 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 74 DEGREES 53 MINUTES 15 SECONDS EAST, 43.07 FEET TO A PK NAIL (OLD) IN THE CENTERLINE OF AN ACCESS DRIVE, THE **POINT OF BEGINNING** OF THE HEREIN DESCRIBED TRACT OF LAND AND PROCEEEDING AS FOLLOWS:
4. THENCE, LEAVING SAID RIGHT-OF-WAY OF OAK MEADOW DRIVE WITH THE CENTERLINE OF SAID ACCESS DRIVE AND THE EAST LINE OF SAID LOT 31 ON THE PLAN ENTITLED "WATSON GLEN SUBDIVISION, SECTION 2, REVISON 1, RESUBDIVISION OF LOT 31" OF RECORD IN PLAT BOOK P62, PAGE 45, R.O.W.C.T.;NORTH 06 DEGREES 14 MINUTES 29 SECONDS EAST, 564.50 FEET TO A PK NAIL (OLD) IN THE SOUTH LINE OF LOT 2 AS SHOWN ON THE PLAN ENTITLED "WATSON GLEN SUBDIVISION, SECTION 1, REVISION 10, (RESUBDIVISION OF LOT 2 AND OF RIVERSIDE BUSINESS PARK SUBDIVISION, SECTION 1, REVISION 4, LOT 11);
THENCE, WITH THE SOUTH AND EAST LINE OF SAID LOT 2, THE FOLLOWING TWO BEARINGS AND DISTANCES:
1. SOUTH 83 DEGREES 35 MINUTES 44 SECONDS EAST, 73.68 FEET TO AN IRON ROD (OLD) WITH CAP STAMPED (RSA);
2. NORTH 06 DEGREES 24 MINUTES 16 SECONDS EAST, 708.89 FEET TO PUNCH HOLE IN A LIGHT BASE IN THE SOUTH LINE OF SAID LOT 10 OF FINAL PLAT ENTITLED "WATSON GLEN SUBDIVISION, SECTION 2";
THENCE, WITH THE SOUTH LINE OF SAID LOT 10, SOUTH 83 DEGREES 32 MINUTES 35 SECONDS EAST, 377.77 FEET TO CONCRETE MONUMENT OLD IN THE WESTERLY RIGHT-OF-WAY OF RIVERSIDE DRIVE (RIGHT-OF-WAY WIDTH VARIES);
THENCE, WITH THE WESTERLY RIGHT-OF-WAY OF RIVERSIDE DRIVE (IMPROVED AND UNIMPROVED ROAD), THE FOLLOWING FOUR CALLS:
1. SOUTH 07 DEGREES 40 MINUTES 29 SECONDS WEST, 577.88 FEET TO AN IRON ROD (OLD);
2. SOUTH 04 DEGREES 01 MINUTES 39 SECONDS WEST, 310.67 FEET TO AN IRON ROD (OLD);
3. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 11300.00 FEET, AN ARC LENGTH OF 470.04 FEET, A CENTRAL ANGLE OF 02 DEGREES 23 MINUTES 00 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 05 DEGREES 13 MINUTES 09 SECONDS WEST, 470.01 FEET TO A CONCRETE MONUMENT (OLD);
4. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 11300.00 FEET, AN ARC LENGTH OF 112.73 FEET, A CENTRAL ANGLE OF 00 DEGREES 34 MINUTES 18 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 06 DEGREES 41 MINUTES 48 SECONDS WEST, 112.73 FEET TO A CONCRETE MONUMENT (OLD);
THENCE, LEAVING SAID RIGHT-OF-WAY OF RIVERSIDE DRIVE AND WITH THE NORTH RIGHT-OF-WAY OF OAK MEADOW DRIVE (RIGHT-OF-WAY WIDTH VARIES) THE FOLLOWING TWO CALLS:
1. WITH A CURVE TO THE RIGHT HAVING A RADIUS OF 50.00 FEET, AN ARC LENGTH OF 123.89 FEET, A CENTRAL ANGLE OF 141 DEGREES 58 MINUTES 19 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 77 DEGREES 58 MINUTES 06 SECONDS WEST, 94.54 FEET TO AN IRON ROD (OLD);
2. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 607.96 FEET, AN ARC LENGTH OF 443.66 FEET, A CENTRAL ANGLE OF 41 DEGREES 48 MINUTES 42 SECONDS, AND A CHORD BEARING AND DISTANCE OF NORTH 51 DEGREES 57 MINUTES 06 SECONDS WEST, 433.88 FEET TO THE **POINT OF BEGINNING** AND CONTAINING 569,021 SQUARE FEET OR 13.06 ACRES, MORE OR LESS.

**SECTION II:** That the attached Location Map shall serve the purpose of further delimiting the geographical boundaries as described by this Ordinance.

**SECTION III.** BE IT FINALLY ORDAINED by the Board of Mayor and Aldermen of the City of Franklin, Tennessee, that this Ordinance shall take effect from and after its passage on third and final reading, the health, safety, and welfare of the citizens requiring it.

**ATTEST:**

By: _____
**Eric Stuckey**
City Administrator/Recorder

**CITY OF FRANKLIN, TENNESSEE:**

By: _____
**Dr. Ken Moore**
Mayor

Approved as to form by:

_____
Shauna R. Billingsley
City Attorney

PLANNING COMMISSION RECOMMENDED: _____

PASSED FIRST READING: _____

PUBLIC HEARING HELD: _____

PASSED SECOND READING: _____

PASSED THIRD READING: _____

F i s c h b a c h
Transportation Group, LLC
Traffic Engineering and Planning

# Traffic Impact Study

# Epoch Apartments
# Oak Meadow Drive
# Franklin, TN

Prepared March 2016
(Revised April 2016)
For Epoch Residential

**FTG, LLC**
**P.O. Box 682736**
**Franklin, TN 37068**
**(615) 771-8022 phone**
**Gillian@FTGtraffic.com**

**Traffic Impact Study**

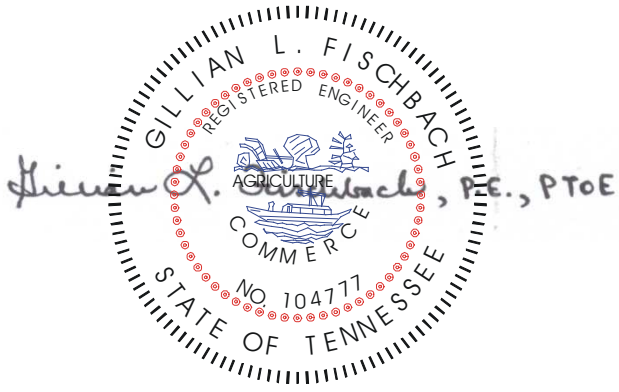
# Epoch Apartments
# Oak Meadow Drive

## Franklin, Tennessee

**Prepared March 2016**
**(Revised April 2016)**

**PREPARED FOR:**
Epoch Residential
359 Carolina Avenue
Winter Park, FL 32789

**PREPARED BY:**
Ms. Gillian L. Fischbach, P.E., PTOE
Fischbach Transportation Group (FTG, LLC)
P.O. Box 682736
Franklin, TN 37068
Phone: (615) 771-8022
FTG Project Number: 10728



## Table of Contents

1. INTRODUCTION ..... 4
2. PROJECT DESCRIPTION ..... 5
FIGURE 1. LOCATION OF THE PROJECT SITE ..... 6
FIGURE 2. CURRENT PROJECT SITE PLAN ..... 7
3. EXISTING TRAFFIC VOLUMES ..... 8
FIGURE 3. EXISTING LANEAGE WITHIN THE STUDY AREA ..... 9
FIGURE 4. EXISTING PEAK HOUR TRAFFIC VOLUMES ..... 10
TABLE 1. DESCRIPTIONS OF LOS FOR SIGNALIZED INTERSECTIONS ..... 11
TABLE 2. DESCRIPTIONS OF LOS FOR UNSIGNALIZED INTERSECTIONS ..... 12
TABLE 3. EXISTING PEAK HOUR LEVELS OF SERVICE ..... 13
4. PROJECTION OF BACKGROUND TRAFFIC VOLUMES ..... 16
TABLE 4. HISTORICAL TRAFFIC VOLUMES IN THE STUDY AREA ..... 16
FIGURE 5A. INITIAL YEAR 2018 BACKGROUND TRAFFIC VOLUMES ..... 17
TABLE 5. TRIP GENERATION (SOMERBY ASSISTED LIVING FACILITY) ..... 18
FIGURE 5B. DIRECTIONAL DISTRIBUTION OF ASSISTED LIVING TRAFFIC ..... 19
FIGURE 5C. PEAK HOUR TRAFFIC GENERATED BY ASSISTED LIVING ..... 20
FIGURE 5D. FINAL BACKGROUND TRAFFIC VOLUMES ..... 21
TABLE 5. BACKGROUND PEAK HOUR LEVELS OF SERVICE ..... 22
5. IMPACTS OF PROPOSED DEVELOPMENT ..... 25
5.1 TRIP GENERATION ..... 25
TABLE 6. TRIP GENERATION ..... 25
5.2 TRIP DISTRIBUTION AND TRAFFIC ASSIGNMENT ..... 26
FIGURE 6A. DIRECTIONAL DISTRIBUTION OF SITE TRAFFIC (SOUTHERN SITE) ..... 27
FIGURE 6B. DIRECTIONAL DISTRIBUTION OF SITE TRAFFIC (NORTHERN SITE) ..... 28
FIGURE 7A. PEAK HOUR SITE TRAFFIC (SOUTHERN SITE) ..... 29
FIGURE 7B. PEAK HOUR SITE TRAFFIC (NORTHERN SITE) ..... 30
FIGURE 7C. TOTAL PEAK HOUR SITE TRAFFIC (TOTAL BOTH SITES) ..... 31
5.3 CAPACITY ANALYSES ..... 32
FIGURE 8. TOTAL PROJECTED PEAK HOUR TRAFFIC VOLUMES ..... 33
TABLE 7. PROJECTED PEAK HOUR LEVELS OF SERVICE ..... 34
5.4 CAPACITY ANALYSES ..... 38

TABLE 8. COMPARISON OF AM PEAK HOUR LEVELS OF SERVICE .....40
TABLE 9. COMPARISON OF PM PEAK HOUR LEVELS OF SERVICE .....41
6. CONCLUSIONS AND RECOMMENDATIONS .....42
APPENDIX A .....44
APPENDIX B .....48
APPENDIX C .....57
APPENDIX D .....198

## 1. INTRODUCTION

This traffic study has been prepared in order to identify the traffic impacts of a multi-family residential development that is proposed to be constructed on the north and south sides of Oak Meadow Drive, east of S. Royal Oaks Boulevard, in Franklin, Tennessee.

For the purposes of this study, existing and background traffic volumes were established, and capacity analyses were conducted for these conditions. Also, trip generation calculations were performed, and the trips which are expected to be generated by the proposed project were distributed to the roadway system and added to the background traffic volumes. The roadways and intersections which provide access to the site were then re-evaluated to determine the traffic impacts of the proposed project. Access needs for the project were evaluated, and the necessary roadway and/or traffic control improvements were identified. This report presents the results of these analyses and the subsequent recommendations.

It is important to note that the scope of this Traffic Impact Study was provided by the City of Franklin Engineering Department and their third-party private consultant, Neel-Schaffer, Inc. The approved scope is included in in Appendix A.

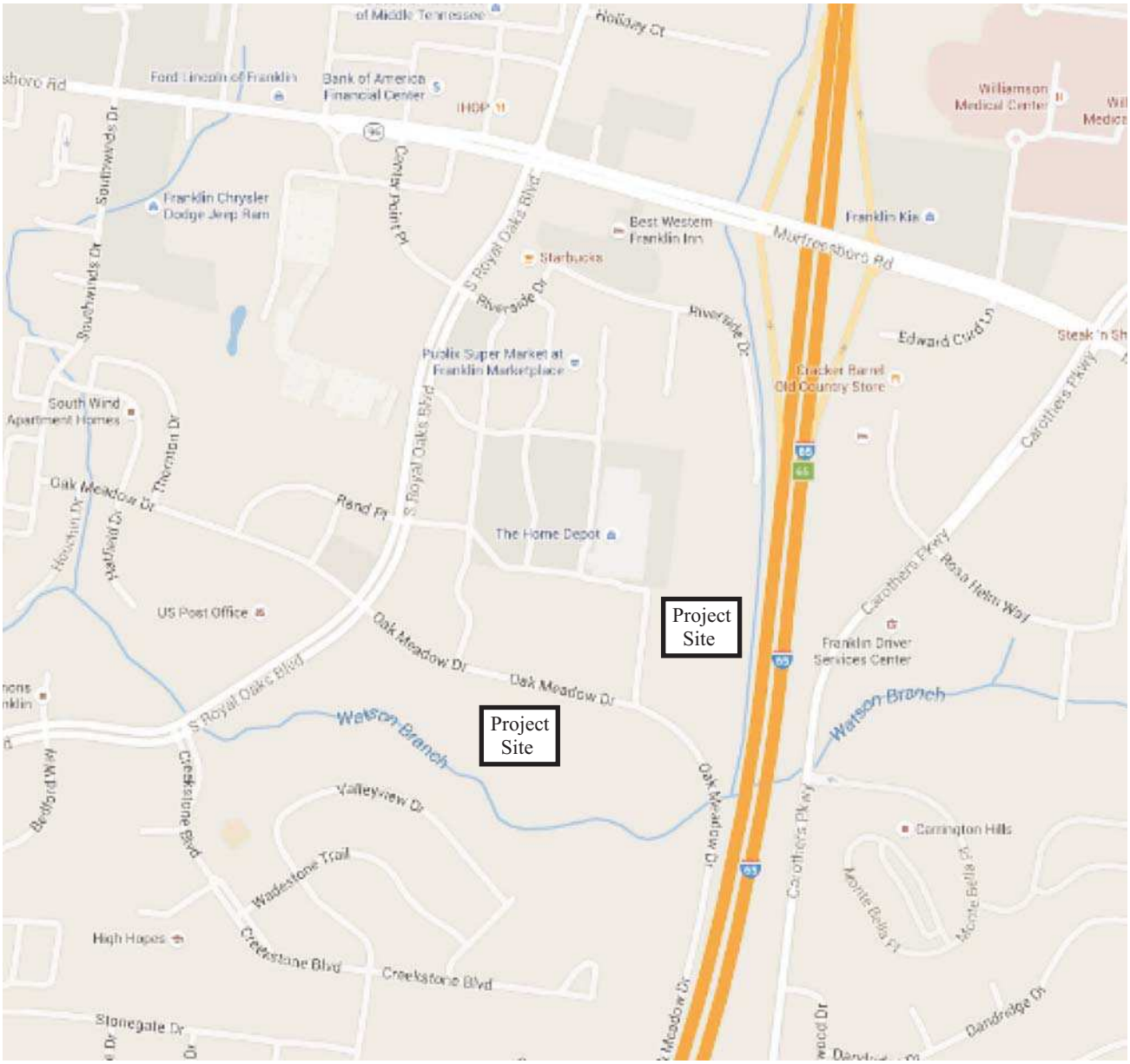
## 2. PROJECT DESCRIPTION

The location of the proposed project is shown in Figure 1. As shown, the project site is located on the north and south sides of Oak Meadow Drive, east of S. Royal Oaks Boulevard, in Franklin, Tennessee. The current project site plan is shown in Figure 2. As shown, the proposed plan includes 115 apartments on the south side of Oak Meadow Drive and 240 apartments on the north side of Oak Meadow Drive. Access for the southern portion of the site will be provided at two locations on Oak Meadow Drive, directly opposite two existing accesses for the Home Depot shopping center on the north side of Oak Meadow Drive. Access for the northern portion of the site will be provided at one location on the eastern access for the Home Depot shopping center on the north side of Oak Meadow Drive. Also, secondary access will be provided at the existing terminus of Riverside Drive.

In large part, economic and market considerations will dictate the pace and timing with which the proposed project is actually completed. The analyses conducted within this study are based on the estimation that the entire project will be completed within two years.

.

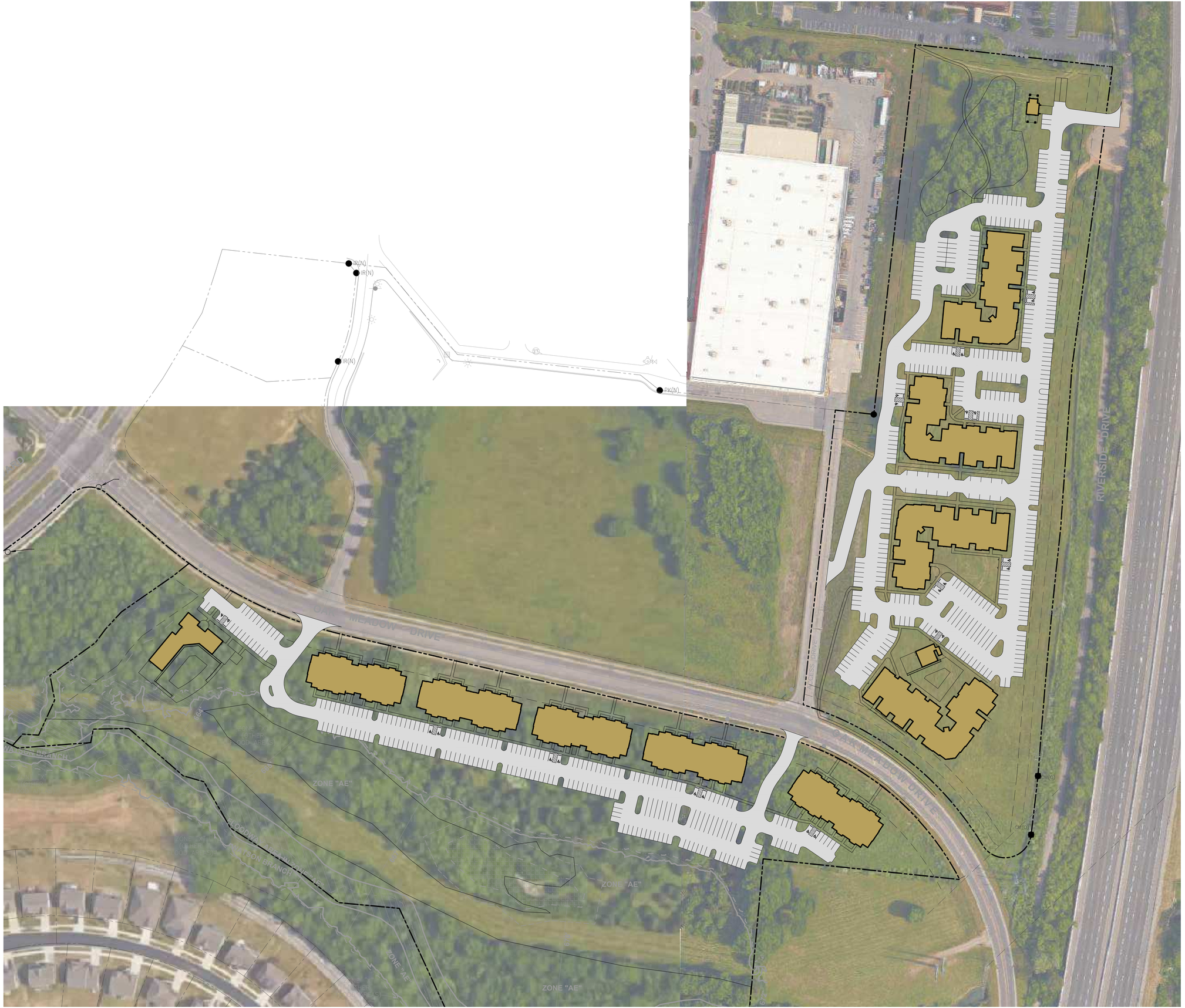
F i s c h b a c h
Transportation Group, LLC
**Traffic Engineering and Planning**




N

**No Scale**

**Figure 1.**
**Location of the Project Site**


IR(N)
IR(N)
IR(N)
PK(N)
PK(N)
RIVERSIDE DRIVE
GARNET MEADOW DRIVE
GARNET MEADOW DRIVE
ZONE "AE"
ZONE "AE"
ZONE "AE"

# 3. EXISTING TRAFFIC VOLUMES

In order to quantify the impact of the traffic that will be generated by the proposed project, peak hour traffic volumes were counted at the following locations:

1. Oak Meadow Drive and the project accesses
2. S. Royal Oaks Boulevard and Oak Meadow Drive
3. S. Royal Oaks Boulevard and Rand Place / Access for Home Depot
4. S. Royal Oaks Boulevard and Riverside Drive / Center Point Place

Also, the City of Franklin requested that peak hour traffic counts be collected for signal timing purposes at the following intersections:

5. Murfreesboro Road and Royal Oaks Boulevard
6. Murfreesboro Road and the Ramps for Southbound I-65
7. Murfreesboro Road and the Ramps for Northbound I-65

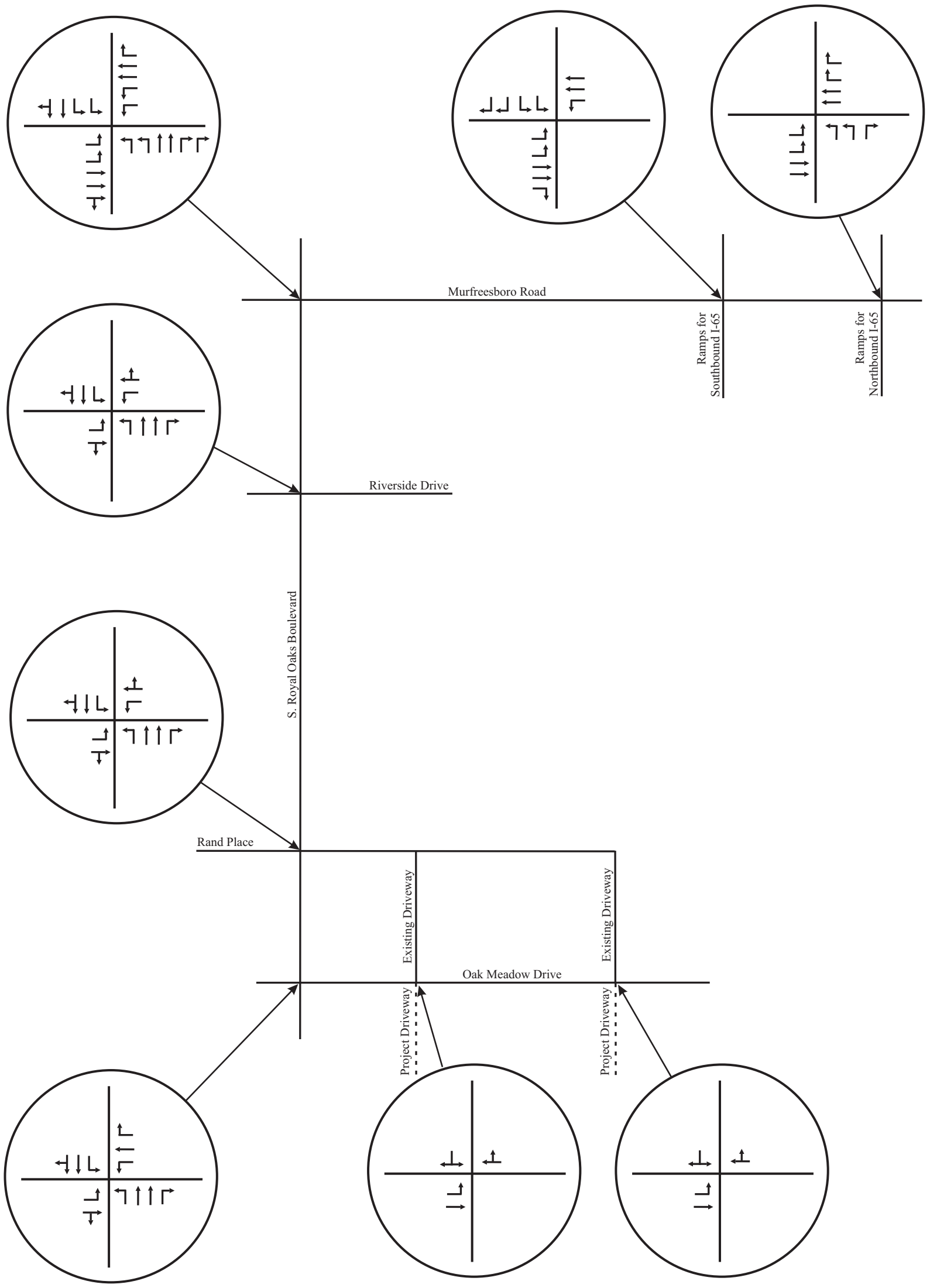
This data was collected during the morning and afternoon peak hours on typical weekdays in February 2016 when schools were in session. The raw traffic volumes are included in Appendix B. The existing laneage at the intersections within the study area is shown in Figure 3, and the existing peak hour traffic volumes are shown in Figure 4.

Using the existing peak hour traffic volumes shown in Figure 4, capacity analyses were conducted for the intersections counted. Specifically, in order to identify current peak hour levels of operation within the study area, the capacity calculations were performed according to the methods outlined in the Highway Capacity Manual 2010 (HCM2010). These analyses result in the determination of a Level of Service (LOS), which is a measure of evaluation is used to describe how well an intersection or roadway operates. LOS A represents free flow traffic operations, and LOS F suggests that the traffic demand exceeds the available capacity. In an urbanized area, LOS D is typically considered to be the minimum acceptable LOS. Table 1 presents the descriptions of LOS for signalized intersections, and Table 2 presents the descriptions of LOS for unsignalized intersections.

It is important to note that the City of Franklin Engineering Department provided the Synchro software files that were used to identify existing operations at the signalized intersections within the study area. Specifically, the files were updated to include the February 2016 traffic volumes. Also, the files were updated to reflect the recently-approved City ordinance that prohibits right-turns-on-red for the northbound right turns on S. Royal Oaks Boulevard at Murfreesboro Road.

The results of the capacity analyses for the existing peak hour traffic volumes are shown in Table 3, and Appendix C includes the capacity analyses worksheets.

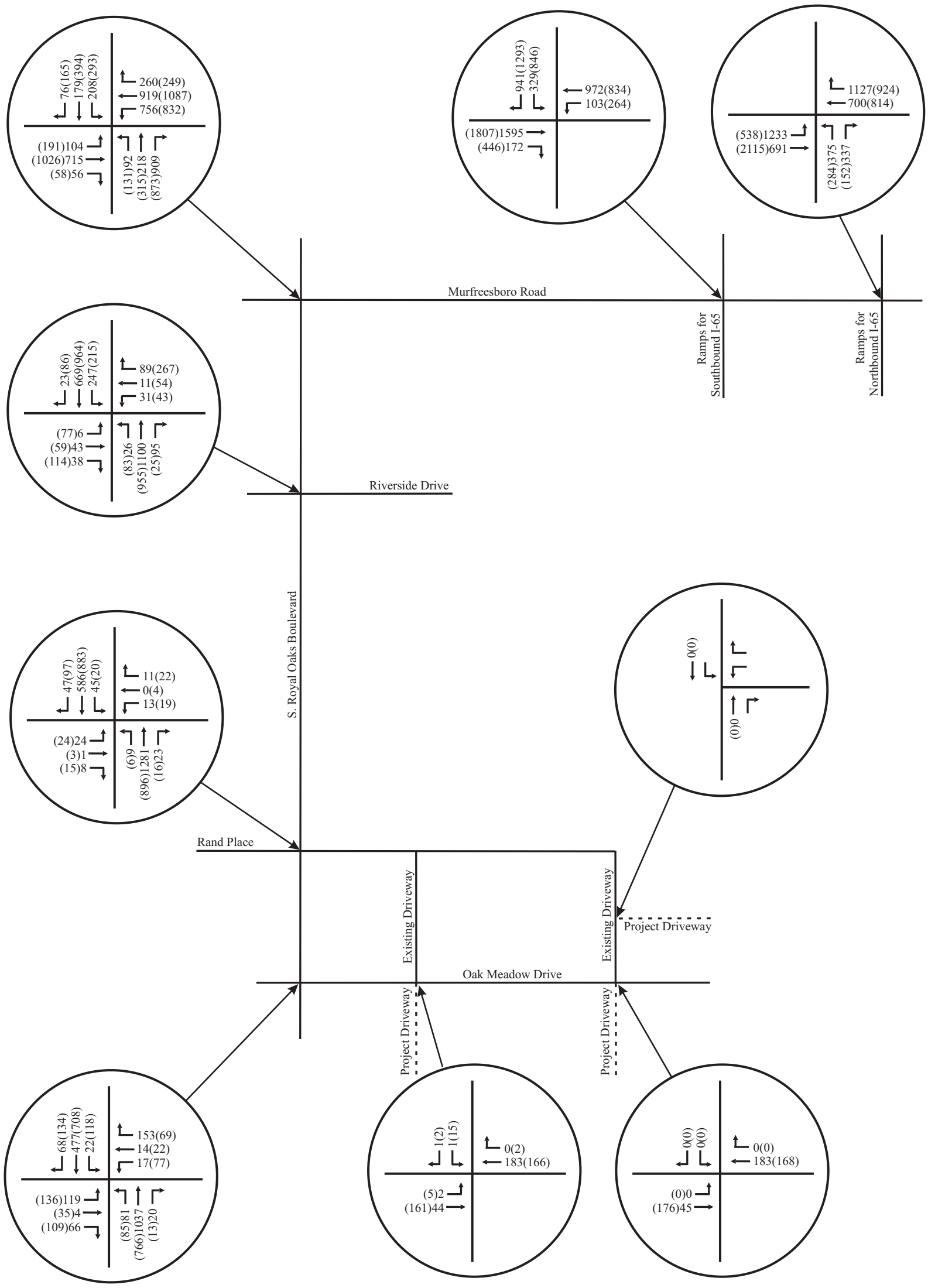
F i s c h b a c h
Transportation Group, LLC
Traffic Engineering and Planning




No Scale

**Figure 3.**
**Existing Laneage at the Intersections within the Study Area**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning




**No Scale**

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

**Figure 4.**
**Existing Peak Hour Traffic Volumes within the Study Area**

**TABLE 1. DESCRIPTIONS OF LOS FOR SIGNALIZED INTERSECTIONS**

| Level of Service | Description | Average Control Delay per Vehicle (sec) |
|---|---|---|
| A | Operations with very low control delay. Progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay. | ≤ 10 |
| B | Operations with stable flows. This generally occurs with good progression, short cycle lengths, or both. More vehicles stop than for LOS A, causing higher levels of average delay. | > 10 and ≤ 20 |
| C | Operations with stable flow. Occurs with fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, although many still pass through the intersection without stopping. | > 20 and ≤ 35 |
| D | Approaching unstable flow. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop. | > 35 and ≤ 55 |
| E | Unstable flow. In many cases, this is considered to be the limit for acceptable delay. These high delays generally indicate poor progression, long cycle lengths, and high v/c ratios. | > 55 and ≤ 80 |
| F | Unacceptable delay. This condition often occurs with oversaturation or with high v/c ratios. Poor progression and long cycle lengths may also cause such delay levels. | > 80 |

Source: Highway Capacity Manual 2010 (HCM2010)

**TABLE 2. DESCRIPTIONS OF LOS FOR UNSIGNALIZED INTERSECTIONS**

| Level of Service | Description | Average Control Delay (sec/veh) |
|---|---|---|
| A | Minimal delay | ≤ 10 |
| B | Brief delay | > 10 and ≤ 15 |
| C | Average delay | > 15 and ≤ 25 |
| D | Significant delay | > 25 and ≤ 35 |
| E | Long delay | > 35 and ≤ 50 |
| F | Extreme delay | > 50 |

Source: Highway Capacity Manual 2010 (HCM 2010)

**TABLE 3. EXISTING PEAK HOUR LEVELS OF SERVICE**

| INTERSECTION | TURNING MOVEMENT | AM PEAK HOUR | | PM PEAK HOUR | |
|---|---|---|---|---|---|
| | | LEVEL OF SERVICE | 95TH %-ILE QUEUE | LEVEL OF SERVICE | 95TH %-ILE QUEUE |
| **Oak Meadow Drive and the Eastern Access for Home Depot** | Eastbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Southbound Left and Right Turns | LOS A | 1 veh | LOS A | 1 veh |
| **Oak Meadow Drive and the Western Access for Home Depot** | Eastbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Southbound Left and Right Turns | LOS A | 1 veh | LOS B | 1 veh |
| **S. Royal Oaks Boulevard and Oak Meadow Drive** (signalized) | Northbound Left Turns | LOS A | 32 feet | LOS B | 47 feet |
| | Northbound Thrus | LOS B | 308 feet | LOS B | 268 feet |
| | Northbound Right Turns | LOS A | 0 feet | LOS A | 0 feet |
| | Southbound Left Turns | LOS A | 12 feet | LOS A | 64 feet |
| | Southbound Thrus/Right Turns | LOS A | 130 feet | LOS C | 356 feet |
| | Eastbound Left Turns | LOS D | 120 feet | LOS D | 137 feet |
| | Eastbound Thrus/Right Turns | LOS B | 13 feet | LOS C | 63 feet |
| | Westbound Left Turns | LOS C | 27 feet | LOS D | 82 feet |
| | Westbound Thrus | LOS D | 25 feet | LOS D | 35 feet |
| | Westbound Right Turns | LOS B | 88 feet | LOS A | 33 feet |
| | **Overall Intersection** | **LOS B** | | **LOS C** | |
| **S. Royal Oaks Boulevard and Rand Place / Home Depot Access** | Northbound Left Turns | LOS A | 1 veh | LOS B | 1 veh |
| | Southbound Left Turns | LOS B | 1 veh | LOS B | 1 veh |
| | Eastbound Left Turns | LOS D | 1 veh | LOS D | 1 veh |
| | Eastbound Thrus/Right Turns | LOS B | 1 veh | LOS B | 1 veh |

| | | | | | |
|---|---|---|---|---|---|
| | Westbound Left Turns | LOS E | 1 veh | LOS D | 1 veh |
| | Westbound Thrus/Right Turns | LOS B | 1 veh | LOS B | 1 veh |
| **S. Royal Oaks Boulevard and Riverside Drive / Center Point Place** (signalized) | Northbound Left Turns | LOS A | 10 feet | LOS B | 55 feet |
| | Northbound Thrus | LOS B | 386 feet | LOS C | 577 feet |
| | Northbound Right Turns | LOS A | 24 feet | LOS A | 0 feet |
| | Southbound Left Turns | LOS D | 142 feet | LOS C | 80 feet |
| | Southbound Thrus/Right Turns | LOS A | 246 feet | LOS A | 411 feet |
| | Eastbound Left Turns | LOS E | 17 feet | LOS F | 209 feet |
| | Eastbound Thrus/Right Turns | LOS E | 75 feet | LOS D | 82 feet |
| | Westbound Left Turns | LOS E | 58 feet | LOS D | 66 veh |
| | Westbound Thrus/Right Turns | LOS C | 25 feet | LOS D | 258 veh |
| | **Overall Intersection** | **LOS F** | | **LOS F** | |
| **Murfreesboro Road and Royal Oaks Boulevard** (signalized) | Eastbound Left Turns | LOS E | 80 feet | LOS E | 141 feet |
| | Eastbound Thrus / Right Turns | LOS D | 306 feet | LOS D | 431 feet |
| | Westbound Left Turns | LOS D | 412 feet | LOS F | 499 feet |
| | Westbound Thrus | LOS D | 539 feet | LOS D | 492 feet |
| | Westbound Right Turns | LOS A | 80 feet | LOS B | 120 feet |
| | Northbound Left Turns | LOS D | 68 feet | LOS E | 92 feet |
| | Northbound Thrus | LOS D | 142 feet | LOS D | 211 feet |
| | Northbound Right Turns | LOS D | 598 feet | LOS D | 623 feet |
| | Southbound Left Turns | LOS E | 148 feet | LOS F | 242 feet |

| | | | | | |
|---|---|---|---|---|---|
| | Southbound Thrus / Right Turns | LOS D | 141 feet | LOS E | 398 feet |
| | **Overall Intersection** | **LOS D** | | **LOS E** | |
| **Murfreesboro Road and Ramps for Southbound I-65** (signalized) | Eastbound Thrus | LOS C | 346 feet | LOS E | 612 feet |
| | Eastbound Right Turns | LOS A | 51 feet | LOS C | 265 feet |
| | Westbound Left Turns | LOS E | 156 feet | LOS F | 465 feet |
| | Westbound Thrus | LOS B | 273 feet | LOS C | 337 feet |
| | Southbound Left Turns | LOS D | 164 feet | LOS D | 465 feet |
| | Southbound Right Turns | LOS E | 617 feet | LOS F | 1065 feet |
| | **Overall Intersection** | **LOS C** | | **LOS E** | |
| **Murfreesboro Road and Ramps for Northbound I-65** (signalized) | Eastbound Left Turns | LOS F | 914 feet | LOS E | 341 feet |
| | Eastbound Thrus | LOS A | 71 feet | LOS C | 368 feet |
| | Westbound Thrus | LOS D | 337 feet | LOS C | 305 feet |
| | Westbound Right Turns | LOS C | 502 feet | LOS A | 150 feet |
| | Northbound Left Turns | LOS F | 302 feet | LOS E | 148 feet |
| | Northbound Right Turns | LOS C | 225 feet | LOS D | 97 feet |
| | **Overall Intersection** | **LOS E** | | **LOS C** | |

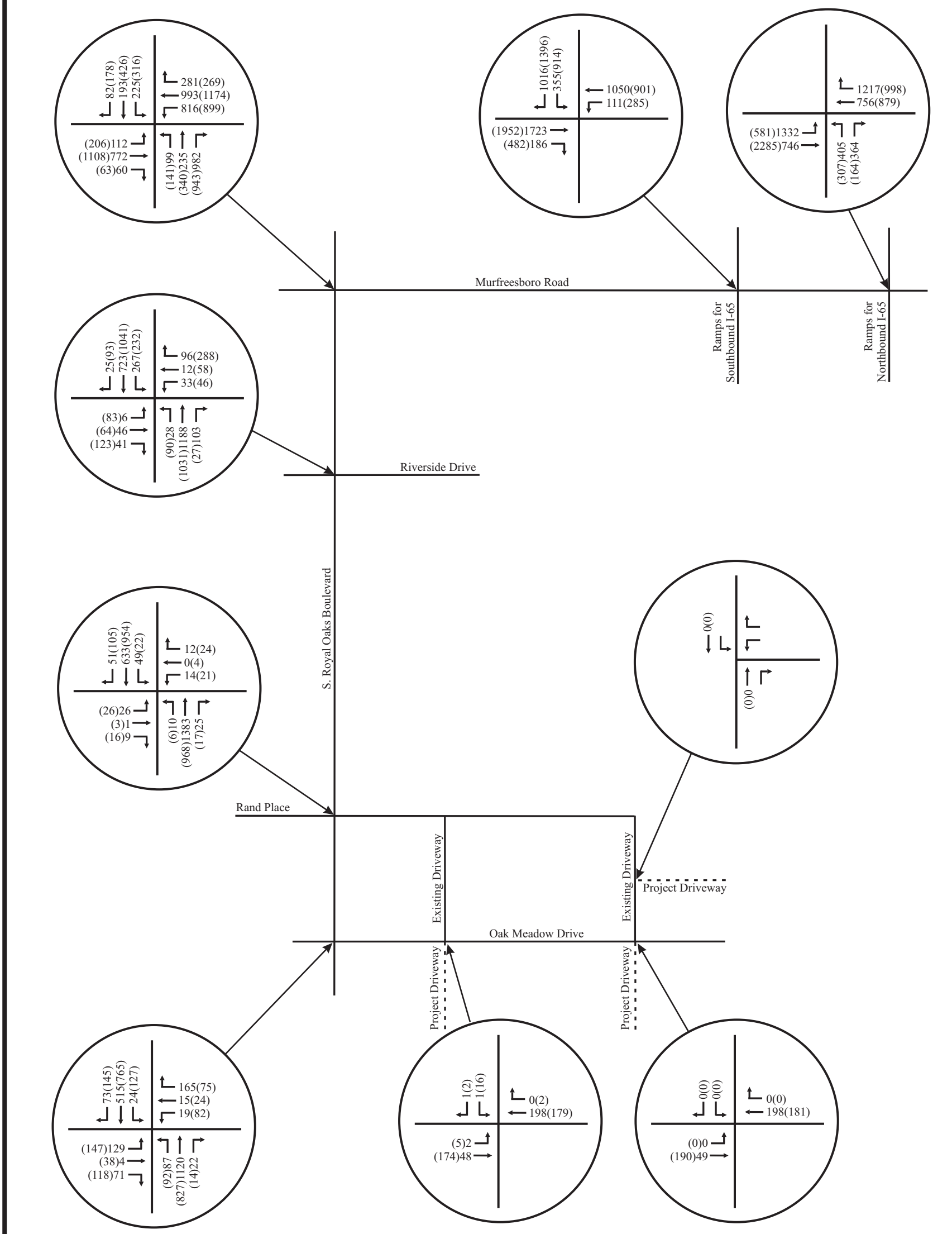
# 4. PROJECTION OF BACKGROUND TRAFFIC VOLUMES

In order to account for the traffic growth which will occur within the study area because of typical growth, background traffic volumes were established for the intersections within the study area. Specifically, in order to account for typical growth within the study area, consideration was given to the historical traffic volumes near the project site. The Tennessee Department of Transportation (TDOT) conducts an annual count program throughout the state. This count program includes the annual collection of average daily traffic (ADT) counts at numerous fixed locations. As shown in Table 4, the daily traffic volumes within the study area have increased 2.65% per year since 2006. Based on this information, for the purposes of this study, the existing traffic volumes at the intersections within the study area were increased by 8% to represent initial background traffic volumes in the Year 2018, as shown in Figure 5A.

**TABLE 4. HISTORICAL TRAFFIC VOLUMES IN THE STUDY AREA**

| Year | Station 164 S. Royal Oaks Blvd ADT | Annual Growth | |
|---|---|---|---|
| 2006 | 18,274 | | |
| 2007 | 17,787 | -2.66% | |
| 2008 | 20,374 | 14.54% | |
| 2009 | 19,666 | -3.48% | |
| 2010 | 19,324 | -1.74% | |
| 2011 | 19,090 | -1.21% | |
| 2012 | 19,435 | 1.81% | |
| 2013 | 20,343 | 4.67% | |
| 2014 | 22,118 | 8.73% | **Overall Growth** |
| 2015 | 22,638 | 2.35% | **2.65%** |

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning




**No Scale**

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

**Figure 5A.**
**Initial Background Peak Hour Traffic Volumes within the Study Area**

It is important to note that a day care center is under construction on the north side of S. Royal Oaks Boulevard at Mack Hatcher Parkway, southwest of the proposed project. It is likely that a significant portion of the traffic that will be generated by the day care center will be pass-by traffic that is already traveling on the S. Royal Oaks Boulevard corridor. The 8% growth rate applied to the existing traffic volumes will account for the additional traffic that will be generated by the day care center.

Also, it is important to note that an assisted living facility with 208 beds is under construction on the north side of Oak Meadow Drive, opposite the southern project site for the proposed project. For the purposes of this study, trip generation calculations were conducted in order to identify how much traffic is expected to be generated by the assisted living facility. Trip generation data for daily and peak hour trips were identified from Trip Generation, Ninth Edition, which was published by the Institute of Transportation Engineers (ITE) in 2012. Table 5 presents the daily and peak hour trip generations, and these calculations are included in Appendix D.

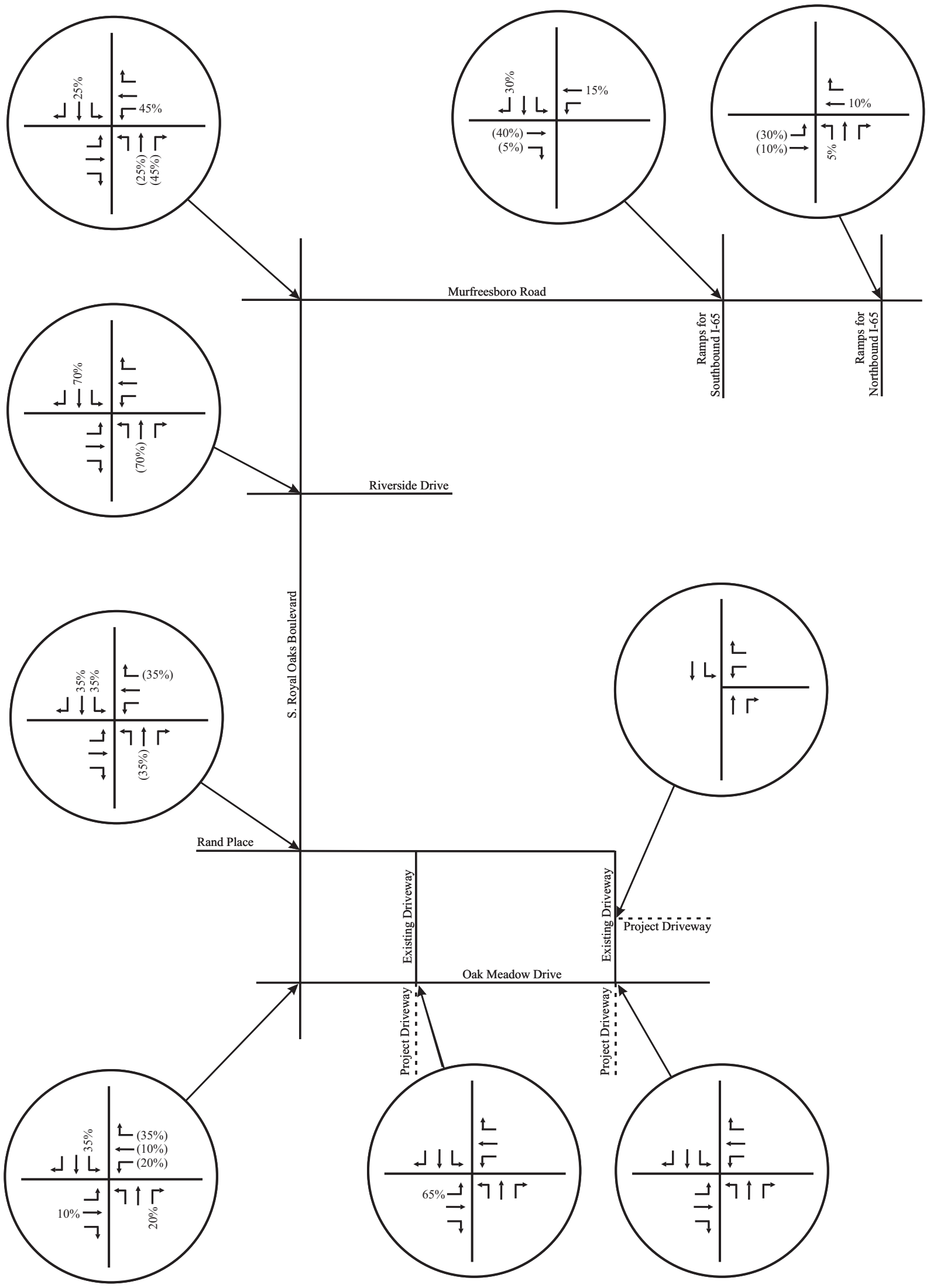
**TABLE 5. TRIP GENERATION (SOMERBY ASSISTED LIVING FACILITY)**

| LAND USE | SIZE | DAILY TRAFFIC | GENERATED TRAFFIC | | | |
|---|---|---|---|---|---|---|
| | | | AM PEAK HOUR | | PM PEAK HOUR | |
| | | | ENTER | EXIT | ENTER | EXIT |
| Assisted Living Facility (LUC 254) | 208 beds | 570 | 34 | 13 | 30 | 47 |

Figures 5B and 5C include the directional distribution and assignment of peak hour traffic volumes that are expected to be generated by the assisted living facility.

The peak hour traffic volumes shown in Figures 5B and 5C were added to the traffic volumes shown in Figure 5A in order to establish the final background traffic volumes shown in Figure 5D. Using the background peak hour traffic volumes, capacity analyses were conducted for the intersections within the study area. For these analyses, it was assumed that all existing laneage and traffic control will be maintained and no improvements will be provided. The results of the capacity analyses for the background peak hour traffic volumes are shown in Table 5, and Appendix C includes the capacity analyses worksheets. These analyses indicate that the background conditions are consistent with the existing conditions within the study area.

F i s c h b a c h
Transportation Group, LLC
Traffic Engineering and Planning

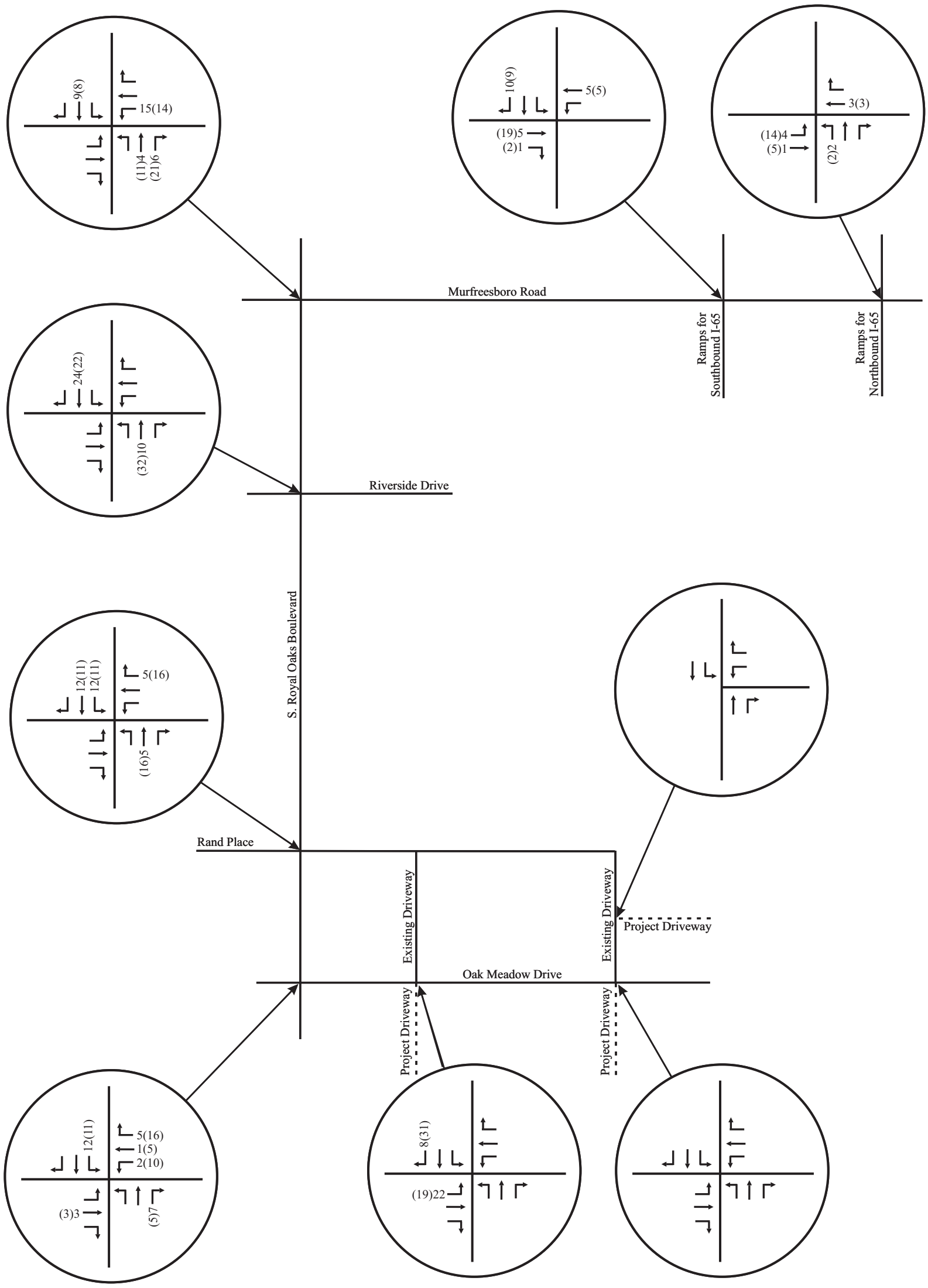



**No Scale**

XX - Entering Volumes
(XX) - Exiting Volumes

**Figure 5B.**
**Directional Distribution of Peak Hour Traffic Generated by the Somerby Assisted Living Facility**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning

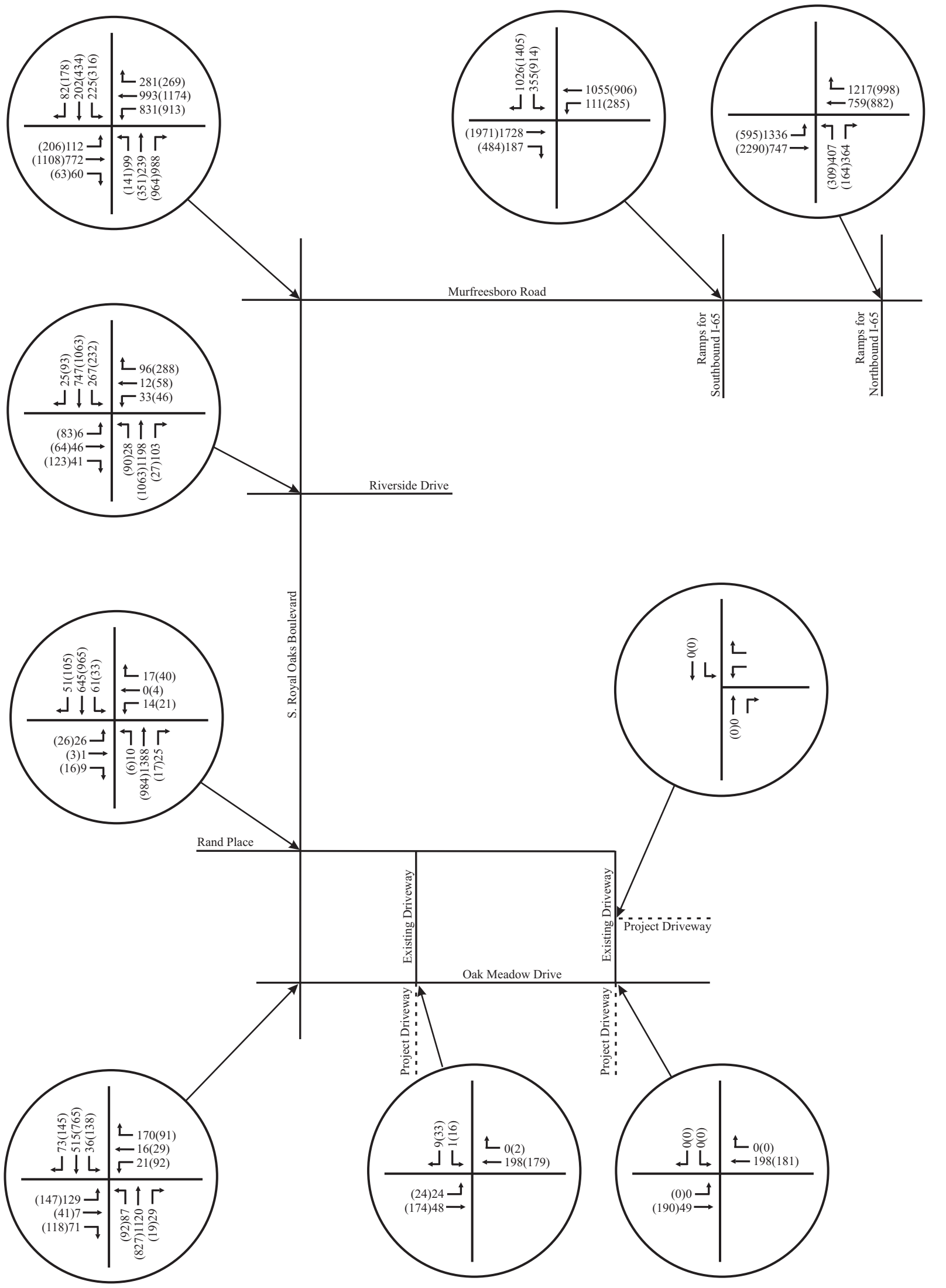



**No Scale**

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

**Figure 5C.**
**Peak Hour Traffic Generated by the Somerby Assisted Living Facility**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning




**No Scale**

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

**Figure 5D.**
**Final Background Peak Hour Traffic Volumes within the Study Area**

**TABLE 5. BACKGROUND PEAK HOUR LEVELS OF SERVICE**

| INTERSECTION | TURNING MOVEMENT | AM PEAK HOUR | | PM PEAK HOUR | |
|---|---|---|---|---|---|
| | | LEVEL OF SERVICE | 95TH %-ILE QUEUE | LEVEL OF SERVICE | 95TH %-ILE QUEUE |
| **Oak Meadow Drive and the Eastern Access for Home Depot** | Eastbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Southbound Left and Right Turns | LOS A | 1 veh | LOS A | 1 veh |
| **Oak Meadow Drive and the Western Access for Home Depot** | Eastbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Southbound Left and Right Turns | LOS A | 1 veh | LOS B | 1 veh |
| **S. Royal Oaks Boulevard and Oak Meadow Drive** (signalized) | Northbound Left Turns | LOS A | 35 feet | LOS C | 56 feet |
| | Northbound Thrus | LOS B | 351 feet | LOS B | 308 feet |
| | Northbound Right Turns | LOS A | 0 feet | LOS A | 0 feet |
| | Southbound Left Turns | LOS A | 13 feet | LOS B | 78 feet |
| | Southbound Thrus/Right Turns | LOS B | 147 feet | LOS C | 423 feet |
| | Eastbound Left Turns | LOS D | 127 feet | LOS D | 142 feet |
| | Eastbound Thrus/Right Turns | LOS B | 15 feet | LOS D | 80 feet |
| | Westbound Left Turns | LOS C | 30 feet | LOS D | 92 feet |
| | Westbound Thrus | LOS D | 27 feet | LOS D | 41 feet |
| | Westbound Right Turns | LOS B | 110 feet | LOS A | 37 feet |
| | **Overall Intersection** | **LOS B** | | **LOS C** | |
| **S. Royal Oaks Boulevard and Rand Place / Home Depot Access** | Northbound Left Turns | LOS A | 1 veh | LOS B | 1 veh |
| | Southbound Left Turns | LOS B | 1 veh | LOS B | 1 veh |
| | Eastbound Left Turns | LOS D | 1 veh | LOS D | 1 veh |
| | Eastbound Thrus/Right Turns | LOS B | 1 veh | LOS C | 1 veh |

| | | | | | |
|---|---|---|---|---|---|
| | Westbound Left Turns | LOS E | 1 veh | LOS D | 1 veh |
| | Westbound Thrus/Right Turns | LOS C | 1 veh | LOS B | 1 veh |
| **S. Royal Oaks Boulevard and Riverside Drive / Center Point Place** (signalized) | Northbound Left Turns | LOS A | 10 feet | LOS B | 58 feet |
| | Northbound Thrus | LOS B | 459 feet | LOS D | 692 feet |
| | Northbound Right Turns | LOS A | 28 feet | LOS A | 0 feet |
| | Southbound Left Turns | LOS E | 163 feet | LOS D | 114 feet |
| | Southbound Thrus/Right Turns | LOS A | 336 feet | LOS B | 571 feet |
| | Eastbound Left Turns | LOS E | 17 feet | LOS F | 214 feet |
| | Eastbound Thrus/Right Turns | LOS E | 79 feet | LOS D | 88 feet |
| | Westbound Left Turns | LOS E | 61 feet | LOS F | 70 veh |
| | Westbound Thrus/Right Turns | LOS C | 24 feet | LOS D | 293 veh |
| | **Overall Intersection** | **LOS F** | | **LOS F** | |
| **Murfreesboro Road and Royal Oaks Boulevard** (signalized) | Eastbound Left Turns | LOS E | 85 feet | LOS E | 151 feet |
| | Eastbound Thrus / Right Turns | LOS D | 335 feet | LOS D | 475 feet |
| | Westbound Left Turns | LOS E | 435 feet | LOS F | 521 feet |
| | Westbound Thrus | LOS D | 554 feet | LOS D | 521 feet |
| | Westbound Right Turns | LOS A | 109 feet | LOS B | 130 feet |
| | Northbound Left Turns | LOS E | 72 feet | LOS E | 100 feet |
| | Northbound Thrus | LOS D | 150 feet | LOS D | 237 feet |
| | Northbound Right Turns | LOS D | 632 feet | LOS D | 692 feet |
| | Southbound Left Turns | LOS E | 159 feet | LOS F | 272 feet |

| | | | | | |
|---|---|---|---|---|---|
| | Southbound Thrus / Right Turns | LOS D | 159 feet | LOS E | 465 feet |
| | **Overall Intersection** | **LOS D** | | **LOS E** | |
| **Murfreesboro Road and Ramps for Southbound I-65** (signalized) | Eastbound Thrus | LOS C | 388 feet | LOS E | 672 feet |
| | Eastbound Right Turns | LOS A | 50 feet | LOS C | 295 feet |
| | Westbound Left Turns | LOS E | 163 feet | LOS F | 520 feet |
| | Westbound Thrus | LOS B | 294 feet | LOS C | 407 feet |
| | Southbound Left Turns | LOS D | 178 feet | LOS D | 515 feet |
| | Southbound Right Turns | LOS F | 738 feet | LOS F | 1235 feet |
| | **Overall Intersection** | **LOS D** | | **LOS F** | |
| **Murfreesboro Road and Ramps for Northbound I-65** (signalized) | Eastbound Left Turns | LOS F | 1028 feet | LOS E | 340 feet |
| | Eastbound Thrus | LOS A | 76 feet | LOS C | 518 feet |
| | Westbound Thrus | LOS D | 372 feet | LOS C | 467 feet |
| | Westbound Right Turns | LOS C | 573 feet | LOS B | 311 feet |
| | Northbound Left Turns | LOS F | 337 feet | LOS E | 218 feet |
| | Northbound Right Turns | LOS D | 341 feet | LOS D | 190 feet |
| | **Overall Intersection** | **LOS F** | | **LOS C** | |

# 5. IMPACTS OF PROPOSED DEVELOPMENT

## 5.1 TRIP GENERATION

Trip generation calculations were conducted in order to identify how much traffic will be generated by the proposed project. Trip generation data for daily and peak hour trips were identified from Trip Generation, Ninth Edition, which was published by the Institute of Transportation Engineers (ITE) in 2012. Table 6 presents the daily and peak hour trip generations for proposed townhomes, and these calculations are included in Appendix D.

**TABLE 6. TRIP GENERATION**

| LAND USE | SIZE | DAILY TRAFFIC | GENERATED TRAFFIC | | | |
|---|---|---|---|---|---|---|
| | | | AM PEAK HOUR | | PM PEAK HOUR | |
| | | | ENTER | EXIT | ENTER | EXIT |
| Multi-Family (LUC 220) **South Site** | 115 units | 764 | 12 | 47 | 46 | 25 |
| Multi-Family (LUC 220) **North Site** | 240 units | 1,596 | 24 | 98 | 97 | 52 |
| **TOTAL** | **355 units** | **2,360** | **36** | **145** | **143** | **77** |

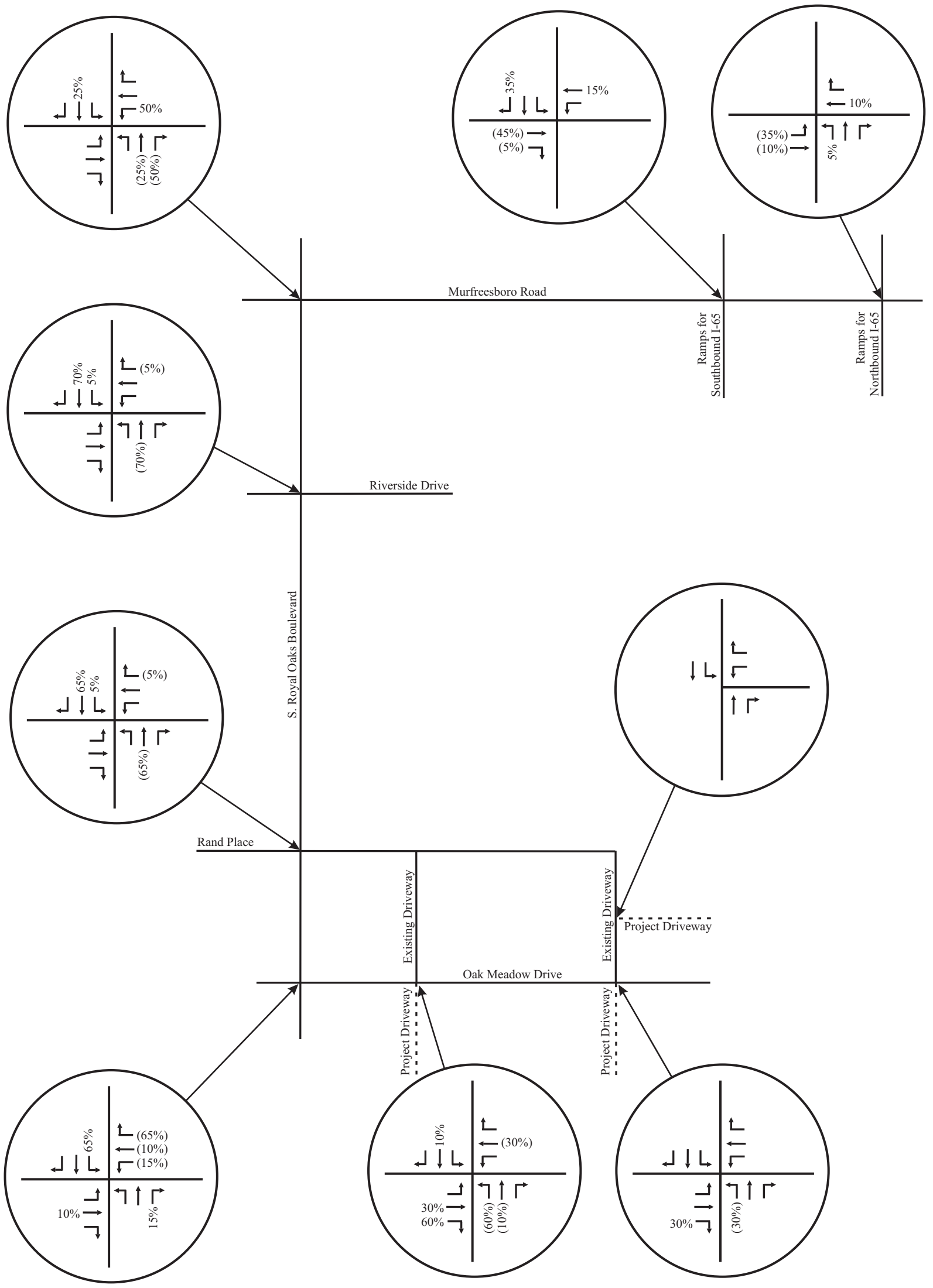
## 5.2 TRIP DISTRIBUTION AND TRAFFIC ASSIGNMENT

For the purposes of this study, it was estimated that the trips generated by the proposed project will access the project site according to the directional distribution shown in Figures 6A and 6B. It is important to note that these directional distributions were prepared with input and approval from the City of Franklin Engineering Department and their third-party private consultant, Neel-Schaffer, Inc. The development of these distributions was based on the following factors:

- existing land use characteristics,
- the directions of approach of the existing traffic,
- the access proposed for the project, and
- the locations of population centers in the area.

The peak hour trip generations and directional distributions were used to add the site-generated trips to the roadway system. Figures 7A, 7B, and 7C include the peak hour traffic volumes that are expected to be generated by the proposed project.

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning



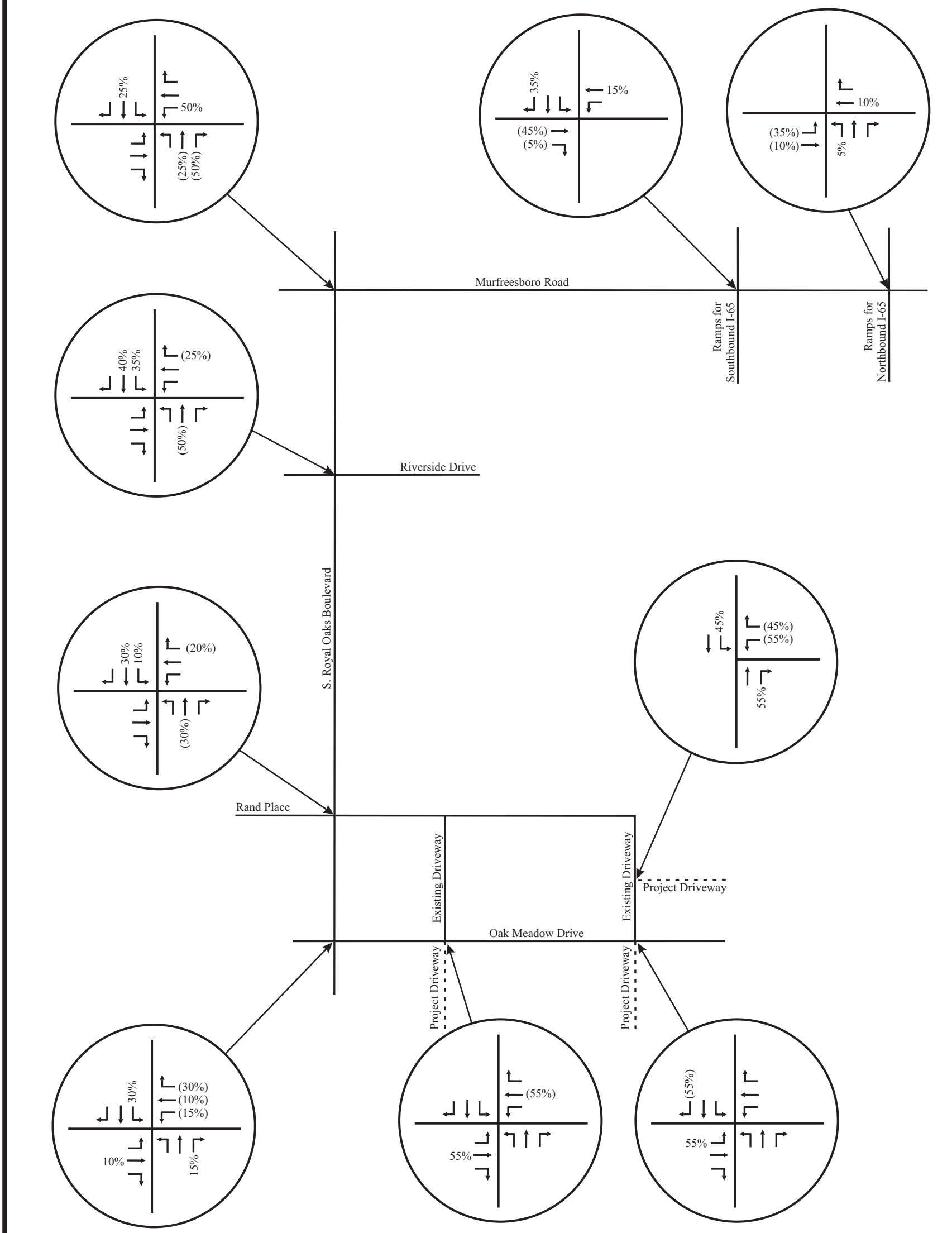

**No Scale**

XX - Entering Volumes
(XX) - Exiting Volumes

N

**Figure 6A.**
**Directional Distribution of Peak Hour Traffic Volumes Generated by the Proposed Apartments (Southern Site)**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning

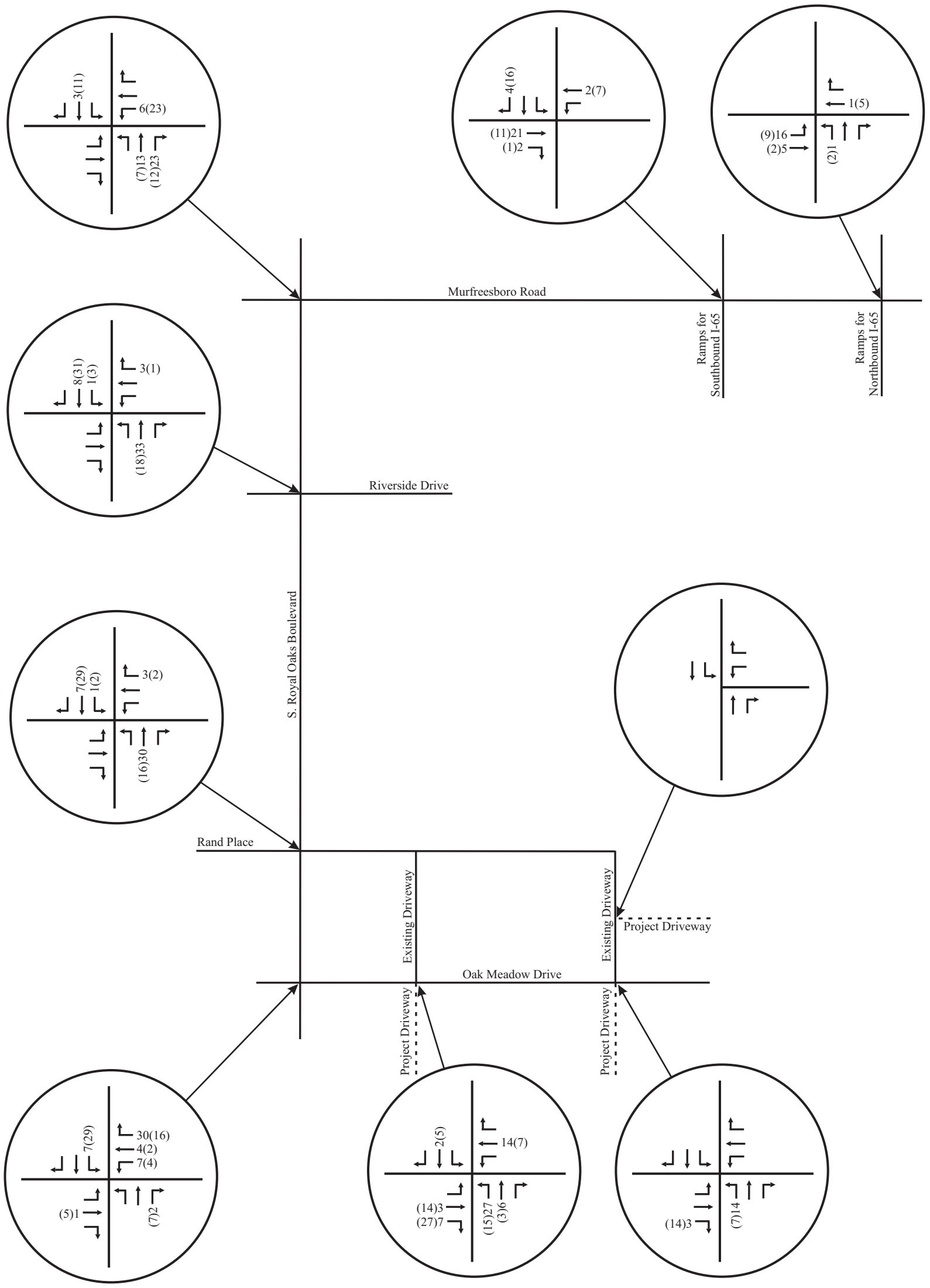



**No Scale**

XX - Entering Volumes
(XX) - Exiting Volumes

**Figure 6B.**
**Directional Distribution of Peak Hour Traffic Volumes Generated by the Proposed Apartments (Northern Site)**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning

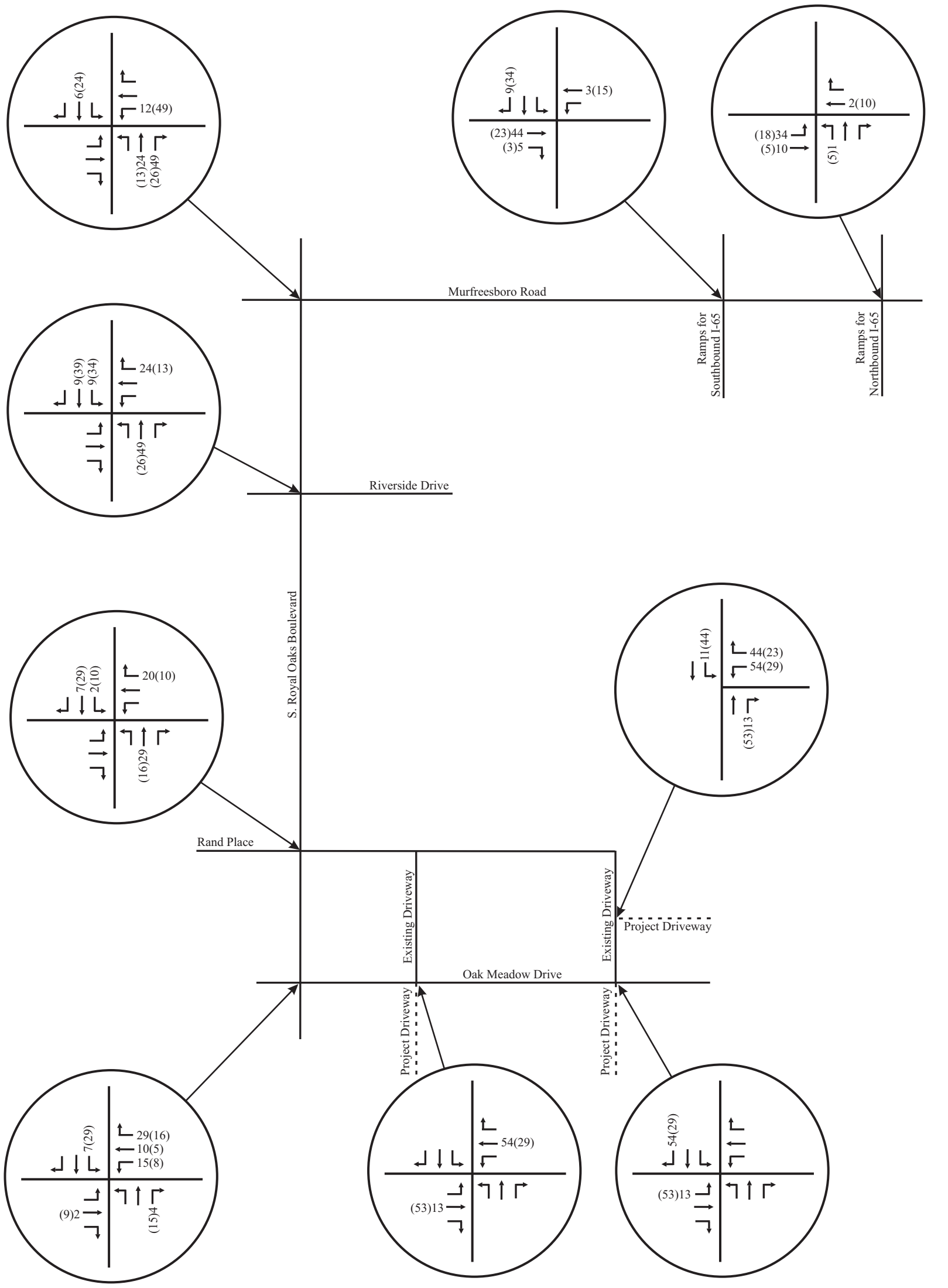



**No Scale**

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

**Figure 7A.**
**Peak Hour Traffic Volumes**
**Generated by the Proposed Apartments (Southern Site)**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning

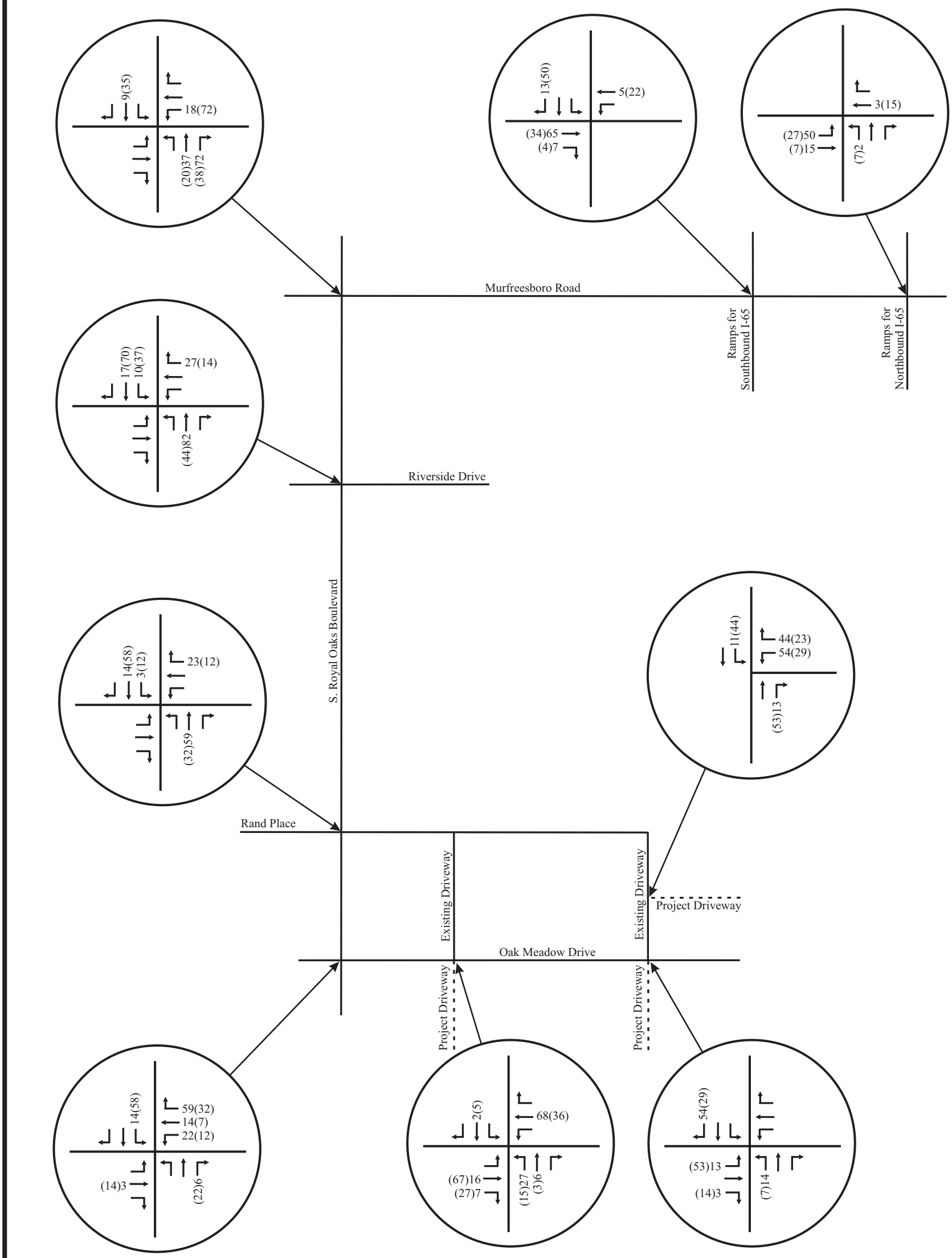



**No Scale**

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

**Figure 7B.**
**Peak Hour Traffic Volumes**
**Generated by the Proposed Apartments (Northern Site)**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning




**No Scale**

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

**Figure 7C.**
**Total Peak Hour Traffic Volumes**
**Generated by the Proposed Apartments (Total Both Sites)**

## 5.3 CAPACITY ANALYSES

In order to identify the projected peak hour traffic volumes at the completion of the proposed project, the trips generated by the project were added to the background peak hour traffic volumes. The resulting peak hour volumes are shown in Figure 8.

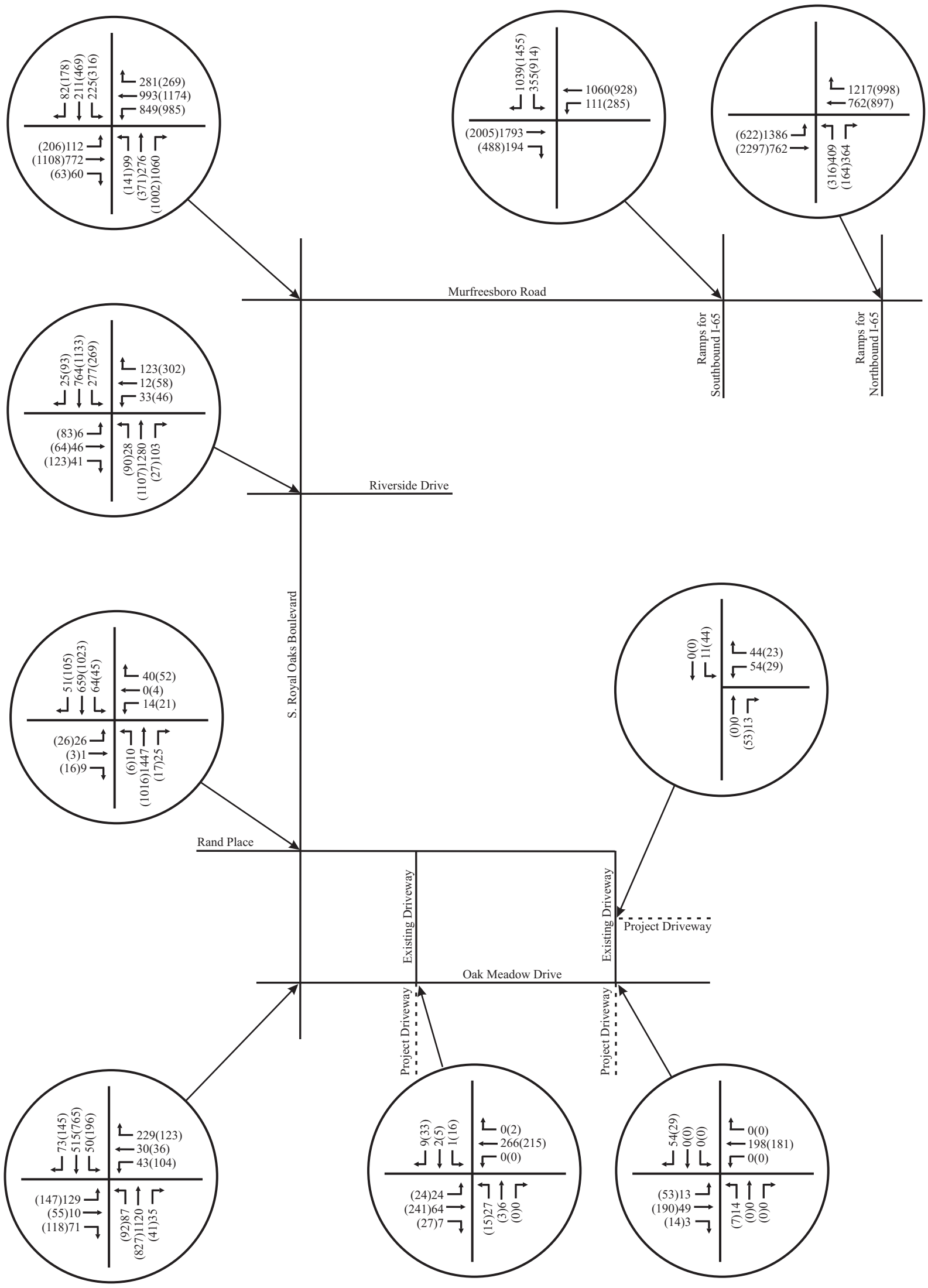
Using the total projected peak hour traffic volumes, capacity analyses were conducted in order to determine the impact of the project on the roadway system. Specifically, these capacity analyses were used to evaluate the need for roadway and traffic control improvements within the study area. For these analyses, the following assumptions were made:

- All existing laneage and traffic control will be maintained and no improvements will be provided.

- Each of the project accesses will be constructed to include one entering lane and one exiting lane.

The results of the capacity analyses for the total projected peak hour traffic volumes are shown in Table 7, and Appendix C includes the capacity analyses worksheets. These analyses indicate that the total projected conditions with full build-out of the project are consistent with the existing and background conditions within the study area.

F i s c h b a c h
Transportation Group, LLC
Traffic Engineering and Planning




N

**No Scale**

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

**Figure 8.**
**Total Projected Peak Hour Traffic Volumes at the Completion of the Proposed Apartments**

## TABLE 7. PROJECTED PEAK HOUR LEVELS OF SERVICE

| INTERSECTION | TURNING MOVEMENT | AM PEAK HOUR | | PM PEAK HOUR | |
|---|---|---|---|---|---|
| | | LEVEL OF SERVICE | 95TH %-ILE QUEUE | LEVEL OF SERVICE | 95TH %-ILE QUEUE |
| **Oak Meadow Drive and the Western Access for Home Depot / Apartments** | Eastbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Westbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Northbound Left/Thru/Right Turns | LOS B | 1 veh | LOS B | 1 veh |
| | Southbound Left/Thru/Right Turns | LOS A | 1 veh | LOS B | 1 veh |
| **Oak Meadow Drive and the Eastern Access for Home Depot / Apartments** | Eastbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Westbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Northbound Left/Thru/Right Turns | LOS B | 1 veh | LOS B | 1 veh |
| | Southbound Left/Thru/Right Turns | LOS A | 1 veh | LOS A | 1 veh |
| **Eastern Access for Home Depot / Access for Northern Apartments** | Southbound Left Turns / Thrus | LOS A | 1 veh | LOS A | 1 veh |
| | Westbound Left and Right Turns | LOS A | 1 veh | LOS A | 1 veh |
| **S. Royal Oaks Boulevard and Oak Meadow Drive** (signalized) | Northbound Left Turns | LOS A | 35 feet | LOS C | 69 feet |
| | Northbound Thrus | LOS B | 361 feet | LOS C | 327 feet |
| | Northbound Right Turns | LOS A | 0 feet | LOS A | 0 feet |
| | Southbound Left Turns | LOS A | 23 feet | LOS C | 118 feet |
| | Southbound Thrus/Right Turns | LOS B | 149 feet | LOS C | 446 feet |
| | Eastbound Left Turns | LOS D | 126 feet | LOS D | 135 feet |
| | Eastbound Thrus/Right Turns | LOS B | 17 feet | LOS D | 107 feet |
| | Westbound Left Turns | LOS C | 50 feet | LOS D | 98 feet |

| | | | | | |
|---|---|---|---|---|---|
| | Westbound Thrus | LOS D | 42 feet | LOS D | 46 feet |
| | Westbound Right Turns | LOS C | 161 feet | LOS A | 40 feet |
| | **Overall Intersection** | **LOS B** | | **LOS C** | |
| **S. Royal Oaks Boulevard and Rand Place / Home Depot Access** | Northbound Left Turns | LOS A | 1 veh | LOS B | 1 veh |
| | Southbound Left Turns | LOS B | 1 veh | LOS B | 1 veh |
| | Eastbound Left Turns | LOS D | 1 veh | LOS E | 1 veh |
| | Eastbound Thrus/Right Turns | LOS B | 1 veh | LOS C | 1 veh |
| | Westbound Left Turns | LOS E | 1 veh | LOS D | 1 veh |
| | Westbound Thrus/Right Turns | LOS C | 1 veh | LOS C | 1 veh |
| **S. Royal Oaks Boulevard and Riverside Drive / Center Point Place** (signalized) | Northbound Left Turns | LOS A | 10 feet | LOS C | 58 feet |
| | Northbound Thrus | LOS B | 525 feet | LOS D | 776 feet |
| | Northbound Right Turns | LOS A | 28 feet | LOS A | 0 feet |
| | Southbound Left Turns | LOS F | 233 feet | LOS E | 165 feet |
| | Southbound Thrus/Right Turns | LOS A | 339 feet | LOS B | 562 feet |
| | Eastbound Left Turns | LOS E | 17 feet | LOS F | 215 feet |
| | Eastbound Thrus/Right Turns | LOS E | 79 feet | LOS D | 88 feet |
| | Westbound Left Turns | LOS E | 61 feet | LOS F | 70 veh |
| | Westbound Thrus/Right Turns | LOS C | 21 feet | LOS D | 305 veh |
| | **Overall Intersection** | **LOS F** | | **LOS F** | |
| **Murfreesboro Road and Royal Oaks Boulevard** (signalized) | Eastbound Left Turns | LOS E | 85 feet | LOS E | 151 feet |
| | Eastbound Thrus / Right Turns | LOS D | 335 feet | LOS D | 475 feet |

| | | | | | |
|---|---|---|---|---|---|
| | Westbound Left Turns | LOS E | 446 feet | LOS F | 573 feet |
| | Westbound Thrus | LOS D | 547 feet | LOS D | 517 feet |
| | Westbound Right Turns | LOS A | 123 feet | LOS B | 125 feet |
| | Northbound Left Turns | LOS E | 71 feet | LOS E | 100 feet |
| | Northbound Thrus | LOS D | 165 feet | LOS D | 252 feet |
| | Northbound Right Turns | LOS D | 680 feet | LOS D | 717 feet |
| | Southbound Left Turns | LOS E | 159 feet | LOS F | 272 feet |
| | Southbound Thrus / Right Turns | LOS D | 165 feet | LOS F | 512 feet |
| | **Overall Intersection** | **LOS D** | | **LOS F** | |
| **Murfreesboro Road and Ramps for Southbound I-65** (signalized) | Eastbound Thrus | LOS C | 408 feet | LOS E | 695 feet |
| | Eastbound Right Turns | LOS A | 46 feet | LOS C | 294 feet |
| | Westbound Left Turns | LOS E | 162 feet | LOS F | 521 feet |
| | Westbound Thrus | LOS B | 296 feet | LOS C | 433 feet |
| | Southbound Left Turns | LOS D | 178 feet | LOS D | 515 feet |
| | Southbound Right Turns | LOS F | 754 feet | LOS F | 1305 feet |
| | **Overall Intersection** | **LOS D** | | **LOS F** | |
| **Murfreesboro Road and Ramps for Northbound I-65** (signalized) | Eastbound Left Turns | LOS F | 1083 feet | LOS E | 343 feet |
| | Eastbound Thrus | LOS A | 75 feet | LOS C | 495 feet |
| | Westbound Thrus | LOS D | 373 feet | LOS C | 487 feet |
| | Westbound Right Turns | LOS C | 573 feet | LOS B | 330 feet |
| | Northbound Left Turns | LOS F | 340 feet | LOS E | 222 feet |

| | | | | | |
|---|---|---|---|---|---|
| | Northbound Right Turns | LOS E | 353 feet | LOS D | 190 feet |
| | **Overall Intersection** | **LOS F** | | **LOS D** | |

## 5.4 CAPACITY ANALYSES

The results of the capacity analyses for the existing, background, and total projected peak hour traffic volumes are included in Tables 8 and 9 for comparison purposes. Also, the levels of service that worsen from background conditions to total projected conditions with the proposed project are highlighted in red. Finally, additional analyses were conducted in order to identify how well the intersections within the study area would operate if a third northbound through lane were provided on S. Royal Oaks between Oak Meadow Drive and Murfreesboro Road. Specifically, for these analyses, the northbound right turn lanes at Oak Meadow Drive, Rand Place, and Riverside Drive were converted to shared through/right turn lanes. The results of these additional analyses are shown in Tables 8 and 9. These comparisons and analyses that reveal poor levels of service are described below:

**S. Royal Oaks Boulevard and Rand Place / Access for Home Depot**
At this intersection, the westbound left turns from the Home Depot access operate at LOS E during the AM peak hour during the existing, background, and total projected conditions. Also, the eastbound left turns from the Rand Place operate at LOS E during the PM peak hour under total projected conditions. These results are typical at unsignalized intersections on major arterial roadways. Also, this intersection is not an appropriate location for a traffic signal installation because of its proximity to the existing traffic signal at Oak Meadow Drive. Therefore, the existing and projected levels of service for motorists on the side streets are reasonable and appropriate, and mitigation is not necessary.

**S. Royal Oaks Boulevard and Riverside Drive / Center Point Place**
This intersection operates at LOS F under existing, background, and total projected conditions. Specifically, these results occur because the northbound right turn volume at Murfreesboro Road, north of Riverside Drive, is significantly high during both peak hours, and these vehicles queue south toward Riverside Drive.

It is important to note that the eastbound and westbound turning movements operate with a single phase, without protected left turn signal phases. Capacity and simulation software indicates that a single phase operates more efficiently than protected-plus-permitted phases for the side streets. However, field observations indicate that the single phase is confusing for eastbound and westbound motorists, resulting in unnecessary delays and potential for vehicle conflicts. If the existing traffic signal were modified to include protected-plus-permitted signal phases rather than a single signal phase, eastbound and westbound motorists would likely experience longer delays but safer conditions. If the total time dedicated to the protected-plus-permitted signal phases does not exceed the single signal phase currently provided, this change would have a negligible impact on the northbound and southbound vehicle delays and queues.

**Murfreesboro Road and Royal Oaks Boulevard**
This intersection operates poorly during the PM peak hour under existing, background, and total projected conditions. Specifically, the traffic volumes for the eastbound throughs, westbound throughs, westbound left turns, and northbound right turns are all approximately equal during

both peak hours. Although some of these turning movements can operate during the same signal phases, the total time needed to serve all of the turning movements is significantly high. These conditions will persist unless the Murfreesboro Road corridor is widened to include three travel lanes in each direction.

**Murfreesboro Road and the Ramps for Southbound I-65**

This intersection operates poorly during the PM peak hour under existing, background, and total projected conditions. Specifically, the traffic volumes for the eastbound throughs, westbound throughs, and southbound right turns are all significantly high during both peak hours, and the traffic volume for the southbound left turns are significantly high during the PM peak hour. Although some of these turning movements can operate during the same signal phases, the total time needed to serve all of the turning movements is significantly high. These conditions will persist unless the Murfreesboro Road corridor is widened to include three travel lanes in each direction.

**Murfreesboro Road and the Ramps for Northbound I-65**

This intersection operates poorly during the AM peak hour under existing, background, and total projected conditions. Specifically, the traffic volumes for the eastbound left turns and westbound right turns are significantly high during the AM peak hour, and the traffic volumes for the eastbound throughs and westbound right turns are significantly high during the PM peak hour. These turning movements cannot operate during the same signal phases, and the total time needed to serve all of the turning movements is significantly high. These conditions will persist unless the Murfreesboro Road corridor is widened to include three travel lanes in each direction.

## TABLE 8. COMPARISON OF AM PEAK HOUR LEVELS OF SERVICE

| INTERSECTION | TURNING MOVEMENT | LEVELS OF SERVICE | | | |
|---|---|---|---|---|---|
| | | EXISTING CONDITIONS | BACKGROUND CONDITIONS | TOTAL PROJECTED CONDITIONS | WITH THIRD NORTHBOUND TRAVEL LANE |
| S. Royal Oaks Boulevard and Oak Meadow Drive | Overall Intersection | LOS B (13.9 sec/veh) | LOS B (15.4 sec/veh) | LOS B (17.3 sec/veh) | LOS B (14.7 sec/veh) |
| S. Royal Oaks Boulevard and Rand Place / Home Depot Access | Northbound Left Turns | LOS A (8.8 sec/veh) | LOS A (9.1 sec/veh) | LOS A (9.1 sec/veh) | LOS A (9.1 sec/veh) |
| | Southbound Left Turns | LOS B (12.6 sec/veh) | LOS B (13.8 sec/veh) | LOS B (14.5 sec/veh) | LOS B (14.5 sec/veh) |
| | Eastbound Left Turns | LOS D (0.4 sec/veh) | LOS D (31.0 sec/veh) | LOS D (34.8 sec/veh) | LOS D (30.0 sec/veh) |
| | Eastbound Thrus/Right Turns | LOS B (0.1 sec/veh) | LOS B (13.9 sec/veh) | LOS B (14.4 sec/veh) | LOS B (14.5 sec/veh) |
| | Westbound Left Turns | LOS E (0.3 sec/veh) | LOS E (43.1 sec/veh) | LOS E (47.0 sec/veh) | LOS E (47.8 sec/veh) |
| | Westbound Thrus/Right Turns | LOS B (0.1 sec/veh) | LOS C (15.0 sec/veh) | LOS C (16.3 sec/veh) | LOS C (16.5 sec/veh) |
| S. Royal Oaks Boulevard and Riverside Drive / Center Point Place | Overall Intersection | LOS F (undefined) | LOS F (undefined) | LOS F (undefined) | LOS F (undefined) |
| Murfreesboro Road and Royal Oaks Boulevard | Overall Intersection | LOS D (43.8 sec/veh) | LOS D (46.3 sec/veh) | LOS D (45.7 sec/veh) | LOS D (44.8 sec/veh) |
| Murfreesboro Road and Ramps for Southbound I-65 | Overall Intersection | LOS C (32.4 sec/veh) | LOS D (40.4 sec/veh) | LOS D (41.9 sec/veh) | LOS D (37.8 sec/veh) |
| Murfreesboro Road and Ramps for Northbound I-65 | Overall Intersection | LOS E (64.7 sec/veh) | LOS F (81.2 sec/veh) | LOS F (88.7 sec/veh) | LOS E (75.7 sec/veh) |

## TABLE 9. COMPARISON OF PM PEAK HOUR LEVELS OF SERVICE

| INTERSECTION | TURNING MOVEMENT | LEVELS OF SERVICE | | | |
|---|---|---|---|---|---|
| | | EXISTING CONDITIONS | BACKGROUND CONDITIONS | TOTAL PROJECTED CONDITIONS | TOTAL PROJECTED CONDITIONS |
| S. Royal Oaks Boulevard and Oak Meadow Drive | Overall Intersection | LOS C (22.0 sec/veh) | LOS C (25.3 sec/veh) | LOS C (27.8 sec/veh) | LOS C (22.5 sec/veh) |
| S. Royal Oaks Boulevard and Rand Place / Home Depot Access | Northbound Left Turns | LOS B (10.3 sec/veh) | LOS B (10.7 sec/veh) | LOS B (11.0 sec/veh) | LOS B (11.0 sec/veh) |
| | Southbound Left Turns | LOS B (10.1 sec/veh) | LOS B (10.6 sec/veh) | LOS B (10.9 sec/veh) | LOS B (10.9 sec/veh) |
| | Eastbound Left Turns | LOS D (27.7 sec/veh) | **LOS D** (34.1 sec/veh) | **LOS E** (39.7 sec/veh) | LOS E (37.4 sec/veh) |
| | Eastbound Thrus/Right Turns | LOS B (14.7 sec/veh) | LOS C (15.7 sec/veh) | LOS C (16.6 sec/veh) | LOS C (16.7 sec/veh) |
| | Westbound Left Turns | LOS D (25.1 sec/veh) | LOS D (29.2 sec/veh) | LOS D (31.6 sec/veh) | LOS D (31.9 sec/veh) |
| | Westbound Thrus/Right Turns | LOS B (14.4 sec/veh) | **LOS B** (14.7 sec/veh) | **LOS C** (15.0 sec/veh) | LOS C (15.1 sec/veh) |
| S. Royal Oaks Boulevard and Riverside Drive / Center Point Place | Overall Intersection | LOS F (undefined) | LOS F (undefined) | LOS F (undefined) | LOS F (undefined) |
| Murfreesboro Road and Royal Oaks Boulevard | Overall Intersection | LOS E (62.6 sec/veh) | **LOS E** (73.0 sec/veh) | **LOS F** (82.3 sec/veh) | LOS E (78.6 sec/veh) |
| Murfreesboro Road and Ramps for Southbound I-65 | Overall Intersection | LOS E (78.6 sec/veh) | LOS F (97.6 sec/veh) | LOS F (104.8 sec/veh) | LOS F (98.6 sec/veh) |
| Murfreesboro Road and Ramps for Northbound I-65 | Overall Intersection | LOS C (29.5 sec/veh) | **LOS C** (34.2 sec/veh) | **LOS D** (35.2 sec/veh) | LOS D (35.6 sec/veh) |

# 6. CONCLUSIONS AND RECOMMENDATIONS

The analyses presented in this study indicate the following information for the intersections that provide direct access to the project sites:

**Oak Meadow Drive and the Eastern Project Access / Home Depot Access**
At this intersection, the new project access should be constructed to include one entering lane and one exiting lane, and a stop sign should be installed on the northbound approach of the new access. The capacity analyses indicate that all of the vehicle queues and vehicle delays at this intersection will be very low.

**Oak Meadow Drive and the Western Project Access / Home Depot Access**
At this intersection, the new project access should be constructed to include one entering lane and one exiting lane, and a stop sign should be installed on the northbound approach of the new access. The capacity analyses indicate that all of the vehicle queues and vehicle delays at this intersection will be very low.

**Eastern Home Depot Access and the Project Access for the Northern Apartments**
At this intersection, the new project access should be constructed to include one entering lane and one exiting lane, and a stop sign should be installed on the westbound approach of the new access. The capacity analyses indicate that all of the vehicle queues and vehicle delays at this intersection will be very low.

**S. Royal Oaks Boulevard and Oak Meadow Drive**
The capacity analyses indicate that all of the turning movements at this intersection will operate at acceptable levels of service. Also, the existing lengths of the turn lanes are adequate to accommodate the total projected traffic volumes with the completion of the proposed project. Finally, it is important to note that the westbound approach of Oak Meadow Drive already includes separate left, through, and right turn lanes at the intersection with S. Royal Oaks Boulevard, and the existing traffic signal already includes a right turn overlap signal phase for westbound motorists. Therefore, there are no additional dedicated turn lanes or traffic control modifications that can be provided at this location. Field observations and traffic counts confirm that the northbound and southbound through volumes are significant, particularly the northbound through movement during the AM peak hour. However, the proposed project will have a minimal impact on these conditions.

**S. Royal Oaks Boulevard and Rand Place / Access for Home Depot**
The capacity analyses indicate that all of the critical turning movements at this unsignalized intersection will operate at acceptable levels of service. Also, the existing lengths of the turn lanes are adequate to accommodate the total projected traffic volumes with the completion of the proposed project. Field observations and traffic counts confirm that the northbound and southbound through volumes are significant, particularly the northbound through movement during the AM peak hour. Also, the field observations and traffic counts confirm that the eastbound and westbound left turn volumes are relatively low, presumably because left turns are challenging when the northbound and southbound through volumes are high. Also, the eastbound

and westbound motorists have access to the existing traffic signal at Oak Meadow Drive. It is important to note that proposed project will have a minimal impact on these conditions. Also, it is important to note that this intersection is not an appropriate location for a traffic signal installation because of its proximity to the existing traffic signal at Oak Meadow Drive.

**S. Royal Oaks Boulevard and Riverside Drive / Center Point Place**

The capacity analyses indicate that several turning movements at this intersection will operate at poor levels of service under existing, background, and total projected conditions. In particular, the southbound left turns, eastbound turns, and westbound left turns are expected to operate at poor levels of service but with reasonable vehicle queues. The vehicle delays for these turning movements can only be reduced by increasing the delays for northbound and southbound through vehicles. Specifically, the traffic signal would have to allocate more "green time" to the southbound left turns by reducing the "green time" for northbound throughs. Also, the traffic signal would have to allocate more "green time" to the eastbound and westbound turning movements by reducing the "green time" for northbound and southbound throughs. Field observations and traffic counts confirm that the northbound and southbound through volumes are significant, particularly the northbound through movement during the AM peak hour. Therefore, it is recommended that the northbound and southbound through movements be prioritized during the peak hours in order to minimize overall delays within the study area.

**APPENDIX A**
**TRAFFIC IMPACT STUDY SCOPE PROVIDED BY**
**THE CITY OF FRANKLIN AND NEEL-SCHAFFER, INC.**

Exhibit B

City of Franklin
Engineering Department

# APPLICATION FORM
# REQUEST FOR APPROVED TRANSPORTATION IMPACT ANALYSIS REPORT

| | | | |
|---|---|---|---|
| Applicant Name: | Crunk Engineering . | Applicant Name: | Epoch Residential . |
| Address: | 1894 Gen. George Patton. | Address: | 359 Carolina Avenue . |
| | Franklin, TN 37067 . | | Winter Park, FL 32789 . |
| Phone #: | (615) 873-1795 . | Phone #: | (321) 316-6005 . |
| e-mail address: | adam@crunkeng.com . | e-mail address: | mccarley@epochresidential.com . |

## PROCESS OVERVIEW

A Transportation Impact Analysis shall be prepared by the Applicant's Consultant or the City's Traffic Consultant using the standard format specified by the Institute of Transportation Engineers in accordance with the following:

(i) The applicant shall submit a completed *Request for Transportation Impact Analysis Application Form* to the Engineering Department.

(ii) Scope of Services
   a. Following initial review of the application form, the Engineering Department shall prepare and submit a Scope of Services and schedule to the Applicant. If necessary a meeting will be scheduled to review and discuss the Scope of Services in detail.
   b. Following approval the applicant will pay the City 90% of the estimated cost of the traffic impact study. At the completion of the study the City shall reimburse the applicant all remaining fees.

(iii) Transportation impact analyses shall be prepared utilizing traffic data that are consistent with:
   a. The land use and density data as referenced in the most current edition of Trip Generation, published by the Institute of Transportation Engineers;
   b. Current city and state traffic counts for surrounding streets;
   c. Any additional traffic counts performed as a part of preparing the study.

## Attachment A

City of Franklin Review Process for Transportation Impact Analysis

**Step 1 – Preliminary discussion with Consultant/Developer on project description including site plan.**
**Step 2 – Scoping of Transportation Impact Analysis between the City of Franklin and Consultant/Developer.**
**Step 3 – Consultant, Traffic Engineer and Director of Engineering execute a MOU (Fees may apply per COF Ordinance 2015-64.**
**Step 4 – Consultant/Developer pays review fee and submits Transportation Impact Analysis.**
**Step 5 – City of Franklin prepares initial comments on the transportation impact analysis, if necessary.**

**Step 6 – Consultant submits corrections/revisions to the transportation impact analysis, if necessary.**
**Step 7 – City of Franklin prepares initial comments on proposed mitigation measures, if necessary**
**Step 8 – Consultant submits corrections/revisions on proposed mitigation measures, if necessary and electronic copy of the transportation impact analysis.**
**Step 9 – City of Franklin issues an assessment letter**

# Attachment B

Transportation Impact Analysis – Memorandum of Understanding (MOU)

This MOU acknowledges that the transportation impact analysis for the following project will be prepared in accordance with the latest version of City of Franklin Zoning Ordinance.

Project Name: Epoch Franklin .
Project Address: Oak Meadow Drive, east of S. Royal Oaks Boulevard .
Project Description: 352 apartments (240 units on north side, 112 apts on the south side) .

Attach a site map and a trip generation table with a description of the proposed land uses, ITE rates, estimated daily, morning, midday and afternoon peak hour volumes (ins/outs/totals), proposed trip credits, etc.

Project Buildout Year: 2018 Ambient or CMP Growth Rate: : 4 % Per Yr.

Study Intersections:

| | |
|---|---|
| 1. Oak Meadow Drive and Private Road for Home Depot / western project access | 9. Oak Meadow Drive and the eastern project accesses |
| 2. S. Royal Oaks Blvd and Oak Meadow Dr | 10. |
| 3. S. Royal Oaks Blvd and Center Point Pl / Riverside Dr | 11. |
| 4. Highway 96E and Royal Oaks Blvd (for data collection and signal timing purposes only) | 12. |
| 5. Highway 96E and Ramps for SB I-65(for data collection and signal timing purposes only) | 13. |
| 6. Highway 96E and Ramps for NB I-65(for data collection and signal timing purposes only) | 14. |

Trip Credits: (Exact amount of credit subject to approval by City of Franklin)

| | Yes | No |
|---|---|---|
| Transit Usage | | X |
| Existing Active Land Use | | X |
| Previous Land Use | | X |
| Internal Trip | | X |
| Pass-By Trip | | X |

Exhibit B

| | | | |
|---|---|---|---|
| Consultant: | FTG, LLC | Developer: | Epoch Residential |
| Address: | PO Box 682736 | Address: | 359 Carolina Avenue |
| | Franklin, TN 37068 | | Winter Park, FL 32789 |
| Phone #: | (615) 771-8022 | Phone #: | (321) 316-6005 |
| e-mail address: | Gillian@FTGtraffic.com | e-mail address: | mccarley@epochresidential.com |

Approved By: _____ _____

City of Franklin Traffic Engineer Director of Engineering

**Reason for Request:** (Planned Unit Development, Site Plan, Rezoning)

site plan

**Description of Proposed Project** (Address, Map/Parcel Number, etc.) (Attach a conceptual development plans showing all access points and adjacent streets.):

079 08800 00009079

079 10105 00109079

**Existing Land Use** (be specific):

undeveloped

**Proposed Land Use** (be specific):

240 apartments on 13.06 acres (north) and 112 apartments on 18.87 acres (south)

**Potential Development Yield** (number of residential units; building square footage, projected number of employees, hours of operations):

352 apartments

**As applicant, I agree to pay to the City of Franklin 90% of the entire cost of the Transportation Impact Analysis.**

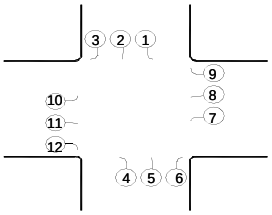
Property Owner Signature: _____

Property Owner Title: _____

Date: _____

The information above shall be submitted to the Engineering Department (109 3rd Ave South; Franklin, TN 37064) to review and provide estimated cost along with a proposed scope of services. All questions should be directed to Carl Baughman, Traffic Engineer III (615-791-3218).

**APPENDIX B**
**EXISTING TRAFFIC COUNTS**

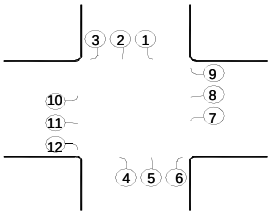



**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** Oak Meadow Dr and Eastern Home Depot Access
**DATE:** 23-Feb-16 Tue
**RECORDER:** FTG
**NOTES:** unsignalized

| LOCATION | S/B Home Depot Access | | | N/B | | | W/B Oak Meadow Dr | | | E/B Oak Meadow Dr | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TIME | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | |
| 6:30-6:45 | | | | | | | | 24 | | | 7 | | 209 | 31 |
| 6:45-7:00 | | | | | | | | **54** | | | **13** | | **228** | **67** |
| 7:00-7:15 | | | | | | | | **50** | | | **13** | | 209 | 63 |
| 7:15-7:30 | | | | | | | | **36** | | | **12** | | 189 | 48 |
| 7:30-7:45 | | | | | | | | **43** | | | **7** | | 179 | 50 |
| 7:45-8:00 | | | | | | | | 41 | | | 7 | | | 48 |
| 8:00-8:15 | | | | | | | | 33 | | | 10 | | | 43 |
| 8:15-8:30 | | | | | | | | 29 | | | 9 | | | 38 |
| | | | | | | | | | | | | | | |
| 4:30-4:45 | | | | | | | | **46** | | | **33** | | **344** | 79 |
| 4:45-5:00 | | | | | | | | **33** | | | **49** | | 336 | 82 |
| 5:00-5:15 | | | | | | | | **41** | | | **48** | | 346 | 89 |
| 5:15-5:30 | | | | | | | | **48** | | | **46** | | 329 | **94** |
| 5:30-5:45 | | | | | | | | 33 | | | 38 | | 309 | 71 |
| 5:45-6:00 | | | | | | | | 34 | | | 58 | | | 92 |
| 6:00-6:15 | | | | | | | | 25 | | | 47 | | | 72 |
| 6:15-6:30 | | | | | | | | 32 | | | 42 | | | 74 |
| **TOTAL** | | | | | | | | **602** | | | **439** | | | |
| **AM PK HR** | | | | | | | | 183 | | | 45 | | **6:45-7:45** | |
| **PM PK HR** | | | | | | | | 168 | | | 176 | | **4:30-5:30** | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | | | | | | | | 0.85 | | | 0.87 | | **0.85** |
| **PM PK PHF** | | | | | | | | 0.88 | | | 0.90 | | **0.91** |

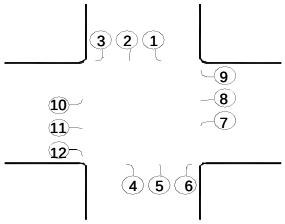



**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** Oak Meadow Dr and Western Home Depot Access
**DATE:** 23-Feb-16 Tue
**RECORDER:** FTG
**NOTES:** unsignalized

| LOCATION | S/B Home Depot Access | | | N/B | | | W/B Oak Meadow Dr | | | E/B Oak Meadow Dr | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TIME** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | | |
| 6:30-6:45 | | | 1 | | | | | 24 | | | 7 | | 213 | 32 |
| 6:45-7:00 | | | | | | | | **54** | | | **13** | | **231** | **67** |
| 7:00-7:15 | | | | | | | | **50** | | **1** | **13** | | 213 | 64 |
| 7:15-7:30 | | | **1** | | | | | **36** | | **1** | **12** | | 192 | 50 |
| 7:30-7:45 | **1** | | | | | | | **43** | | | **6** | | 180 | 50 |
| 7:45-8:00 | | | | | | | | 41 | | 1 | 7 | | | 49 |
| 8:00-8:15 | 1 | | | | | | | 33 | | | 9 | | | 43 |
| 8:15-8:30 | | | | | | | | 29 | | | 9 | | | 38 |
| | | | | | | | | | | | | | | |
| 4:30-4:45 | **3** | | | | | | | **46** | | **1** | **30** | | **351** | 80 |
| 4:45-5:00 | **4** | | | | | | | **33** | | **1** | **45** | | 343 | 83 |
| 5:00-5:15 | **3** | | **1** | | | | | **40** | **1** | **2** | **45** | | 354 | 92 |
| 5:15-5:30 | **5** | | **1** | | | | | **47** | **1** | **1** | **41** | | 335 | **96** |
| 5:30-5:45 | 3 | | | | | | | 33 | | 1 | 35 | | 314 | 72 |
| 5:45-6:00 | 6 | | | | | | | 34 | | 2 | 52 | | | 94 |
| 6:00-6:15 | 7 | | | | | | | 25 | | 1 | 40 | | | 73 |
| 6:15-6:30 | 5 | | | | | | | 32 | | 1 | 37 | | | 75 |
| **TOTAL** | **38** | | **4** | | | | | **600** | **2** | **13** | **401** | | | |
| **AM PK HR** | 1 | | 1 | | | | | 183 | | 2 | 44 | | **6:45-7:45** | |
| **PM PK HR** | 15 | | 2 | | | | | 166 | 2 | 5 | 161 | | **4:30-5:30** | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | 0.25 | | 0.25 | | | | | 0.85 | | 0.50 | 0.85 | | **0.86** |
| **PM PK PHF** | 0.75 | | 0.50 | | | | | 0.88 | 0.50 | 0.63 | 0.89 | | **0.91** |

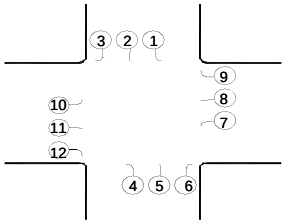



**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** S. Royal Oaks Blvd and Oak Meadow Dr
**DATE:** 4-Feb-16 Thu
**RECORDER:** Burns
**NOTES:** signalized

| LOCATION | S/B S. Royal Oaks Blvd | | | N/B S. Royal Oaks Blvd | | | W/B Oak Meadow Dr | | | E/B Oak Meadow Dr | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TIME | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| 6:30-6:45 | 1 | 96 | 15 | 17 | 231 | 2 | 2 | 2 | 21 | 28 | 4 | 9 | 1,978 |
| 6:45-7:00 | **4** | **88** | **17** | **17** | **270** | **7** | **1** | **4** | **49** | **31** | **2** | **12** | **2,078** |
| 7:00-7:15 | **6** | **115** | **15** | **14** | **300** | **6** | **5** | **2** | **43** | **26** | **2** | **16** | 2,071 |
| 7:15-7:30 | **9** | **117** | **15** | **23** | **242** | **4** | **4** | | **33** | **34** | | **17** | 1,995 |
| 7:30-7:45 | **3** | **157** | **21** | **27** | **225** | **3** | **7** | **8** | **28** | **28** | | **21** | 1,972 |
| 7:45-8:00 | 5 | 172 | 15 | 17 | 199 | 2 | 8 | 4 | 29 | 30 | 1 | 13 | |
| 8:00-8:15 | 3 | 123 | 22 | 22 | 214 | 4 | 8 | 8 | 17 | 29 | 2 | 22 | |
| 8:15-8:30 | 6 | 142 | 19 | 18 | 213 | 3 | 7 | 3 | 19 | 24 | | 21 | |
| | | | | | | | | | | | | | |
| 4:30-4:45 | **25** | **187** | **40** | **17** | **169** | | **20** | **9** | **17** | **44** | **6** | **26** | **2,272** |
| 4:45-5:00 | **29** | **179** | **29** | **18** | **200** | **6** | **17** | **2** | **14** | **25** | **11** | **31** | 2,225 |
| 5:00-5:15 | **32** | **170** | **33** | **28** | **222** | **5** | **19** | **5** | **17** | **35** | **10** | **29** | 2,170 |
| 5:15-5:30 | **32** | **172** | **32** | **22** | **175** | **2** | **21** | **6** | **21** | **32** | **8** | **23** | 2,016 |
| 5:30-5:45 | 27 | 150 | 29 | 16 | 188 | 4 | 14 | 3 | 16 | 33 | 5 | 28 | 1,932 |
| 5:45-6:00 | 33 | 158 | 33 | 8 | 162 | 11 | 12 | 7 | 15 | 35 | 10 | 22 | |
| 6:00-6:15 | 34 | 164 | 16 | 20 | 138 | 3 | 10 | 9 | 6 | 22 | 4 | 25 | |
| 6:15-6:30 | 33 | 175 | 18 | 9 | 148 | 1 | 17 | 6 | 9 | 23 | 4 | 19 | |
| **TOTAL** | **282** | **2,365** | **369** | **293** | **3,296** | **63** | **172** | **78** | **354** | **479** | **69** | **334** | |
| **AM PK HR** | 22 | 477 | 68 | 81 | 1,037 | 20 | 17 | 14 | 153 | 119 | 4 | 66 | **6:45-7:45** |
| **PM PK HR** | 118 | 708 | 134 | 85 | 766 | 13 | 77 | 22 | 69 | 136 | 35 | 109 | **4:30-5:30** |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | 0.61 | 0.76 | 0.81 | 0.75 | 0.86 | 0.71 | 0.61 | 0.44 | 0.78 | 0.88 | 0.50 | 0.79 | **0.94** |
| **PM PK PHF** | 0.92 | 0.95 | 0.84 | 0.76 | 0.86 | 0.54 | 0.92 | 0.61 | 0.82 | 0.77 | 0.80 | 0.88 | **0.94** |

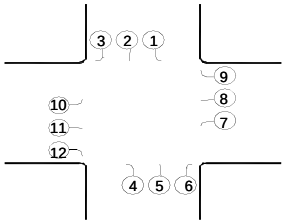



**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** S. Royal Oaks Blvd and Rand Place / Home Depot
**DATE:** 23-Feb-16 Tue
**RECORDER:** Burns
**NOTES:** unsignalized

| LOCATION | S/B S. Royal Oaks Blvd | | | N/B S. Royal Oaks Blvd | | | W/B Home Depot Access | | | E/B Rand Place | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TIME** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | |
| 6:30-6:45 | 13 | 93 | 10 | 3 | 279 | 11 | 2 | 1 | 2 | 6 | 1 | | 1,934 |
| 6:45-7:00 | **10** | **132** | **8** | **2** | **358** | **6** | **2** | | **1** | **5** | | **1** | **2,048** |
| 7:00-7:15 | **15** | **119** | **12** | | **364** | **5** | **1** | | **1** | **8** | **1** | **1** | 2,029 |
| 7:15-7:30 | **9** | **153** | **9** | **4** | **264** | **5** | **2** | | **7** | **4** | | **4** | 1,968 |
| 7:30-7:45 | **11** | **182** | **18** | **3** | **295** | **7** | **8** | | **2** | **7** | | **2** | 1,986 |
| 7:45-8:00 | 6 | 188 | 6 | 4 | 279 | 9 | 3 | | 5 | 2 | | 4 | |
| 8:00-8:15 | 13 | 172 | 14 | 4 | 240 | 6 | 2 | 1 | 3 | 5 | | 6 | |
| 8:15-8:30 | 11 | 123 | 11 | 7 | 307 | 7 | 2 | | 4 | 7 | | | |
| | | | | | | | | | | | | | |
| 4:30-4:45 | **5** | **207** | **19** | **1** | **218** | **5** | **11** | | **6** | **8** | **1** | **4** | **2,005** |
| 4:45-5:00 | **5** | **211** | **27** | **1** | **209** | **3** | **3** | | **8** | **6** | **1** | **6** | 1,987 |
| 5:00-5:15 | **5** | **228** | **26** | **2** | **235** | **4** | **4** | **3** | **3** | **5** | | **2** | 1,967 |
| 5:15-5:30 | **5** | **237** | **25** | **2** | **234** | **4** | **1** | **1** | **5** | **5** | **1** | **3** | 1,888 |
| 5:30-5:45 | 2 | 262 | 17 | 4 | 156 | 1 | 5 | 1 | 3 | 12 | | 4 | 1,720 |
| 5:45-6:00 | 3 | 211 | 23 | 4 | 196 | 2 | 3 | 1 | 4 | 7 | | 6 | |
| 6:00-6:15 | 3 | 213 | 18 | 2 | 168 | 3 | 5 | 1 | 4 | 12 | 2 | 7 | |
| 6:15-6:30 | 1 | 204 | 17 | 2 | 115 | 3 | 2 | | | 8 | | 3 | |
| **TOTAL** | **117** | **2,935** | **260** | **45** | **3,917** | **81** | **56** | **9** | **58** | **107** | **7** | **53** | |
| **AM PK HR** | 45 | 586 | 47 | 9 | 1,281 | 23 | 13 | | 11 | 24 | 1 | 8 | **6:45-7:45** |
| **PM PK HR** | 20 | 883 | 97 | 6 | 896 | 16 | 19 | 4 | 22 | 24 | 3 | 15 | **4:30-5:30** |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | 0.75 | 0.80 | 0.65 | 0.56 | 0.88 | 0.82 | 0.41 | | 0.39 | 0.75 | 0.25 | 0.50 | **0.97** |
| **PM PK PHF** | 1.00 | 0.93 | 0.90 | 0.75 | 0.95 | 0.80 | 0.43 | 0.33 | 0.69 | 0.75 | 0.75 | 0.63 | **0.96** |

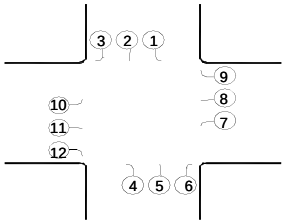



**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** S. Royal Oaks Blvd and Center Point Pl and Riverside Dr
**DATE:** 4-Feb-16 Thu
**RECORDER:** Burns
**NOTES:** signalized

| LOCATION | S/B S. Royal Oaks Blvd | | | N/B S. Royal Oaks Blvd | | | W/B Riverside Dr | | | E/B Cener Point Pl | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TIME** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | |
| 6:30-6:45 | 50 | 105 | 4 | 3 | 226 | 24 | 6 | 2 | 13 | 0 | 3 | 6 | 2,202 |
| 6:45-7:00 | 45 | 113 | 5 | 2 | 335 | 22 | 5 | 0 | 23 | 2 | 9 | 3 | 2,321 |
| 7:00-7:15 | **63** | **130** | **4** | **3** | **306** | **22** | **4** | **4** | **26** | **0** | **7** | **10** | **2,378** |
| 7:15-7:30 | **59** | **161** | **8** | **7** | **297** | **30** | **10** | **4** | **20** | **0** | **14** | **7** | 2,372 |
| 7:30-7:45 | **63** | **158** | **4** | **8** | **253** | **16** | **12** | **2** | **21** | **3** | **12** | **9** | 2,375 |
| 7:45-8:00 | **62** | **220** | **7** | **8** | **244** | **27** | **5** | **1** | **22** | **3** | **10** | **12** | |
| 8:00-8:15 | 74 | 161 | 8 | 7 | 232 | 19 | 11 | 3 | 33 | 4 | 14 | 7 | |
| 8:15-8:30 | 70 | 194 | 6 | 7 | 231 | 25 | 13 | 5 | 31 | 10 | 10 | 18 | |
| | | | | | | | | | | | | | |
| 4:30-4:45 | **56** | **255** | **24** | **19** | **240** | **6** | **11** | **15** | **59** | **21** | **14** | **38** | **2,942** |
| 4:45-5:00 | **48** | **243** | **16** | **30** | **228** | **4** | **13** | **14** | **67** | **15** | **15** | **29** | 2,865 |
| 5:00-5:15 | **47** | **233** | **28** | **12** | **247** | **7** | **11** | **20** | **71** | **28** | **13** | **30** | 2,829 |
| 5:15-5:30 | **64** | **233** | **18** | **22** | **240** | **8** | **8** | **5** | **70** | **13** | **17** | **17** | 2,730 |
| 5:30-5:45 | 60 | 223 | 25 | 14 | 221 | 9 | 8 | 8 | 47 | 15 | 29 | 22 | 2,571 |
| 5:45-6:00 | 55 | 206 | 23 | 20 | 228 | 13 | 6 | 7 | 52 | 25 | 22 | 29 | |
| 6:00-6:15 | 61 | 200 | 19 | 19 | 199 | 6 | 7 | 10 | 63 | 25 | 14 | 25 | |
| 6:15-6:30 | 37 | 184 | 21 | 17 | 166 | 6 | 11 | 10 | 33 | 25 | 17 | 29 | |
| **TOTAL** | **914** | **3,019** | **220** | **198** | **3,893** | **244** | **141** | **110** | **651** | **189** | **220** | **291** | |
| **AM PK HR** | 247 | 669 | 23 | 26 | 1,100 | 95 | 31 | 11 | 89 | 6 | 43 | 38 | **7:00-8:00** |
| **PM PK HR** | 215 | 964 | 86 | 83 | 955 | 25 | 43 | 54 | 267 | 77 | 59 | 114 | **4:30-5:30** |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | 0.98 | 0.76 | 0.72 | 0.81 | 0.90 | 0.79 | 0.65 | 0.69 | 0.86 | 0.50 | 0.77 | 0.79 | **0.96** |
| **PM PK PHF** | 0.84 | 0.95 | 0.77 | 0.69 | 0.97 | 0.78 | 0.83 | 0.68 | 0.94 | 0.69 | 0.87 | 0.75 | **0.97** |

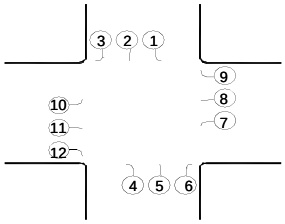



**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** Murfreesboro Road and Royal Oaks Blvd
**DATE:** 11-Feb-16 Thu
**RECORDER:** Burns
**NOTES:** signalized

| LOCATION | S/B N. Royal Oaks Blvd | | | N/B S. Royal Oaks Blvd | | | W/B Murfreesboro Road | | | E/B Murfreesboro Road | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TIME** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | |
| 6:30-6:45 | 21 | 26 | 8 | 14 | 38 | 211 | 99 | 137 | 37 | 4 | 118 | 7 | 3,669 |
| 6:45-7:00 | 29 | 17 | 4 | 24 | 80 | 244 | 123 | 193 | 43 | 15 | 168 | 8 | 4,005 |
| 7:00-7:15 | 48 | 27 | 5 | 28 | 119 | 253 | 107 | 159 | 37 | 20 | 166 | 13 | 4,252 |
| 7:15-7:30 | 51 | 25 | 14 | 22 | 53 | 236 | 160 | 204 | 57 | 21 | 163 | 13 | 4,384 |
| 7:30-7:45 | **53** | **39** | **18** | **25** | **70** | **213** | **162** | **210** | **58** | **29** | **165** | **14** | **4,492** |
| 7:45-8:00 | **50** | **43** | **20** | **26** | **56** | **267** | **210** | **234** | **72** | **25** | **181** | **11** | |
| 8:00-8:15 | **53** | **36** | **19** | **14** | **48** | **205** | **193** | **249** | **61** | **23** | **202** | **11** | |
| 8:15-8:30 | **52** | **61** | **19** | **27** | **44** | **224** | **191** | **226** | **69** | **27** | **167** | **20** | |
| | | | | | | | | | | | | | |
| 4:30-4:45 | **71** | **94** | **37** | **28** | **90** | **220** | **195** | **284** | **54** | **45** | **238** | **15** | **5,614** |
| 4:45-5:00 | **67** | **103** | **47** | **32** | **78** | **213** | **198** | **252** | **61** | **50** | **275** | **17** | 5,552 |
| 5:00-5:15 | **78** | **90** | **39** | **38** | **74** | **235** | **222** | **272** | **60** | **41** | **267** | **12** | 5,358 |
| 5:15-5:30 | **77** | **107** | **42** | **33** | **73** | **205** | **217** | **279** | **74** | **55** | **246** | **14** | 5,160 |
| 5:30-5:45 | 81 | 101 | 41 | 22 | 74 | 187 | 199 | 271 | 60 | 42 | 211 | 20 | 4,965 |
| 5:45-6:00 | 68 | 78 | 47 | 25 | 72 | 157 | 175 | 208 | 119 | 33 | 197 | 20 | |
| 6:00-6:15 | 80 | 89 | 44 | 32 | 65 | 169 | 169 | 234 | 60 | 42 | 229 | 17 | |
| 6:15-6:30 | 72 | 87 | 38 | 19 | 54 | 175 | 183 | 260 | 58 | 49 | 219 | 13 | |
| **TOTAL** | **951** | **1,023** | **442** | **409** | **1,088** | **3,414** | **2,803** | **3,672** | **980** | **521** | **3,212** | **225** | |
| **AM PK HR** | 208 | 179 | 76 | 92 | 218 | 909 | 756 | 919 | 260 | 104 | 715 | 56 | **7:30-8:30** |
| **PM PK HR** | 293 | 394 | 165 | 131 | 315 | 873 | 832 | 1,087 | 249 | 191 | 1,026 | 58 | **4:30-5:30** |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | 0.98 | 0.73 | 0.95 | 0.85 | 0.78 | 0.85 | 0.90 | 0.92 | 0.90 | 0.90 | 0.88 | 0.70 | **0.94** |
| **PM PK PHF** | 0.94 | 0.92 | 0.88 | 0.86 | 0.88 | 0.93 | 0.94 | 0.96 | 0.84 | 0.87 | 0.93 | 0.85 | **0.98** |

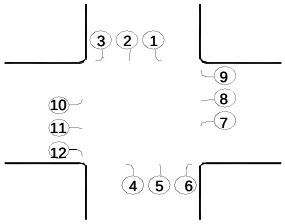



**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** Murfreesboro Road and the Ramps for Southbound I-65
**DATE:** 11-Feb-16 Thu
**RECORDER:** Burns
**NOTES:** signalized

| LOCATION | S/B Ramps | | | N/B | | | W/B Murfreesboro Road | | | E/B Murfreesboro Road | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TIME | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| 6:30-6:45 | 63 | | 148 | | | | 11 | | | | 369 | 34 | 2,929 |
| 6:45-7:00 | 69 | | 181 | | | | 31 | | | | 406 | 47 | 3,112 |
| 7:00-7:15 | 66 | | 139 | | | | 30 | | | | 471 | 49 | 3,159 |
| 7:15-7:30 | **73** | | **196** | | | | **37** | | | | **452** | **57** | **3,168** |
| 7:30-7:45 | **61** | | **237** | | | | **32** | | | | **432** | **46** | 3,140 |
| 7:45-8:00 | **91** | | **245** | | | | **18** | | | | **385** | **42** | |
| 8:00-8:15 | **86** | | **219** | | | | **29** | | | | **385** | **45** | |
| 8:15-8:30 | 91 | | 240 | | | | 24 | | | | 393 | 39 | |
| | | | | | | | | | | | | | |
| 4:30-4:45 | **205** | | **299** | | | | **71** | | | | **480** | **114** | **4,656** |
| 4:45-5:00 | **222** | | **322** | | | | **48** | | | | **388** | **95** | 4,524 |
| 5:00-5:15 | **197** | | **298** | | | | **76** | | | | **470** | **119** | 4,499 |
| 5:15-5:30 | **222** | | **374** | | | | **69** | | | | **469** | **118** | 4,376 |
| 5:30-5:45 | 175 | | 319 | | | | 56 | | | | 385 | 102 | 4,089 |
| 5:45-6:00 | 181 | | 349 | | | | 44 | | | | 383 | 93 | |
| 6:00-6:15 | 196 | | 290 | | | | 43 | | | | 408 | 100 | |
| 6:15-6:30 | 178 | | 256 | | | | 40 | | | | 414 | 77 | |
| **TOTAL** | **2,176** | | **4,112** | | | | **659** | | | | **6,690** | **1,177** | |
| **AM PK HR** | 311 | | 897 | | | | 116 | | | | 1,654 | 190 | **7:15-8:15** |
| **PM PK HR** | 846 | | 1,293 | | | | 264 | | | | 1,807 | 446 | **4:30-5:30** |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | 0.85 | | 0.92 | | | | 0.91 | | | | 0.96 | 1.03 | **0.97** |
| **PM PK PHF** | 0.95 | | 0.86 | | | | 0.87 | | | | 0.94 | 0.94 | **0.93** |




**INTERSECTION TRAFFIC VOLUME COUNTS**

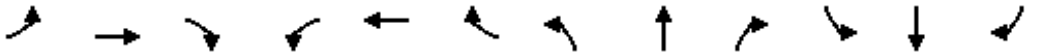
**LOCATION:** Murfreesboro Road and the Ramps for Northbound I-65
**DATE:** 11-Feb-16 Thu
**RECORDER:** Burns
**NOTES:** signalized

| LOCATION | S/B Ramps | | | N/B | | | W/B Murfreesboro Road | | | E/B Murfreesboro Road | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TIME | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| 6:30-6:45 | | | | 74 | | 78 | | 144 | 286 | 278 | | | 3,695 |
| 6:45-7:00 | | | | **109** | | **94** | | **150** | **306** | **319** | | | **3,772** |
| 7:00-7:15 | | | | **65** | | **66** | | **183** | **306** | **331** | | | 3,689 |
| 7:15-7:30 | | | | **94** | | **92** | | **154** | **267** | **299** | | | 3,592 |
| 7:30-7:45 | | | | **107** | | **85** | | **213** | **248** | **284** | | | 3,508 |
| 7:45-8:00 | | | | 72 | | 101 | | 243 | 236 | 243 | | | |
| 8:00-8:15 | | | | 108 | | 82 | | 182 | 223 | 259 | | | |
| 8:15-8:30 | | | | 91 | | 67 | | 234 | 223 | 207 | | | |
| | | | | | | | | | | | | | |
| 4:30-4:45 | | | | **80** | | **40** | | **229** | **138** | **215** | | | **2,712** |
| 4:45-5:00 | | | | **75** | | **39** | | **231** | **134** | **187** | | | 2,597 |
| 5:00-5:15 | | | | **63** | | **39** | | **251** | **123** | **208** | | | 2,490 |
| 5:15-5:30 | | | | **66** | | **34** | | **213** | **143** | **204** | | | 2,376 |
| 5:30-5:45 | | | | 49 | | 40 | | 200 | 105 | 193 | | | 2,230 |
| 5:45-6:00 | | | | 79 | | 46 | | 161 | 101 | 172 | | | |
| 6:00-6:15 | | | | 71 | | 44 | | 183 | 106 | 166 | | | |
| 6:15-6:30 | | | | 52 | | 44 | | 176 | 89 | 153 | | | |
| **TOTAL** | | | | **1,255** | | **991** | | **1,503** | **3,034** | **3,718** | | | |
| **AM PK HR** | | | | 375 | | 337 | | 700 | 1,127 | 1,233 | | | **6:45-7:45** |
| **PM PK HR** | | | | 284 | | 152 | | 814 | 924 | 538 | | | **4:30-5:30** |

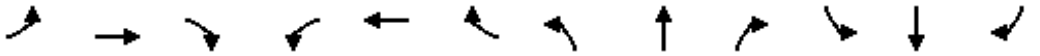
| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | | | | 0.86 | | 0.90 | | 0.82 | 0.92 | 0.93 | #DIV/0! | | **0.96** |
| **PM PK PHF** | | | | 0.89 | | 0.95 | | 0.95 | 0.92 | 0.94 | #DIV/0! | | **0.97** |

**APPENDIX C**
**CAPACITY ANALYSES**

## EXISTING CONDITIONS



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 104 | 715 | 56 | 756 | 919 | 260 | 92 | 218 | 909 | 208 | 179 | 76 |
| Future Volume (vph) | 104 | 715 | 56 | 756 | 919 | 260 | 92 | 218 | 909 | 208 | 179 | 76 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.988 | | | | 0.850 | | | 0.850 | | 0.958 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3232 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3232 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 10 | | | | 201 | | | | | 36 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 350 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 6.0 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.80 | 0.90 | 0.80 | 0.93 | 0.91 | 0.88 | 0.82 | 0.80 | 0.93 | 0.92 | 0.74 | 0.81 |
| Heavy Vehicles (%) | 3% | 6% | 2% | 3% | 6% | 3% | 4% | 2% | 2% | 2% | 4% | 2% |
| Adj. Flow (vph) | 130 | 794 | 70 | 813 | 1010 | 295 | 112 | 273 | 977 | 226 | 242 | 94 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 130 | 864 | 0 | 813 | 1010 | 295 | 112 | 273 | 977 | 226 | 336 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

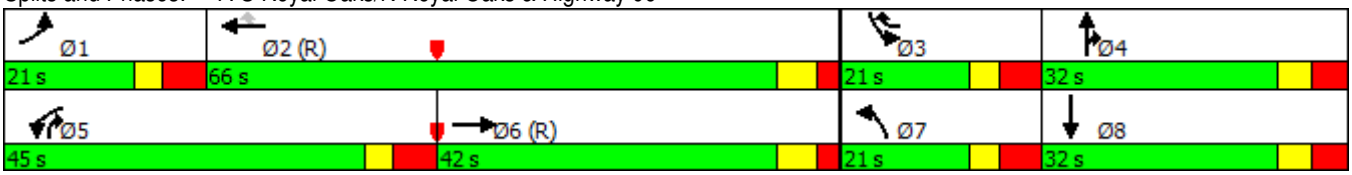


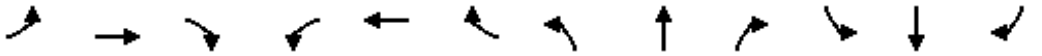
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (%) | 15.0% | 30.0% | | 32.1% | 47.1% | 15.0% | 15.0% | 22.9% | | 15.0% | 22.9% | |
| Maximum Green (s) | 13.5 | 35.5 | | 37.5 | 59.5 | 13.5 | 13.5 | 24.5 | | 13.5 | 24.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 13.2 | 38.9 | | 39.8 | 65.4 | 84.3 | 12.0 | 27.5 | 71.8 | 14.9 | 30.3 | |
| Actuated g/C Ratio | 0.09 | 0.28 | | 0.28 | 0.47 | 0.60 | 0.09 | 0.20 | 0.51 | 0.11 | 0.22 | |
| v/c Ratio | 0.40 | 0.66 | | 0.87 | 0.63 | 0.28 | 0.39 | 0.38 | 0.67 | 0.64 | 0.46 | |
| Control Delay | 63.0 | 47.3 | | 49.2 | 40.8 | 6.0 | 54.6 | 44.0 | 40.9 | 68.9 | 45.0 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 63.0 | 47.3 | | 49.2 | 40.8 | 6.0 | 54.6 | 44.0 | 40.9 | 68.9 | 45.0 | |
| LOS | E | D | | D | D | A | D | D | D | E | D | |
| Approach Delay | | 49.3 | | | 39.2 | | | 42.6 | | | 54.6 | |
| Approach LOS | | D | | | D | | | D | | | D | |
| 90th %ile Green (s) | 13.5 | 35.5 | | 37.5 | 59.5 | 13.5 | 12.9 | 24.5 | | 13.5 | 25.1 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 70th %ile Green (s) | 12.0 | 35.5 | | 37.5 | 61.0 | 13.5 | 11.2 | 24.5 | | 13.5 | 26.8 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 50th %ile Green (s) | 10.8 | 35.5 | | 37.5 | 62.2 | 13.5 | 10.0 | 24.5 | | 13.5 | 28.0 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 30th %ile Green (s) | 9.6 | 35.9 | | 37.5 | 63.8 | 13.1 | 8.9 | 24.5 | | 13.1 | 28.7 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | Gap | Gap | Max | | Gap | Hold | |
| 10th %ile Green (s) | 7.8 | 39.4 | | 36.4 | 68.0 | 10.7 | 7.2 | 24.5 | | 10.7 | 28.0 | |
| 10th %ile Term Code | Gap | Coord | | Gap | Coord | Gap | Gap | Max | | Gap | Hold | |
| Stops (vph) | 95 | 661 | | 657 | 884 | 60 | 85 | 189 | 779 | 196 | 196 | |
| Fuel Used(gal) | 3 | 16 | | 20 | 24 | 3 | 2 | 4 | 17 | 6 | 5 | |
| CO Emissions (g/hr) | 176 | 1101 | | 1407 | 1661 | 210 | 144 | 304 | 1222 | 389 | 373 | |
| NOx Emissions (g/hr) | 34 | 214 | | 274 | 323 | 41 | 28 | 59 | 238 | 76 | 73 | |
| VOC Emissions (g/hr) | 41 | 255 | | 326 | 385 | 49 | 33 | 70 | 283 | 90 | 86 | |
| Dilemma Vehicles (#) | 0 | 28 | | 0 | 34 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 58 | 255 | | 352 | 503 | 50 | 50 | 117 | 447 | 103 | 125 | |
| Queue Length 95th (ft) | 80 | 306 | | m412 | m539 | m80 | 68 | 142 | 598 | 148 | 141 | |
| Internal Link Dist (ft) | | 270 | | | 611 | | | 712 | | | 884 | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 388 | 1308 | | 938 | 1591 | 1061 | 370 | 714 | 1473 | 367 | 728 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.34 | 0.66 | | 0.87 | 0.63 | 0.28 | 0.30 | 0.38 | 0.66 | 0.62 | 0.46 | |

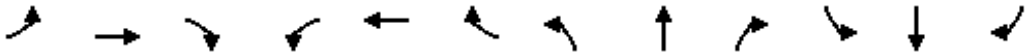
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 116 (83%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.87 | | | |
| Intersection Signal Delay: 43.8 | | Intersection LOS: D | |
| Intersection Capacity Utilization 66.7% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 7: S Royal Oaks/N Royal Oaks & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 1595 | 172 | 103 | 972 | 0 | 0 | 0 | 0 | 329 | 0 | 941 |
| Future Volume (vph) | 0 | 1595 | 172 | 103 | 972 | 0 | 0 | 0 | 0 | 329 | 0 | 941 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 181 | | | | | | | | | 147 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.91 | 0.90 | 0.86 | 0.87 | 1.00 | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 |
| Heavy Vehicles (%) | 2% | 3% | 7% | 1% | 3% | 2% | 2% | 2% | 2% | 6% | 2% | 3% |
| Adj. Flow (vph) | 0 | 1753 | 191 | 120 | 1117 | 0 | 0 | 0 | 0 | 387 | 0 | 1001 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 1753 | 191 | 120 | 1117 | 0 | 0 | 0 | 0 | 387 | 0 | 1001 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



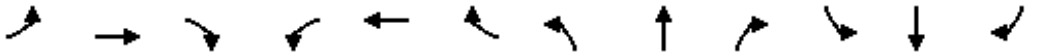
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (%) | | 44.3% | 44.3% | 16.4% | 60.7% | | | | | 39.3% | | 39.3% |
| Maximum Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 60.9 | 60.9 | 15.1 | 81.0 | | | | | 49.5 | | 49.5 |
| Actuated g/C Ratio | | 0.44 | 0.44 | 0.11 | 0.58 | | | | | 0.35 | | 0.35 |
| v/c Ratio | | 0.64 | 0.25 | 0.62 | 0.57 | | | | | 0.33 | | 0.97 |
| Control Delay | | 25.6 | 4.8 | 69.3 | 18.2 | | | | | 34.2 | | 59.3 |
| Queue Delay | | 0.1 | 0.0 | 0.0 | 0.3 | | | | | 1.2 | | 0.0 |
| Total Delay | | 25.7 | 4.8 | 69.3 | 18.5 | | | | | 35.3 | | 59.3 |
| LOS | | C | A | E | B | | | | | D | | E |
| Approach Delay | | 23.6 | | | 23.5 | | | | | | | |
| Approach LOS | | C | | | C | | | | | | | |
| 90th %ile Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| 90th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 70th %ile Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| 70th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 50th %ile Green (s) | | 58.2 | 58.2 | 14.8 | 79.0 | | | | | 47.5 | | 47.5 |
| 50th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| 30th %ile Green (s) | | 60.5 | 60.5 | 12.5 | 79.0 | | | | | 47.5 | | 47.5 |
| 30th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| 10th %ile Green (s) | | 63.7 | 63.7 | 9.3 | 79.0 | | | | | 47.5 | | 47.5 |
| 10th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| Stops (vph) | | 937 | 33 | 103 | 466 | | | | | 235 | | 753 |
| Fuel Used(gal) | | 30 | 2 | 3 | 12 | | | | | 6 | | 21 |
| CO Emissions (g/hr) | | 2126 | 132 | 199 | 828 | | | | | 397 | | 1494 |
| NOx Emissions (g/hr) | | 414 | 26 | 39 | 161 | | | | | 77 | | 291 |
| VOC Emissions (g/hr) | | 493 | 30 | 46 | 192 | | | | | 92 | | 346 |
| Dilemma Vehicles (#) | | 39 | 0 | 0 | 24 | | | | | 0 | | 0 |
| Queue Length 50th (ft) | | 282 | 24 | 116 | 273 | | | | | 132 | | 451 |
| Queue Length 95th (ft) | | 346 | 51 | m156 | m273 | | | | | 164 | | #617 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2759 | 758 | 229 | 1960 | | | | | 1162 | | 1033 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 305 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 150 | 0 | 0 | 0 | | | | | 537 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.67 | 0.25 | 0.52 | 0.67 | | | | | 0.62 | | 0.97 |

Intersection Summary

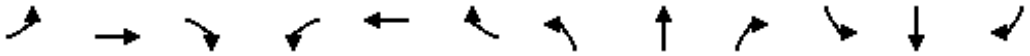
| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 106 (76%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.97 | | | |
| Intersection Signal Delay: 32.4 | | Intersection LOS: C | |
| Intersection Capacity Utilization 100.3% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1233 | 691 | 0 | 0 | 700 | 1127 | 375 | 0 | 337 | 0 | 0 | 0 |
| Future Volume (vph) | 1233 | 691 | 0 | 0 | 700 | 1127 | 375 | 0 | 337 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 23 | | | 289 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 1845 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 31.4 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.88 | 0.86 | 0.95 | 1.00 | 0.95 | 0.98 | 0.95 | 0.25 | 0.92 | 1.00 | 1.00 | 0.95 |
| Heavy Vehicles (%) | 2% | 5% | 2% | 2% | 2% | 1% | 2% | 0% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 1401 | 803 | 0 | 0 | 737 | 1150 | 395 | 0 | 366 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 1401 | 803 | 0 | 0 | 737 | 1150 | 395 | 0 | 366 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (%) | 40.0% | 82.9% | | | 42.9% | | 17.1% | | 17.1% | | | |
| Maximum Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 50.0 | 110.0 | | | 53.5 | 79.5 | 16.5 | | 16.5 | | | |
| Actuated g/C Ratio | 0.36 | 0.79 | | | 0.38 | 0.57 | 0.12 | | 0.12 | | | |
| v/c Ratio | 1.19 | 0.31 | | | 0.55 | 0.72 | 1.02 | | 0.82 | | | |
| Control Delay | 144.4 | 2.7 | | | 35.6 | 24.7 | 109.7 | | 29.7 | | | |
| Queue Delay | 0.3 | 0.1 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 144.7 | 2.8 | | | 35.6 | 24.7 | 109.7 | | 29.7 | | | |
| LOS | F | A | | | D | C | F | | C | | | |
| Approach Delay | | 93.0 | | | 28.9 | | | | | | | |
| Approach LOS | | F | | | C | | | | | | | |
| 90th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 90th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 70th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 70th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 50th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 50th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 30th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 30th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 10th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 10th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| Stops (vph) | 895 | 79 | | | 533 | 785 | 332 | | 80 | | | |
| Fuel Used(gal) | 50 | 4 | | | 19 | 27 | 12 | | 4 | | | |
| CO Emissions (g/hr) | 3474 | 263 | | | 1333 | 1921 | 827 | | 301 | | | |
| NOx Emissions (g/hr) | 676 | 51 | | | 259 | 374 | 161 | | 59 | | | |
| VOC Emissions (g/hr) | 805 | 61 | | | 309 | 445 | 192 | | 70 | | | |
| Dilemma Vehicles (#) | 0 | 18 | | | 25 | 0 | 0 | | 0 | | | |
| Queue Length 50th (ft) | ~756 | 47 | | | 273 | 409 | ~195 | | 66 | | | |
| Queue Length 95th (ft) | #914 | 71 | | | 337 | 502 | #302 | | #225 | | | |
| Internal Link Dist (ft) | | 476 | | | 1765 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1179 | 2598 | | | 1352 | 1607 | 389 | | 446 | | | |
| Starvation Cap Reductn | 67 | 590 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 1.26 | 0.40 | | | 0.55 | 0.72 | 1.02 | | 0.82 | | | |

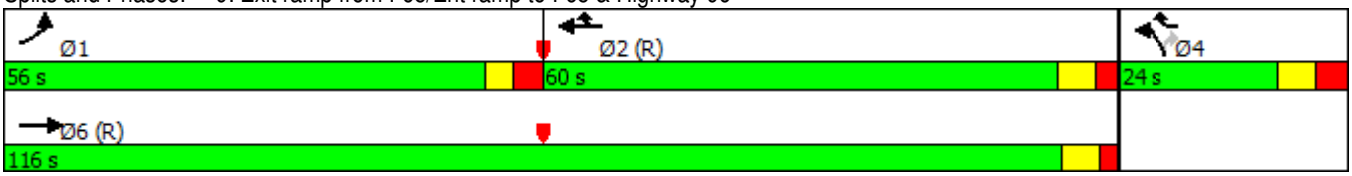
Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 122 (87%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.19 | | | |
| Intersection Signal Delay: 64.7 | | Intersection LOS: E | |
| Intersection Capacity Utilization 100.3% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



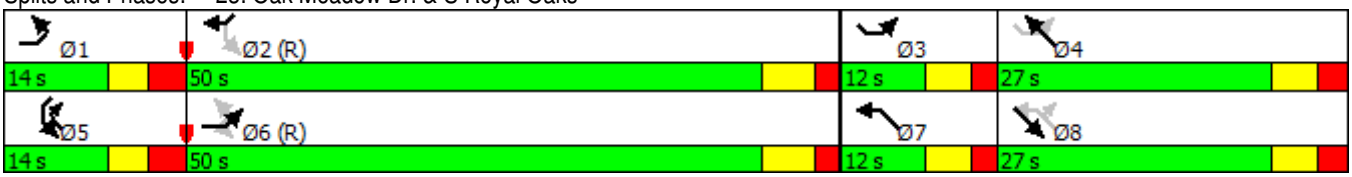
| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 81 | 1037 | 20 | 119 | 4 | 66 | 17 | 14 | 153 | 22 | 477 | 68 |
| Future Volume (vph) | 81 | 1037 | 20 | 119 | 4 | 66 | 17 | 14 | 153 | 22 | 477 | 68 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 3 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | | 0.850 | | 0.861 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.950 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 3319 | 1531 | 1711 | 1550 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.308 | 0.950 | | 0.742 | | | 0.583 | | | 0.208 | | |
| Satd. Flow (perm) | 497 | 3319 | 1531 | 1336 | 1550 | 0 | 1086 | 1925 | 1583 | 387 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 154 | | 90 | | | | 101 | | 154 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 1875 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 42.6 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 121 | 1103 | 32 | 151 | 7 | 90 | 23 | 24 | 166 | 29 | 636 | 99 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 121 | 1103 | 32 | 151 | 97 | 0 | 23 | 24 | 166 | 29 | 735 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 30 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | 42 | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | 45 | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | Perm | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | 6 | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | 20.0 | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 13.0 | 26.0 | 26.0 | 12.5 | 20.0 | | 12.5 | 20.0 | 13.0 | 13.0 | 26.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 14.0 | 50.0 | 50.0 | 12.0 | 27.0 | | 12.0 | 27.0 | 14.0 | 14.0 | 50.0 | |
| Total Split (%) | 13.6% | 48.5% | 48.5% | 11.7% | 26.2% | | 11.7% | 26.2% | 13.6% | 13.6% | 48.5% | |
| Maximum Green (s) | 8.0 | 44.0 | 44.0 | 6.5 | 21.0 | | 6.5 | 21.0 | 8.0 | 8.0 | 44.0 | |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | -1.5 | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | 4.5 | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | 5.0 | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | C-Min | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 77.4 | 66.6 | 66.6 | 14.7 | 10.8 | | 14.7 | 10.8 | 21.2 | 76.9 | 66.4 | |
| Actuated g/C Ratio | 0.75 | 0.65 | 0.65 | 0.14 | 0.10 | | 0.14 | 0.10 | 0.21 | 0.75 | 0.64 | |
| v/c Ratio | 0.26 | 0.51 | 0.03 | 0.67 | 0.40 | | 0.11 | 0.12 | 0.41 | 0.07 | 0.40 | |
| Control Delay | 5.3 | 12.0 | 0.1 | 54.1 | 15.7 | | 34.1 | 42.2 | 16.9 | 4.5 | 8.6 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 5.3 | 12.0 | 0.1 | 54.1 | 15.7 | | 34.1 | 42.2 | 16.9 | 4.5 | 8.6 | |
| LOS | A | B | A | D | B | | C | D | B | A | A | |
| Approach Delay | | 11.1 | | | 39.0 | | | 21.6 | | 8.4 | | |
| Approach LOS | | B | | | D | | | C | | A | | |
| 90th %ile Green (s) | 8.0 | 54.3 | 54.3 | 6.5 | 11.7 | | 6.5 | 11.7 | 7.0 | 7.0 | 53.3 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Min | Min | Coord | |
| 70th %ile Green (s) | 7.3 | 57.4 | 57.4 | 6.5 | 8.6 | | 6.5 | 8.6 | 7.0 | 7.0 | 57.1 | |
| 70th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Min | Min | Coord | |
| 50th %ile Green (s) | 7.0 | 71.0 | 71.0 | 7.5 | 7.0 | | 0.0 | 0.0 | 7.0 | 7.0 | 71.0 | |
| 50th %ile Term Code | Min | Coord | Coord | Hold | Min | | Skip | Skip | Min | Min | Coord | |
| 30th %ile Green (s) | 7.0 | 71.0 | 71.0 | 7.5 | 7.0 | | 0.0 | 0.0 | 7.0 | 7.0 | 71.0 | |
| 30th %ile Term Code | Min | Coord | Coord | Hold | Min | | Skip | Skip | Min | Min | Coord | |
| 10th %ile Green (s) | 7.0 | 72.0 | 72.0 | 6.5 | 0.0 | | 0.0 | 0.0 | 7.0 | 7.0 | 72.0 | |
| 10th %ile Term Code | Min | Coord | Coord | Max | Skip | | Skip | Skip | Min | Min | Coord | |
| Stops (vph) | 21 | 538 | 0 | 110 | 17 | | 15 | 14 | 53 | 7 | 205 | |
| Fuel Used(gal) | 1 | 21 | 0 | 2 | 1 | | 0 | 0 | 2 | 0 | 9 | |
| CO Emissions (g/hr) | 97 | 1445 | 20 | 172 | 50 | | 26 | 24 | 140 | 24 | 628 | |
| NOx Emissions (g/hr) | 19 | 281 | 4 | 33 | 10 | | 5 | 5 | 27 | 5 | 122 | |
| VOC Emissions (g/hr) | 22 | 335 | 5 | 40 | 12 | | 6 | 6 | 32 | 5 | 146 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 1 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 10 | 145 | 0 | 100 | 4 | | 14 | 15 | 35 | 2 | 71 | |
| Queue Length 95th (ft) | 32 | 308 | 0 | 120 | 13 | | 27 | 25 | 88 | 12 | 130 | |
| Internal Link Dist (ft) | | 1795 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | 150 | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 482 | 2147 | 1044 | 224 | 423 | | 214 | 439 | 420 | 433 | 1850 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.25 | 0.51 | 0.03 | 0.67 | 0.23 | | 0.11 | 0.05 | 0.40 | 0.07 | 0.40 | |

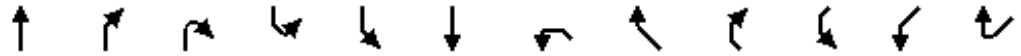
| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 103 | |

| | |
|---|---|
| Actuated Cycle Length: 103 | |
| Offset: 0 (0%), Referenced to phase 2:SWL and 6:EBL, Start of Green | |
| Natural Cycle: 75 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.67 | |
| Intersection Signal Delay: 13.9 | Intersection LOS: B |
| Intersection Capacity Utilization 59.1% | ICU Level of Service B |
| Analysis Period (min) 15 | |

Splits and Phases: 23: Oak Meadow Dr. & S Royal Oaks



| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 26 | 1100 | 95 | 6 | 43 | 38 | 31 | 11 | 89 | 247 | 669 | 23 |
| Future Volume (vph) | 26 | 1100 | 95 | 6 | 43 | 38 | 31 | 11 | 89 | 247 | 669 | 23 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | 1% | | | | | -1% | 2% | | | | -2% | |
| Storage Length (ft) | | 135 | | | 100 | | 120 | 0 | | | 220 | 0 |
| Storage Lanes | | 3 | | | 1 | | 1 | 1 | | | 2 | 0 |
| Taper Length (ft) | | | | | 50 | | 50 | | | | 50 | |
| Lane Util. Factor | 1.00 | 0.88 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 0.95 |
| Frt | | 0.850 | 0.850 | | | | | 0.850 | | | 0.993 | |
| Flt Protected | | | | 0.950 | 0.950 | | 0.950 | | | 0.950 | 0.955 | |
| Satd. Flow (prot) | 1764 | 2707 | 1607 | 1754 | 1580 | 0 | 1787 | 1486 | 0 | 1787 | 3343 | 0 |
| Flt Permitted | 0.386 | | | 0.461 | 0.950 | | 0.712 | | | 0.162 | 0.955 | |
| Satd. Flow (perm) | 681 | 2707 | 1607 | 851 | 1580 | 0 | 1339 | 1486 | 0 | 305 | 3343 | 0 |
| Right Turn on Red | | | Yes | | | | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 82 | | | | | 103 | | | 82 | |
| Link Speed (mph) | 30 | | | | | 30 | 30 | | | | 30 | |
| Link Distance (ft) | 1624 | | | | | 433 | 515 | | | | 792 | |
| Travel Time (s) | 36.9 | | | | | 9.8 | 11.7 | | | | 18.0 | |
| Peak Hour Factor | 0.63 | 0.92 | 0.87 | 0.58 | 0.68 | 0.77 | 0.67 | 0.63 | 0.86 | 0.80 | 0.99 | 0.67 |
| Heavy Vehicles (%) | 0% | 1% | 0% | 0% | 11% | 0% | 0% | 10% | 3% | 2% | 2% | 4% |
| Adj. Flow (vph) | 41 | 1196 | 109 | 10 | 63 | 49 | 46 | 17 | 103 | 309 | 676 | 34 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 41 | 1196 | 109 | 10 | 63 | 49 | 46 | 120 | 0 | 309 | 710 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Right | Left | Left | Left | Left | Right | Right | Left | Left | Right |
| Median Width(ft) | 22 | | | | | 22 | 12 | | | | 35 | |
| Link Offset(ft) | 0 | | | | | 0 | 0 | | | | 0 | |
| Crosswalk Width(ft) | 16 | | | | | 16 | 16 | | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 | 0.99 | 1.03 | 0.99 |
| Turning Speed (mph) | | 9 | 9 | 15 | 15 | | 15 | 9 | 9 | 15 | 15 | 9 |
| Number of Detectors | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | 0 | 42 | 42 | 50 | 42 | 42 | | 42 | 226 | |
| Trailing Detector (ft) | -3 | 220 | 0 | -3 | -3 | 0 | -3 | -3 | | -3 | 220 | |
| Detector 1 Position(ft) | -3 | 220 | 0 | -3 | -3 | 0 | -3 | -3 | | -3 | 220 | |
| Detector 1 Size(ft) | 45 | 6 | 50 | 45 | 45 | 50 | 45 | 45 | | 45 | 6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | NA | custom | custom | custom | Prot | NA | D.Pm | Prot | | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | | 4 | | | 8 | | 5 | 2 | |
| Permitted Phases | 6 | | 6 | 8 | | | 4 | | | 2 | | |
| Detector Phase | 1 | 6 | | 8 | 4 | | 4 | 8 | | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |



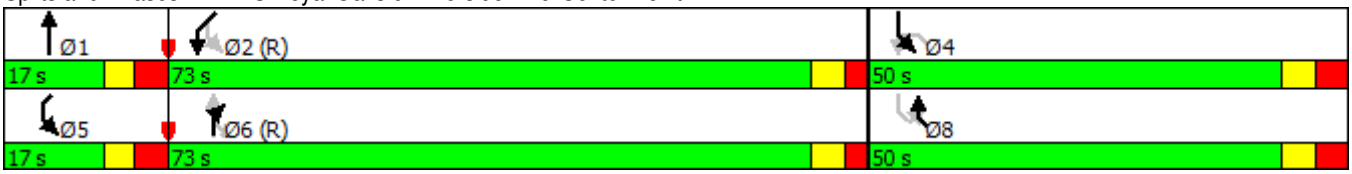
| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 7.0 | 7.0 | | 7.0 | 7.0 | | 5.0 | 10.0 | |
| Minimum Split (s) | 17.0 | 73.0 | 73.0 | 50.0 | 50.0 | | 50.0 | 50.0 | | 17.0 | 73.0 | |
| Total Split (s) | 17.0 | 73.0 | 73.0 | 50.0 | 50.0 | | 50.0 | 50.0 | | 17.0 | 73.0 | |
| Total Split (%) | 12.1% | 52.1% | 52.1% | 35.7% | 35.7% | | 35.7% | 35.7% | | 12.1% | 52.1% | |
| Maximum Green (s) | 10.5 | 67.0 | 67.0 | 43.0 | 43.0 | | 43.0 | 43.0 | | 10.5 | 67.0 | |
| Yellow Time (s) | 3.0 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | 2.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 2.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | -3.0 | -2.5 | -2.5 | | -2.5 | -2.5 | | -1.0 | -3.0 | |
| Total Lost Time (s) | 5.5 | 3.0 | 3.0 | 4.5 | 4.5 | | 4.5 | 4.5 | | 5.5 | 3.0 | |
| Lead/Lag | Lead | Lag | Lag | | | | | | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Recall Mode | None | C-Min | C-Min | None | None | | None | None | | None | C-Min | |
| Walk Time (s) | | 7.0 | 7.0 | 8.0 | 8.0 | | 8.0 | 8.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 16.0 | 16.0 | 35.0 | 32.0 | | 32.0 | 35.0 | | | 20.0 | |
| Pedestrian Calls (#/hr) | | 0 | 0 | 0 | 0 | | 0 | 0 | | | 0 | |
| Act Effct Green (s) | 106.6 | 101.5 | 101.5 | 14.0 | 14.0 | 0.0 | 14.0 | 14.0 | | 114.6 | 107.9 | |
| Actuated g/C Ratio | 0.76 | 0.72 | 0.72 | 0.10 | 0.10 | 0.00 | 0.10 | 0.10 | | 0.82 | 0.77 | |
| v/c Ratio | 0.07 | 0.61 | 0.09 | 0.12 | 0.40 | no cap | 0.35 | 0.50 | | 0.83 | 0.27 | |
| Control Delay | 3.1 | 11.5 | 2.3 | 58.5 | 65.7 | | 64.7 | 21.5 | | 44.1 | 5.6 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 3.1 | 11.5 | 2.3 | 58.5 | 65.7 | Error | 64.7 | 21.5 | | 44.1 | 5.6 | |
| LOS | A | B | A | E | E | F | E | C | | D | A | |
| Approach Delay | 10.5 | | | | | Err | 33.4 | | | | 17.3 | |
| Approach LOS | B | | | | | F | C | | | | B | |
| 90th %ile Green (s) | 7.4 | 93.9 | 93.9 | 16.1 | 16.1 | | 16.1 | 16.1 | | 10.5 | 97.0 | |
| 90th %ile Term Code | Gap | Coord | Coord | Hold | Gap | | Gap | Hold | | Max | Coord | |
| 70th %ile Green (s) | 6.8 | 96.7 | 96.7 | 13.3 | 13.3 | | 13.3 | 13.3 | | 10.5 | 100.4 | |
| 70th %ile Term Code | Gap | Coord | Coord | Hold | Gap | | Gap | Hold | | Max | Coord | |
| 50th %ile Green (s) | 6.5 | 98.6 | 98.6 | 11.4 | 11.4 | | 11.4 | 11.4 | | 10.5 | 102.6 | |
| 50th %ile Term Code | Gap | Coord | Coord | Hold | Gap | | Gap | Hold | | Max | Coord | |
| 30th %ile Green (s) | 6.3 | 100.4 | 100.4 | 9.6 | 9.6 | | 9.6 | 9.6 | | 10.5 | 104.6 | |
| 30th %ile Term Code | Gap | Coord | Coord | Hold | Gap | | Gap | Hold | | Max | Coord | |
| 10th %ile Green (s) | 0.0 | 103.0 | 103.0 | 7.0 | 7.0 | | 7.0 | 7.0 | | 10.5 | 120.0 | |
| 10th %ile Term Code | Skip | Coord | Coord | Min | Hold | | Hold | Min | | Max | Coord | |
| Stops (vph) | 6 | 524 | 9 | 6 | 40 | 0 | 28 | 23 | | 190 | 252 | |
| Fuel Used(gal) | 0 | 19 | 1 | 0 | 1 | 0 | 1 | 1 | | 5 | 6 | |
| CO Emissions (g/hr) | 26 | 1357 | 91 | 9 | 66 | 9 | 48 | 67 | | 335 | 451 | |
| NOx Emissions (g/hr) | 5 | 264 | 18 | 2 | 13 | 2 | 9 | 13 | | 65 | 88 | |
| VOC Emissions (g/hr) | 6 | 314 | 21 | 2 | 15 | 2 | 11 | 16 | | 78 | 105 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 5 | 273 | 6 | 8 | 55 | 0 | 40 | 14 | | 135 | 59 | |
| Queue Length 95th (ft) | 10 | 386 | 24 | 17 | 75 | 0 | 58 | 25 | | m#142 | m246 | |
| Internal Link Dist (ft) | 1544 | | | | | 353 | 435 | | | | 712 | |
| Turn Bay Length (ft) | | 135 | 135 | 100 | 100 | | 120 | | | 220 | 220 | |
| Base Capacity (vph) | 626 | 1962 | 1187 | 276 | 513 | 1 | 435 | 552 | | 371 | 2595 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |

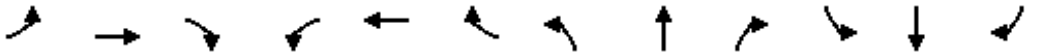
| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.07 | 0.61 | 0.09 | 0.04 | 0.12 | 49.00 | 0.11 | 0.22 | | 0.83 | 0.27 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 139 (99%), Referenced to phase 2:SWL and 6:NBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: Err | | | |
| Intersection Signal Delay: Err | | Intersection LOS: F | |
| Intersection Capacity Utilization Err% | | ICU Level of Service H | |
| Analysis Period (min) 15 | | | |

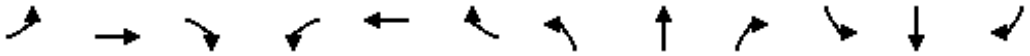
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 24: S Royal Oaks & Riverside Dr & Center Point Pl





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 191 | 1026 | 58 | 832 | 1087 | 249 | 131 | 315 | 873 | 293 | 394 | 165 |
| Future Volume (vph) | 191 | 1026 | 58 | 832 | 1087 | 249 | 131 | 315 | 873 | 293 | 394 | 165 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.991 | | | | 0.850 | | | 0.850 | | 0.950 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3315 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3315 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 7 | | | | 106 | | | | | 51 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 350 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 6.0 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.92 | 0.93 | 0.81 | 0.87 | 0.91 | 0.89 | 0.74 | 0.83 | 0.89 | 0.83 | 0.95 | 0.80 |
| Heavy Vehicles (%) | 1% | 1% | 0% | 1% | 2% | 1% | 0% | 0% | 1% | 0% | 0% | 0% |
| Adj. Flow (vph) | 208 | 1103 | 72 | 956 | 1195 | 280 | 177 | 380 | 981 | 353 | 415 | 206 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 208 | 1175 | 0 | 956 | 1195 | 280 | 177 | 380 | 981 | 353 | 621 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

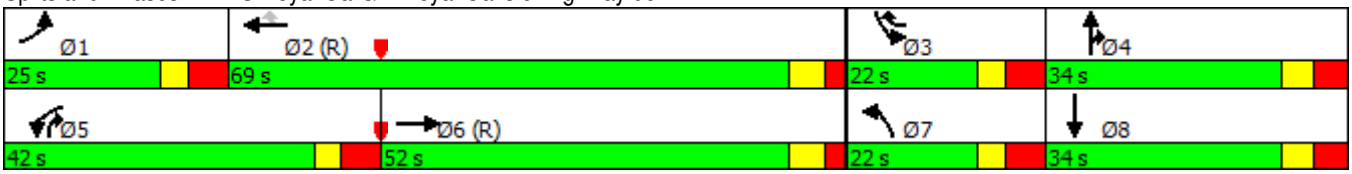


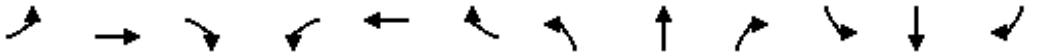
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (%) | 16.7% | 34.7% | | 28.0% | 46.0% | 14.7% | 14.7% | 22.7% | | 14.7% | 22.7% | |
| Maximum Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 16.7 | 48.0 | | 37.0 | 68.3 | 88.8 | 14.5 | 29.5 | 71.0 | 16.5 | 31.5 | |
| Actuated g/C Ratio | 0.11 | 0.32 | | 0.25 | 0.46 | 0.59 | 0.10 | 0.20 | 0.47 | 0.11 | 0.21 | |
| v/c Ratio | 0.54 | 0.74 | | 1.16 | 0.74 | 0.27 | 0.53 | 0.52 | 0.72 | 0.95 | 0.84 | |
| Control Delay | 68.0 | 48.7 | | 119.7 | 46.5 | 14.5 | 60.0 | 50.1 | 46.5 | 100.9 | 63.9 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 68.0 | 48.7 | | 119.7 | 46.5 | 14.5 | 60.0 | 50.1 | 46.5 | 100.9 | 63.9 | |
| LOS | E | D | | F | D | B | E | D | D | F | E | |
| Approach Delay | | 51.6 | | | 71.6 | | | 49.0 | | | 77.3 | |
| Approach LOS | | D | | | E | | | D | | | E | |
| 90th %ile Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | Max | Max | Max | | Max | Max | |
| 70th %ile Green (s) | 15.9 | 45.5 | | 34.5 | 64.1 | 14.5 | 14.4 | 26.5 | | 14.5 | 26.6 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 50th %ile Green (s) | 14.4 | 45.5 | | 34.5 | 65.6 | 14.5 | 12.9 | 26.5 | | 14.5 | 28.1 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 30th %ile Green (s) | 12.8 | 45.5 | | 34.5 | 67.2 | 14.5 | 11.5 | 26.5 | | 14.5 | 29.5 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 10th %ile Green (s) | 10.5 | 45.5 | | 34.5 | 69.5 | 14.5 | 9.4 | 26.5 | | 14.5 | 31.6 | |
| 10th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| Stops (vph) | 176 | 942 | | 714 | 982 | 166 | 122 | 276 | 771 | 266 | 474 | |
| Fuel Used(gal) | 5 | 23 | | 34 | 29 | 4 | 3 | 7 | 18 | 10 | 14 | |
| CO Emissions (g/hr) | 337 | 1578 | | 2378 | 2008 | 306 | 216 | 467 | 1253 | 677 | 985 | |
| NOx Emissions (g/hr) | 66 | 307 | | 463 | 391 | 60 | 42 | 91 | 244 | 132 | 192 | |
| VOC Emissions (g/hr) | 78 | 366 | | 551 | 465 | 71 | 50 | 108 | 290 | 157 | 228 | |
| Dilemma Vehicles (#) | 0 | 36 | | 0 | 37 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 100 | 374 | | ~580 | 551 | 113 | 87 | 175 | 539 | 179 | 287 | |
| Queue Length 95th (ft) | 141 | 431 | | m#499 | m492 | m120 | m92 | m211 | m623 | #242 | #398 | |
| Internal Link Dist (ft) | | 270 | | | 611 | | | 712 | | | 884 | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 462 | 1580 | | 826 | 1610 | 1021 | 383 | 730 | 1369 | 372 | 735 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.45 | 0.74 | | 1.16 | 0.74 | 0.27 | 0.46 | 0.52 | 0.72 | 0.95 | 0.84 | |

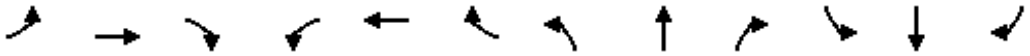
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 133 (89%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.16 | | | |
| Intersection Signal Delay: 62.6 | | Intersection LOS: E | |
| Intersection Capacity Utilization 81.9% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |
| ~ Volume exceeds capacity, queue is theoretically infinite. | | | |
| Queue shown is maximum after two cycles. | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | |
| Queue shown is maximum after two cycles. | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 7: S Royal Oaks/N Royal Oaks & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 1807 | 446 | 264 | 834 | 0 | 0 | 0 | 0 | 846 | 0 | 1293 |
| Future Volume (vph) | 0 | 1807 | 446 | 264 | 834 | 0 | 0 | 0 | 0 | 846 | 0 | 1293 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 405 | | | | | | | | | 177 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.93 | 0.78 | 0.71 | 0.86 | 1.00 | 1.00 | 1.00 | 1.00 | 0.87 | 1.00 | 0.88 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 1% | 1% | 2% | 2% | 2% | 2% | 1% | 2% | 1% |
| Adj. Flow (vph) | 0 | 1943 | 572 | 372 | 970 | 0 | 0 | 0 | 0 | 972 | 0 | 1469 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 1943 | 572 | 372 | 970 | 0 | 0 | 0 | 0 | 972 | 0 | 1469 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (%) | | 36.7% | 36.7% | 20.0% | 56.7% | | | | | 43.3% | | 43.3% |
| Maximum Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 51.0 | 51.0 | 25.0 | 81.0 | | | | | 59.5 | | 59.5 |
| Actuated g/C Ratio | | 0.34 | 0.34 | 0.17 | 0.54 | | | | | 0.40 | | 0.40 |
| v/c Ratio | | 0.89 | 0.71 | 1.25 | 0.52 | | | | | 0.71 | | 1.24 |
| Control Delay | | 63.5 | 27.3 | 190.8 | 21.8 | | | | | 41.5 | | 151.8 |
| Queue Delay | | 0.0 | 0.0 | 0.0 | 0.3 | | | | | 0.2 | | 0.0 |
| Total Delay | | 63.5 | 27.3 | 190.8 | 22.1 | | | | | 41.8 | | 151.8 |
| LOS | | E | C | F | C | | | | | D | | F |
| Approach Delay | | 55.3 | | | 68.9 | | | | | | | |
| Approach LOS | | E | | | E | | | | | | | |
| 90th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 90th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 70th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 70th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 50th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 50th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 30th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 30th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 10th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 10th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| Stops (vph) | | 1680 | 414 | 205 | 393 | | | | | 695 | | 956 |
| Fuel Used(gal) | | 54 | 10 | 13 | 11 | | | | | 16 | | 53 |
| CO Emissions (g/hr) | | 3808 | 710 | 927 | 748 | | | | | 1134 | | 3733 |
| NOx Emissions (g/hr) | | 741 | 138 | 180 | 146 | | | | | 221 | | 726 |
| VOC Emissions (g/hr) | | 882 | 164 | 215 | 173 | | | | | 263 | | 865 |
| Dilemma Vehicles (#) | | 109 | 0 | 0 | 34 | | | | | 0 | | 0 |
| Queue Length 50th (ft) | | 564 | 279 | ~464 | 239 | | | | | 409 | | ~953 |
| Queue Length 95th (ft) | | m612 | 265 | #465 | 337 | | | | | 465 | | #1065 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2178 | 805 | 297 | 1865 | | | | | 1368 | | 1180 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 353 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 57 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.89 | 0.71 | 1.25 | 0.64 | | | | | 0.74 | | 1.24 |

Intersection Summary

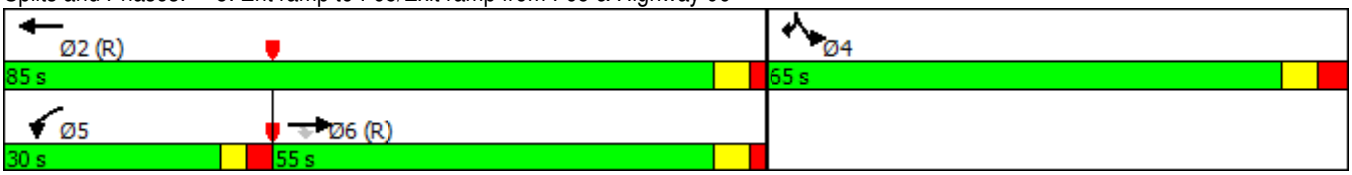
| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 104 (69%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.25 | | | |
| Intersection Signal Delay: 78.6 | | Intersection LOS: E | |
| Intersection Capacity Utilization 79.1% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

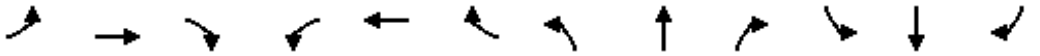
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

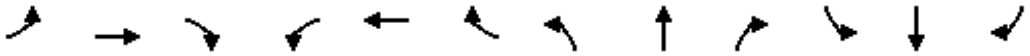
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 538 | 2115 | 0 | 0 | 814 | 924 | 284 | 0 | 152 | 0 | 0 | 0 |
| Future Volume (vph) | 538 | 2115 | 0 | 0 | 814 | 924 | 284 | 0 | 152 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 301 | | | 69 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 1845 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 31.4 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.97 | 0.98 | 1.00 | 0.25 | 0.91 | 0.93 | 0.92 | 1.00 | 0.87 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 3% | 3% | 2% | 0% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 2% |
| Adj. Flow (vph) | 555 | 2158 | 0 | 0 | 895 | 994 | 309 | 0 | 175 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 555 | 2158 | 0 | 0 | 895 | 994 | 309 | 0 | 175 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |

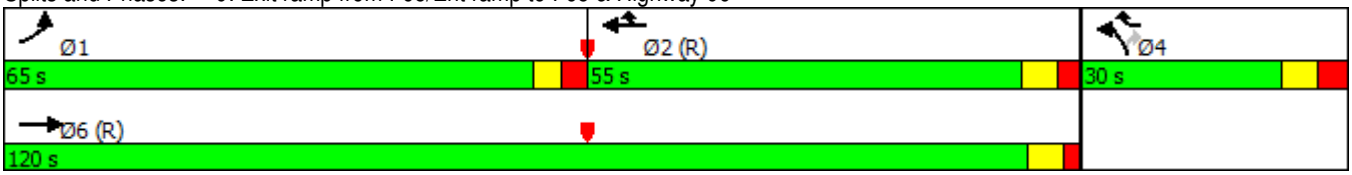


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (%) | 43.3% | 80.0% | | | 36.7% | | 20.0% | | 20.0% | | | |
| Maximum Green (s) | 59.0 | 114.0 | | | 48.5 | | 22.5 | | 22.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 33.1 | 115.2 | | | 75.6 | 106.4 | 21.3 | | 21.3 | | | |
| Actuated g/C Ratio | 0.22 | 0.77 | | | 0.50 | 0.71 | 0.14 | | 0.14 | | | |
| v/c Ratio | 0.77 | 0.83 | | | 0.50 | 0.48 | 0.66 | | 0.61 | | | |
| Control Delay | 78.3 | 19.8 | | | 27.0 | 7.5 | 68.0 | | 45.7 | | | |
| Queue Delay | 0.0 | 1.5 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 78.3 | 21.3 | | | 27.0 | 7.5 | 68.0 | | 45.7 | | | |
| LOS | E | C | | | C | A | E | | D | | | |
| Approach Delay | | 33.0 | | | 16.8 | | | | | | | |
| Approach LOS | | C | | | B | | | | | | | |
| 90th %ile Green (s) | 40.9 | 114.0 | | | 66.6 | | 22.5 | | 22.5 | | | |
| 90th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 70th %ile Green (s) | 36.1 | 114.0 | | | 71.4 | | 22.5 | | 22.5 | | | |
| 70th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 50th %ile Green (s) | 33.3 | 114.0 | | | 74.2 | | 22.5 | | 22.5 | | | |
| 50th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 30th %ile Green (s) | 29.6 | 114.7 | | | 78.6 | | 21.8 | | 21.8 | | | |
| 30th %ile Term Code | Gap | Coord | | | Coord | | Gap | | Gap | | | |
| 10th %ile Green (s) | 25.4 | 119.3 | | | 87.4 | | 17.2 | | 17.2 | | | |
| 10th %ile Term Code | Gap | Coord | | | Coord | | Gap | | Gap | | | |
| Stops (vph) | 537 | 1522 | | | 532 | 278 | 266 | | 86 | | | |
| Fuel Used(gal) | 16 | 31 | | | 20 | 16 | 7 | | 3 | | | |
| CO Emissions (g/hr) | 1110 | 2200 | | | 1390 | 1099 | 462 | | 184 | | | |
| NOx Emissions (g/hr) | 216 | 428 | | | 270 | 214 | 90 | | 36 | | | |
| VOC Emissions (g/hr) | 257 | 510 | | | 322 | 255 | 107 | | 43 | | | |
| Dilemma Vehicles (#) | 0 | 77 | | | 27 | 0 | 0 | | 0 | | | |
| Queue Length 50th (ft) | 297 | 362 | | | 305 | 150 | 148 | | 97 | | | |
| Queue Length 95th (ft) | m341 | 368 | | | 406 | 234 | 201 | | 172 | | | |
| Internal Link Dist (ft) | | 476 | | | 1765 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1286 | 2588 | | | 1784 | 2085 | 495 | | 298 | | | |
| Starvation Cap Reductn | 0 | 244 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 0.43 | 0.92 | | | 0.50 | 0.48 | 0.62 | | 0.59 | | | |

Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 138 (92%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.83 | | | |
| Intersection Signal Delay: 29.5 | | Intersection LOS: C | |
| Intersection Capacity Utilization 79.1% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 85 | 766 | 13 | 136 | 35 | 109 | 77 | 22 | 69 | 118 | 708 | 134 |
| Future Volume (vph) | 85 | 766 | 13 | 136 | 35 | 109 | 77 | 22 | 69 | 118 | 708 | 134 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 3 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | | 0.850 | | 0.893 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.950 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 3319 | 1531 | 1711 | 1608 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.127 | 0.950 | | 0.732 | | | 0.317 | | | 0.295 | | |
| Satd. Flow (perm) | 205 | 3319 | 1531 | 1318 | 1608 | 0 | 590 | 1925 | 1583 | 550 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 132 | | 101 | | | | 77 | | 132 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 552 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 12.5 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 127 | 815 | 21 | 172 | 60 | 149 | 103 | 38 | 75 | 157 | 944 | 194 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 127 | 815 | 21 | 172 | 209 | 0 | 103 | 38 | 75 | 157 | 1138 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 30 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | 42 | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | 45 | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | Perm | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | 6 | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | 20.0 | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 18.0 | 57.0 | 57.0 | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 18.0 | 57.0 | 57.0 | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |
| Total Split (%) | 15.0% | 47.5% | 47.5% | 11.7% | 29.2% | | 11.7% | 29.2% | 11.7% | 11.7% | 44.2% | |
| Maximum Green (s) | 12.0 | 51.0 | 51.0 | 8.5 | 29.0 | | 8.5 | 29.0 | 8.0 | 8.0 | 47.0 | |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | -1.5 | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | 4.5 | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | 5.0 | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | C-Min | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 80.6 | 67.8 | 67.8 | 29.4 | 17.1 | | 28.2 | 16.3 | 30.6 | 76.7 | 65.7 | |
| Actuated g/C Ratio | 0.67 | 0.56 | 0.56 | 0.24 | 0.14 | | 0.24 | 0.14 | 0.26 | 0.64 | 0.55 | |
| v/c Ratio | 0.47 | 0.43 | 0.02 | 0.46 | 0.66 | | 0.42 | 0.15 | 0.16 | 0.35 | 0.72 | |
| Control Delay | 13.5 | 17.0 | 0.1 | 39.6 | 34.2 | | 38.6 | 43.7 | 7.1 | 10.0 | 22.5 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 13.5 | 17.0 | 0.1 | 39.6 | 34.2 | | 38.6 | 43.7 | 7.1 | 10.0 | 22.5 | |
| LOS | B | B | A | D | C | | D | D | A | A | C | |
| Approach Delay | | 16.2 | | | 36.6 | | | 28.6 | | 20.9 | | |
| Approach LOS | | B | | | D | | | C | | C | | |
| 90th %ile Green (s) | 12.0 | 57.5 | 57.5 | 8.5 | 22.5 | | 8.5 | 22.5 | 8.0 | 8.0 | 53.5 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 70th %ile Green (s) | 12.0 | 62.2 | 62.2 | 8.5 | 17.8 | | 8.5 | 17.8 | 8.0 | 8.0 | 58.2 | |
| 70th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 50th %ile Green (s) | 9.6 | 65.9 | 65.9 | 8.5 | 14.5 | | 8.5 | 14.5 | 7.6 | 7.6 | 63.9 | |
| 50th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Gap | Gap | Coord | |
| 30th %ile Green (s) | 7.2 | 70.2 | 70.2 | 25.3 | 11.2 | | 8.1 | 0.0 | 7.0 | 7.0 | 70.0 | |
| 30th %ile Term Code | Gap | Coord | Coord | Hold | Gap | | Gap | Skip | Min | Min | Coord | |
| 10th %ile Green (s) | 7.0 | 75.5 | 75.5 | 20.0 | 7.0 | | 7.0 | 0.0 | 7.0 | 7.0 | 75.5 | |
| 10th %ile Term Code | Min | Coord | Coord | Hold | Min | | Min | Skip | Min | Min | Coord | |
| Stops (vph) | 29 | 432 | 0 | 111 | 70 | | 58 | 19 | 10 | 45 | 563 | |
| Fuel Used(gal) | 1 | 8 | 0 | 2 | 2 | | 2 | 1 | 1 | 2 | 18 | |
| CO Emissions (g/hr) | 53 | 583 | 4 | 165 | 151 | | 116 | 36 | 44 | 139 | 1232 | |
| NOx Emissions (g/hr) | 10 | 113 | 1 | 32 | 29 | | 23 | 7 | 9 | 27 | 240 | |
| VOC Emissions (g/hr) | 12 | 135 | 1 | 38 | 35 | | 27 | 8 | 10 | 32 | 285 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 1 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 31 | 180 | 0 | 109 | 79 | | 63 | 26 | 0 | 38 | 321 | |
| Queue Length 95th (ft) | 47 | 268 | 0 | 137 | 63 | | 82 | 35 | 33 | 64 | 356 | |
| Internal Link Dist (ft) | | 472 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | 150 | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 301 | 1874 | 921 | 377 | 496 | | 248 | 505 | 467 | 460 | 1585 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.42 | 0.43 | 0.02 | 0.46 | 0.42 | | 0.42 | 0.08 | 0.16 | 0.34 | 0.72 | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 120 | |

| | |
|---|---|
| Actuated Cycle Length: 120 | |
| Offset: 117 (98%), Referenced to phase 2:SWL and 6:EBL, Start of Green | |
| Natural Cycle: 120 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.72 | |
| Intersection Signal Delay: 22.0 | Intersection LOS: C |
| Intersection Capacity Utilization 56.5% | ICU Level of Service B |
| Analysis Period (min) 15 | |

Splits and Phases: 23: Oak Meadow Dr. & S Royal Oaks

| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 83 | 955 | 25 | 77 | 59 | 114 | 43 | 54 | 267 | 215 | 964 | 86 |
| Future Volume (vph) | 83 | 955 | 25 | 77 | 59 | 114 | 43 | 54 | 267 | 215 | 964 | 86 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | 1% | | | | | -1% | 2% | | | | -2% | |
| Storage Length (ft) | | 135 | | | 100 | | 120 | 0 | | | 220 | 0 |
| Storage Lanes | | 3 | | | 1 | | 1 | 1 | | | 2 | 0 |
| Taper Length (ft) | | | | | 50 | | 50 | | | | 50 | |
| Lane Util. Factor | 1.00 | 0.88 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 0.95 |
| Frt | | 0.850 | 0.850 | | | | | 0.850 | | | 0.986 | |
| Flt Protected | | | | 0.950 | 0.950 | | 0.950 | | | 0.950 | 0.957 | |
| Satd. Flow (prot) | 1764 | 2707 | 1575 | 1736 | 1754 | 0 | 1752 | 1546 | 0 | 1805 | 3365 | 0 |
| Flt Permitted | 0.202 | | | 0.147 | 0.950 | | 0.677 | | | 0.171 | 0.957 | |
| Satd. Flow (perm) | 356 | 2707 | 1575 | 269 | 1754 | 0 | 1248 | 1546 | 0 | 325 | 3365 | 0 |
| Right Turn on Red | | | Yes | | | | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 124 | | | | | 159 | | | 76 | |
| Link Speed (mph) | 30 | | | | | 30 | 30 | | | | 30 | |
| Link Distance (ft) | 1624 | | | | | 433 | 515 | | | | 792 | |
| Travel Time (s) | 36.9 | | | | | 9.8 | 11.7 | | | | 18.0 | |
| Peak Hour Factor | 0.79 | 0.95 | 0.64 | 0.86 | 0.71 | 0.82 | 0.75 | 0.88 | 0.94 | 0.75 | 0.90 | 0.76 |
| Heavy Vehicles (%) | 0% | 1% | 2% | 1% | 0% | 0% | 2% | 0% | 0% | 1% | 1% | 0% |
| Adj. Flow (vph) | 105 | 1005 | 39 | 90 | 83 | 139 | 57 | 61 | 284 | 287 | 1071 | 113 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 105 | 1005 | 39 | 90 | 83 | 139 | 57 | 345 | 0 | 287 | 1184 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Right | Left | Left | Left | Left | Right | Right | Left | Left | Right |
| Median Width(ft) | 22 | | | | | 22 | 12 | | | | 35 | |
| Link Offset(ft) | 0 | | | | | 0 | 0 | | | | 0 | |
| Crosswalk Width(ft) | 16 | | | | | 16 | 16 | | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 | 0.99 | 1.03 | 0.99 |
| Turning Speed (mph) | | 9 | 9 | 15 | 15 | | 15 | 9 | 9 | 15 | 15 | 9 |
| Number of Detectors | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | 0 | 42 | 42 | 50 | 42 | 42 | | 42 | 226 | |
| Trailing Detector (ft) | -3 | 220 | 0 | -3 | -3 | 0 | -3 | -3 | | -3 | 220 | |
| Detector 1 Position(ft) | -3 | 220 | 0 | -3 | -3 | 0 | -3 | -3 | | -3 | 220 | |
| Detector 1 Size(ft) | 45 | 6 | 50 | 45 | 45 | 50 | 45 | 45 | | 45 | 6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | NA | custom | custom | custom | Prot | NA | D.Pm | Prot | | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | | 4 | 2! | | 8 | | 5 | 2! | |
| Permitted Phases | 6 | | 6 | 8 | | | 4 | | | 2 | | |
| Detector Phase | 1 | 6 | | 8 | 4 | 2 | 4 | 8 | | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |

| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 7.0 | 7.0 | 10.0 | 7.0 | 7.0 | | 5.0 | 10.0 | |
| Minimum Split (s) | 15.0 | 70.0 | 70.0 | 50.0 | 50.0 | 85.0 | 50.0 | 50.0 | | 30.0 | 85.0 | |
| Total Split (s) | 14.0 | 72.0 | 72.0 | 49.0 | 49.0 | 87.0 | 49.0 | 49.0 | | 29.0 | 87.0 | |
| Total Split (%) | 9.3% | 48.0% | 48.0% | 32.7% | 32.7% | 58.0% | 32.7% | 32.7% | | 19.3% | 58.0% | |
| Maximum Green (s) | 7.5 | 66.0 | 66.0 | 42.0 | 42.0 | 81.0 | 42.0 | 42.0 | | 22.5 | 81.0 | |
| Yellow Time (s) | 3.0 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | 2.5 | 3.5 | 3.5 | 2.5 | 3.5 | 3.5 | | 3.5 | 2.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | -3.0 | -2.5 | -2.5 | | -2.5 | -2.5 | | -1.0 | -3.0 | |
| Total Lost Time (s) | 5.5 | 3.0 | 3.0 | 4.5 | 4.5 | | 4.5 | 4.5 | | 5.5 | 3.0 | |
| Lead/Lag | Lead | Lag | Lag | | | Lag | | | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Recall Mode | None | C-Min | C-Min | None | None | C-Min | None | None | | None | C-Min | |
| Walk Time (s) | | 7.0 | 7.0 | 8.0 | 8.0 | 7.0 | 8.0 | 8.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 16.0 | 16.0 | 35.0 | 32.0 | 20.0 | 32.0 | 35.0 | | | 20.0 | |
| Pedestrian Calls (#/hr) | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | |
| Act Effct Green (s) | 92.8 | 86.9 | 86.9 | 32.0 | 32.0 | 0.0 | 32.0 | 32.0 | | 107.3 | 96.6 | |
| Actuated g/C Ratio | 0.62 | 0.58 | 0.58 | 0.21 | 0.21 | 0.00 | 0.21 | 0.21 | | 0.72 | 0.64 | |
| v/c Ratio | 0.35 | 0.64 | 0.04 | 1.58 | 0.22 | no cap | 0.21 | 0.76 | | 0.70 | 0.54 | |
| Control Delay | 12.9 | 26.8 | 0.1 | 368.0 | 47.0 | | 46.8 | 38.9 | | 23.9 | 9.1 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.9 | |
| Total Delay | 12.9 | 26.8 | 0.1 | 368.0 | 47.0 | Error | 46.8 | 38.9 | | 23.9 | 9.9 | |
| LOS | B | C | A | F | D | F | D | D | | C | A | |
| Approach Delay | 24.6 | | | | | Err | 40.0 | | | | 12.6 | |
| Approach LOS | C | | | | | F | D | | | | B | |
| 90th %ile Green (s) | 7.5 | 66.0 | 66.0 | 42.0 | 42.0 | 81.0 | 42.0 | 42.0 | | 22.5 | 81.0 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Hold | Coord | Hold | Max | | Max | Coord | |
| 70th %ile Green (s) | 7.5 | 71.0 | 71.0 | 37.0 | 37.0 | 86.0 | 37.0 | 37.0 | | 22.5 | 86.0 | |
| 70th %ile Term Code | Max | Coord | Coord | Gap | Hold | Coord | Hold | Gap | | Max | Coord | |
| 50th %ile Green (s) | 7.5 | 82.0 | 82.0 | 30.6 | 30.6 | 92.4 | 30.6 | 30.6 | | 17.9 | 92.4 | |
| 50th %ile Term Code | Max | Coord | Coord | Gap | Hold | Coord | Hold | Gap | | Gap | Coord | |
| 30th %ile Green (s) | 7.5 | 93.3 | 93.3 | 24.0 | 24.0 | 99.0 | 24.0 | 24.0 | | 13.2 | 99.0 | |
| 30th %ile Term Code | Max | Coord | Coord | Gap | Hold | Coord | Hold | Gap | | Gap | Coord | |
| 10th %ile Green (s) | 6.6 | 107.4 | 107.4 | 14.1 | 14.1 | 109.8 | 14.1 | 14.1 | | 9.0 | 109.8 | |
| 10th %ile Term Code | Gap | Coord | Coord | Gap | Hold | Coord | Hold | Gap | | Gap | Coord | |
| Stops (vph) | 35 | 653 | 0 | 56 | 46 | 0 | 34 | 167 | | 134 | 592 | |
| Fuel Used(gal) | 1 | 21 | 0 | 6 | 1 | 0 | 1 | 5 | | 3 | 12 | |
| CO Emissions (g/hr) | 102 | 1461 | 22 | 443 | 71 | 27 | 54 | 332 | | 218 | 817 | |
| NOx Emissions (g/hr) | 20 | 284 | 4 | 86 | 14 | 5 | 10 | 65 | | 42 | 159 | |
| VOC Emissions (g/hr) | 24 | 339 | 5 | 103 | 16 | 6 | 12 | 77 | | 50 | 189 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 29 | 372 | 0 | ~122 | 67 | 0 | 46 | 176 | | 115 | 163 | |
| Queue Length 95th (ft) | 55 | 577 | 0 | #209 | 82 | 0 | 66 | 258 | | m80 | m411 | |
| Internal Link Dist (ft) | 1544 | | | | | 353 | 435 | | | | 712 | |
| Turn Bay Length (ft) | | 135 | 135 | 100 | 100 | | 120 | | | 220 | 220 | |
| Base Capacity (vph) | 300 | 1568 | 964 | 79 | 520 | 1 | 370 | 570 | | 465 | 2194 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 654 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |

| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.35 | 0.64 | 0.04 | 1.14 | 0.16 | 139.00 | 0.15 | 0.61 | | 0.62 | 0.77 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 123 (82%), Referenced to phase 2:SBSW and 6:NBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: Err | | | |
| Intersection Signal Delay: Err | | Intersection LOS: F | |
| Intersection Capacity Utilization Err% | | ICU Level of Service H | |
| Analysis Period (min) 15 | | | |

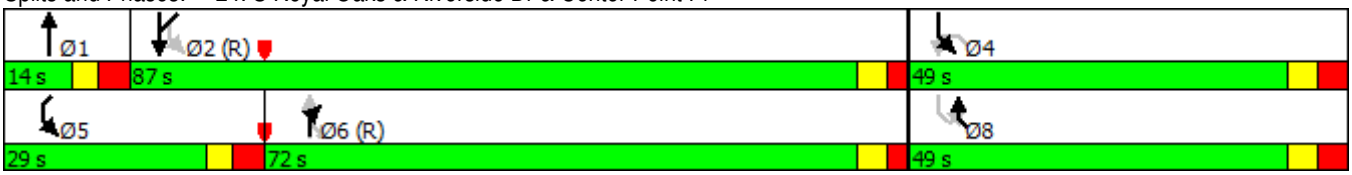
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

! Phase conflict between lane groups.

Splits and Phases: 24: S Royal Oaks & Riverside Dr & Center Point Pl



# HCS 2010 Two-Way Stop Control Summary Report

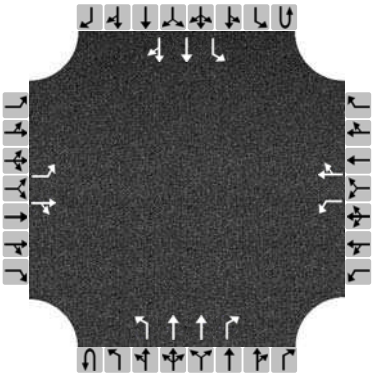
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Existing) |

## Site Information

| | |
|---|---|
| Intersection | S. Royal Oaks and Rand |
| Jurisdiction | Franklin, TN |
| East/West Street | Rand Pl / Home Depot |
| North/South Street | S. Royal Oaks Blvd |
| Peak Hour Factor | 0.97 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 1 | 1 | 0 | | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 2 | 0 |
| Configuration | | L | | TR | | L | | TR | | L | T | R | | L | T | TR |
| Volume (veh/h) | | 24 | 1 | 8 | | 13 | 0 | 11 | | 9 | 1281 | 23 | | 45 | 586 | 47 |
| Percent Heavy Vehicles | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left + Thru | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 25 | | 9 | | 13 | | 11 | | 9 | | | | 46 | | |
| Capacity | | 203 | | 461 | | 130 | | 410 | | 944 | | | | 519 | | |
| v/c Ratio | | 0.12 | | 0.02 | | 0.10 | | 0.03 | | 0.01 | | | | 0.09 | | |
| 95% Queue Length | | 0.4 | | 0.1 | | 0.3 | | 0.1 | | 0.0 | | | | 0.3 | | |
| Control Delay (s/veh) | | 25.2 | | 13.0 | | 35.8 | | 14.0 | | 8.8 | | | | 12.6 | | |
| Level of Service (LOS) | | D | | B | | E | | B | | A | | | | B | | |
| Approach Delay (s/veh) | 21.9 | | | | 25.8 | | | | 0.1 | | | | 0.8 | | | |
| Approach LOS | C | | | | D | | | | A | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

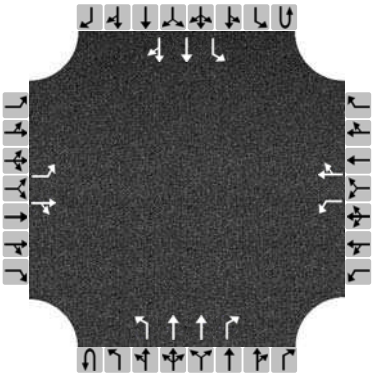
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Existing) |

## Site Information

| | |
|---|---|
| Intersection | S. Royal Oaks and Rand |
| Jurisdiction | Franklin, TN |
| East/West Street | Rand Pl / Home Depot |
| North/South Street | S. Royal Oaks Blvd |
| Peak Hour Factor | 0.96 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 1 | 1 | 0 | | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 2 | 0 |
| Configuration | | L | | TR | | L | | TR | | L | T | R | | L | T | TR |
| Volume (veh/h) | | 24 | 3 | 15 | | 19 | 4 | 22 | | 6 | 896 | 16 | | 20 | 883 | 97 |
| Percent Heavy Vehicles | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left + Thru | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 25 | | 19 | | 20 | | 27 | | 6 | | | | 21 | | |
| Capacity | | 183 | | 391 | | 199 | | 411 | | 688 | | | | 731 | | |
| v/c Ratio | | 0.14 | | 0.05 | | 0.10 | | 0.07 | | 0.01 | | | | 0.03 | | |
| 95% Queue Length | | 0.5 | | 0.2 | | 0.3 | | 0.2 | | 0.0 | | | | 0.1 | | |
| Control Delay (s/veh) | | 27.7 | | 14.7 | | 25.1 | | 14.4 | | 10.3 | | | | 10.1 | | |
| Level of Service (LOS) | | D | | B | | D | | B | | B | | | | B | | |
| Approach Delay (s/veh) | 22.1 | | | | 18.9 | | | | 0.1 | | | | 0.2 | | | |
| Approach LOS | C | | | | C | | | | A | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

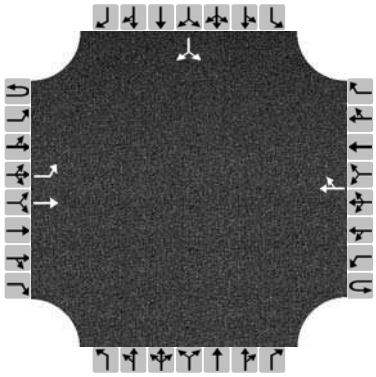
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Existing) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and dwy |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Western Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 2 | 44 | | | | 183 | 0 | | | | | | 1 | | 1 |
| Percent Heavy Vehicles | | 0 | | | | | | | | | | | | 0 | | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 2 | | | | | | | | | | | | | 2 | |
| Capacity | | 1351 | | | | | | | | | | | | | 761 | |
| v/c Ratio | | 0.00 | | | | | | | | | | | | | 0.00 | |
| 95% Queue Length | | 0.0 | | | | | | | | | | | | | 0.0 | |
| Control Delay (s/veh) | | 7.7 | | | | | | | | | | | | | 9.7 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | A | |
| Approach Delay (s/veh) | 0.3 | | | | | | | | | | | | 9.7 | | | |
| Approach LOS | A | | | | | | | | | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

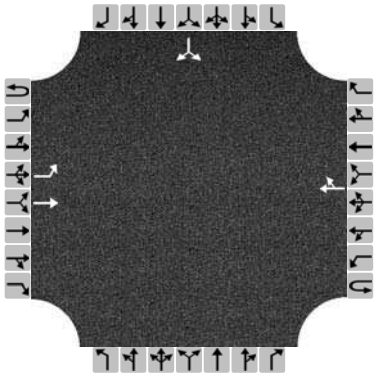
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Existing) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and dwy |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Western Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

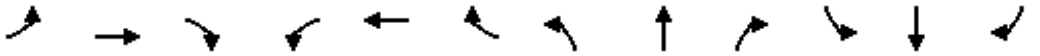
| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 5 | 161 | | | | 166 | 2 | | | | | | 15 | | 2 |
| Percent Heavy Vehicles | | 0 | | | | | | | | | | | | 0 | | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 6 | | | | | | | | | | | | | 21 | |
| Capacity | | 1373 | | | | | | | | | | | | | 660 | |
| v/c Ratio | | 0.00 | | | | | | | | | | | | | 0.03 | |
| 95% Queue Length | | 0.0 | | | | | | | | | | | | | 0.1 | |
| Control Delay (s/veh) | | 7.6 | | | | | | | | | | | | | 10.6 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | B | |
| Approach Delay (s/veh) | 0.2 | | | | | | | | | | | | 10.6 | | | |
| Approach LOS | A | | | | | | | | | | | | B | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

## BACKGROUND CONDITIONS



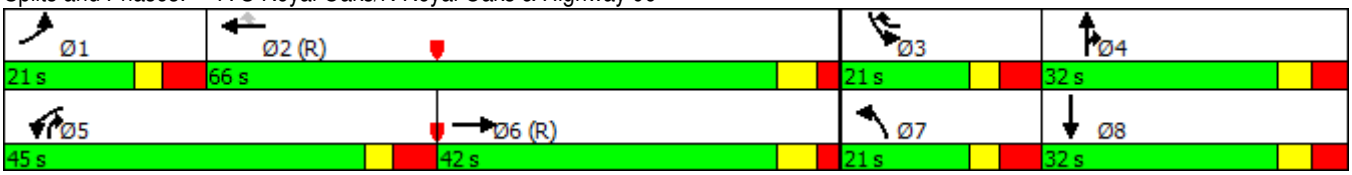
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 112 | 772 | 60 | 831 | 993 | 281 | 99 | 239 | 988 | 225 | 202 | 82 |
| Future Volume (vph) | 112 | 772 | 60 | 831 | 993 | 281 | 99 | 239 | 988 | 225 | 202 | 82 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.988 | | | | 0.850 | | | 0.850 | | 0.959 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3235 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3235 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 10 | | | | 173 | | | | | 34 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 350 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 6.0 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.80 | 0.90 | 0.80 | 0.93 | 0.91 | 0.88 | 0.82 | 0.80 | 0.93 | 0.92 | 0.74 | 0.81 |
| Heavy Vehicles (%) | 3% | 6% | 2% | 3% | 6% | 3% | 4% | 2% | 2% | 2% | 4% | 2% |
| Adj. Flow (vph) | 140 | 858 | 75 | 894 | 1091 | 319 | 121 | 299 | 1062 | 245 | 273 | 101 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 140 | 933 | 0 | 894 | 1091 | 319 | 121 | 299 | 1062 | 245 | 374 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

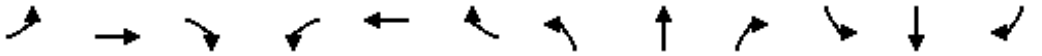
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (%) | 15.0% | 30.0% | | 32.1% | 47.1% | 15.0% | 15.0% | 22.9% | | 15.0% | 22.9% | |
| Maximum Green (s) | 13.5 | 35.5 | | 37.5 | 59.5 | 13.5 | 13.5 | 24.5 | | 13.5 | 24.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 13.5 | 38.4 | | 40.0 | 64.9 | 84.0 | 12.4 | 27.5 | 72.0 | 15.1 | 30.2 | |
| Actuated g/C Ratio | 0.10 | 0.27 | | 0.29 | 0.46 | 0.60 | 0.09 | 0.20 | 0.51 | 0.11 | 0.22 | |
| v/c Ratio | 0.43 | 0.72 | | 0.95 | 0.69 | 0.31 | 0.41 | 0.42 | 0.72 | 0.69 | 0.52 | |
| Control Delay | 63.3 | 49.3 | | 57.0 | 40.9 | 7.8 | 56.3 | 41.6 | 43.5 | 70.7 | 47.1 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 63.3 | 49.3 | | 57.0 | 40.9 | 7.8 | 56.3 | 41.6 | 43.5 | 70.7 | 47.1 | |
| LOS | E | D | | E | D | A | E | D | D | E | D | |
| Approach Delay | | 51.1 | | | 42.6 | | | 44.2 | | | 56.4 | |
| Approach LOS | | D | | | D | | | D | | | E | |
| 90th %ile Green (s) | 13.5 | 35.5 | | 37.5 | 59.5 | 13.5 | 13.3 | 24.5 | | 13.5 | 24.7 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 70th %ile Green (s) | 12.4 | 35.5 | | 37.5 | 60.6 | 13.5 | 11.6 | 24.5 | | 13.5 | 26.4 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 50th %ile Green (s) | 11.2 | 35.5 | | 37.5 | 61.8 | 13.5 | 10.4 | 24.5 | | 13.5 | 27.6 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 30th %ile Green (s) | 9.9 | 35.5 | | 37.5 | 63.1 | 13.5 | 9.2 | 24.5 | | 13.5 | 28.8 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 10th %ile Green (s) | 8.1 | 37.6 | | 37.5 | 67.0 | 11.4 | 7.5 | 24.5 | | 11.4 | 28.4 | |
| 10th %ile Term Code | Gap | Coord | | Max | Coord | Gap | Gap | Max | | Gap | Hold | |
| Stops (vph) | 103 | 730 | | 736 | 955 | 86 | 89 | 206 | 937 | 214 | 225 | |
| Fuel Used(gal) | 3 | 17 | | 24 | 26 | 4 | 2 | 5 | 20 | 6 | 6 | |
| CO Emissions (g/hr) | 190 | 1223 | | 1650 | 1796 | 249 | 156 | 324 | 1401 | 427 | 427 | |
| NOx Emissions (g/hr) | 37 | 238 | | 321 | 349 | 48 | 30 | 63 | 273 | 83 | 83 | |
| VOC Emissions (g/hr) | 44 | 283 | | 382 | 416 | 58 | 36 | 75 | 325 | 99 | 99 | |
| Dilemma Vehicles (#) | 0 | 29 | | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 62 | 281 | | 409 | 535 | 65 | 55 | 127 | 573 | 112 | 144 | |
| Queue Length 95th (ft) | 85 | 335 | | m435 | m554 | m109 | 72 | 150 | 632 | 159 | 159 | |
| Internal Link Dist (ft) | | 270 | | | 611 | | | 712 | | | 884 | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 388 | 1293 | | 938 | 1578 | 1045 | 370 | 714 | 1473 | 367 | 724 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.36 | 0.72 | | 0.95 | 0.69 | 0.31 | 0.33 | 0.42 | 0.72 | 0.67 | 0.52 | |

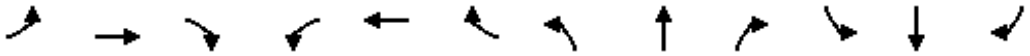
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 116 (83%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.95 | | | |
| Intersection Signal Delay: 46.3 | | Intersection LOS: D | |
| Intersection Capacity Utilization 70.5% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 7: S Royal Oaks/N Royal Oaks & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 1728 | 187 | 111 | 1055 | 0 | 0 | 0 | 0 | 355 | 0 | 1026 |
| Future Volume (vph) | 0 | 1728 | 187 | 111 | 1055 | 0 | 0 | 0 | 0 | 355 | 0 | 1026 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 182 | | | | | | | | | 117 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.91 | 0.90 | 0.86 | 0.87 | 1.00 | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 |
| Heavy Vehicles (%) | 2% | 3% | 7% | 1% | 3% | 2% | 2% | 2% | 2% | 6% | 2% | 3% |
| Adj. Flow (vph) | 0 | 1899 | 208 | 129 | 1213 | 0 | 0 | 0 | 0 | 418 | 0 | 1091 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 1899 | 208 | 129 | 1213 | 0 | 0 | 0 | 0 | 418 | 0 | 1091 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (%) | | 44.3% | 44.3% | 16.4% | 60.7% | | | | | 39.3% | | 39.3% |
| Maximum Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 60.5 | 60.5 | 15.5 | 81.0 | | | | | 49.5 | | 49.5 |
| Actuated g/C Ratio | | 0.43 | 0.43 | 0.11 | 0.58 | | | | | 0.35 | | 0.35 |
| v/c Ratio | | 0.69 | 0.28 | 0.65 | 0.62 | | | | | 0.36 | | 1.08 |
| Control Delay | | 27.8 | 5.1 | 71.1 | 19.1 | | | | | 34.6 | | 89.4 |
| Queue Delay | | 0.5 | 0.0 | 0.0 | 0.3 | | | | | 2.1 | | 0.0 |
| Total Delay | | 28.3 | 5.1 | 71.1 | 19.4 | | | | | 36.7 | | 89.4 |
| LOS | | C | A | E | B | | | | | D | | F |
| Approach Delay | | 26.0 | | | 24.3 | | | | | | | |
| Approach LOS | | C | | | C | | | | | | | |
| 90th %ile Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| 90th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 70th %ile Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| 70th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 50th %ile Green (s) | | 57.6 | 57.6 | 15.4 | 79.0 | | | | | 47.5 | | 47.5 |
| 50th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| 30th %ile Green (s) | | 59.8 | 59.8 | 13.2 | 79.0 | | | | | 47.5 | | 47.5 |
| 30th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| 10th %ile Green (s) | | 63.2 | 63.2 | 9.8 | 79.0 | | | | | 47.5 | | 47.5 |
| 10th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| Stops (vph) | | 1097 | 39 | 111 | 500 | | | | | 256 | | 827 |
| Fuel Used(gal) | | 35 | 2 | 3 | 13 | | | | | 6 | | 30 |
| CO Emissions (g/hr) | | 2415 | 146 | 218 | 908 | | | | | 431 | | 2069 |
| NOx Emissions (g/hr) | | 470 | 28 | 42 | 177 | | | | | 84 | | 403 |
| VOC Emissions (g/hr) | | 560 | 34 | 50 | 211 | | | | | 100 | | 480 |
| Dilemma Vehicles (#) | | 50 | 0 | 0 | 33 | | | | | 0 | | 0 |
| Queue Length 50th (ft) | | 340 | 27 | 125 | 282 | | | | | 144 | | ~586 |
| Queue Length 95th (ft) | | 388 | m50 | m163 | m294 | | | | | 178 | | #738 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2743 | 755 | 229 | 1960 | | | | | 1162 | | 1014 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 217 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 379 | 0 | 0 | 0 | | | | | 581 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.80 | 0.28 | 0.56 | 0.70 | | | | | 0.72 | | 1.08 |

Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 106 (76%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.08 | | | |
| Intersection Signal Delay: 40.4 | | Intersection LOS: D | |
| Intersection Capacity Utilization 107.3% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

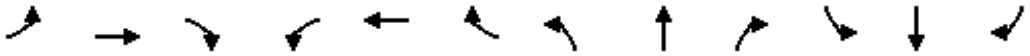
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1336 | 747 | 0 | 0 | 759 | 1217 | 407 | 0 | 364 | 0 | 0 | 0 |
| Future Volume (vph) | 1336 | 747 | 0 | 0 | 759 | 1217 | 407 | 0 | 364 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 23 | | | 258 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 1845 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 31.4 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.88 | 0.86 | 0.95 | 1.00 | 0.95 | 0.98 | 0.95 | 0.25 | 0.92 | 1.00 | 1.00 | 0.95 |
| Heavy Vehicles (%) | 2% | 5% | 2% | 2% | 2% | 1% | 2% | 0% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 1518 | 869 | 0 | 0 | 799 | 1242 | 428 | 0 | 396 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 1518 | 869 | 0 | 0 | 799 | 1242 | 428 | 0 | 396 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (%) | 40.0% | 82.9% | | | 42.9% | | 17.1% | | 17.1% | | | |
| Maximum Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 50.0 | 110.0 | | | 53.5 | 79.5 | 16.5 | | 16.5 | | | |
| Actuated g/C Ratio | 0.36 | 0.79 | | | 0.38 | 0.57 | 0.12 | | 0.12 | | | |
| v/c Ratio | 1.29 | 0.33 | | | 0.59 | 0.77 | 1.10 | | 0.95 | | | |
| Control Delay | 186.0 | 3.2 | | | 36.7 | 27.0 | 131.0 | | 53.3 | | | |
| Queue Delay | 0.7 | 0.1 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 186.7 | 3.3 | | | 36.7 | 27.0 | 131.0 | | 53.3 | | | |
| LOS | F | A | | | D | C | F | | D | | | |
| Approach Delay | | 119.9 | | | 30.8 | | | | | | | |
| Approach LOS | | F | | | C | | | | | | | |
| 90th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 90th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 70th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 70th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 50th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 50th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 30th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 30th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 10th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 10th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| Stops (vph) | 967 | 101 | | | 591 | 899 | 348 | | 115 | | | |
| Fuel Used(gal) | 65 | 4 | | | 21 | 31 | 15 | | 7 | | | |
| CO Emissions (g/hr) | 4552 | 300 | | | 1467 | 2149 | 1018 | | 455 | | | |
| NOx Emissions (g/hr) | 886 | 58 | | | 285 | 418 | 198 | | 89 | | | |
| VOC Emissions (g/hr) | 1055 | 70 | | | 340 | 498 | 236 | | 105 | | | |
| Dilemma Vehicles (#) | 0 | 17 | | | 27 | 0 | 0 | | 0 | | | |
| Queue Length 50th (ft) | ~899 | 68 | | | 303 | 468 | ~227 | | 135 | | | |
| Queue Length 95th (ft) | #1028 | 76 | | | 372 | 573 | #337 | | #341 | | | |
| Internal Link Dist (ft) | | 476 | | | 1765 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1179 | 2598 | | | 1352 | 1607 | 389 | | 419 | | | |
| Starvation Cap Reductn | 163 | 612 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 1.49 | 0.44 | | | 0.59 | 0.77 | 1.10 | | 0.95 | | | |

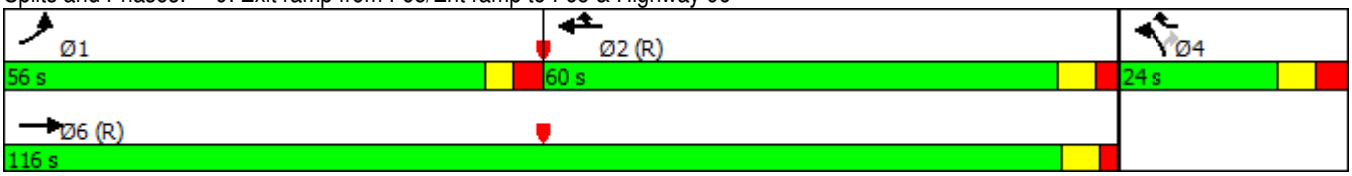
Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 122 (87%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.29 | | | |
| Intersection Signal Delay: 81.2 | | Intersection LOS: F | |
| Intersection Capacity Utilization 107.3% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



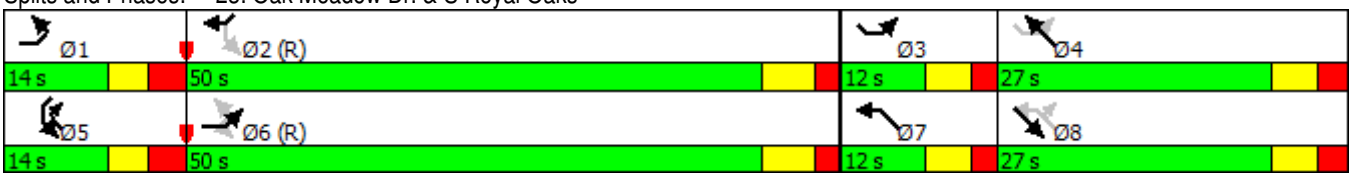
| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 87 | 1120 | 29 | 129 | 7 | 71 | 21 | 16 | 170 | 36 | 515 | 73 |
| Future Volume (vph) | 87 | 1120 | 29 | 129 | 7 | 71 | 21 | 16 | 170 | 36 | 515 | 73 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 3 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | | 0.850 | | 0.867 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.950 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 3319 | 1531 | 1711 | 1561 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.278 | 0.950 | | 0.739 | | | 0.540 | | | 0.177 | | |
| Satd. Flow (perm) | 449 | 3319 | 1531 | 1331 | 1561 | 0 | 1006 | 1925 | 1583 | 330 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 154 | | 97 | | | | 90 | | 154 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 1875 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 42.6 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 130 | 1191 | 46 | 163 | 12 | 97 | 28 | 28 | 185 | 48 | 687 | 106 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 130 | 1191 | 46 | 163 | 109 | 0 | 28 | 28 | 185 | 48 | 793 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 30 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | 42 | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | 45 | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | Perm | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | 6 | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | 20.0 | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 13.0 | 26.0 | 26.0 | 12.5 | 20.0 | | 12.5 | 20.0 | 13.0 | 13.0 | 26.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 14.0 | 50.0 | 50.0 | 12.0 | 27.0 | | 12.0 | 27.0 | 14.0 | 14.0 | 50.0 | |
| Total Split (%) | 13.6% | 48.5% | 48.5% | 11.7% | 26.2% | | 11.7% | 26.2% | 13.6% | 13.6% | 48.5% | |
| Maximum Green (s) | 8.0 | 44.0 | 44.0 | 6.5 | 21.0 | | 6.5 | 21.0 | 8.0 | 8.0 | 44.0 | |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | -1.5 | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | 4.5 | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | 5.0 | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | C-Min | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 74.6 | 63.7 | 63.7 | 17.0 | 11.1 | | 17.0 | 11.1 | 24.1 | 73.9 | 63.4 | |
| Actuated g/C Ratio | 0.72 | 0.62 | 0.62 | 0.17 | 0.11 | | 0.17 | 0.11 | 0.23 | 0.72 | 0.62 | |
| v/c Ratio | 0.30 | 0.58 | 0.05 | 0.64 | 0.43 | | 0.12 | 0.14 | 0.42 | 0.13 | 0.45 | |
| Control Delay | 6.5 | 14.4 | 0.1 | 48.7 | 16.3 | | 32.2 | 42.1 | 19.9 | 5.6 | 10.3 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 6.5 | 14.4 | 0.1 | 48.7 | 16.3 | | 32.2 | 42.1 | 19.9 | 5.6 | 10.3 | |
| LOS | A | B | A | D | B | | C | D | B | A | B | |
| Approach Delay | | 13.2 | | | 35.7 | | | 23.9 | | 10.0 | | |
| Approach LOS | | B | | | D | | | C | | A | | |
| 90th %ile Green (s) | 8.0 | 53.7 | 53.7 | 6.5 | 12.3 | | 6.5 | 12.3 | 7.0 | 7.0 | 52.7 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Min | Min | Coord | |
| 70th %ile Green (s) | 7.6 | 57.0 | 57.0 | 6.5 | 9.0 | | 6.5 | 9.0 | 7.0 | 7.0 | 56.4 | |
| 70th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Min | Min | Coord | |
| 50th %ile Green (s) | 7.0 | 58.5 | 58.5 | 6.5 | 7.5 | | 6.5 | 7.5 | 7.0 | 7.0 | 58.5 | |
| 50th %ile Term Code | Min | Coord | Coord | Max | Hold | | Max | Gap | Min | Min | Coord | |
| 30th %ile Green (s) | 7.0 | 71.0 | 71.0 | 7.5 | 7.0 | | 0.0 | 0.0 | 7.0 | 7.0 | 71.0 | |
| 30th %ile Term Code | Min | Coord | Coord | Hold | Min | | Skip | Skip | Min | Min | Coord | |
| 10th %ile Green (s) | 7.0 | 71.0 | 71.0 | 7.5 | 7.0 | | 0.0 | 0.0 | 7.0 | 7.0 | 71.0 | |
| 10th %ile Term Code | Min | Coord | Coord | Hold | Min | | Skip | Skip | Min | Min | Coord | |
| Stops (vph) | 25 | 656 | 0 | 116 | 19 | | 17 | 15 | 74 | 11 | 250 | |
| Fuel Used(gal) | 2 | 23 | 0 | 3 | 1 | | 0 | 0 | 2 | 1 | 10 | |
| CO Emissions (g/hr) | 107 | 1628 | 30 | 176 | 57 | | 30 | 27 | 173 | 39 | 703 | |
| NOx Emissions (g/hr) | 21 | 317 | 6 | 34 | 11 | | 6 | 5 | 34 | 8 | 137 | |
| VOC Emissions (g/hr) | 25 | 377 | 7 | 41 | 13 | | 7 | 6 | 40 | 9 | 163 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 1 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 23 | 246 | 0 | 93 | 7 | | 15 | 17 | 52 | 8 | 125 | |
| Queue Length 95th (ft) | 35 | 351 | 0 | 127 | 15 | | 30 | 27 | 110 | 18 | 147 | |
| Internal Link Dist (ft) | | 1795 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | 150 | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 438 | 2054 | 1006 | 254 | 431 | | 232 | 439 | 453 | 386 | 1775 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.30 | 0.58 | 0.05 | 0.64 | 0.25 | | 0.12 | 0.06 | 0.41 | 0.12 | 0.45 | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 103 | |

| | |
|---|---|
| Actuated Cycle Length: 103 | |
| Offset: 0 (0%), Referenced to phase 2:SWL and 6:EBL, Start of Green | |
| Natural Cycle: 80 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.64 | |
| Intersection Signal Delay: 15.4 | Intersection LOS: B |
| Intersection Capacity Utilization 62.0% | ICU Level of Service B |
| Analysis Period (min) 15 | |

Splits and Phases: 23: Oak Meadow Dr. & S Royal Oaks



| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 28 | 1198 | 103 | 6 | 46 | 41 | 33 | 12 | 96 | 267 | 747 | 25 |
| Future Volume (vph) | 28 | 1198 | 103 | 6 | 46 | 41 | 33 | 12 | 96 | 267 | 747 | 25 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | 1% | | | | | -1% | 2% | | | | -2% | |
| Storage Length (ft) | | 135 | | | 100 | | 120 | 0 | | | 220 | 0 |
| Storage Lanes | | 3 | | | 1 | | 1 | 1 | | | 2 | 0 |
| Taper Length (ft) | | | | | 50 | | 50 | | | | 50 | |
| Lane Util. Factor | 1.00 | 0.88 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 0.95 |
| Frt | | 0.850 | 0.850 | | | | | 0.850 | | | 0.993 | |
| Flt Protected | | | | 0.950 | 0.950 | | 0.950 | | | 0.950 | 0.955 | |
| Satd. Flow (prot) | 1764 | 2707 | 1607 | 1754 | 1580 | 0 | 1787 | 1486 | 0 | 1787 | 3343 | 0 |
| Flt Permitted | 0.351 | | | 0.423 | 0.950 | | 0.691 | | | 0.137 | 0.955 | |
| Satd. Flow (perm) | 619 | 2707 | 1607 | 781 | 1580 | 0 | 1300 | 1486 | 0 | 258 | 3343 | 0 |
| Right Turn on Red | | | Yes | | | | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 82 | | | | | 112 | | | 82 | |
| Link Speed (mph) | 30 | | | | | 30 | 30 | | | | 30 | |
| Link Distance (ft) | 1624 | | | | | 433 | 515 | | | | 792 | |
| Travel Time (s) | 36.9 | | | | | 9.8 | 11.7 | | | | 18.0 | |
| Peak Hour Factor | 0.63 | 0.92 | 0.87 | 0.58 | 0.68 | 0.77 | 0.67 | 0.63 | 0.86 | 0.80 | 0.99 | 0.67 |
| Heavy Vehicles (%) | 0% | 1% | 0% | 0% | 11% | 0% | 0% | 10% | 3% | 2% | 2% | 4% |
| Adj. Flow (vph) | 44 | 1302 | 118 | 10 | 68 | 53 | 49 | 19 | 112 | 334 | 755 | 37 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 44 | 1302 | 118 | 10 | 68 | 53 | 49 | 131 | 0 | 334 | 792 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Right | Left | Left | Left | Left | Right | Right | Left | Left | Right |
| Median Width(ft) | 22 | | | | | 22 | 12 | | | | 35 | |
| Link Offset(ft) | 0 | | | | | 0 | 0 | | | | 0 | |
| Crosswalk Width(ft) | 16 | | | | | 16 | 16 | | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 | 0.99 | 1.03 | 0.99 |
| Turning Speed (mph) | | 9 | 9 | 15 | 15 | | 15 | 9 | 9 | 15 | 15 | 9 |
| Number of Detectors | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | 0 | 42 | 42 | 50 | 42 | 42 | | 42 | 226 | |
| Trailing Detector (ft) | -3 | 220 | 0 | -3 | -3 | 0 | -3 | -3 | | -3 | 220 | |
| Detector 1 Position(ft) | -3 | 220 | 0 | -3 | -3 | 0 | -3 | -3 | | -3 | 220 | |
| Detector 1 Size(ft) | 45 | 6 | 50 | 45 | 45 | 50 | 45 | 45 | | 45 | 6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | NA | custom | custom | custom | Prot | NA | D.Pm | Prot | | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | | 4 | | | 8 | | 5 | 2 | |
| Permitted Phases | 6 | | 6 | 8 | | | 4 | | | 2 | | |
| Detector Phase | 1 | 6 | | 8 | 4 | | 4 | 8 | | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |

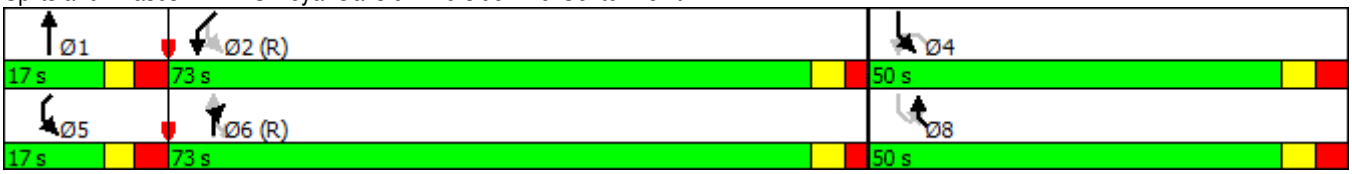
| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 7.0 | 7.0 | | 7.0 | 7.0 | | 5.0 | 10.0 | |
| Minimum Split (s) | 17.0 | 73.0 | 73.0 | 50.0 | 50.0 | | 50.0 | 50.0 | | 17.0 | 73.0 | |
| Total Split (s) | 17.0 | 73.0 | 73.0 | 50.0 | 50.0 | | 50.0 | 50.0 | | 17.0 | 73.0 | |
| Total Split (%) | 12.1% | 52.1% | 52.1% | 35.7% | 35.7% | | 35.7% | 35.7% | | 12.1% | 52.1% | |
| Maximum Green (s) | 10.5 | 67.0 | 67.0 | 43.0 | 43.0 | | 43.0 | 43.0 | | 10.5 | 67.0 | |
| Yellow Time (s) | 3.0 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | 2.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 2.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | -3.0 | -2.5 | -2.5 | | -2.5 | -2.5 | | -1.0 | -3.0 | |
| Total Lost Time (s) | 5.5 | 3.0 | 3.0 | 4.5 | 4.5 | | 4.5 | 4.5 | | 5.5 | 3.0 | |
| Lead/Lag | Lead | Lag | Lag | | | | | | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Recall Mode | None | C-Min | C-Min | None | None | | None | None | | None | C-Min | |
| Walk Time (s) | | 7.0 | 7.0 | 8.0 | 8.0 | | 8.0 | 8.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 16.0 | 16.0 | 35.0 | 32.0 | | 32.0 | 35.0 | | | 20.0 | |
| Pedestrian Calls (#/hr) | | 0 | 0 | 0 | 0 | | 0 | 0 | | | 0 | |
| Act Effct Green (s) | 106.2 | 101.1 | 101.1 | 14.4 | 14.4 | 0.0 | 14.4 | 14.4 | | 114.1 | 107.4 | |
| Actuated g/C Ratio | 0.76 | 0.72 | 0.72 | 0.10 | 0.10 | 0.00 | 0.10 | 0.10 | | 0.82 | 0.77 | |
| v/c Ratio | 0.08 | 0.67 | 0.10 | 0.12 | 0.42 | no cap | 0.37 | 0.52 | | 1.00 | 0.31 | |
| Control Delay | 3.3 | 13.0 | 2.6 | 58.5 | 65.8 | | 65.1 | 21.2 | | 70.3 | 8.3 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 3.3 | 13.0 | 2.6 | 58.5 | 65.8 | Error | 65.1 | 21.2 | | 70.3 | 8.3 | |
| LOS | A | B | A | E | E | F | E | C | | E | A | |
| Approach Delay | 11.9 | | | | | Err | 33.2 | | | | 26.7 | |
| Approach LOS | B | | | | | F | C | | | | C | |
| 90th %ile Green (s) | 7.5 | 93.3 | 93.3 | 16.7 | 16.7 | | 16.7 | 16.7 | | 10.5 | 96.3 | |
| 90th %ile Term Code | Gap | Coord | Coord | Hold | Gap | | Gap | Hold | | Max | Coord | |
| 70th %ile Green (s) | 6.9 | 96.2 | 96.2 | 13.8 | 13.8 | | 13.8 | 13.8 | | 10.5 | 99.8 | |
| 70th %ile Term Code | Gap | Coord | Coord | Hold | Gap | | Gap | Hold | | Max | Coord | |
| 50th %ile Green (s) | 6.6 | 98.1 | 98.1 | 11.9 | 11.9 | | 11.9 | 11.9 | | 10.5 | 102.0 | |
| 50th %ile Term Code | Gap | Coord | Coord | Hold | Gap | | Gap | Hold | | Max | Coord | |
| 30th %ile Green (s) | 6.3 | 100.0 | 100.0 | 10.0 | 10.0 | | 10.0 | 10.0 | | 10.5 | 104.2 | |
| 30th %ile Term Code | Gap | Coord | Coord | Hold | Gap | | Gap | Hold | | Max | Coord | |
| 10th %ile Green (s) | 0.0 | 102.8 | 102.8 | 7.2 | 7.2 | | 7.2 | 7.2 | | 10.5 | 119.8 | |
| 10th %ile Term Code | Skip | Coord | Coord | Hold | Hold | | Hold | Hold | | Max | Coord | |
| Stops (vph) | 6 | 624 | 11 | 6 | 41 | 0 | 30 | 25 | | 205 | 368 | |
| Fuel Used(gal) | 0 | 22 | 1 | 0 | 1 | 0 | 1 | 1 | | 7 | 8 | |
| CO Emissions (g/hr) | 28 | 1523 | 99 | 9 | 70 | 10 | 51 | 73 | | 462 | 567 | |
| NOx Emissions (g/hr) | 6 | 296 | 19 | 2 | 14 | 2 | 10 | 14 | | 90 | 110 | |
| VOC Emissions (g/hr) | 7 | 353 | 23 | 2 | 16 | 2 | 12 | 17 | | 107 | 131 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 6 | 326 | 8 | 8 | 59 | 0 | 42 | 16 | | 168 | 68 | |
| Queue Length 95th (ft) | 10 | 459 | 28 | 17 | 79 | 0 | 61 | 24 | | m#163 | m336 | |
| Internal Link Dist (ft) | 1544 | | | | | 353 | 435 | | | | 712 | |
| Turn Bay Length (ft) | | 135 | 135 | 100 | 100 | | 120 | | | 220 | 220 | |
| Base Capacity (vph) | 580 | 1954 | 1182 | 253 | 513 | 1 | 422 | 558 | | 335 | 2583 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |

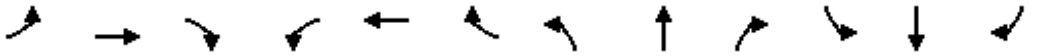
| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.08 | 0.67 | 0.10 | 0.04 | 0.13 | 53.00 | 0.12 | 0.23 | | 1.00 | 0.31 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 139 (99%), Referenced to phase 2:SWL and 6:NBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: Err | | | |
| Intersection Signal Delay: Err | | Intersection LOS: F | |
| Intersection Capacity Utilization Err% | | ICU Level of Service H | |
| Analysis Period (min) 15 | | | |

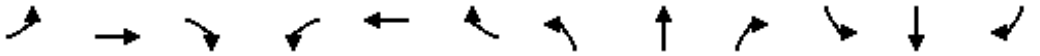
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 24: S Royal Oaks & Riverside Dr & Center Point Pl





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 206 | 1108 | 63 | 913 | 1174 | 269 | 141 | 351 | 964 | 316 | 434 | 178 |
| Future Volume (vph) | 206 | 1108 | 63 | 913 | 1174 | 269 | 141 | 351 | 964 | 316 | 434 | 178 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.991 | | | | 0.850 | | | 0.850 | | 0.951 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3319 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3319 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 7 | | | | 87 | | | | | 49 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 350 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 6.0 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.92 | 0.93 | 0.81 | 0.87 | 0.91 | 0.89 | 0.74 | 0.83 | 0.89 | 0.83 | 0.95 | 0.80 |
| Heavy Vehicles (%) | 1% | 1% | 0% | 1% | 2% | 1% | 0% | 0% | 1% | 0% | 0% | 0% |
| Adj. Flow (vph) | 224 | 1191 | 78 | 1049 | 1290 | 302 | 191 | 423 | 1083 | 381 | 457 | 223 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 224 | 1269 | 0 | 1049 | 1290 | 302 | 191 | 423 | 1083 | 381 | 680 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

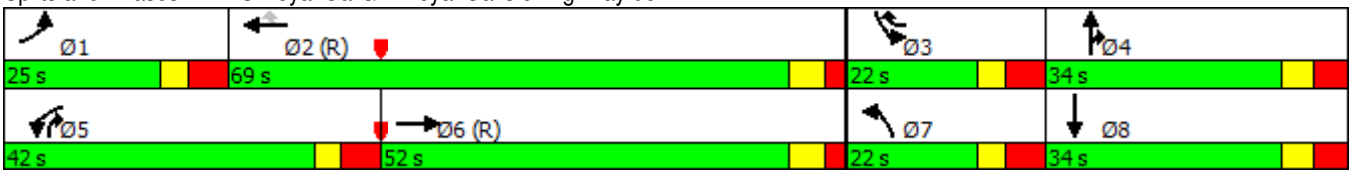


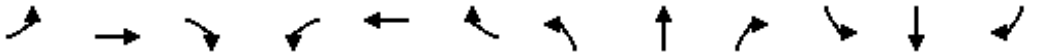
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (%) | 16.7% | 34.7% | | 28.0% | 46.0% | 14.7% | 14.7% | 22.7% | | 14.7% | 22.7% | |
| Maximum Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 17.3 | 48.0 | | 37.0 | 67.7 | 88.2 | 14.9 | 29.5 | 71.0 | 16.5 | 31.1 | |
| Actuated g/C Ratio | 0.12 | 0.32 | | 0.25 | 0.45 | 0.59 | 0.10 | 0.20 | 0.47 | 0.11 | 0.21 | |
| v/c Ratio | 0.56 | 0.80 | | 1.27 | 0.81 | 0.30 | 0.55 | 0.58 | 0.79 | 1.02 | 0.94 | |
| Control Delay | 68.2 | 51.1 | | 163.5 | 48.8 | 16.5 | 57.4 | 48.2 | 51.9 | 117.0 | 74.6 | |
| Queue Delay | 0.0 | 0.3 | | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | |
| Total Delay | 68.2 | 51.4 | | 163.6 | 48.8 | 16.5 | 57.4 | 48.2 | 51.9 | 117.0 | 74.9 | |
| LOS | E | D | | F | D | B | E | D | D | F | E | |
| Approach Delay | | 53.9 | | | 90.7 | | | 51.6 | | | 90.0 | |
| Approach LOS | | D | | | F | | | D | | | F | |
| 90th %ile Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | Max | Max | Max | | Max | Max | |
| 70th %ile Green (s) | 16.7 | 45.5 | | 34.5 | 63.3 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | Max | Max | Max | | Max | Max | |
| 50th %ile Green (s) | 15.1 | 45.5 | | 34.5 | 64.9 | 14.5 | 13.5 | 26.5 | | 14.5 | 27.5 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 30th %ile Green (s) | 13.4 | 45.5 | | 34.5 | 66.6 | 14.5 | 12.0 | 26.5 | | 14.5 | 29.0 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 10th %ile Green (s) | 11.1 | 45.5 | | 34.5 | 68.9 | 14.5 | 9.8 | 26.5 | | 14.5 | 31.2 | |
| 10th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| Stops (vph) | 189 | 1046 | | 743 | 1069 | 205 | 130 | 314 | 913 | 280 | 514 | |
| Fuel Used(gal) | 5 | 25 | | 45 | 32 | 5 | 3 | 7 | 21 | 11 | 17 | |
| CO Emissions (g/hr) | 364 | 1765 | | 3150 | 2214 | 356 | 226 | 514 | 1480 | 800 | 1171 | |
| NOx Emissions (g/hr) | 71 | 343 | | 613 | 431 | 69 | 44 | 100 | 288 | 156 | 228 | |
| VOC Emissions (g/hr) | 84 | 409 | | 730 | 513 | 83 | 52 | 119 | 343 | 185 | 271 | |
| Dilemma Vehicles (#) | 0 | 39 | | 0 | 44 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 108 | 415 | | ~680 | 582 | 137 | 92 | 201 | 625 | ~203 | 327 | |
| Queue Length 95th (ft) | 151 | 475 | | m#521 | m521 | m130 | m100 | m237 | m692 | #272 | #465 | |
| Internal Link Dist (ft) | | 270 | | | 611 | | | 712 | | | 884 | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 462 | 1580 | | 826 | 1598 | 1007 | 383 | 730 | 1369 | 372 | 727 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 48 | | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.48 | 0.83 | | 1.30 | 0.81 | 0.30 | 0.50 | 0.58 | 0.79 | 1.02 | 0.94 | |

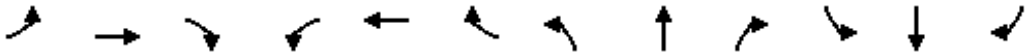
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 133 (89%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.27 | | | |
| Intersection Signal Delay: 73.0 | | Intersection LOS: E | |
| Intersection Capacity Utilization 87.4% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |
| ~ Volume exceeds capacity, queue is theoretically infinite. | | | |
| Queue shown is maximum after two cycles. | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | |
| Queue shown is maximum after two cycles. | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 7: S Royal Oaks/N Royal Oaks & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 1971 | 484 | 285 | 906 | 0 | 0 | 0 | 0 | 914 | 0 | 1405 |
| Future Volume (vph) | 0 | 1971 | 484 | 285 | 906 | 0 | 0 | 0 | 0 | 914 | 0 | 1405 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 403 | | | | | | | | | 143 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.93 | 0.78 | 0.71 | 0.86 | 1.00 | 1.00 | 1.00 | 1.00 | 0.87 | 1.00 | 0.88 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 1% | 1% | 2% | 2% | 2% | 2% | 1% | 2% | 1% |
| Adj. Flow (vph) | 0 | 2119 | 621 | 401 | 1053 | 0 | 0 | 0 | 0 | 1051 | 0 | 1597 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 2119 | 621 | 401 | 1053 | 0 | 0 | 0 | 0 | 1051 | 0 | 1597 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (%) | | 36.7% | 36.7% | 20.0% | 56.7% | | | | | 43.3% | | 43.3% |
| Maximum Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 51.0 | 51.0 | 25.0 | 81.0 | | | | | 59.5 | | 59.5 |
| Actuated g/C Ratio | | 0.34 | 0.34 | 0.17 | 0.54 | | | | | 0.40 | | 0.40 |
| v/c Ratio | | 0.97 | 0.77 | 1.35 | 0.56 | | | | | 0.77 | | 1.38 |
| Control Delay | | 70.4 | 31.0 | 226.6 | 25.0 | | | | | 43.9 | | 207.9 |
| Queue Delay | | 0.8 | 0.0 | 0.0 | 0.7 | | | | | 1.7 | | 0.0 |
| Total Delay | | 71.2 | 31.0 | 226.6 | 25.7 | | | | | 45.6 | | 207.9 |
| LOS | | E | C | F | C | | | | | D | | F |
| Approach Delay | | 62.1 | | | 81.1 | | | | | | | |
| Approach LOS | | E | | | F | | | | | | | |
| 90th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 90th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 70th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 70th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 50th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 50th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 30th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 30th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 10th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 10th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| Stops (vph) | | 1850 | 520 | 222 | 472 | | | | | 776 | | 985 |
| Fuel Used(gal) | | 62 | 12 | 16 | 13 | | | | | 18 | | 74 |
| CO Emissions (g/hr) | | 4359 | 844 | 1147 | 886 | | | | | 1262 | | 5163 |
| NOx Emissions (g/hr) | | 848 | 164 | 223 | 172 | | | | | 246 | | 1005 |
| VOC Emissions (g/hr) | | 1010 | 196 | 266 | 205 | | | | | 292 | | 1197 |
| Dilemma Vehicles (#) | | 105 | 0 | 0 | 45 | | | | | 0 | | 0 |
| Queue Length 50th (ft) | | 628 | 328 | ~524 | 272 | | | | | 457 | | ~1127 |
| Queue Length 95th (ft) | | m#672 | m295 | #520 | 407 | | | | | 515 | | #1235 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2178 | 804 | 297 | 1865 | | | | | 1368 | | 1160 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 446 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 14 | 0 | 0 | 0 | | | | | 166 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.98 | 0.77 | 1.35 | 0.74 | | | | | 0.87 | | 1.38 |

Intersection Summary

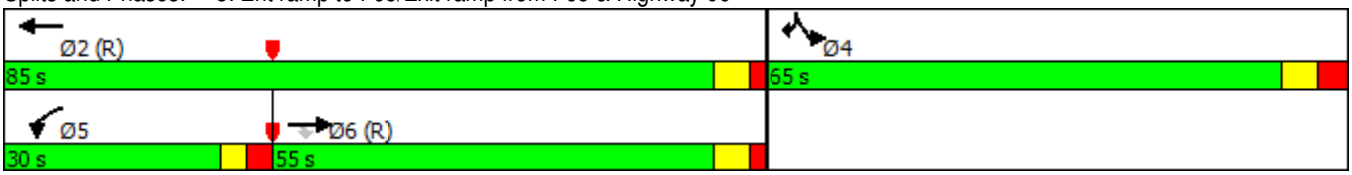
| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 104 (69%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.38 | | | |
| Intersection Signal Delay: 97.6 | | Intersection LOS: F | |
| Intersection Capacity Utilization 84.7% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

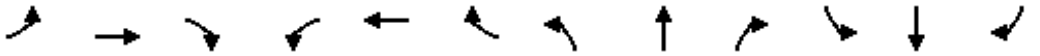
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

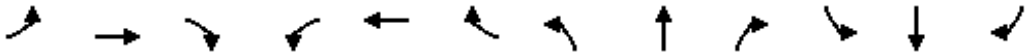
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 595 | 2290 | 0 | 0 | 882 | 998 | 309 | 0 | 164 | 0 | 0 | 0 |
| Future Volume (vph) | 595 | 2290 | 0 | 0 | 882 | 998 | 309 | 0 | 164 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 246 | | | 69 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 1845 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 31.4 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.97 | 0.98 | 1.00 | 0.25 | 0.91 | 0.93 | 0.92 | 1.00 | 0.87 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 3% | 3% | 2% | 0% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 2% |
| Adj. Flow (vph) | 613 | 2337 | 0 | 0 | 969 | 1073 | 336 | 0 | 189 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 613 | 2337 | 0 | 0 | 969 | 1073 | 336 | 0 | 189 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |

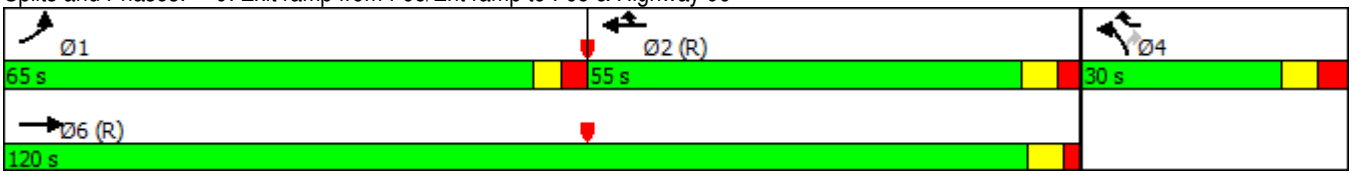


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (%) | 43.3% | 80.0% | | | 36.7% | | 20.0% | | 20.0% | | | |
| Maximum Green (s) | 59.0 | 114.0 | | | 48.5 | | 22.5 | | 22.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 35.9 | 114.7 | | | 72.3 | 103.6 | 21.8 | | 21.8 | | | |
| Actuated g/C Ratio | 0.24 | 0.76 | | | 0.48 | 0.69 | 0.15 | | 0.15 | | | |
| v/c Ratio | 0.78 | 0.91 | | | 0.57 | 0.54 | 0.70 | | 0.65 | | | |
| Control Delay | 79.7 | 23.8 | | | 30.4 | 10.0 | 69.4 | | 49.0 | | | |
| Queue Delay | 0.0 | 4.8 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 79.7 | 28.6 | | | 30.4 | 10.0 | 69.4 | | 49.0 | | | |
| LOS | E | C | | | C | B | E | | D | | | |
| Approach Delay | | 39.2 | | | 19.7 | | | | | | | |
| Approach LOS | | D | | | B | | | | | | | |
| 90th %ile Green (s) | 43.9 | 114.0 | | | 63.6 | | 22.5 | | 22.5 | | | |
| 90th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 70th %ile Green (s) | 39.0 | 114.0 | | | 68.5 | | 22.5 | | 22.5 | | | |
| 70th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 50th %ile Green (s) | 36.0 | 114.0 | | | 71.5 | | 22.5 | | 22.5 | | | |
| 50th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 30th %ile Green (s) | 33.0 | 114.0 | | | 74.5 | | 22.5 | | 22.5 | | | |
| 30th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 10th %ile Green (s) | 27.8 | 117.5 | | | 83.2 | | 19.0 | | 19.0 | | | |
| 10th %ile Term Code | Gap | Coord | | | Coord | | Gap | | Gap | | | |
| Stops (vph) | 588 | 1844 | | | 621 | 375 | 290 | | 100 | | | |
| Fuel Used(gal) | 18 | 38 | | | 23 | 18 | 7 | | 3 | | | |
| CO Emissions (g/hr) | 1236 | 2645 | | | 1580 | 1273 | 509 | | 208 | | | |
| NOx Emissions (g/hr) | 240 | 515 | | | 307 | 248 | 99 | | 40 | | | |
| VOC Emissions (g/hr) | 286 | 613 | | | 366 | 295 | 118 | | 48 | | | |
| Dilemma Vehicles (#) | 0 | 83 | | | 29 | 0 | 0 | | 0 | | | |
| Queue Length 50th (ft) | 329 | 582 | | | 353 | 205 | 162 | | 112 | | | |
| Queue Length 95th (ft) | m340 | m518 | | | 467 | 311 | 218 | | 190 | | | |
| Internal Link Dist (ft) | | 476 | | | 1765 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1286 | 2577 | | | 1704 | 2012 | 495 | | 298 | | | |
| Starvation Cap Reductn | 0 | 197 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 0.48 | 0.98 | | | 0.57 | 0.53 | 0.68 | | 0.63 | | | |

Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 138 (92%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.91 | | | |
| Intersection Signal Delay: 34.2 | | Intersection LOS: C | |
| Intersection Capacity Utilization 84.7% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 92 | 827 | 19 | 147 | 41 | 118 | 92 | 29 | 91 | 138 | 765 | 145 |
| Future Volume (vph) | 92 | 827 | 19 | 147 | 41 | 118 | 92 | 29 | 91 | 138 | 765 | 145 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 3 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | | 0.850 | | 0.896 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.950 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 3319 | 1531 | 1711 | 1613 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.097 | 0.950 | | 0.724 | | | 0.278 | | | 0.265 | | |
| Satd. Flow (perm) | 157 | 3319 | 1531 | 1304 | 1613 | 0 | 518 | 1925 | 1583 | 494 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 132 | | 93 | | | | 99 | | 132 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 552 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 12.5 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 137 | 880 | 30 | 186 | 71 | 162 | 123 | 50 | 99 | 184 | 1020 | 210 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 137 | 880 | 30 | 186 | 233 | 0 | 123 | 50 | 99 | 184 | 1230 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 30 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | 42 | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | 45 | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | Perm | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | 6 | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | 20.0 | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 18.0 | 57.0 | 57.0 | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 18.0 | 57.0 | 57.0 | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |
| Total Split (%) | 15.0% | 47.5% | 47.5% | 11.7% | 29.2% | | 11.7% | 29.2% | 11.7% | 11.7% | 44.2% | |
| Maximum Green (s) | 12.0 | 51.0 | 51.0 | 8.5 | 29.0 | | 8.5 | 29.0 | 8.0 | 8.0 | 47.0 | |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | -1.5 | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | 4.5 | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | 5.0 | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | C-Min | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 78.4 | 65.3 | 65.3 | 31.2 | 19.4 | | 30.6 | 19.1 | 33.0 | 74.3 | 63.1 | |
| Actuated g/C Ratio | 0.65 | 0.54 | 0.54 | 0.26 | 0.16 | | 0.26 | 0.16 | 0.28 | 0.62 | 0.53 | |
| v/c Ratio | 0.56 | 0.49 | 0.03 | 0.48 | 0.69 | | 0.51 | 0.16 | 0.20 | 0.45 | 0.80 | |
| Control Delay | 22.4 | 19.3 | 0.1 | 38.4 | 38.0 | | 39.3 | 41.7 | 6.4 | 12.4 | 27.4 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 22.4 | 19.3 | 0.1 | 38.4 | 38.0 | | 39.3 | 41.7 | 6.4 | 12.4 | 27.4 | |
| LOS | C | B | A | D | D | | D | D | A | B | C | |
| Approach Delay | | 19.1 | | | 38.2 | | | 27.8 | | 25.5 | | |
| Approach LOS | | B | | | D | | | C | | C | | |
| 90th %ile Green (s) | 12.0 | 54.9 | 54.9 | 8.5 | 25.1 | | 8.5 | 25.1 | 8.0 | 8.0 | 50.9 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 70th %ile Green (s) | 12.0 | 59.7 | 59.7 | 8.5 | 20.3 | | 8.5 | 20.3 | 8.0 | 8.0 | 55.7 | |
| 70th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 50th %ile Green (s) | 10.3 | 63.1 | 63.1 | 8.5 | 16.9 | | 8.5 | 16.9 | 8.0 | 8.0 | 60.8 | |
| 50th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 30th %ile Green (s) | 7.7 | 67.2 | 67.2 | 8.5 | 13.5 | | 8.5 | 13.5 | 7.3 | 7.3 | 66.8 | |
| 30th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Gap | Gap | Coord | |
| 10th %ile Green (s) | 7.0 | 73.9 | 73.9 | 21.6 | 8.6 | | 7.0 | 0.0 | 7.0 | 7.0 | 73.9 | |
| 10th %ile Term Code | Min | Coord | Coord | Hold | Gap | | Min | Skip | Min | Min | Coord | |
| Stops (vph) | 40 | 507 | 0 | 118 | 89 | | 69 | 23 | 12 | 56 | 640 | |
| Fuel Used(gal) | 1 | 10 | 0 | 3 | 3 | | 2 | 1 | 1 | 2 | 20 | |
| CO Emissions (g/hr) | 72 | 671 | 6 | 175 | 178 | | 139 | 46 | 56 | 168 | 1408 | |
| NOx Emissions (g/hr) | 14 | 131 | 1 | 34 | 35 | | 27 | 9 | 11 | 33 | 274 | |
| VOC Emissions (g/hr) | 17 | 156 | 1 | 41 | 41 | | 32 | 11 | 13 | 39 | 326 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 1 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 36 | 211 | 0 | 116 | 103 | | 74 | 34 | 0 | 49 | 395 | |
| Queue Length 95th (ft) | 56 | 308 | 0 | 142 | 80 | | 92 | 41 | 37 | 78 | 423 | |
| Internal Link Dist (ft) | | 472 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | 150 | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 270 | 1804 | 892 | 385 | 492 | | 248 | 505 | 512 | 418 | 1528 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.51 | 0.49 | 0.03 | 0.48 | 0.47 | | 0.50 | 0.10 | 0.19 | 0.44 | 0.80 | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 120 | |

| | |
|---|---|
| Actuated Cycle Length: 120 | |
| Offset: 117 (98%), Referenced to phase 2:SWL and 6:EBL, Start of Green | |
| Natural Cycle: 120 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.80 | |
| Intersection Signal Delay: 25.3 | Intersection LOS: C |
| Intersection Capacity Utilization 60.2% | ICU Level of Service B |
| Analysis Period (min) 15 | |

Splits and Phases: 23: Oak Meadow Dr. & S Royal Oaks

| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 90 | 1063 | 27 | 83 | 64 | 123 | 46 | 58 | 288 | 232 | 1063 | 93 |
| Future Volume (vph) | 90 | 1063 | 27 | 83 | 64 | 123 | 46 | 58 | 288 | 232 | 1063 | 93 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | 1% | | | | | -1% | 2% | | | | -2% | |
| Storage Length (ft) | | 135 | | | 100 | | 120 | 0 | | | 220 | 0 |
| Storage Lanes | | 3 | | | 1 | | 1 | 1 | | | 2 | 0 |
| Taper Length (ft) | | | | | 50 | | 50 | | | | 50 | |
| Lane Util. Factor | 1.00 | 0.88 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 0.95 |
| Frt | | 0.850 | 0.850 | | | | | 0.850 | | | 0.986 | |
| Flt Protected | | | | 0.950 | 0.950 | | 0.950 | | | 0.950 | 0.957 | |
| Satd. Flow (prot) | 1764 | 2707 | 1575 | 1736 | 1754 | 0 | 1752 | 1546 | 0 | 1805 | 3365 | 0 |
| Flt Permitted | 0.166 | | | 0.168 | 0.950 | | 0.670 | | | 0.116 | 0.957 | |
| Satd. Flow (perm) | 293 | 2707 | 1575 | 307 | 1754 | 0 | 1236 | 1546 | 0 | 220 | 3365 | 0 |
| Right Turn on Red | | | Yes | | | | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 124 | | | | | 158 | | | 76 | |
| Link Speed (mph) | 30 | | | | | 30 | 30 | | | | 30 | |
| Link Distance (ft) | 1624 | | | | | 433 | 515 | | | | 792 | |
| Travel Time (s) | 36.9 | | | | | 9.8 | 11.7 | | | | 18.0 | |
| Peak Hour Factor | 0.79 | 0.95 | 0.64 | 0.86 | 0.71 | 0.82 | 0.75 | 0.88 | 0.94 | 0.75 | 0.90 | 0.76 |
| Heavy Vehicles (%) | 0% | 1% | 2% | 1% | 0% | 0% | 2% | 0% | 0% | 1% | 1% | 0% |
| Adj. Flow (vph) | 114 | 1119 | 42 | 97 | 90 | 150 | 61 | 66 | 306 | 309 | 1181 | 122 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 114 | 1119 | 42 | 97 | 90 | 150 | 61 | 372 | 0 | 309 | 1303 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Right | Left | Left | Left | Left | Right | Right | Left | Left | Right |
| Median Width(ft) | 22 | | | | | 22 | 12 | | | | 35 | |
| Link Offset(ft) | 0 | | | | | 0 | 0 | | | | 0 | |
| Crosswalk Width(ft) | 16 | | | | | 16 | 16 | | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 | 0.99 | 1.03 | 0.99 |
| Turning Speed (mph) | | 9 | 9 | 15 | 15 | | 15 | 9 | 9 | 15 | 15 | 9 |
| Number of Detectors | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | 0 | 42 | 42 | 50 | 42 | 42 | | 42 | 226 | |
| Trailing Detector (ft) | -3 | 220 | 0 | -3 | -3 | 0 | -3 | -3 | | -3 | 220 | |
| Detector 1 Position(ft) | -3 | 220 | 0 | -3 | -3 | 0 | -3 | -3 | | -3 | 220 | |
| Detector 1 Size(ft) | 45 | 6 | 50 | 45 | 45 | 50 | 45 | 45 | | 45 | 6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | NA | custom | custom | custom | Prot | NA | D.Pm | Prot | | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | | 4 | 2! | | 8 | | 5 | 2! | |
| Permitted Phases | 6 | | 6 | 8 | | | 4 | | | 2 | | |
| Detector Phase | 1 | 6 | | 8 | 4 | 2 | 4 | 8 | | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |

| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 7.0 | 7.0 | 10.0 | 7.0 | 7.0 | | 5.0 | 10.0 | |
| Minimum Split (s) | 15.0 | 70.0 | 70.0 | 50.0 | 50.0 | 85.0 | 50.0 | 50.0 | | 30.0 | 85.0 | |
| Total Split (s) | 14.0 | 72.0 | 72.0 | 49.0 | 49.0 | 87.0 | 49.0 | 49.0 | | 29.0 | 87.0 | |
| Total Split (%) | 9.3% | 48.0% | 48.0% | 32.7% | 32.7% | 58.0% | 32.7% | 32.7% | | 19.3% | 58.0% | |
| Maximum Green (s) | 7.5 | 66.0 | 66.0 | 42.0 | 42.0 | 81.0 | 42.0 | 42.0 | | 22.5 | 81.0 | |
| Yellow Time (s) | 3.0 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | 2.5 | 3.5 | 3.5 | 2.5 | 3.5 | 3.5 | | 3.5 | 2.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | -3.0 | -2.5 | -2.5 | | -2.5 | -2.5 | | -1.0 | -3.0 | |
| Total Lost Time (s) | 5.5 | 3.0 | 3.0 | 4.5 | 4.5 | | 4.5 | 4.5 | | 5.5 | 3.0 | |
| Lead/Lag | Lead | Lag | Lag | | | Lag | | | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Recall Mode | None | C-Min | C-Min | None | None | C-Min | None | None | | None | C-Min | |
| Walk Time (s) | | 7.0 | 7.0 | 8.0 | 8.0 | 7.0 | 8.0 | 8.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 16.0 | 16.0 | 35.0 | 32.0 | 20.0 | 32.0 | 35.0 | | | 20.0 | |
| Pedestrian Calls (#/hr) | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | |
| Act Effct Green (s) | 84.9 | 79.0 | 79.0 | 36.4 | 36.4 | 0.0 | 36.4 | 36.4 | | 103.6 | 92.2 | |
| Actuated g/C Ratio | 0.57 | 0.53 | 0.53 | 0.24 | 0.24 | 0.00 | 0.24 | 0.24 | | 0.69 | 0.61 | |
| v/c Ratio | 0.46 | 0.79 | 0.05 | 1.31 | 0.21 | no cap | 0.20 | 0.75 | | 0.82 | 0.62 | |
| Control Delay | 17.9 | 35.9 | 0.1 | 250.3 | 44.0 | | 43.8 | 38.5 | | 41.1 | 13.1 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 1.5 | |
| Total Delay | 17.9 | 35.9 | 0.1 | 250.3 | 44.0 | Error | 43.8 | 38.5 | | 41.1 | 14.6 | |
| LOS | B | D | A | F | D | F | D | D | | D | B | |
| Approach Delay | 33.1 | | | | | Err | 39.3 | | | | 19.7 | |
| Approach LOS | C | | | | | F | D | | | | B | |
| 90th %ile Green (s) | 7.5 | 66.0 | 66.0 | 42.0 | 42.0 | 81.0 | 42.0 | 42.0 | | 22.5 | 81.0 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Hold | Coord | Hold | Max | | Max | Coord | |
| 70th %ile Green (s) | 7.5 | 66.0 | 66.0 | 42.0 | 42.0 | 81.0 | 42.0 | 42.0 | | 22.5 | 81.0 | |
| 70th %ile Term Code | Max | Coord | Coord | Max | Hold | Coord | Hold | Max | | Max | Coord | |
| 50th %ile Green (s) | 7.5 | 70.5 | 70.5 | 37.5 | 37.5 | 85.5 | 37.5 | 37.5 | | 22.5 | 85.5 | |
| 50th %ile Term Code | Max | Coord | Coord | Gap | Hold | Coord | Hold | Gap | | Max | Coord | |
| 30th %ile Green (s) | 7.5 | 79.5 | 79.5 | 29.9 | 29.9 | 93.1 | 29.9 | 29.9 | | 21.1 | 93.1 | |
| 30th %ile Term Code | Max | Coord | Coord | Gap | Hold | Coord | Hold | Gap | | Gap | Coord | |
| 10th %ile Green (s) | 6.8 | 98.0 | 98.0 | 18.3 | 18.3 | 105.4 | 18.3 | 18.3 | | 14.2 | 105.4 | |
| 10th %ile Term Code | Gap | Coord | Coord | Gap | Hold | Coord | Hold | Gap | | Gap | Coord | |
| Stops (vph) | 42 | 838 | 0 | 67 | 48 | 0 | 35 | 190 | | 209 | 817 | |
| Fuel Used(gal) | 2 | 26 | 0 | 5 | 1 | 0 | 1 | 5 | | 5 | 15 | |
| CO Emissions (g/hr) | 119 | 1808 | 24 | 341 | 74 | 29 | 55 | 360 | | 317 | 1030 | |
| NOx Emissions (g/hr) | 23 | 352 | 5 | 66 | 14 | 6 | 11 | 70 | | 62 | 200 | |
| VOC Emissions (g/hr) | 28 | 419 | 6 | 79 | 17 | 7 | 13 | 83 | | 73 | 239 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 37 | 530 | 0 | ~114 | 69 | 0 | 46 | 195 | | 162 | 645 | |
| Queue Length 95th (ft) | 58 | #692 | 0 | #214 | 88 | 0 | 70 | 293 | | m114 | m571 | |
| Internal Link Dist (ft) | 1544 | | | | | 353 | 435 | | | | 712 | |
| Turn Bay Length (ft) | | 135 | 135 | 100 | 100 | | 120 | | | 220 | 220 | |
| Base Capacity (vph) | 249 | 1425 | 888 | 91 | 520 | 1 | 366 | 569 | | 400 | 2097 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 558 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |

| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.46 | 0.79 | 0.05 | 1.07 | 0.17 | 150.00 | 0.17 | 0.65 | | 0.77 | 0.85 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 123 (82%), Referenced to phase 2:SBSW and 6:NBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: Err | | | |
| Intersection Signal Delay: Err | | Intersection LOS: F | |
| Intersection Capacity Utilization Err% | | ICU Level of Service H | |
| Analysis Period (min) 15 | | | |

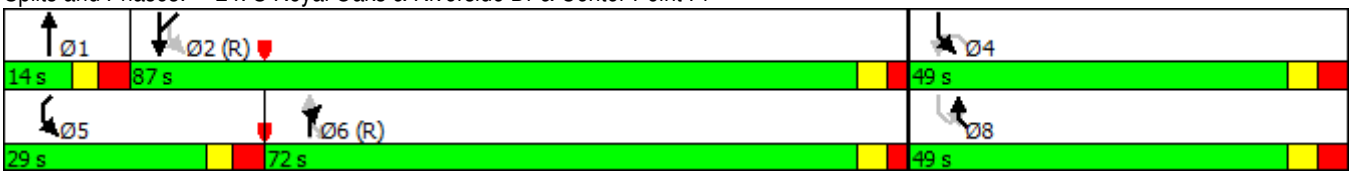
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

! Phase conflict between lane groups.

Splits and Phases: 24: S Royal Oaks & Riverside Dr & Center Point Pl



# HCS 2010 Two-Way Stop Control Summary Report

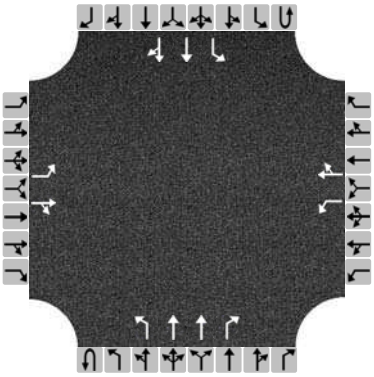
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Background) |

## Site Information

| | |
|---|---|
| Intersection | S. Royal Oaks and Rand |
| Jurisdiction | Franklin, TN |
| East/West Street | Rand Pl / Home Depot |
| North/South Street | S. Royal Oaks Blvd |
| Peak Hour Factor | 0.97 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 1 | 1 | 0 | | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 2 | 0 |
| Configuration | | L | | TR | | L | | TR | | L | T | R | | L | T | TR |
| Volume (veh/h) | | 26 | 1 | 9 | | 14 | 0 | 17 | | 10 | 1388 | 25 | | 61 | 645 | 51 |
| Percent Heavy Vehicles | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left + Thru | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 27 | | 10 | | 14 | | 18 | | 10 | | | | 63 | | |
| Capacity | | 165 | | 416 | | 108 | | 377 | | 893 | | | | 470 | | |
| v/c Ratio | | 0.16 | | 0.02 | | 0.13 | | 0.05 | | 0.01 | | | | 0.13 | | |
| 95% Queue Length | | 0.6 | | 0.1 | | 0.4 | | 0.1 | | 0.0 | | | | 0.5 | | |
| Control Delay (s/veh) | | 31.0 | | 13.9 | | 43.1 | | 15.0 | | 9.1 | | | | 13.8 | | |
| Level of Service (LOS) | | D | | B | | E | | C | | A | | | | B | | |
| Approach Delay (s/veh) | 26.4 | | | | 27.3 | | | | 0.1 | | | | 1.1 | | | |
| Approach LOS | D | | | | D | | | | A | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

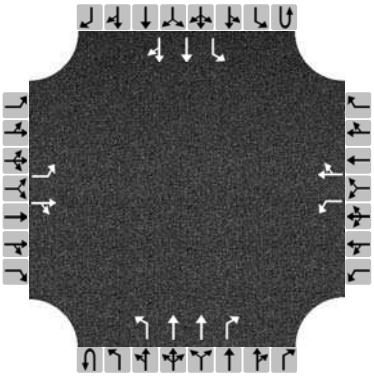
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Background) |

## Site Information

| | |
|---|---|
| Intersection | S. Royal Oaks and Rand |
| Jurisdiction | Franklin, TN |
| East/West Street | Rand Pl / Home Depot |
| North/South Street | S. Royal Oaks Blvd |
| Peak Hour Factor | 0.96 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 1 | 1 | 0 | | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 2 | 0 |
| Configuration | | L | | TR | | L | | TR | | L | T | R | | L | T | TR |
| Volume (veh/h) | | 26 | 3 | 16 | | 21 | 4 | 40 | | 6 | 984 | 17 | | 33 | 965 | 105 |
| Percent Heavy Vehicles | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left + Thru | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 27 | | 20 | | 22 | | 46 | | 6 | | | | 34 | | |
| Capacity | | 150 | | 355 | | 170 | | 419 | | 635 | | | | 675 | | |
| v/c Ratio | | 0.18 | | 0.06 | | 0.13 | | 0.11 | | 0.01 | | | | 0.05 | | |
| 95% Queue Length | | 0.6 | | 0.2 | | 0.4 | | 0.4 | | 0.0 | | | | 0.2 | | |
| Control Delay (s/veh) | | 34.1 | | 15.7 | | 29.2 | | 14.7 | | 10.7 | | | | 10.6 | | |
| Level of Service (LOS) | | D | | C | | D | | B | | B | | | | B | | |
| Approach Delay (s/veh) | 26.3 | | | | 19.4 | | | | 0.1 | | | | 0.3 | | | |
| Approach LOS | D | | | | C | | | | A | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

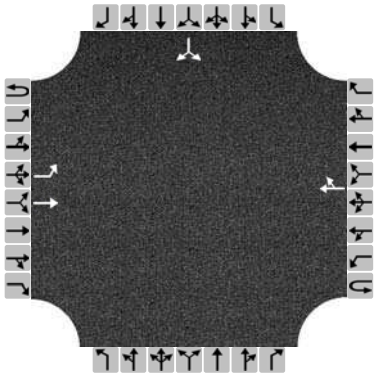
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Background) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and dwy |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Western Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 24 | 48 | | | | 198 | 0 | | | | | | 1 | | 9 |
| Percent Heavy Vehicles | | 0 | | | | | | | | | | | | 0 | | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

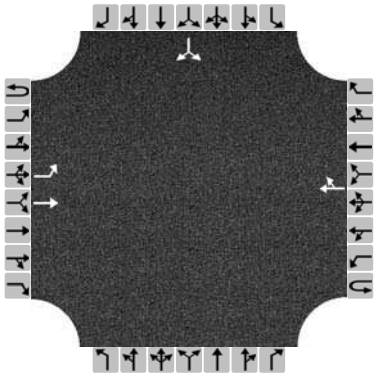
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 30 | | | | | | | | | | | | | 12 | |
| Capacity | | 1330 | | | | | | | | | | | | | 782 | |
| v/c Ratio | | 0.02 | | | | | | | | | | | | | 0.02 | |
| 95% Queue Length | | 0.1 | | | | | | | | | | | | | 0.0 | |
| Control Delay (s/veh) | | 7.8 | | | | | | | | | | | | | 9.7 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | A | |
| Approach Delay (s/veh) | 2.6 | | | | | | | | | | | | 9.7 | | | |
| Approach LOS | A | | | | | | | | | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | FTG | Intersection | Oak Meadow Dr and dwy |
| Agency/Co. | FTG | Jurisdiction | Franklin, TN |
| Date Performed | Mar 2016 | East/West Street | Oak Meadow Drive |
| Analysis Year | 2016 | North/South Street | Western Home Depot dwy |
| Time Analyzed | PM Peak Hour | Peak Hour Factor | 0.80 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | 10728 (Background) | | |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

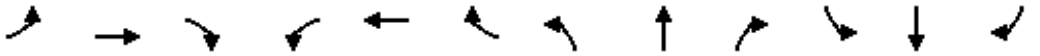
| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 24 | 174 | | | | 179 | 2 | | | | | | 16 | | 33 |
| Percent Heavy Vehicles | | 0 | | | | | | | | | | | | 0 | | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 30 | | | | | | | | | | | | | 61 | |
| Capacity | | 1355 | | | | | | | | | | | | | 726 | |
| v/c Ratio | | 0.02 | | | | | | | | | | | | | 0.08 | |
| 95% Queue Length | | 0.1 | | | | | | | | | | | | | 0.3 | |
| Control Delay (s/veh) | | 7.7 | | | | | | | | | | | | | 10.4 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | B | |
| Approach Delay (s/veh) | 0.9 | | | | | | | | | | | | 10.4 | | | |
| Approach LOS | A | | | | | | | | | | | | B | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

## TOTAL PROJECTED CONDITIONS



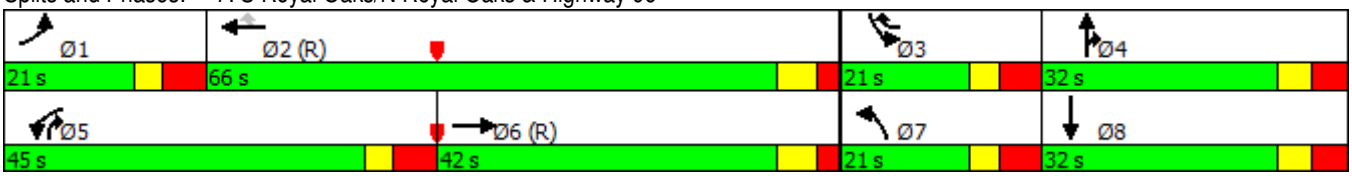
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 112 | 772 | 60 | 849 | 993 | 281 | 99 | 276 | 1060 | 225 | 211 | 82 |
| Future Volume (vph) | 112 | 772 | 60 | 849 | 993 | 281 | 99 | 276 | 1060 | 225 | 211 | 82 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.988 | | | | 0.850 | | | 0.850 | | 0.961 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3241 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3241 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 10 | | | | 147 | | | | | 32 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 350 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 6.0 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.80 | 0.90 | 0.80 | 0.93 | 0.91 | 0.88 | 0.82 | 0.80 | 0.93 | 0.92 | 0.74 | 0.81 |
| Heavy Vehicles (%) | 3% | 6% | 2% | 3% | 6% | 3% | 4% | 2% | 2% | 2% | 4% | 2% |
| Adj. Flow (vph) | 140 | 858 | 75 | 913 | 1091 | 319 | 121 | 345 | 1140 | 245 | 285 | 101 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 140 | 933 | 0 | 913 | 1091 | 319 | 121 | 345 | 1140 | 245 | 386 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

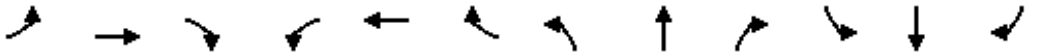
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (%) | 15.0% | 30.0% | | 32.1% | 47.1% | 15.0% | 15.0% | 22.9% | | 15.0% | 22.9% | |
| Maximum Green (s) | 13.5 | 35.5 | | 37.5 | 59.5 | 13.5 | 13.5 | 24.5 | | 13.5 | 24.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 13.5 | 38.4 | | 40.0 | 64.9 | 84.0 | 12.4 | 27.5 | 72.0 | 15.1 | 30.2 | |
| Actuated g/C Ratio | 0.10 | 0.27 | | 0.29 | 0.46 | 0.60 | 0.09 | 0.20 | 0.51 | 0.11 | 0.22 | |
| v/c Ratio | 0.43 | 0.72 | | 0.97 | 0.69 | 0.31 | 0.41 | 0.48 | 0.77 | 0.69 | 0.53 | |
| Control Delay | 63.3 | 49.3 | | 60.9 | 40.3 | 8.7 | 57.6 | 42.1 | 37.4 | 70.7 | 47.9 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 63.3 | 49.3 | | 60.9 | 40.3 | 8.7 | 57.6 | 42.1 | 37.4 | 70.7 | 47.9 | |
| LOS | E | D | | E | D | A | E | D | D | E | D | |
| Approach Delay | | 51.1 | | | 44.0 | | | 40.0 | | | 56.7 | |
| Approach LOS | | D | | | D | | | D | | | E | |
| 90th %ile Green (s) | 13.5 | 35.5 | | 37.5 | 59.5 | 13.5 | 13.3 | 24.5 | | 13.5 | 24.7 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 70th %ile Green (s) | 12.4 | 35.5 | | 37.5 | 60.6 | 13.5 | 11.6 | 24.5 | | 13.5 | 26.4 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 50th %ile Green (s) | 11.2 | 35.5 | | 37.5 | 61.8 | 13.5 | 10.4 | 24.5 | | 13.5 | 27.6 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 30th %ile Green (s) | 9.9 | 35.5 | | 37.5 | 63.1 | 13.5 | 9.2 | 24.5 | | 13.5 | 28.8 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 10th %ile Green (s) | 8.1 | 37.6 | | 37.5 | 67.0 | 11.4 | 7.5 | 24.5 | | 11.4 | 28.4 | |
| 10th %ile Term Code | Gap | Coord | | Max | Coord | Gap | Gap | Max | | Gap | Hold | |
| Stops (vph) | 103 | 730 | | 759 | 946 | 99 | 88 | 239 | 1006 | 214 | 235 | |
| Fuel Used(gal) | 3 | 17 | | 25 | 25 | 4 | 2 | 5 | 20 | 6 | 6 | |
| CO Emissions (g/hr) | 190 | 1223 | | 1736 | 1781 | 262 | 158 | 377 | 1411 | 427 | 444 | |
| NOx Emissions (g/hr) | 37 | 238 | | 338 | 346 | 51 | 31 | 73 | 275 | 83 | 86 | |
| VOC Emissions (g/hr) | 44 | 283 | | 402 | 413 | 61 | 37 | 87 | 327 | 99 | 103 | |
| Dilemma Vehicles (#) | 0 | 29 | | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 62 | 281 | | 419 | 535 | 79 | 51 | 148 | 610 | 112 | 151 | |
| Queue Length 95th (ft) | 85 | 335 | | m#446 | m547 | m123 | m71 | 165 | 680 | 159 | 165 | |
| Internal Link Dist (ft) | | 270 | | | 611 | | | 712 | | | 884 | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 388 | 1293 | | 938 | 1578 | 1035 | 370 | 714 | 1473 | 367 | 723 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.36 | 0.72 | | 0.97 | 0.69 | 0.31 | 0.33 | 0.48 | 0.77 | 0.67 | 0.53 | |

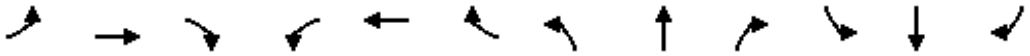
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 116 (83%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.97 | | | |
| Intersection Signal Delay: 45.7 | | Intersection LOS: D | |
| Intersection Capacity Utilization 71.8% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | |
| Queue shown is maximum after two cycles. | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 7: S Royal Oaks/N Royal Oaks & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 1793 | 194 | 111 | 1060 | 0 | 0 | 0 | 0 | 355 | 0 | 1039 |
| Future Volume (vph) | 0 | 1793 | 194 | 111 | 1060 | 0 | 0 | 0 | 0 | 355 | 0 | 1039 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 182 | | | | | | | | | 115 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.91 | 0.90 | 0.86 | 0.87 | 1.00 | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 |
| Heavy Vehicles (%) | 2% | 3% | 7% | 1% | 3% | 2% | 2% | 2% | 2% | 6% | 2% | 3% |
| Adj. Flow (vph) | 0 | 1970 | 216 | 129 | 1218 | 0 | 0 | 0 | 0 | 418 | 0 | 1105 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 1970 | 216 | 129 | 1218 | 0 | 0 | 0 | 0 | 418 | 0 | 1105 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (%) | | 44.3% | 44.3% | 16.4% | 60.7% | | | | | 39.3% | | 39.3% |
| Maximum Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 60.5 | 60.5 | 15.5 | 81.0 | | | | | 49.5 | | 49.5 |
| Actuated g/C Ratio | | 0.43 | 0.43 | 0.11 | 0.58 | | | | | 0.35 | | 0.35 |
| v/c Ratio | | 0.72 | 0.29 | 0.65 | 0.62 | | | | | 0.36 | | 1.09 |
| Control Delay | | 28.3 | 5.1 | 71.7 | 19.3 | | | | | 34.6 | | 94.9 |
| Queue Delay | | 0.8 | 0.0 | 0.0 | 0.3 | | | | | 2.1 | | 0.0 |
| Total Delay | | 29.1 | 5.1 | 71.7 | 19.5 | | | | | 36.7 | | 94.9 |
| LOS | | C | A | E | B | | | | | D | | F |
| Approach Delay | | 26.7 | | | 24.5 | | | | | | | |
| Approach LOS | | C | | | C | | | | | | | |
| 90th %ile Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| 90th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 70th %ile Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| 70th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 50th %ile Green (s) | | 57.6 | 57.6 | 15.4 | 79.0 | | | | | 47.5 | | 47.5 |
| 50th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| 30th %ile Green (s) | | 59.8 | 59.8 | 13.2 | 79.0 | | | | | 47.5 | | 47.5 |
| 30th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| 10th %ile Green (s) | | 63.2 | 63.2 | 9.8 | 79.0 | | | | | 47.5 | | 47.5 |
| 10th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| Stops (vph) | | 1194 | 39 | 111 | 497 | | | | | 256 | | 836 |
| Fuel Used(gal) | | 37 | 2 | 3 | 13 | | | | | 6 | | 31 |
| CO Emissions (g/hr) | | 2555 | 150 | 219 | 912 | | | | | 431 | | 2177 |
| NOx Emissions (g/hr) | | 497 | 29 | 43 | 177 | | | | | 84 | | 423 |
| VOC Emissions (g/hr) | | 592 | 35 | 51 | 211 | | | | | 100 | | 504 |
| Dilemma Vehicles (#) | | 50 | 0 | 0 | 34 | | | | | 0 | | 0 |
| Queue Length 50th (ft) | | 359 | 28 | 125 | 283 | | | | | 144 | | ~602 |
| Queue Length 95th (ft) | | 408 | m46 | m162 | m296 | | | | | 178 | | #754 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2743 | 755 | 229 | 1960 | | | | | 1162 | | 1012 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 216 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 426 | 0 | 0 | 0 | | | | | 581 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.85 | 0.29 | 0.56 | 0.70 | | | | | 0.72 | | 1.09 |

Intersection Summary

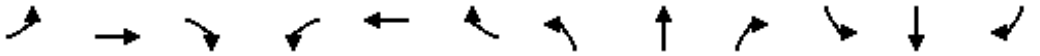
| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 106 (76%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.09 | | | |
| Intersection Signal Delay: 41.9 | | Intersection LOS: D | |
| Intersection Capacity Utilization 108.8% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

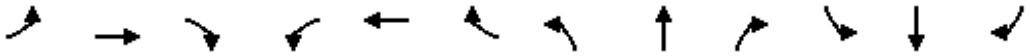
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1386 | 762 | 0 | 0 | 762 | 1217 | 409 | 0 | 364 | 0 | 0 | 0 |
| Future Volume (vph) | 1386 | 762 | 0 | 0 | 762 | 1217 | 409 | 0 | 364 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 23 | | | 251 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 1845 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 31.4 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.88 | 0.86 | 0.95 | 1.00 | 0.95 | 0.98 | 0.95 | 0.25 | 0.92 | 1.00 | 1.00 | 0.95 |
| Heavy Vehicles (%) | 2% | 5% | 2% | 2% | 2% | 1% | 2% | 0% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 1575 | 886 | 0 | 0 | 802 | 1242 | 431 | 0 | 396 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 1575 | 886 | 0 | 0 | 802 | 1242 | 431 | 0 | 396 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (%) | 40.0% | 82.9% | | | 42.9% | | 17.1% | | 17.1% | | | |
| Maximum Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 50.0 | 110.0 | | | 53.5 | 79.5 | 16.5 | | 16.5 | | | |
| Actuated g/C Ratio | 0.36 | 0.79 | | | 0.38 | 0.57 | 0.12 | | 0.12 | | | |
| v/c Ratio | 1.34 | 0.34 | | | 0.59 | 0.77 | 1.11 | | 0.96 | | | |
| Control Delay | 206.7 | 3.4 | | | 36.8 | 27.0 | 133.3 | | 57.3 | | | |
| Queue Delay | 0.7 | 0.1 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 207.3 | 3.5 | | | 36.8 | 27.0 | 133.3 | | 57.3 | | | |
| LOS | F | A | | | D | C | F | | E | | | |
| Approach Delay | | 133.9 | | | 30.8 | | | | | | | |
| Approach LOS | | F | | | C | | | | | | | |
| 90th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 90th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 70th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 70th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 50th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 50th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 30th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 30th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 10th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 10th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| Stops (vph) | 1009 | 107 | | | 593 | 899 | 349 | | 119 | | | |
| Fuel Used(gal) | 73 | 4 | | | 21 | 31 | 15 | | 7 | | | |
| CO Emissions (g/hr) | 5135 | 311 | | | 1473 | 2149 | 1036 | | 477 | | | |
| NOx Emissions (g/hr) | 999 | 60 | | | 287 | 418 | 202 | | 93 | | | |
| VOC Emissions (g/hr) | 1190 | 72 | | | 341 | 498 | 240 | | 111 | | | |
| Dilemma Vehicles (#) | 0 | 18 | | | 27 | 0 | 0 | | 0 | | | |
| Queue Length 50th (ft) | ~957 | 67 | | | 305 | 468 | ~230 | | 143 | | | |
| Queue Length 95th (ft) | #1083 | 75 | | | 373 | 573 | #340 | | #353 | | | |
| Internal Link Dist (ft) | | 476 | | | 1765 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1179 | 2598 | | | 1352 | 1607 | 389 | | 413 | | | |
| Starvation Cap Reductn | 163 | 623 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 1.55 | 0.45 | | | 0.59 | 0.77 | 1.11 | | 0.96 | | | |

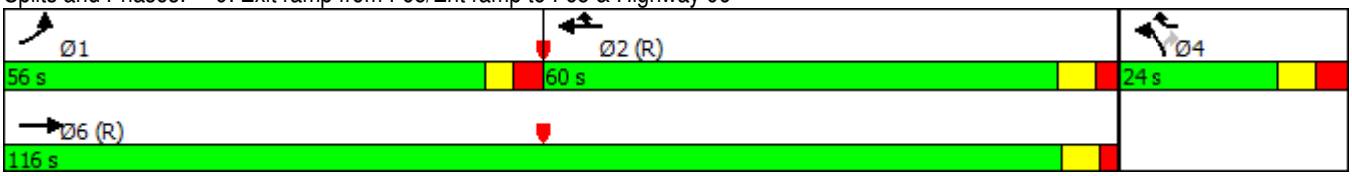
Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 122 (87%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.34 | | | |
| Intersection Signal Delay: 88.7 | | Intersection LOS: F | |
| Intersection Capacity Utilization 108.8% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



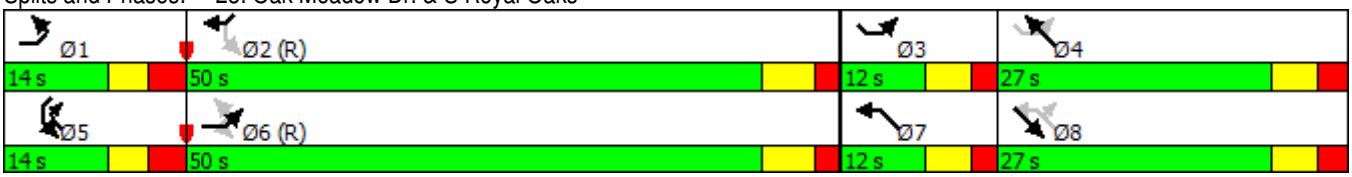
| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 87 | 1120 | 35 | 129 | 10 | 71 | 43 | 30 | 229 | 50 | 515 | 73 |
| Future Volume (vph) | 87 | 1120 | 35 | 129 | 10 | 71 | 43 | 30 | 229 | 50 | 515 | 73 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 3 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | | 0.850 | | 0.872 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.950 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 3319 | 1531 | 1711 | 1570 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.275 | 0.950 | | 0.723 | | | 0.529 | | | 0.170 | | |
| Satd. Flow (perm) | 444 | 3319 | 1531 | 1302 | 1570 | 0 | 985 | 1925 | 1583 | 317 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 154 | | 97 | | | | 90 | | 154 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 1875 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 42.6 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 130 | 1191 | 56 | 163 | 17 | 97 | 57 | 52 | 249 | 67 | 687 | 106 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 130 | 1191 | 56 | 163 | 114 | 0 | 57 | 52 | 249 | 67 | 793 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 30 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | 42 | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | 45 | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | Perm | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | 6 | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | 20.0 | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 13.0 | 26.0 | 26.0 | 12.5 | 20.0 | | 12.5 | 20.0 | 13.0 | 13.0 | 26.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 14.0 | 50.0 | 50.0 | 12.0 | 27.0 | | 12.0 | 27.0 | 14.0 | 14.0 | 50.0 | |
| Total Split (%) | 13.6% | 48.5% | 48.5% | 11.7% | 26.2% | | 11.7% | 26.2% | 13.6% | 13.6% | 48.5% | |
| Maximum Green (s) | 8.0 | 44.0 | 44.0 | 6.5 | 21.0 | | 6.5 | 21.0 | 8.0 | 8.0 | 44.0 | |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | -1.5 | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | 4.5 | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | 5.0 | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | C-Min | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 71.4 | 60.5 | 60.5 | 19.4 | 11.7 | | 19.4 | 11.7 | 24.9 | 71.1 | 60.4 | |
| Actuated g/C Ratio | 0.69 | 0.59 | 0.59 | 0.19 | 0.11 | | 0.19 | 0.11 | 0.24 | 0.69 | 0.59 | |
| v/c Ratio | 0.32 | 0.61 | 0.06 | 0.58 | 0.43 | | 0.22 | 0.24 | 0.55 | 0.19 | 0.47 | |
| Control Delay | 7.3 | 16.5 | 0.1 | 43.1 | 16.8 | | 32.7 | 43.5 | 26.1 | 6.5 | 11.4 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 7.3 | 16.5 | 0.1 | 43.1 | 16.8 | | 32.7 | 43.5 | 26.1 | 6.5 | 11.4 | |
| LOS | A | B | A | D | B | | C | D | C | A | B | |
| Approach Delay | | 14.9 | | | 32.3 | | | 29.7 | | 11.1 | | |
| Approach LOS | | B | | | C | | | C | | B | | |
| 90th %ile Green (s) | 8.0 | 52.4 | 52.4 | 6.5 | 12.7 | | 6.5 | 12.7 | 7.9 | 7.9 | 52.3 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Gap | Gap | Coord | |
| 70th %ile Green (s) | 7.7 | 56.1 | 56.1 | 6.5 | 9.9 | | 6.5 | 9.9 | 7.0 | 7.0 | 55.4 | |
| 70th %ile Term Code | Gap | Coord | Coord | Max | Hold | | Max | Gap | Min | Min | Coord | |
| 50th %ile Green (s) | 7.0 | 57.3 | 57.3 | 6.5 | 8.7 | | 6.5 | 8.7 | 7.0 | 7.0 | 57.3 | |
| 50th %ile Term Code | Min | Coord | Coord | Max | Hold | | Max | Gap | Min | Min | Coord | |
| 30th %ile Green (s) | 7.0 | 58.4 | 58.4 | 6.5 | 7.6 | | 6.5 | 7.6 | 7.0 | 7.0 | 58.4 | |
| 30th %ile Term Code | Min | Coord | Coord | Max | Hold | | Max | Gap | Min | Min | Coord | |
| 10th %ile Green (s) | 7.0 | 71.0 | 71.0 | 7.5 | 7.0 | | 0.0 | 0.0 | 7.0 | 7.0 | 71.0 | |
| 10th %ile Term Code | Min | Coord | Coord | Hold | Min | | Skip | Skip | Min | Min | Coord | |
| Stops (vph) | 27 | 708 | 0 | 114 | 21 | | 32 | 27 | 127 | 16 | 268 | |
| Fuel Used(gal) | 2 | 24 | 1 | 2 | 1 | | 1 | 1 | 4 | 1 | 10 | |
| CO Emissions (g/hr) | 108 | 1680 | 36 | 165 | 60 | | 61 | 50 | 272 | 55 | 720 | |
| NOx Emissions (g/hr) | 21 | 327 | 7 | 32 | 12 | | 12 | 10 | 53 | 11 | 140 | |
| VOC Emissions (g/hr) | 25 | 389 | 8 | 38 | 14 | | 14 | 12 | 63 | 13 | 167 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 1 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 24 | 254 | 0 | 92 | 10 | | 30 | 32 | 91 | 12 | 129 | |
| Queue Length 95th (ft) | 35 | 361 | 0 | 126 | 17 | | 50 | 42 | 161 | 23 | 149 | |
| Internal Link Dist (ft) | | 1795 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | 150 | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 421 | 1950 | 963 | 281 | 433 | | 254 | 439 | 462 | 369 | 1697 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.31 | 0.61 | 0.06 | 0.58 | 0.26 | | 0.22 | 0.12 | 0.54 | 0.18 | 0.47 | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 103 | |

| | |
|---|---|
| Actuated Cycle Length: 103 | |
| Offset: 0 (0%), Referenced to phase 2:SWL and 6:EBL, Start of Green | |
| Natural Cycle: 80 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.61 | |
| Intersection Signal Delay: 17.3 | Intersection LOS: B |
| Intersection Capacity Utilization 62.0% | ICU Level of Service B |
| Analysis Period (min) 15 | |

Splits and Phases: 23: Oak Meadow Dr. & S Royal Oaks



| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 28 | 1280 | 103 | 6 | 46 | 41 | 33 | 12 | 123 | 277 | 764 | 25 |
| Future Volume (vph) | 28 | 1280 | 103 | 6 | 46 | 41 | 33 | 12 | 123 | 277 | 764 | 25 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | 1% | | | | | -1% | 2% | | | | -2% | |
| Storage Length (ft) | | 135 | | | 100 | | 120 | 0 | | | 220 | 0 |
| Storage Lanes | | 3 | | | 1 | | 1 | 1 | | | 2 | 0 |
| Taper Length (ft) | | | | | 50 | | 50 | | | | 50 | |
| Lane Util. Factor | 1.00 | 0.88 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 0.95 |
| Frt | | 0.850 | 0.850 | | | | | 0.850 | | | 0.993 | |
| Flt Protected | | | | 0.950 | 0.950 | | 0.950 | | | 0.950 | 0.954 | |
| Satd. Flow (prot) | 1764 | 2707 | 1607 | 1754 | 1580 | 0 | 1787 | 1489 | 0 | 1787 | 3339 | 0 |
| Flt Permitted | 0.344 | | | 0.294 | 0.950 | | 0.691 | | | 0.119 | 0.954 | |
| Satd. Flow (perm) | 607 | 2707 | 1607 | 543 | 1580 | 0 | 1300 | 1489 | 0 | 224 | 3339 | 0 |
| Right Turn on Red | | | Yes | | | | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 82 | | | | | 143 | | | 82 | |
| Link Speed (mph) | 30 | | | | | 30 | 30 | | | | 30 | |
| Link Distance (ft) | 1624 | | | | | 433 | 515 | | | | 792 | |
| Travel Time (s) | 36.9 | | | | | 9.8 | 11.7 | | | | 18.0 | |
| Peak Hour Factor | 0.63 | 0.92 | 0.87 | 0.58 | 0.68 | 0.77 | 0.67 | 0.63 | 0.86 | 0.80 | 0.99 | 0.67 |
| Heavy Vehicles (%) | 0% | 1% | 0% | 0% | 11% | 0% | 0% | 10% | 3% | 2% | 2% | 4% |
| Adj. Flow (vph) | 44 | 1391 | 118 | 10 | 68 | 53 | 49 | 19 | 143 | 346 | 772 | 37 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 44 | 1391 | 118 | 10 | 68 | 53 | 49 | 162 | 0 | 346 | 809 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Right | Left | Left | Left | Left | Right | Right | Left | Left | Right |
| Median Width(ft) | 22 | | | | | 22 | 12 | | | | 35 | |
| Link Offset(ft) | 0 | | | | | 0 | 0 | | | | 0 | |
| Crosswalk Width(ft) | 16 | | | | | 16 | 16 | | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 | 0.99 | 1.03 | 0.99 |
| Turning Speed (mph) | | 9 | 9 | 15 | 15 | | 15 | 9 | 9 | 15 | 15 | 9 |
| Number of Detectors | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | 0 | 42 | 42 | 50 | 42 | 42 | | 42 | 226 | |
| Trailing Detector (ft) | -3 | 220 | 0 | -3 | -3 | 0 | -3 | -3 | | -3 | 220 | |
| Detector 1 Position(ft) | -3 | 220 | 0 | -3 | -3 | 0 | -3 | -3 | | -3 | 220 | |
| Detector 1 Size(ft) | 45 | 6 | 50 | 45 | 45 | 50 | 45 | 45 | | 45 | 6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | NA | custom | custom | custom | Prot | NA | D.Pm | Prot | | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | | 4 | | | 8 | | 5 | 2 | |
| Permitted Phases | 6 | | 6 | 8 | | | 4 | | | 2 | | |
| Detector Phase | 1 | 6 | | 8 | 4 | | 4 | 8 | | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |

| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 7.0 | 7.0 | | 7.0 | 7.0 | | 5.0 | 10.0 | |
| Minimum Split (s) | 17.0 | 73.0 | 73.0 | 50.0 | 50.0 | | 50.0 | 50.0 | | 17.0 | 73.0 | |
| Total Split (s) | 17.0 | 73.0 | 73.0 | 50.0 | 50.0 | | 50.0 | 50.0 | | 17.0 | 73.0 | |
| Total Split (%) | 12.1% | 52.1% | 52.1% | 35.7% | 35.7% | | 35.7% | 35.7% | | 12.1% | 52.1% | |
| Maximum Green (s) | 10.5 | 67.0 | 67.0 | 43.0 | 43.0 | | 43.0 | 43.0 | | 10.5 | 67.0 | |
| Yellow Time (s) | 3.0 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | 2.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 2.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | -3.0 | -2.5 | -2.5 | | -2.5 | -2.5 | | -1.0 | -3.0 | |
| Total Lost Time (s) | 5.5 | 3.0 | 3.0 | 4.5 | 4.5 | | 4.5 | 4.5 | | 5.5 | 3.0 | |
| Lead/Lag | Lead | Lag | Lag | | | | | | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Recall Mode | None | C-Min | C-Min | None | None | | None | None | | None | C-Min | |
| Walk Time (s) | | 7.0 | 7.0 | 8.0 | 8.0 | | 8.0 | 8.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 16.0 | 16.0 | 35.0 | 32.0 | | 32.0 | 35.0 | | | 20.0 | |
| Pedestrian Calls (#/hr) | | 0 | 0 | 0 | 0 | | 0 | 0 | | | 0 | |
| Act Effct Green (s) | 106.2 | 101.1 | 101.1 | 14.4 | 14.4 | 0.0 | 14.4 | 14.4 | | 114.1 | 107.4 | |
| Actuated g/C Ratio | 0.76 | 0.72 | 0.72 | 0.10 | 0.10 | 0.00 | 0.10 | 0.10 | | 0.82 | 0.77 | |
| v/c Ratio | 0.08 | 0.71 | 0.10 | 0.18 | 0.42 | no cap | 0.37 | 0.58 | | 1.12 | 0.31 | |
| Control Delay | 3.3 | 14.3 | 2.6 | 63.2 | 65.8 | | 65.1 | 20.5 | | 96.3 | 8.7 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 3.3 | 14.3 | 2.6 | 63.2 | 65.8 | Error | 65.1 | 20.5 | | 96.3 | 8.7 | |
| LOS | A | B | A | E | E | F | E | C | | F | A | |
| Approach Delay | 13.1 | | | | | Err | 30.9 | | | | 34.9 | |
| Approach LOS | B | | | | | F | C | | | | C | |
| 90th %ile Green (s) | 7.5 | 93.3 | 93.3 | 16.7 | 16.7 | | 16.7 | 16.7 | | 10.5 | 96.3 | |
| 90th %ile Term Code | Gap | Coord | Coord | Hold | Gap | | Gap | Hold | | Max | Coord | |
| 70th %ile Green (s) | 6.9 | 96.2 | 96.2 | 13.8 | 13.8 | | 13.8 | 13.8 | | 10.5 | 99.8 | |
| 70th %ile Term Code | Gap | Coord | Coord | Hold | Gap | | Gap | Hold | | Max | Coord | |
| 50th %ile Green (s) | 6.6 | 98.1 | 98.1 | 11.9 | 11.9 | | 11.9 | 11.9 | | 10.5 | 102.0 | |
| 50th %ile Term Code | Gap | Coord | Coord | Hold | Gap | | Gap | Hold | | Max | Coord | |
| 30th %ile Green (s) | 6.3 | 100.0 | 100.0 | 10.0 | 10.0 | | 10.0 | 10.0 | | 10.5 | 104.2 | |
| 30th %ile Term Code | Gap | Coord | Coord | Hold | Gap | | Gap | Hold | | Max | Coord | |
| 10th %ile Green (s) | 0.0 | 102.8 | 102.8 | 7.2 | 7.2 | | 7.2 | 7.2 | | 10.5 | 119.8 | |
| 10th %ile Term Code | Skip | Coord | Coord | Hold | Hold | | Hold | Hold | | Max | Coord | |
| Stops (vph) | 6 | 714 | 11 | 7 | 41 | 0 | 30 | 28 | | 165 | 524 | |
| Fuel Used(gal) | 0 | 24 | 1 | 0 | 1 | 0 | 1 | 1 | | 8 | 9 | |
| CO Emissions (g/hr) | 28 | 1668 | 99 | 10 | 70 | 10 | 51 | 88 | | 563 | 641 | |
| NOx Emissions (g/hr) | 6 | 325 | 19 | 2 | 14 | 2 | 10 | 17 | | 110 | 125 | |
| VOC Emissions (g/hr) | 7 | 387 | 23 | 2 | 16 | 2 | 12 | 20 | | 130 | 148 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 6 | 372 | 8 | 8 | 59 | 0 | 42 | 16 | | ~186 | 175 | |
| Queue Length 95th (ft) | 10 | 525 | 28 | 17 | 79 | 0 | 61 | 21 | | m#233 | m339 | |
| Internal Link Dist (ft) | 1544 | | | | | 353 | 435 | | | | 712 | |
| Turn Bay Length (ft) | | 135 | 135 | 100 | 100 | | 120 | | | 220 | 220 | |
| Base Capacity (vph) | 572 | 1954 | 1182 | 176 | 513 | 1 | 422 | 580 | | 310 | 2580 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |

| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.08 | 0.71 | 0.10 | 0.06 | 0.13 | 53.00 | 0.12 | 0.28 | | 1.12 | 0.31 | |

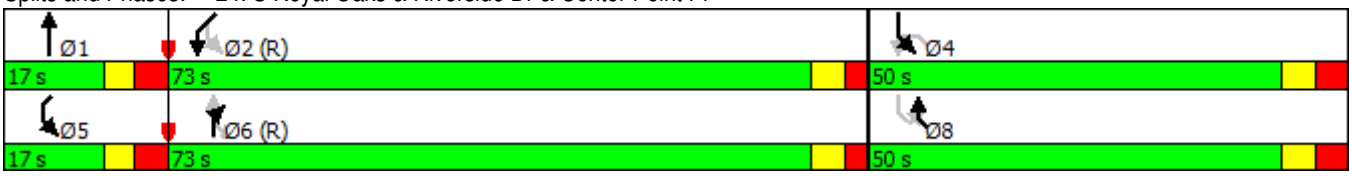
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 139 (99%), Referenced to phase 2:SWL and 6:NBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: Err | | | |
| Intersection Signal Delay: Err | | Intersection LOS: F | |
| Intersection Capacity Utilization Err% | | ICU Level of Service H | |
| Analysis Period (min) 15 | | | |

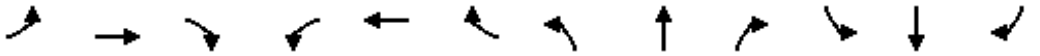
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

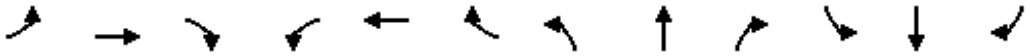
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 24: S Royal Oaks & Riverside Dr & Center Point Pl





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 206 | 1108 | 63 | 985 | 1174 | 269 | 141 | 371 | 1002 | 316 | 469 | 178 |
| Future Volume (vph) | 206 | 1108 | 63 | 985 | 1174 | 269 | 141 | 371 | 1002 | 316 | 469 | 178 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.991 | | | | 0.850 | | | 0.850 | | 0.953 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3326 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3326 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 7 | | | | 87 | | | | | 43 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 350 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 6.0 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.92 | 0.93 | 0.81 | 0.87 | 0.91 | 0.89 | 0.74 | 0.83 | 0.89 | 0.83 | 0.95 | 0.80 |
| Heavy Vehicles (%) | 1% | 1% | 0% | 1% | 2% | 1% | 0% | 0% | 1% | 0% | 0% | 0% |
| Adj. Flow (vph) | 224 | 1191 | 78 | 1132 | 1290 | 302 | 191 | 447 | 1126 | 381 | 494 | 223 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 224 | 1269 | 0 | 1132 | 1290 | 302 | 191 | 447 | 1126 | 381 | 717 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

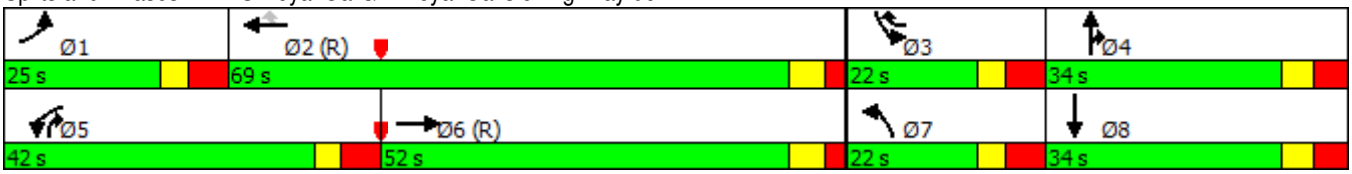


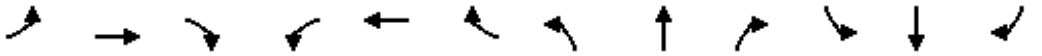
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (%) | 16.7% | 34.7% | | 28.0% | 46.0% | 14.7% | 14.7% | 22.7% | | 14.7% | 22.7% | |
| Maximum Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 17.3 | 48.0 | | 37.0 | 67.7 | 88.2 | 14.9 | 29.5 | 71.0 | 16.5 | 31.1 | |
| Actuated g/C Ratio | 0.12 | 0.32 | | 0.25 | 0.45 | 0.59 | 0.10 | 0.20 | 0.47 | 0.11 | 0.21 | |
| v/c Ratio | 0.56 | 0.80 | | 1.37 | 0.81 | 0.30 | 0.55 | 0.61 | 0.82 | 1.02 | 0.99 | |
| Control Delay | 68.2 | 51.1 | | 205.9 | 49.2 | 16.7 | 56.0 | 47.5 | 54.4 | 117.0 | 86.1 | |
| Queue Delay | 0.0 | 0.3 | | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.6 | |
| Total Delay | 68.2 | 51.4 | | 206.1 | 49.2 | 16.7 | 56.0 | 47.5 | 54.6 | 117.0 | 86.7 | |
| LOS | E | D | | F | D | B | E | D | D | F | F | |
| Approach Delay | | 53.9 | | | 110.8 | | | 53.0 | | | 97.2 | |
| Approach LOS | | D | | | F | | | D | | | F | |
| 90th %ile Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | Max | Max | Max | | Max | Max | |
| 70th %ile Green (s) | 16.7 | 45.5 | | 34.5 | 63.3 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | Max | Max | Max | | Max | Max | |
| 50th %ile Green (s) | 15.1 | 45.5 | | 34.5 | 64.9 | 14.5 | 13.5 | 26.5 | | 14.5 | 27.5 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 30th %ile Green (s) | 13.4 | 45.5 | | 34.5 | 66.6 | 14.5 | 12.0 | 26.5 | | 14.5 | 29.0 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 10th %ile Green (s) | 11.1 | 45.5 | | 34.5 | 68.9 | 14.5 | 9.8 | 26.5 | | 14.5 | 31.2 | |
| 10th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| Stops (vph) | 189 | 1046 | | 761 | 1064 | 208 | 128 | 336 | 976 | 280 | 542 | |
| Fuel Used(gal) | 5 | 25 | | 57 | 32 | 5 | 3 | 8 | 23 | 11 | 19 | |
| CO Emissions (g/hr) | 364 | 1765 | | 3965 | 2216 | 359 | 223 | 541 | 1585 | 800 | 1343 | |
| NOx Emissions (g/hr) | 71 | 343 | | 771 | 431 | 70 | 43 | 105 | 308 | 156 | 261 | |
| VOC Emissions (g/hr) | 84 | 409 | | 919 | 514 | 83 | 52 | 125 | 367 | 185 | 311 | |
| Dilemma Vehicles (#) | 0 | 39 | | 0 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 108 | 415 | | ~771 | 582 | 140 | 86 | 215 | 651 | ~203 | ~360 | |
| Queue Length 95th (ft) | 151 | 475 | | m#573 | m517 | m125 | m100 | m252 | m717 | #272 | #512 | |
| Internal Link Dist (ft) | | 270 | | | 611 | | | 712 | | | 884 | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 462 | 1580 | | 826 | 1598 | 1007 | 383 | 730 | 1369 | 372 | 724 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 48 | | 40 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.48 | 0.83 | | 1.44 | 0.81 | 0.30 | 0.50 | 0.61 | 0.84 | 1.02 | 0.99 | |

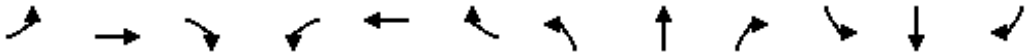
| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 150 | |
| Actuated Cycle Length: 150 | |
| Offset: 133 (89%), Referenced to phase 2:WBT and 6:EBT, Start of Green | |
| Natural Cycle: 150 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 1.37 | |
| Intersection Signal Delay: 82.3 | Intersection LOS: F |
| Intersection Capacity Utilization 90.4% | ICU Level of Service E |
| Analysis Period (min) 15 | |
| ~ Volume exceeds capacity, queue is theoretically infinite. | |
| Queue shown is maximum after two cycles. | |
| # 95th percentile volume exceeds capacity, queue may be longer. | |
| Queue shown is maximum after two cycles. | |
| m Volume for 95th percentile queue is metered by upstream signal. | |

Splits and Phases: 7: S Royal Oaks/N Royal Oaks & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 2005 | 488 | 285 | 928 | 0 | 0 | 0 | 0 | 914 | 0 | 1455 |
| Future Volume (vph) | 0 | 2005 | 488 | 285 | 928 | 0 | 0 | 0 | 0 | 914 | 0 | 1455 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 399 | | | | | | | | | 134 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.93 | 0.78 | 0.71 | 0.86 | 1.00 | 1.00 | 1.00 | 1.00 | 0.87 | 1.00 | 0.88 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 1% | 1% | 2% | 2% | 2% | 2% | 1% | 2% | 1% |
| Adj. Flow (vph) | 0 | 2156 | 626 | 401 | 1079 | 0 | 0 | 0 | 0 | 1051 | 0 | 1653 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 2156 | 626 | 401 | 1079 | 0 | 0 | 0 | 0 | 1051 | 0 | 1653 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (%) | | 36.7% | 36.7% | 20.0% | 56.7% | | | | | 43.3% | | 43.3% |
| Maximum Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 51.0 | 51.0 | 25.0 | 81.0 | | | | | 59.5 | | 59.5 |
| Actuated g/C Ratio | | 0.34 | 0.34 | 0.17 | 0.54 | | | | | 0.40 | | 0.40 |
| v/c Ratio | | 0.99 | 0.78 | 1.35 | 0.58 | | | | | 0.77 | | 1.43 |
| Control Delay | | 72.5 | 30.8 | 226.2 | 26.7 | | | | | 43.9 | | 231.7 |
| Queue Delay | | 1.3 | 0.0 | 0.0 | 0.9 | | | | | 1.8 | | 0.0 |
| Total Delay | | 73.8 | 30.8 | 226.2 | 27.6 | | | | | 45.7 | | 231.7 |
| LOS | | E | C | F | C | | | | | D | | F |
| Approach Delay | | 64.1 | | | 81.4 | | | | | | | |
| Approach LOS | | E | | | F | | | | | | | |
| 90th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 90th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 70th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 70th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 50th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 50th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 30th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 30th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 10th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 10th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| Stops (vph) | | 1879 | 525 | 223 | 503 | | | | | 776 | | 1000 |
| Fuel Used(gal) | | 64 | 12 | 16 | 13 | | | | | 18 | | 83 |
| CO Emissions (g/hr) | | 4492 | 850 | 1146 | 943 | | | | | 1262 | | 5836 |
| NOx Emissions (g/hr) | | 874 | 165 | 223 | 184 | | | | | 246 | | 1135 |
| VOC Emissions (g/hr) | | 1041 | 197 | 266 | 219 | | | | | 292 | | 1353 |
| Dilemma Vehicles (#) | | 105 | 0 | 0 | 52 | | | | | 0 | | 0 |
| Queue Length 50th (ft) | | 639 | 325 | ~525 | 290 | | | | | 457 | | ~1200 |
| Queue Length 95th (ft) | | m#695 | m294 | #521 | 433 | | | | | 515 | | #1305 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2178 | 801 | 297 | 1865 | | | | | 1368 | | 1154 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 466 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 14 | 0 | 0 | 0 | | | | | 172 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 1.00 | 0.78 | 1.35 | 0.77 | | | | | 0.88 | | 1.43 |

Intersection Summary

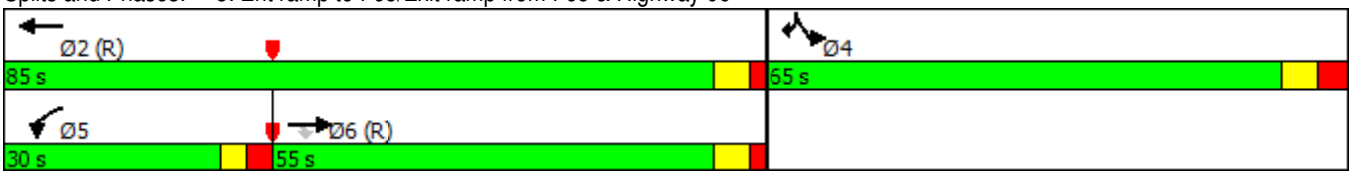
| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 104 (69%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.43 | | | |
| Intersection Signal Delay: 104.8 | | Intersection LOS: F | |
| Intersection Capacity Utilization 84.9% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

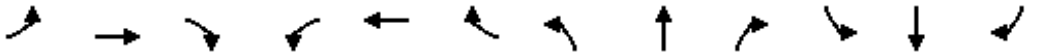
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

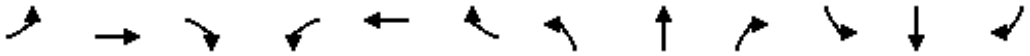
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 622 | 2297 | 0 | 0 | 897 | 998 | 316 | 0 | 164 | 0 | 0 | 0 |
| Future Volume (vph) | 622 | 2297 | 0 | 0 | 897 | 998 | 316 | 0 | 164 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 223 | | | 69 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 1845 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 31.4 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.97 | 0.98 | 1.00 | 0.25 | 0.91 | 0.93 | 0.92 | 1.00 | 0.87 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 3% | 3% | 2% | 0% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 2% |
| Adj. Flow (vph) | 641 | 2344 | 0 | 0 | 986 | 1073 | 343 | 0 | 189 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 641 | 2344 | 0 | 0 | 986 | 1073 | 343 | 0 | 189 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |

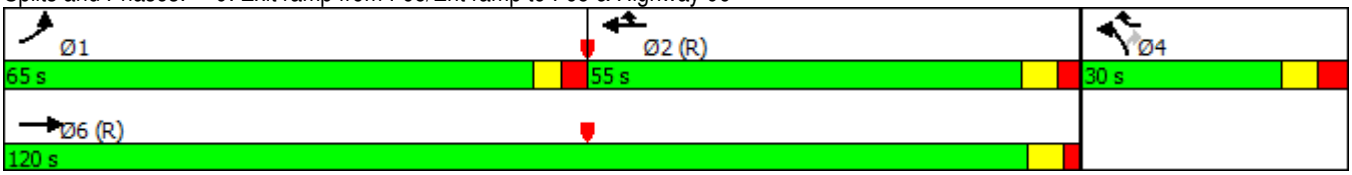


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (%) | 43.3% | 80.0% | | | 36.7% | | 20.0% | | 20.0% | | | |
| Maximum Green (s) | 59.0 | 114.0 | | | 48.5 | | 22.5 | | 22.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 37.4 | 114.6 | | | 70.7 | 102.1 | 21.9 | | 21.9 | | | |
| Actuated g/C Ratio | 0.25 | 0.76 | | | 0.47 | 0.68 | 0.15 | | 0.15 | | | |
| v/c Ratio | 0.79 | 0.91 | | | 0.59 | 0.55 | 0.71 | | 0.65 | | | |
| Control Delay | 79.6 | 23.9 | | | 32.0 | 11.0 | 70.0 | | 48.9 | | | |
| Queue Delay | 0.0 | 5.5 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 79.6 | 29.4 | | | 32.0 | 11.0 | 70.0 | | 48.9 | | | |
| LOS | E | C | | | C | B | E | | D | | | |
| Approach Delay | | 40.2 | | | 21.0 | | | | | | | |
| Approach LOS | | D | | | C | | | | | | | |
| 90th %ile Green (s) | 45.4 | 114.0 | | | 62.1 | | 22.5 | | 22.5 | | | |
| 90th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 70th %ile Green (s) | 41.1 | 114.0 | | | 66.4 | | 22.5 | | 22.5 | | | |
| 70th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 50th %ile Green (s) | 37.3 | 114.0 | | | 70.2 | | 22.5 | | 22.5 | | | |
| 50th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 30th %ile Green (s) | 34.3 | 114.0 | | | 73.2 | | 22.5 | | 22.5 | | | |
| 30th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 10th %ile Green (s) | 29.0 | 117.2 | | | 81.7 | | 19.3 | | 19.3 | | | |
| 10th %ile Term Code | Gap | Coord | | | Coord | | Gap | | Gap | | | |
| Stops (vph) | 611 | 1844 | | | 649 | 398 | 298 | | 100 | | | |
| Fuel Used(gal) | 18 | 38 | | | 23 | 19 | 7 | | 3 | | | |
| CO Emissions (g/hr) | 1288 | 2653 | | | 1639 | 1303 | 524 | | 208 | | | |
| NOx Emissions (g/hr) | 251 | 516 | | | 319 | 253 | 102 | | 40 | | | |
| VOC Emissions (g/hr) | 299 | 615 | | | 380 | 302 | 121 | | 48 | | | |
| Dilemma Vehicles (#) | 0 | 83 | | | 30 | 0 | 0 | | 0 | | | |
| Queue Length 50th (ft) | 344 | 588 | | | 368 | 219 | 166 | | 112 | | | |
| Queue Length 95th (ft) | m343 | m495 | | | 487 | 330 | 222 | | 190 | | | |
| Internal Link Dist (ft) | | 476 | | | 1765 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1286 | 2575 | | | 1668 | 1978 | 495 | | 298 | | | |
| Starvation Cap Reductn | 0 | 200 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 0.50 | 0.99 | | | 0.59 | 0.54 | 0.69 | | 0.63 | | | |

Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 138 (92%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.91 | | | |
| Intersection Signal Delay: 35.2 | | Intersection LOS: D | |
| Intersection Capacity Utilization 84.9% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 92 | 827 | 41 | 147 | 55 | 118 | 104 | 36 | 123 | 196 | 765 | 145 |
| Future Volume (vph) | 92 | 827 | 41 | 147 | 55 | 118 | 104 | 36 | 123 | 196 | 765 | 145 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 3 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | | 0.850 | | 0.905 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.950 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 3319 | 1531 | 1711 | 1630 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.084 | 0.950 | | 0.715 | | | 0.286 | | | 0.253 | | |
| Satd. Flow (perm) | 136 | 3319 | 1531 | 1287 | 1630 | 0 | 533 | 1925 | 1583 | 471 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 132 | | 69 | | | | 134 | | 132 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 552 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 12.5 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 137 | 880 | 65 | 186 | 95 | 162 | 139 | 62 | 134 | 261 | 1020 | 210 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 137 | 880 | 65 | 186 | 257 | 0 | 139 | 62 | 134 | 261 | 1230 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 30 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | 42 | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | 45 | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | Perm | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | 6 | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | 20.0 | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 18.0 | 57.0 | 57.0 | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 18.0 | 57.0 | 57.0 | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |
| Total Split (%) | 15.0% | 47.5% | 47.5% | 11.7% | 29.2% | | 11.7% | 29.2% | 11.7% | 11.7% | 44.2% | |
| Maximum Green (s) | 12.0 | 51.0 | 51.0 | 8.5 | 29.0 | | 8.5 | 29.0 | 8.0 | 8.0 | 47.0 | |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | -1.5 | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | 4.5 | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | 5.0 | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | C-Min | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 74.7 | 61.6 | 61.6 | 34.5 | 22.7 | | 33.9 | 21.7 | 36.6 | 71.3 | 59.8 | |
| Actuated g/C Ratio | 0.62 | 0.51 | 0.51 | 0.29 | 0.19 | | 0.28 | 0.18 | 0.30 | 0.59 | 0.50 | |
| v/c Ratio | 0.60 | 0.52 | 0.08 | 0.44 | 0.71 | | 0.53 | 0.18 | 0.23 | 0.67 | 0.85 | |
| Control Delay | 28.5 | 21.8 | 0.2 | 34.8 | 43.0 | | 37.5 | 39.6 | 5.3 | 21.2 | 31.4 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 28.5 | 21.8 | 0.2 | 34.8 | 43.0 | | 37.5 | 39.6 | 5.3 | 21.2 | 31.4 | |
| LOS | C | C | A | C | D | | D | D | A | C | C | |
| Approach Delay | | 21.3 | | | 39.5 | | | 25.0 | | 29.6 | | |
| Approach LOS | | C | | | D | | | C | | C | | |
| 90th %ile Green (s) | 12.0 | 51.5 | 51.5 | 8.5 | 28.5 | | 8.5 | 28.5 | 8.0 | 8.0 | 47.5 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 70th %ile Green (s) | 12.0 | 56.3 | 56.3 | 8.5 | 23.7 | | 8.5 | 23.7 | 8.0 | 8.0 | 52.3 | |
| 70th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 50th %ile Green (s) | 10.3 | 59.8 | 59.8 | 8.5 | 20.2 | | 8.5 | 20.2 | 8.0 | 8.0 | 57.5 | |
| 50th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 30th %ile Green (s) | 7.7 | 63.2 | 63.2 | 8.5 | 16.8 | | 8.5 | 16.8 | 8.0 | 8.0 | 63.5 | |
| 30th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 10th %ile Green (s) | 7.0 | 69.9 | 69.9 | 24.8 | 11.7 | | 7.1 | 0.0 | 7.8 | 7.8 | 70.7 | |
| 10th %ile Term Code | Min | Coord | Coord | Hold | Gap | | Gap | Skip | Gap | Gap | Coord | |
| Stops (vph) | 47 | 538 | 0 | 113 | 117 | | 76 | 28 | 14 | 91 | 657 | |
| Fuel Used(gal) | 1 | 10 | 0 | 2 | 3 | | 2 | 1 | 1 | 4 | 21 | |
| CO Emissions (g/hr) | 83 | 713 | 12 | 166 | 211 | | 153 | 55 | 72 | 268 | 1466 | |
| NOx Emissions (g/hr) | 16 | 139 | 2 | 32 | 41 | | 30 | 11 | 14 | 52 | 285 | |
| VOC Emissions (g/hr) | 19 | 165 | 3 | 39 | 49 | | 35 | 13 | 17 | 62 | 340 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 2 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 41 | 226 | 0 | 111 | 138 | | 80 | 41 | 0 | 80 | 421 | |
| Queue Length 95th (ft) | 69 | 327 | 0 | 135 | 107 | | 98 | 46 | 40 | 118 | 446 | |
| Internal Link Dist (ft) | | 472 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | 150 | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 255 | 1704 | 850 | 420 | 478 | | 265 | 505 | 577 | 393 | 1455 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.54 | 0.52 | 0.08 | 0.44 | 0.54 | | 0.52 | 0.12 | 0.23 | 0.66 | 0.85 | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 120 | |

| | |
|---|---|
| Actuated Cycle Length: 120 | |
| Offset: 117 (98%), Referenced to phase 2:SWL and 6:EBL, Start of Green | |
| Natural Cycle: 120 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.85 | |
| Intersection Signal Delay: 27.8 | Intersection LOS: C |
| Intersection Capacity Utilization 64.2% | ICU Level of Service C |
| Analysis Period (min) 15 | |

Splits and Phases: 23: Oak Meadow Dr. & S Royal Oaks

| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 90 | 1107 | 27 | 83 | 64 | 123 | 46 | 58 | 302 | 269 | 1133 | 93 |
| Future Volume (vph) | 90 | 1107 | 27 | 83 | 64 | 123 | 46 | 58 | 302 | 269 | 1133 | 93 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | 1% | | | | | -1% | 2% | | | | -2% | |
| Storage Length (ft) | | 135 | | | 100 | | 120 | 0 | | | 220 | 0 |
| Storage Lanes | | 3 | | | 1 | | 1 | 1 | | | 2 | 0 |
| Taper Length (ft) | | | | | 50 | | 50 | | | | 50 | |
| Lane Util. Factor | 1.00 | 0.88 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 0.95 |
| Frt | | 0.850 | 0.850 | | | | | 0.850 | | | 0.987 | |
| Flt Protected | | | | 0.950 | 0.950 | | 0.950 | | | 0.950 | 0.956 | |
| Satd. Flow (prot) | 1764 | 2707 | 1575 | 1736 | 1754 | 0 | 1752 | 1546 | 0 | 1805 | 3365 | 0 |
| Flt Permitted | 0.144 | | | 0.167 | 0.950 | | 0.673 | | | 0.093 | 0.956 | |
| Satd. Flow (perm) | 254 | 2707 | 1575 | 305 | 1754 | 0 | 1241 | 1546 | 0 | 177 | 3365 | 0 |
| Right Turn on Red | | | Yes | | | | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 124 | | | | | 166 | | | 76 | |
| Link Speed (mph) | 30 | | | | | 30 | 30 | | | | 30 | |
| Link Distance (ft) | 1624 | | | | | 433 | 515 | | | | 792 | |
| Travel Time (s) | 36.9 | | | | | 9.8 | 11.7 | | | | 18.0 | |
| Peak Hour Factor | 0.79 | 0.95 | 0.64 | 0.86 | 0.71 | 0.82 | 0.75 | 0.88 | 0.94 | 0.75 | 0.90 | 0.76 |
| Heavy Vehicles (%) | 0% | 1% | 2% | 1% | 0% | 0% | 2% | 0% | 0% | 1% | 1% | 0% |
| Adj. Flow (vph) | 114 | 1165 | 42 | 97 | 90 | 150 | 61 | 66 | 321 | 359 | 1259 | 122 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 114 | 1165 | 42 | 97 | 90 | 150 | 61 | 387 | 0 | 359 | 1381 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Right | Left | Left | Left | Left | Right | Right | Left | Left | Right |
| Median Width(ft) | 22 | | | | | 22 | 12 | | | | 35 | |
| Link Offset(ft) | 0 | | | | | 0 | 0 | | | | 0 | |
| Crosswalk Width(ft) | 16 | | | | | 16 | 16 | | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 | 0.99 | 1.03 | 0.99 |
| Turning Speed (mph) | | 9 | 9 | 15 | 15 | | 15 | 9 | 9 | 15 | 15 | 9 |
| Number of Detectors | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | 0 | 42 | 42 | 50 | 42 | 42 | | 42 | 226 | |
| Trailing Detector (ft) | -3 | 220 | 0 | -3 | -3 | 0 | -3 | -3 | | -3 | 220 | |
| Detector 1 Position(ft) | -3 | 220 | 0 | -3 | -3 | 0 | -3 | -3 | | -3 | 220 | |
| Detector 1 Size(ft) | 45 | 6 | 50 | 45 | 45 | 50 | 45 | 45 | | 45 | 6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | NA | custom | custom | custom | Prot | NA | D.Pm | Prot | | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | | 4 | 2! | | 8 | | 5 | 2! | |
| Permitted Phases | 6 | | 6 | 8 | | | 4 | | | 2 | | |
| Detector Phase | 1 | 6 | | 8 | 4 | 2 | 4 | 8 | | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |

| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 7.0 | 7.0 | 10.0 | 7.0 | 7.0 | | 5.0 | 10.0 | |
| Minimum Split (s) | 15.0 | 70.0 | 70.0 | 50.0 | 50.0 | 85.0 | 50.0 | 50.0 | | 30.0 | 85.0 | |
| Total Split (s) | 14.0 | 72.0 | 72.0 | 49.0 | 49.0 | 87.0 | 49.0 | 49.0 | | 29.0 | 87.0 | |
| Total Split (%) | 9.3% | 48.0% | 48.0% | 32.7% | 32.7% | 58.0% | 32.7% | 32.7% | | 19.3% | 58.0% | |
| Maximum Green (s) | 7.5 | 66.0 | 66.0 | 42.0 | 42.0 | 81.0 | 42.0 | 42.0 | | 22.5 | 81.0 | |
| Yellow Time (s) | 3.0 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | 2.5 | 3.5 | 3.5 | 2.5 | 3.5 | 3.5 | | 3.5 | 2.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | -3.0 | -2.5 | -2.5 | | -2.5 | -2.5 | | -1.0 | -3.0 | |
| Total Lost Time (s) | 5.5 | 3.0 | 3.0 | 4.5 | 4.5 | | 4.5 | 4.5 | | 5.5 | 3.0 | |
| Lead/Lag | Lead | Lag | Lag | | | Lag | | | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Recall Mode | None | C-Min | C-Min | None | None | C-Min | None | None | | None | C-Min | |
| Walk Time (s) | | 7.0 | 7.0 | 8.0 | 8.0 | 7.0 | 8.0 | 8.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 16.0 | 16.0 | 35.0 | 32.0 | 20.0 | 32.0 | 35.0 | | | 20.0 | |
| Pedestrian Calls (#/hr) | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | |
| Act Effct Green (s) | 81.3 | 75.4 | 75.4 | 38.1 | 38.1 | 0.0 | 38.1 | 38.1 | | 101.9 | 90.6 | |
| Actuated g/C Ratio | 0.54 | 0.50 | 0.50 | 0.25 | 0.25 | 0.00 | 0.25 | 0.25 | | 0.68 | 0.60 | |
| v/c Ratio | 0.52 | 0.86 | 0.05 | 1.26 | 0.20 | no cap | 0.19 | 0.75 | | 0.96 | 0.67 | |
| Control Delay | 21.2 | 41.5 | 0.1 | 231.8 | 42.9 | | 42.8 | 37.4 | | 56.3 | 15.8 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 2.2 | |
| Total Delay | 21.2 | 41.5 | 0.1 | 231.8 | 42.9 | Error | 42.8 | 37.4 | | 56.3 | 18.0 | |
| LOS | C | D | A | F | D | F | D | D | | E | B | |
| Approach Delay | 38.4 | | | | | Err | 38.2 | | | | 25.9 | |
| Approach LOS | D | | | | | F | D | | | | C | |
| 90th %ile Green (s) | 7.5 | 66.0 | 66.0 | 42.0 | 42.0 | 81.0 | 42.0 | 42.0 | | 22.5 | 81.0 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Hold | Coord | Hold | Max | | Max | Coord | |
| 70th %ile Green (s) | 7.5 | 66.0 | 66.0 | 42.0 | 42.0 | 81.0 | 42.0 | 42.0 | | 22.5 | 81.0 | |
| 70th %ile Term Code | Max | Coord | Coord | Max | Hold | Coord | Hold | Max | | Max | Coord | |
| 50th %ile Green (s) | 7.5 | 67.2 | 67.2 | 40.8 | 40.8 | 82.2 | 40.8 | 40.8 | | 22.5 | 82.2 | |
| 50th %ile Term Code | Max | Coord | Coord | Gap | Hold | Coord | Hold | Gap | | Max | Coord | |
| 30th %ile Green (s) | 7.5 | 75.2 | 75.2 | 32.8 | 32.8 | 90.2 | 32.8 | 32.8 | | 22.5 | 90.2 | |
| 30th %ile Term Code | Max | Coord | Coord | Gap | Hold | Coord | Hold | Gap | | Max | Coord | |
| 10th %ile Green (s) | 6.8 | 87.8 | 87.8 | 20.2 | 20.2 | 103.5 | 20.2 | 20.2 | | 22.5 | 103.5 | |
| 10th %ile Term Code | Gap | Coord | Coord | Gap | Hold | Coord | Hold | Gap | | Max | Coord | |
| Stops (vph) | 43 | 918 | 0 | 68 | 48 | 0 | 35 | 198 | | 270 | 996 | |
| Fuel Used(gal) | 2 | 28 | 0 | 5 | 1 | 0 | 1 | 5 | | 6 | 17 | |
| CO Emissions (g/hr) | 123 | 1988 | 24 | 320 | 73 | 29 | 54 | 369 | | 436 | 1189 | |
| NOx Emissions (g/hr) | 24 | 387 | 5 | 62 | 14 | 6 | 11 | 72 | | 85 | 231 | |
| VOC Emissions (g/hr) | 29 | 461 | 6 | 74 | 17 | 7 | 13 | 86 | | 101 | 276 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 40 | 595 | 0 | ~108 | 66 | 0 | 45 | 197 | | 234 | 692 | |
| Queue Length 95th (ft) | 58 | #776 | 0 | #215 | 88 | 0 | 70 | 305 | | m165 | m562 | |
| Internal Link Dist (ft) | 1544 | | | | | 353 | 435 | | | | 712 | |
| Turn Bay Length (ft) | | 135 | 135 | 100 | 100 | | 120 | | | 220 | 220 | |
| Base Capacity (vph) | 223 | 1361 | 853 | 90 | 520 | 1 | 368 | 575 | | 375 | 2062 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 514 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |

| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.51 | 0.86 | 0.05 | 1.08 | 0.17 | 150.00 | 0.17 | 0.67 | | 0.96 | 0.89 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 123 (82%), Referenced to phase 2:SBSW and 6:NBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: Err | | | |
| Intersection Signal Delay: Err | | Intersection LOS: F | |
| Intersection Capacity Utilization Err% | | ICU Level of Service H | |
| Analysis Period (min) 15 | | | |

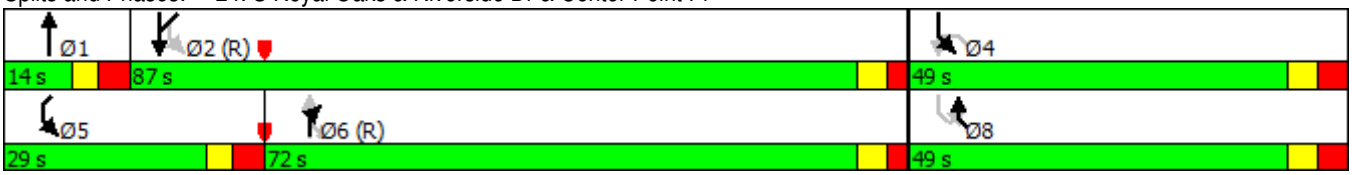
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

! Phase conflict between lane groups.

Splits and Phases: 24: S Royal Oaks & Riverside Dr & Center Point Pl



# HCS 2010 Two-Way Stop Control Summary Report

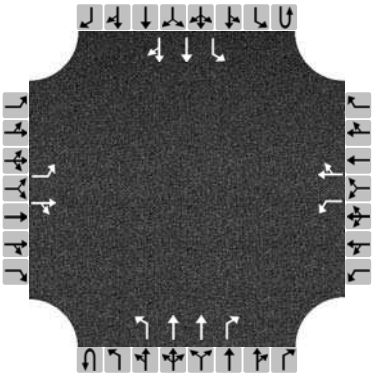
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | S. Royal Oaks and Rand |
| Jurisdiction | Franklin, TN |
| East/West Street | Rand Pl / Home Depot |
| North/South Street | S. Royal Oaks Blvd |
| Peak Hour Factor | 0.97 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 1 | 1 | 0 | | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 2 | 0 |
| Configuration | | L | | TR | | L | | TR | | L | T | R | | L | T | TR |
| Volume (veh/h) | | 26 | 1 | 9 | | 14 | 0 | 40 | | 10 | 1447 | 25 | | 64 | 659 | 51 |
| Percent Heavy Vehicles | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left + Thru | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 27 | | 10 | | 14 | | 41 | | 10 | | | | 66 | | |
| Capacity | | 148 | | 394 | | 100 | | 361 | | 882 | | | | 446 | | |
| v/c Ratio | | 0.18 | | 0.03 | | 0.14 | | 0.11 | | 0.01 | | | | 0.15 | | |
| 95% Queue Length | | 0.6 | | 0.1 | | 0.5 | | 0.4 | | 0.0 | | | | 0.5 | | |
| Control Delay (s/veh) | | 34.8 | | 14.4 | | 47.0 | | 16.3 | | 9.1 | | | | 14.5 | | |
| Level of Service (LOS) | | D | | B | | E | | C | | A | | | | B | | |
| Approach Delay (s/veh) | 29.3 | | | | 24.1 | | | | 0.1 | | | | 1.2 | | | |
| Approach LOS | D | | | | C | | | | A | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

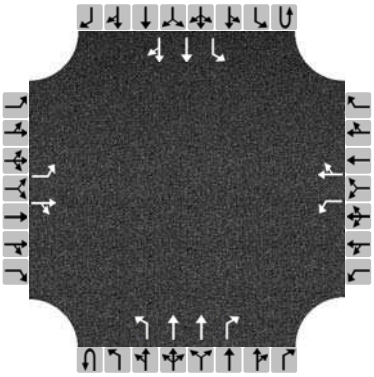
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | S. Royal Oaks and Rand |
| Jurisdiction | Franklin, TN |
| East/West Street | Rand Pl / Home Depot |
| North/South Street | S. Royal Oaks Blvd |
| Peak Hour Factor | 0.96 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 1 | 1 | 0 | | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 2 | 0 |
| Configuration | | L | | TR | | L | | TR | | L | T | R | | L | T | TR |
| Volume (veh/h) | | 26 | 3 | 16 | | 21 | 4 | 52 | | 6 | 1016 | 17 | | 45 | 1023 | 105 |
| Percent Heavy Vehicles | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left + Thru | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 27 | | 20 | | 22 | | 58 | | 6 | | | | 47 | | |
| Capacity | | 130 | | 330 | | 157 | | 418 | | 602 | | | | 656 | | |
| v/c Ratio | | 0.21 | | 0.06 | | 0.14 | | 0.14 | | 0.01 | | | | 0.07 | | |
| 95% Queue Length | | 0.7 | | 0.2 | | 0.5 | | 0.5 | | 0.0 | | | | 0.2 | | |
| Control Delay (s/veh) | | 39.7 | | 16.6 | | 31.6 | | 15.0 | | 11.0 | | | | 10.9 | | |
| Level of Service (LOS) | | E | | C | | D | | C | | B | | | | B | | |
| Approach Delay (s/veh) | 29.9 | | | | 19.6 | | | | 0.1 | | | | 0.4 | | | |
| Approach LOS | D | | | | C | | | | A | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

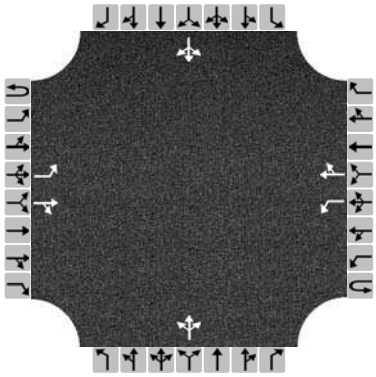
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and dwy |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Western Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | | 0 | 1 | 0 | | 0 | 1 | 0 |
| Configuration | | L | | TR | | L | | TR | | | LTR | | | | LTR | |
| Volume (veh/h) | | 24 | 64 | 7 | | 0 | 266 | 0 | | 27 | 6 | 0 | | 1 | 2 | 9 |
| Percent Heavy Vehicles | | 0 | | | | 0 | | | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 30 | | | | | | | | | 42 | | | | 14 | |
| Capacity | | 1239 | | | | 1519 | | | | | 665 | | | | 814 | |
| v/c Ratio | | 0.02 | | | | | | | | | 0.06 | | | | 0.02 | |
| 95% Queue Length | | 0.1 | | | | | | | | | 0.2 | | | | 0.1 | |
| Control Delay (s/veh) | | 8.0 | | | | 7.4 | | | | | 10.8 | | | | 9.5 | |
| Level of Service (LOS) | | A | | | | A | | | | | B | | | | A | |
| Approach Delay (s/veh) | 2.0 | | | | | | | | 10.8 | | | | 9.5 | | | |
| Approach LOS | A | | | | | | | | B | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

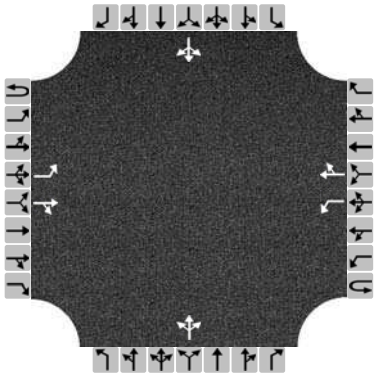
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and dwy |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Western Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | | 0 | 1 | 0 | | 0 | 1 | 0 |
| Configuration | | L | | TR | | L | | TR | | | LTR | | | | LTR | |
| Volume (veh/h) | | 24 | 241 | 27 | | 0 | 215 | 2 | | 15 | 3 | 0 | | 16 | 5 | 33 |
| Percent Heavy Vehicles | | 0 | | | | 0 | | | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 30 | | | | | | | | | 23 | | | | 67 | |
| Capacity | | 1304 | | | | 1236 | | | | | 543 | | | | 707 | |
| v/c Ratio | | 0.02 | | | | | | | | | 0.04 | | | | 0.09 | |
| 95% Queue Length | | 0.1 | | | | | | | | | 0.1 | | | | 0.3 | |
| Control Delay (s/veh) | | 7.8 | | | | 7.9 | | | | | 11.9 | | | | 10.6 | |
| Level of Service (LOS) | | A | | | | A | | | | | B | | | | B | |
| Approach Delay (s/veh) | 0.6 | | | | | | | | 11.9 | | | | 10.6 | | | |
| Approach LOS | A | | | | | | | | B | | | | B | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

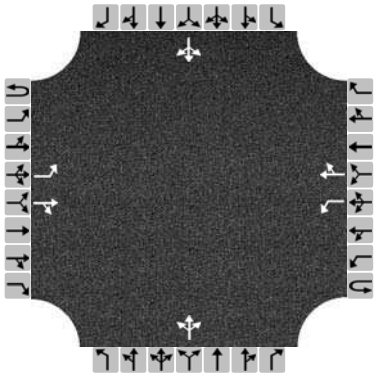
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and dwy |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Eastern Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | | 0 | 1 | 0 | | 0 | 1 | 0 |
| Configuration | | L | | TR | | L | | TR | | | LTR | | | | LTR | |
| Volume (veh/h) | | 13 | 49 | 3 | | 0 | 198 | 0 | | 14 | 0 | 0 | | 0 | 0 | 54 |
| Percent Heavy Vehicles | | 0 | | | | 0 | | | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 16 | | | | | | | | | 18 | | | | 68 | |
| Capacity | | 1330 | | | | 1550 | | | | | 567 | | | | 796 | |
| v/c Ratio | | 0.01 | | | | | | | | | 0.03 | | | | 0.09 | |
| 95% Queue Length | | 0.0 | | | | | | | | | 0.1 | | | | 0.3 | |
| Control Delay (s/veh) | | 7.7 | | | | 7.3 | | | | | 11.6 | | | | 9.9 | |
| Level of Service (LOS) | | A | | | | A | | | | | B | | | | A | |
| Approach Delay (s/veh) | 1.5 | | | | | | | | 11.6 | | | | 9.9 | | | |
| Approach LOS | A | | | | | | | | B | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

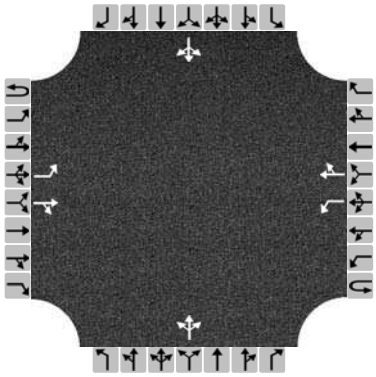
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and dwy |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Eastern Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | | 0 | 1 | 0 | | 0 | 1 | 0 |
| Configuration | | L | | TR | | L | | TR | | | LTR | | | | LTR | |
| Volume (veh/h) | | 53 | 190 | 14 | | 0 | 181 | 0 | | 7 | 0 | 0 | | 0 | 0 | 29 |
| Percent Heavy Vehicles | | 0 | | | | 0 | | | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 66 | | | | | | | | | 9 | | | | 36 | |
| Capacity | | 1355 | | | | 1321 | | | | | 460 | | | | 819 | |
| v/c Ratio | | 0.05 | | | | | | | | | 0.02 | | | | 0.04 | |
| 95% Queue Length | | 0.2 | | | | | | | | | 0.1 | | | | 0.1 | |
| Control Delay (s/veh) | | 7.8 | | | | 7.7 | | | | | 13.0 | | | | 9.6 | |
| Level of Service (LOS) | | A | | | | A | | | | | B | | | | A | |
| Approach Delay (s/veh) | 1.6 | | | | | | | | 13.0 | | | | 9.6 | | | |
| Approach LOS | A | | | | | | | | B | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

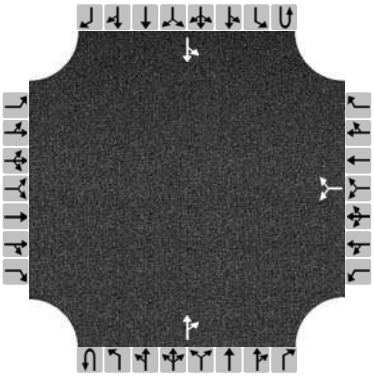
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | Home Depot dwy and projec |
| Jurisdiction | Franklin, TN |
| East/West Street | Project Access |
| North/South Street | Eastern Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| Configuration | | | | | | | LR | | | | | TR | | LT | | |
| Volume (veh/h) | | | | | | 54 | | 44 | | | 0 | 13 | | 11 | 0 | |
| Percent Heavy Vehicles | | | | | | 0 | | 0 | | | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Undivided | | | | | | | | | | | | | | | |
| Median Storage | | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | | | | | | 123 | | | | | | | 14 | | |
| Capacity | | | | | | | 1018 | | | | | | | 1615 | | |
| v/c Ratio | | | | | | | 0.12 | | | | | | | 0.01 | | |
| 95% Queue Length | | | | | | | 0.4 | | | | | | | 0.0 | | |
| Control Delay (s/veh) | | | | | | | 9.0 | | | | | | | 7.2 | | |
| Level of Service (LOS) | | | | | | | A | | | | | | | A | | |
| Approach Delay (s/veh) | | | | | 9.0 | | | | | | | | 7.2 | | | |
| Approach LOS | | | | | A | | | | | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

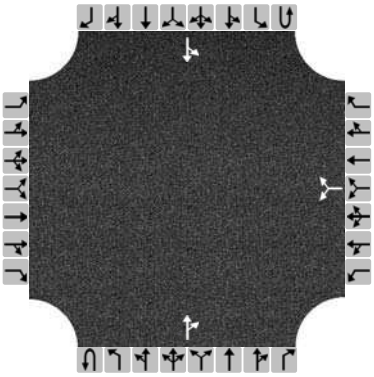
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | Home Depot dwy and projec |
| Jurisdiction | Franklin, TN |
| East/West Street | Project Access |
| North/South Street | Eastern Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

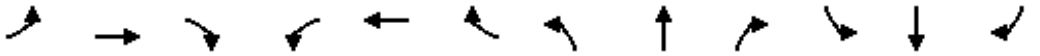
| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| Configuration | | | | | | | LR | | | | | TR | | LT | | |
| Volume (veh/h) | | | | | | 29 | | 23 | | | 0 | 53 | | 44 | 0 | |
| Percent Heavy Vehicles | | | | | | 0 | | 0 | | | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Undivided | | | | | | | | | | | | | | | |
| Median Storage | | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

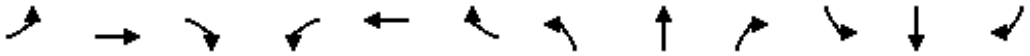
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | | | | | | 65 | | | | | | | 55 | | |
| Capacity | | | | | | | 910 | | | | | | | 1549 | | |
| v/c Ratio | | | | | | | 0.07 | | | | | | | 0.04 | | |
| 95% Queue Length | | | | | | | 0.2 | | | | | | | 0.1 | | |
| Control Delay (s/veh) | | | | | | | 9.3 | | | | | | | 7.4 | | |
| Level of Service (LOS) | | | | | | | A | | | | | | | A | | |
| Approach Delay (s/veh) | | | | | 9.3 | | | | | | | | 7.4 | | | |
| Approach LOS | | | | | A | | | | | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

**TOTAL PROJECTED CONDITIONS**
**With a third northbound through lane**



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 112 | 772 | 60 | 849 | 993 | 281 | 99 | 276 | 1060 | 225 | 211 | 82 |
| Future Volume (vph) | 112 | 772 | 60 | 849 | 993 | 281 | 99 | 276 | 1060 | 225 | 211 | 82 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.988 | | | | 0.850 | | | 0.850 | | 0.961 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3241 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3241 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 9 | | | | 127 | | | | | 29 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 350 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 6.0 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.80 | 0.90 | 0.80 | 0.93 | 0.91 | 0.88 | 0.82 | 0.80 | 0.93 | 0.92 | 0.74 | 0.81 |
| Heavy Vehicles (%) | 3% | 6% | 2% | 3% | 6% | 3% | 4% | 2% | 2% | 2% | 4% | 2% |
| Adj. Flow (vph) | 140 | 858 | 75 | 913 | 1091 | 319 | 121 | 345 | 1140 | 245 | 285 | 101 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 140 | 933 | 0 | 913 | 1091 | 319 | 121 | 345 | 1140 | 245 | 386 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

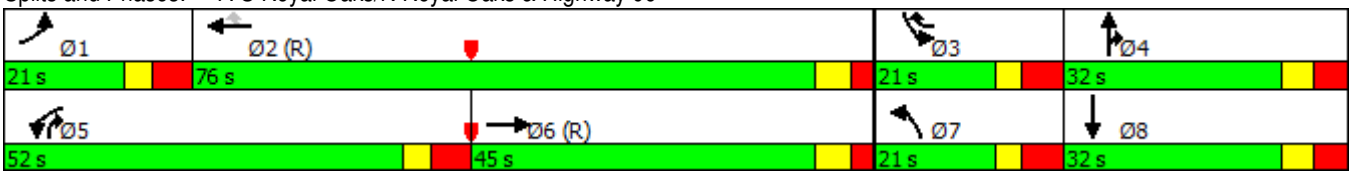


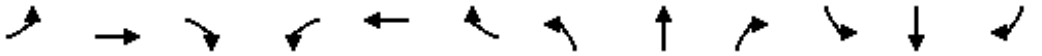
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (s) | 21.0 | 45.0 | | 52.0 | 76.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (%) | 14.0% | 30.0% | | 34.7% | 50.7% | 14.0% | 14.0% | 21.3% | | 14.0% | 21.3% | |
| Maximum Green (s) | 13.5 | 38.5 | | 44.5 | 69.5 | 13.5 | 13.5 | 24.5 | | 13.5 | 24.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 13.8 | 41.4 | | 46.9 | 74.5 | 93.7 | 12.7 | 27.5 | 78.9 | 15.2 | 30.0 | |
| Actuated g/C Ratio | 0.09 | 0.28 | | 0.31 | 0.50 | 0.62 | 0.08 | 0.18 | 0.53 | 0.10 | 0.20 | |
| v/c Ratio | 0.45 | 0.72 | | 0.89 | 0.65 | 0.30 | 0.43 | 0.52 | 0.76 | 0.73 | 0.58 | |
| Control Delay | 68.7 | 52.3 | | 56.2 | 30.7 | 9.4 | 69.5 | 58.4 | 32.0 | 78.8 | 54.2 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | |
| Total Delay | 68.7 | 52.3 | | 56.2 | 30.7 | 9.4 | 69.5 | 58.4 | 32.5 | 78.8 | 54.2 | |
| LOS | E | D | | E | C | A | E | E | C | E | D | |
| Approach Delay | | 54.5 | | | 37.8 | | | 40.9 | | | 63.8 | |
| Approach LOS | | D | | | D | | | D | | | E | |
| Queue Length 50th (ft) | 68 | 302 | | 444 | 445 | 89 | 58 | 162 | 485 | 121 | 167 | |
| Queue Length 95th (ft) | 91 | 356 | | m483 | m488 | m123 | 83 | 189 | 586 | 170 | 181 | |
| Internal Link Dist (ft) | | 270 | | | 611 | | | 712 | | | 884 | |
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 362 | 1299 | | 1029 | 1690 | 1062 | 346 | 667 | 1508 | 342 | 671 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 95 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.39 | 0.72 | | 0.89 | 0.65 | 0.30 | 0.35 | 0.52 | 0.81 | 0.72 | 0.58 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 44 (29%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.89 | | | |
| Intersection Signal Delay: 44.8 | | Intersection LOS: D | |

Intersection Capacity Utilization 71.8% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: S Royal Oaks/N Royal Oaks & Highway 96





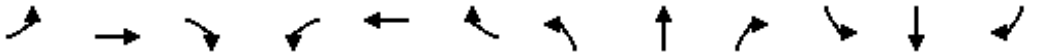
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 1793 | 194 | 111 | 1060 | 0 | 0 | 0 | 0 | 355 | 0 | 1039 |
| Future Volume (vph) | 0 | 1793 | 194 | 111 | 1060 | 0 | 0 | 0 | 0 | 355 | 0 | 1039 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 162 | | | | | | | | | 93 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.91 | 0.90 | 0.86 | 0.87 | 1.00 | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 |
| Heavy Vehicles (%) | 2% | 3% | 7% | 1% | 3% | 2% | 2% | 2% | 2% | 6% | 2% | 3% |
| Adj. Flow (vph) | 0 | 1970 | 216 | 129 | 1218 | 0 | 0 | 0 | 0 | 418 | 0 | 1105 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 1970 | 216 | 129 | 1218 | 0 | 0 | 0 | 0 | 418 | 0 | 1105 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |

Lanes, Volumes, Timings
8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96 3/31/2016

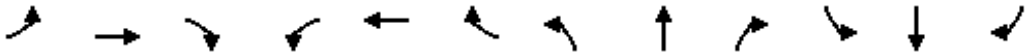
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (%) | | 41.3% | 41.3% | 15.3% | 56.7% | | | | | 43.3% | | 43.3% |
| Maximum Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 57.5 | | 57.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 60.1 | 60.1 | 15.9 | 81.0 | | | | | 59.5 | | 59.5 |
| Actuated g/C Ratio | | 0.40 | 0.40 | 0.11 | 0.54 | | | | | 0.40 | | 0.40 |
| v/c Ratio | | 0.77 | 0.31 | 0.69 | 0.67 | | | | | 0.32 | | 1.00 |
| Control Delay | | 34.8 | 8.3 | 87.9 | 4.6 | | | | | 32.1 | | 67.4 |
| Queue Delay | | 7.6 | 0.0 | 0.0 | 0.6 | | | | | 0.1 | | 0.0 |
| Total Delay | | 42.4 | 8.3 | 87.9 | 5.2 | | | | | 32.3 | | 67.4 |
| LOS | | D | A | F | A | | | | | C | | E |
| Approach Delay | | 39.0 | | | 13.1 | | | | | | | |
| Approach LOS | | D | | | B | | | | | | | |
| Queue Length 50th (ft) | | 386 | 37 | 97 | 24 | | | | | 144 | | 575 |
| Queue Length 95th (ft) | | 461 | m80 | m138 | m24 | | | | | 176 | | #754 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2544 | 702 | 214 | 1829 | | | | | 1303 | | 1108 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 262 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 547 | 0 | 0 | 0 | | | | | 250 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.99 | 0.31 | 0.60 | 0.78 | | | | | 0.40 | | 1.00 |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 32 (21%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.00 | | | |
| Intersection Signal Delay: 37.8 | | Intersection LOS: D | |
| Intersection Capacity Utilization 108.8% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | |
| Queue shown is maximum after two cycles. | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1386 | 762 | 0 | 0 | 762 | 1217 | 409 | 0 | 364 | 0 | 0 | 0 |
| Future Volume (vph) | 1386 | 762 | 0 | 0 | 762 | 1217 | 409 | 0 | 364 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 22 | | | 258 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 1845 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 31.4 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.88 | 0.86 | 0.95 | 1.00 | 0.95 | 0.98 | 0.95 | 0.25 | 0.92 | 1.00 | 1.00 | 0.95 |
| Heavy Vehicles (%) | 2% | 5% | 2% | 2% | 2% | 1% | 2% | 0% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 1575 | 886 | 0 | 0 | 802 | 1242 | 431 | 0 | 396 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 1575 | 886 | 0 | 0 | 802 | 1242 | 431 | 0 | 396 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |



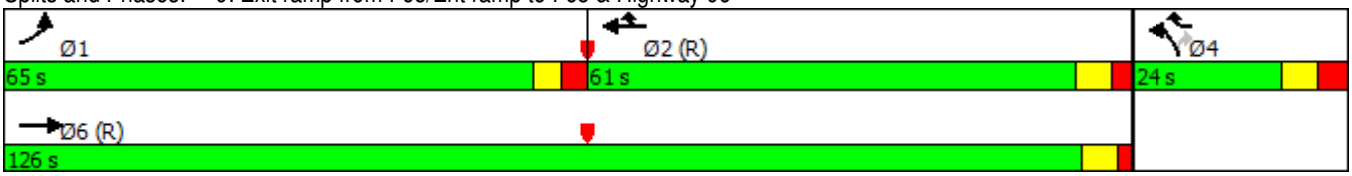
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (s) | 65.0 | 126.0 | | | 61.0 | | 24.0 | | 24.0 | | | |
| Total Split (%) | 43.3% | 84.0% | | | 40.7% | | 16.0% | | 16.0% | | | |
| Maximum Green (s) | 59.0 | 120.0 | | | 54.5 | | 16.5 | | 16.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 59.0 | 120.0 | | | 54.5 | 80.5 | 16.5 | | 16.5 | | | |
| Actuated g/C Ratio | 0.39 | 0.80 | | | 0.36 | 0.54 | 0.11 | | 0.11 | | | |
| v/c Ratio | 1.21 | 0.33 | | | 0.62 | 0.82 | 1.19 | | 0.97 | | | |
| Control Delay | 140.5 | 12.3 | | | 41.9 | 33.7 | 163.6 | | 60.3 | | | |
| Queue Delay | 0.8 | 0.7 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 141.3 | 13.0 | | | 41.9 | 33.7 | 163.6 | | 60.3 | | | |
| LOS | F | B | | | D | C | F | | E | | | |
| Approach Delay | | 95.1 | | | 36.9 | | | | | | | |
| Approach LOS | | F | | | D | | | | | | | |
| Queue Length 50th (ft) | ~990 | 273 | | | 339 | 546 | ~260 | | 147 | | | |
| Queue Length 95th (ft) | #1090 | 333 | | | 411 | 660 | #372 | | #363 | | | |
| Internal Link Dist (ft) | | 476 | | | 1765 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1298 | 2645 | | | 1285 | 1520 | 363 | | 408 | | | |
| Starvation Cap Reductn | 229 | 1319 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 1.47 | 0.67 | | | 0.62 | 0.82 | 1.19 | | 0.97 | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.21 | | | |
| Intersection Signal Delay: 75.7 | | Intersection LOS: E | |
| Intersection Capacity Utilization 108.8% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

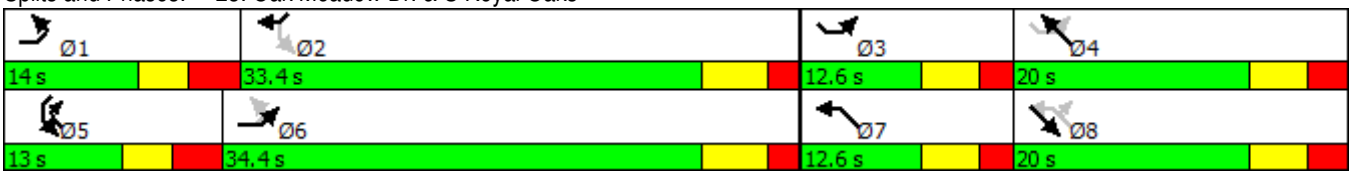


| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 87 | 1120 | 35 | 129 | 10 | 71 | 43 | 30 | 229 | 50 | 515 | 73 |
| Future Volume (vph) | 87 | 1120 | 35 | 129 | 10 | 71 | 43 | 30 | 229 | 50 | 515 | 73 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 3 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.94 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | 0.993 | | | 0.872 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.954 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 4810 | 0 | 1711 | 1570 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.249 | 0.954 | | 0.723 | | | 0.652 | | | 0.147 | | |
| Satd. Flow (perm) | 402 | 4810 | 0 | 1302 | 1570 | 0 | 1215 | 1925 | 1583 | 274 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 198 | | | 97 | | | | 118 | | 198 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 1875 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 42.6 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 130 | 1191 | 56 | 163 | 17 | 97 | 57 | 52 | 249 | 67 | 687 | 106 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 130 | 1247 | 0 | 163 | 114 | 0 | 57 | 52 | 249 | 67 | 793 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 41 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 13.0 | 26.0 | | 12.5 | 20.0 | | 12.5 | 20.0 | 13.0 | 13.0 | 26.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 14.0 | 34.4 | | 12.6 | 20.0 | | 12.6 | 20.0 | 13.0 | 13.0 | 33.4 | |
| Total Split (%) | 17.5% | 43.0% | | 15.8% | 25.0% | | 15.8% | 25.0% | 16.3% | 16.3% | 41.8% | |
| Maximum Green (s) | 8.0 | 28.4 | | 7.1 | 14.0 | | 7.1 | 14.0 | 7.0 | 7.0 | 27.4 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | Min | | None | None | | None | None | None | None | Min | |
| Act Effct Green (s) | 38.7 | 27.6 | | 16.6 | 11.1 | | 16.6 | 11.1 | 21.1 | 39.0 | 30.6 | |
| Actuated g/C Ratio | 0.58 | 0.41 | | 0.25 | 0.17 | | 0.25 | 0.17 | 0.32 | 0.58 | 0.46 | |
| v/c Ratio | 0.32 | 0.59 | | 0.43 | 0.33 | | 0.15 | 0.16 | 0.43 | 0.18 | 0.57 | |
| Control Delay | 9.1 | 14.8 | | 22.9 | 12.0 | | 18.7 | 28.3 | 12.4 | 7.9 | 14.1 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 9.1 | 14.8 | | 22.9 | 12.0 | | 18.7 | 28.3 | 12.4 | 7.9 | 14.1 | |
| LOS | A | B | | C | B | | B | C | B | A | B | |
| Approach Delay | | 14.3 | | | 18.4 | | | 15.7 | | 13.6 | | |
| Approach LOS | | B | | | B | | | B | | B | | |
| Queue Length 50th (ft) | 24 | 128 | | 56 | 7 | | 18 | 21 | 44 | 12 | 118 | |
| Queue Length 95th (ft) | 37 | 185 | | 87 | 16 | | 35 | 32 | 102 | 25 | 145 | |
| Internal Link Dist (ft) | | 1795 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 420 | 2322 | | 384 | 471 | | 384 | 489 | 581 | 378 | 1415 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.31 | 0.54 | | 0.42 | 0.24 | | 0.15 | 0.11 | 0.43 | 0.18 | 0.56 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 80 | | | |
| Actuated Cycle Length: 66.8 | | | |
| Natural Cycle: 75 | | | |
| Control Type: Actuated-Uncoordinated | | | |
| Maximum v/c Ratio: 0.59 | | | |
| Intersection Signal Delay: 14.7 | | Intersection LOS: B | |
| Intersection Capacity Utilization 52.1% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 23: Oak Meadow Dr. & S Royal Oaks



| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 28 | 1280 | 103 | 6 | 46 | 41 | 33 | 12 | 123 | 277 | 764 | 25 |
| Future Volume (vph) | 28 | 1280 | 103 | 6 | 46 | 41 | 33 | 12 | 123 | 277 | 764 | 25 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | 1% | | | | | -1% | 2% | | | | -2% | |
| Storage Length (ft) | | 135 | | | 100 | | 120 | 0 | | | 220 | 0 |
| Storage Lanes | | 3 | | | 1 | | 1 | 1 | | | 2 | 0 |
| Taper Length (ft) | | | | | 50 | | 50 | | | | 50 | |
| Lane Util. Factor | 1.00 | 0.76 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 0.95 |
| Frt | | 0.850 | | | | | | 0.850 | | | 0.993 | |
| Flt Protected | | | | 0.950 | 0.950 | | 0.950 | | | 0.950 | 0.954 | |
| Satd. Flow (prot) | 1764 | 3509 | 0 | 1754 | 1580 | 0 | 1787 | 1489 | 0 | 1787 | 3339 | 0 |
| Flt Permitted | 0.344 | | | 0.294 | 0.950 | | 0.691 | | | 0.089 | 0.954 | |
| Satd. Flow (perm) | 607 | 3509 | 0 | 543 | 1580 | 0 | 1300 | 1489 | 0 | 167 | 3339 | 0 |
| Right Turn on Red | | | Yes | | | | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 82 | | | | | | 143 | | | 82 | |
| Link Speed (mph) | 30 | | | | | 30 | 30 | | | | 30 | |
| Link Distance (ft) | 1624 | | | | | 433 | 515 | | | | 792 | |
| Travel Time (s) | 36.9 | | | | | 9.8 | 11.7 | | | | 18.0 | |
| Peak Hour Factor | 0.63 | 0.92 | 0.87 | 0.58 | 0.68 | 0.77 | 0.67 | 0.63 | 0.86 | 0.80 | 0.99 | 0.67 |
| Heavy Vehicles (%) | 0% | 1% | 0% | 0% | 11% | 0% | 0% | 10% | 3% | 2% | 2% | 4% |
| Adj. Flow (vph) | 44 | 1391 | 118 | 10 | 68 | 53 | 49 | 19 | 143 | 346 | 772 | 37 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 44 | 1509 | 0 | 10 | 68 | 53 | 49 | 162 | 0 | 346 | 809 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Right | Left | Left | Left | Left | Right | Right | Left | Left | Right |
| Median Width(ft) | 22 | | | | | 22 | 12 | | | | 35 | |
| Link Offset(ft) | 0 | | | | | 0 | 0 | | | | 0 | |
| Crosswalk Width(ft) | 16 | | | | | 16 | 16 | | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 | 0.99 | 1.03 | 0.99 |
| Turning Speed (mph) | | 9 | 9 | 15 | 15 | | 15 | 9 | 9 | 15 | 15 | 9 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | | 42 | 42 | 50 | 42 | 42 | | 42 | 226 | |
| Trailing Detector (ft) | -3 | 220 | | -3 | -3 | 0 | -3 | -3 | | -3 | 220 | |
| Detector 1 Position(ft) | -3 | 220 | | -3 | -3 | 0 | -3 | -3 | | -3 | 220 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 45 | 50 | 45 | 45 | | 45 | 6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | NA | custom | | custom | Prot | NA | D.Pm | Prot | | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | | 4 | | | 8 | | 5 | 2 | |
| Permitted Phases | 6 | | | 8 | | | 4 | | | 2 | | |
| Detector Phase | 1 | 6 | | 8 | 4 | | 4 | 8 | | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |

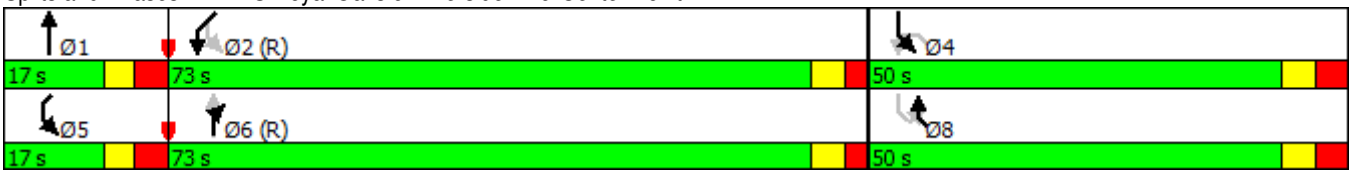
| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | | 5.0 | 10.0 | |
| Minimum Split (s) | 17.0 | 73.0 | | 50.0 | 50.0 | | 50.0 | 50.0 | | 17.0 | 73.0 | |
| Total Split (s) | 17.0 | 73.0 | | 50.0 | 50.0 | | 50.0 | 50.0 | | 17.0 | 73.0 | |
| Total Split (%) | 12.1% | 52.1% | | 35.7% | 35.7% | | 35.7% | 35.7% | | 12.1% | 52.1% | |
| Maximum Green (s) | 10.5 | 67.0 | | 43.0 | 43.0 | | 43.0 | 43.0 | | 10.5 | 67.0 | |
| Yellow Time (s) | 3.0 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 2.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | | -2.5 | -2.5 | | -2.5 | -2.5 | | -1.0 | -3.0 | |
| Total Lost Time (s) | 5.5 | 3.0 | | 4.5 | 4.5 | | 4.5 | 4.5 | | 5.5 | 3.0 | |
| Lead/Lag | Lead | Lag | | | | | | | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Recall Mode | None | C-Min | | None | None | | None | None | | None | C-Min | |
| Walk Time (s) | | 7.0 | | 8.0 | 8.0 | | 8.0 | 8.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 16.0 | | 35.0 | 32.0 | | 32.0 | 35.0 | | | 20.0 | |
| Pedestrian Calls (#/hr) | | 0 | | 0 | 0 | | 0 | 0 | | | 0 | |
| Act Effct Green (s) | 106.2 | 101.1 | | 14.4 | 14.4 | 0.0 | 14.4 | 14.4 | | 114.1 | 107.4 | |
| Actuated g/C Ratio | 0.76 | 0.72 | | 0.10 | 0.10 | 0.00 | 0.10 | 0.10 | | 0.82 | 0.77 | |
| v/c Ratio | 0.08 | 0.59 | | 0.18 | 0.42 | no cap | 0.37 | 0.58 | | 1.29 | 0.31 | |
| Control Delay | 3.3 | 10.3 | | 63.2 | 65.8 | | 65.1 | 20.5 | | 181.0 | 5.4 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 3.3 | 10.3 | | 63.2 | 65.8 | Error | 65.1 | 20.5 | | 181.0 | 5.4 | |
| LOS | A | B | | E | E | F | E | C | | F | A | |
| Approach Delay | 10.1 | | | | | Err | 30.9 | | | | 58.0 | |
| Approach LOS | B | | | | | F | C | | | | E | |
| Queue Length 50th (ft) | 6 | 248 | | 8 | 59 | 0 | 42 | 16 | | ~283 | 97 | |
| Queue Length 95th (ft) | 10 | 337 | | 17 | 79 | 0 | 61 | 21 | | #402 | 146 | |
| Internal Link Dist (ft) | 1544 | | | | | 353 | 435 | | | | 712 | |
| Turn Bay Length (ft) | | 135 | | 100 | 100 | | 120 | | | 220 | 220 | |
| Base Capacity (vph) | 572 | 2556 | | 176 | 513 | 1 | 422 | 580 | | 269 | 2580 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Reduced v/c Ratio | 0.08 | 0.59 | | 0.06 | 0.13 | 53.00 | 0.12 | 0.28 | | 1.29 | 0.31 | |

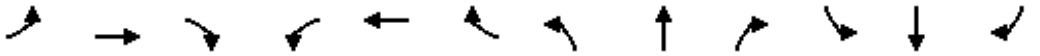
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 139 (99%), Referenced to phase 2:SWL and 6:NBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: Err | | | |
| Intersection Signal Delay: Err | | Intersection LOS: F | |
| Intersection Capacity Utilization Err% | | ICU Level of Service H | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity, queue may be longer.

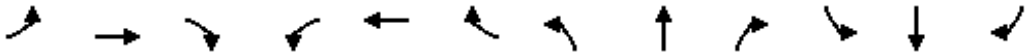
Queue shown is maximum after two cycles.

Splits and Phases: 24: S Royal Oaks & Riverside Dr & Center Point Pl





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 206 | 1108 | 63 | 985 | 1174 | 269 | 141 | 371 | 1002 | 316 | 469 | 178 |
| Future Volume (vph) | 206 | 1108 | 63 | 985 | 1174 | 269 | 141 | 371 | 1002 | 316 | 469 | 178 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.991 | | | | 0.850 | | | 0.850 | | 0.953 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3326 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3326 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 7 | | | | 87 | | | | | 43 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 350 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 6.0 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.92 | 0.93 | 0.81 | 0.87 | 0.91 | 0.89 | 0.74 | 0.83 | 0.89 | 0.83 | 0.95 | 0.80 |
| Heavy Vehicles (%) | 1% | 1% | 0% | 1% | 2% | 1% | 0% | 0% | 1% | 0% | 0% | 0% |
| Adj. Flow (vph) | 224 | 1191 | 78 | 1132 | 1290 | 302 | 191 | 447 | 1126 | 381 | 494 | 223 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 224 | 1269 | 0 | 1132 | 1290 | 302 | 191 | 447 | 1126 | 381 | 717 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

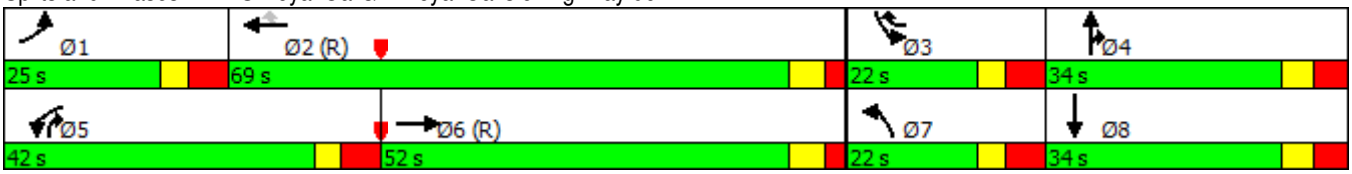


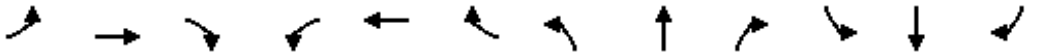
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (%) | 16.7% | 34.7% | | 28.0% | 46.0% | 14.7% | 14.7% | 22.7% | | 14.7% | 22.7% | |
| Maximum Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 17.3 | 48.0 | | 37.0 | 67.7 | 88.2 | 14.9 | 29.5 | 71.0 | 16.5 | 31.1 | |
| Actuated g/C Ratio | 0.12 | 0.32 | | 0.25 | 0.45 | 0.59 | 0.10 | 0.20 | 0.47 | 0.11 | 0.21 | |
| v/c Ratio | 0.56 | 0.80 | | 1.37 | 0.81 | 0.30 | 0.55 | 0.61 | 0.82 | 1.02 | 0.99 | |
| Control Delay | 68.2 | 51.1 | | 205.3 | 32.2 | 12.8 | 59.8 | 67.4 | 45.2 | 117.0 | 86.1 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 68.2 | 51.1 | | 205.3 | 32.2 | 12.8 | 59.8 | 67.4 | 45.3 | 117.0 | 86.1 | |
| LOS | E | D | | F | C | B | E | E | D | F | F | |
| Approach Delay | | 53.7 | | | 102.0 | | | 52.4 | | | 96.8 | |
| Approach LOS | | D | | | F | | | D | | | F | |
| Queue Length 50th (ft) | 108 | 415 | | ~750 | 651 | 140 | 92 | 235 | 454 | ~203 | ~360 | |
| Queue Length 95th (ft) | 151 | 475 | | m#569 | m436 | m122 | m109 | m268 | m570 | #272 | #512 | |
| Internal Link Dist (ft) | | 270 | | | 611 | | | 712 | | | 884 | |
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 462 | 1580 | | 826 | 1598 | 1007 | 383 | 730 | 1369 | 372 | 724 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.48 | 0.80 | | 1.37 | 0.81 | 0.30 | 0.50 | 0.61 | 0.83 | 1.02 | 0.99 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 26 (17%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.37 | | | |
| Intersection Signal Delay: 78.6 | | Intersection LOS: E | |

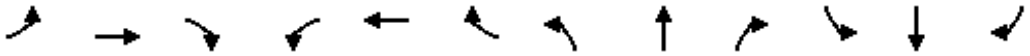
Intersection Capacity Utilization 90.4% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: S Royal Oaks/N Royal Oaks & Highway 96





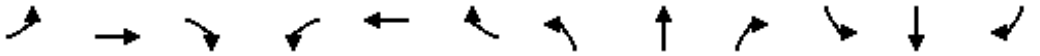
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 2005 | 488 | 285 | 928 | 0 | 0 | 0 | 0 | 914 | 0 | 1455 |
| Future Volume (vph) | 0 | 2005 | 488 | 285 | 928 | 0 | 0 | 0 | 0 | 914 | 0 | 1455 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 399 | | | | | | | | | 134 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.93 | 0.78 | 0.71 | 0.86 | 1.00 | 1.00 | 1.00 | 1.00 | 0.87 | 1.00 | 0.88 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 1% | 1% | 2% | 2% | 2% | 2% | 1% | 2% | 1% |
| Adj. Flow (vph) | 0 | 2156 | 626 | 401 | 1079 | 0 | 0 | 0 | 0 | 1051 | 0 | 1653 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 2156 | 626 | 401 | 1079 | 0 | 0 | 0 | 0 | 1051 | 0 | 1653 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (%) | | 36.7% | 36.7% | 20.0% | 56.7% | | | | | 43.3% | | 43.3% |
| Maximum Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 51.0 | 51.0 | 25.0 | 81.0 | | | | | 59.5 | | 59.5 |
| Actuated g/C Ratio | | 0.34 | 0.34 | 0.17 | 0.54 | | | | | 0.40 | | 0.40 |
| v/c Ratio | | 0.99 | 0.78 | 1.35 | 0.58 | | | | | 0.77 | | 1.43 |
| Control Delay | | 57.0 | 16.7 | 224.3 | 29.1 | | | | | 43.9 | | 231.7 |
| Queue Delay | | 0.0 | 0.0 | 0.0 | 1.3 | | | | | 1.2 | | 0.0 |
| Total Delay | | 57.0 | 16.7 | 224.3 | 30.5 | | | | | 45.0 | | 231.7 |
| LOS | | E | B | F | C | | | | | D | | F |
| Approach Delay | | 47.9 | | | 83.0 | | | | | | | |
| Approach LOS | | D | | | F | | | | | | | |
| Queue Length 50th (ft) | | 637 | 110 | ~525 | 329 | | | | | 457 | | ~1200 |
| Queue Length 95th (ft) | | m#692 | m118 | #521 | 468 | | | | | 515 | | #1305 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2178 | 801 | 297 | 1865 | | | | | 1368 | | 1154 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 535 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 136 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.99 | 0.78 | 1.35 | 0.81 | | | | | 0.85 | | 1.43 |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 42 (28%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.43 | | | |
| Intersection Signal Delay: 98.6 | | Intersection LOS: F | |
| Intersection Capacity Utilization 84.9% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |
| ~ Volume exceeds capacity, queue is theoretically infinite. | | | |
| Queue shown is maximum after two cycles. | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | |
| Queue shown is maximum after two cycles. | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96

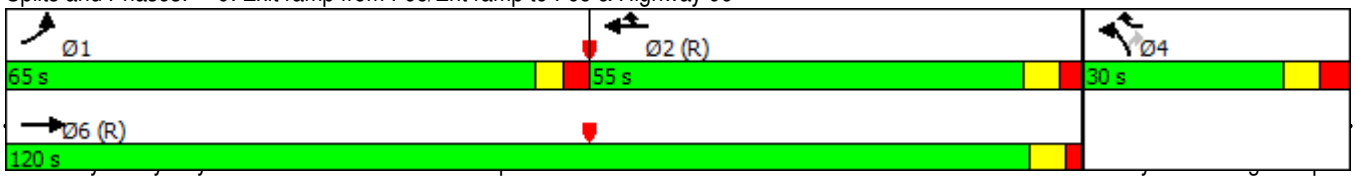


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 622 | 2297 | 0 | 0 | 897 | 998 | 316 | 0 | 164 | 0 | 0 | 0 |
| Future Volume (vph) | 622 | 2297 | 0 | 0 | 897 | 998 | 316 | 0 | 164 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 223 | | | 69 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 1845 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 31.4 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.97 | 0.98 | 1.00 | 0.25 | 0.91 | 0.93 | 0.92 | 1.00 | 0.87 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 3% | 3% | 2% | 0% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 2% |
| Adj. Flow (vph) | 641 | 2344 | 0 | 0 | 986 | 1073 | 343 | 0 | 189 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 641 | 2344 | 0 | 0 | 986 | 1073 | 343 | 0 | 189 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (%) | 43.3% | 80.0% | | | 36.7% | | 20.0% | | 20.0% | | | |
| Maximum Green (s) | 59.0 | 114.0 | | | 48.5 | | 22.5 | | 22.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 37.4 | 114.6 | | | 70.7 | 102.1 | 21.9 | | 21.9 | | | |
| Actuated g/C Ratio | 0.25 | 0.76 | | | 0.47 | 0.68 | 0.15 | | 0.15 | | | |
| v/c Ratio | 0.79 | 0.91 | | | 0.59 | 0.55 | 0.71 | | 0.65 | | | |
| Control Delay | 79.8 | 22.6 | | | 32.0 | 11.0 | 70.0 | | 48.9 | | | |
| Queue Delay | 0.0 | 7.5 | | | 0.0 | 0.0 | 0.3 | | 0.0 | | | |
| Total Delay | 79.8 | 30.1 | | | 32.0 | 11.0 | 70.2 | | 48.9 | | | |
| LOS | E | C | | | C | B | E | | D | | | |
| Approach Delay | | 40.7 | | | 21.0 | | | | | | | |
| Approach LOS | | D | | | C | | | | | | | |
| Queue Length 50th (ft) | 340 | 582 | | | 368 | 219 | 166 | | 112 | | | |
| Queue Length 95th (ft) | m324 | m495 | | | 487 | 330 | 222 | | 190 | | | |
| Internal Link Dist (ft) | | 476 | | | 1765 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1286 | 2575 | | | 1668 | 1978 | 495 | | 298 | | | |
| Starvation Cap Reductn | 0 | 224 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 12 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 0.50 | 1.00 | | | 0.59 | 0.54 | 0.71 | | 0.63 | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 80 (53%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.91 | | | |
| Intersection Signal Delay: 35.6 | | Intersection LOS: D | |
| Intersection Capacity Utilization 84.9% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 92 | 827 | 41 | 147 | 55 | 118 | 104 | 36 | 123 | 196 | 765 | 145 |
| Future Volume (vph) | 92 | 827 | 41 | 147 | 55 | 118 | 104 | 36 | 123 | 196 | 765 | 145 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 3 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.94 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | 0.990 | | | 0.905 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.956 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 4806 | 0 | 1711 | 1630 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.119 | 0.956 | | 0.685 | | | 0.236 | | | 0.253 | | |
| Satd. Flow (perm) | 192 | 4806 | 0 | 1233 | 1630 | 0 | 440 | 1925 | 1583 | 471 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 105 | | | 52 | | | | 127 | | 105 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 552 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 12.5 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 137 | 880 | 65 | 186 | 95 | 162 | 139 | 62 | 134 | 261 | 1020 | 210 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 137 | 945 | 0 | 186 | 257 | 0 | 139 | 62 | 134 | 261 | 1230 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 41 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 18.0 | 57.0 | | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 19.0 | 77.0 | | 14.0 | 35.0 | | 14.0 | 35.0 | 24.0 | 24.0 | 82.0 | |
| Total Split (%) | 12.7% | 51.3% | | 9.3% | 23.3% | | 9.3% | 23.3% | 16.0% | 16.0% | 54.7% | |
| Maximum Green (s) | 13.0 | 71.0 | | 8.5 | 29.0 | | 8.5 | 29.0 | 18.0 | 18.0 | 76.0 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 96.7 | 83.0 | | 38.6 | 26.6 | | 38.0 | 24.8 | 45.1 | 101.1 | 85.2 | |
| Actuated g/C Ratio | 0.64 | 0.55 | | 0.26 | 0.18 | | 0.25 | 0.17 | 0.30 | 0.67 | 0.57 | |
| v/c Ratio | 0.58 | 0.35 | | 0.51 | 0.78 | | 0.67 | 0.19 | 0.24 | 0.58 | 0.76 | |
| Control Delay | 22.9 | 17.7 | | 49.6 | 62.4 | | 58.6 | 52.5 | 7.0 | 17.2 | 11.1 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 22.9 | 17.7 | | 49.6 | 62.4 | | 58.6 | 52.5 | 7.0 | 17.2 | 11.1 | |
| LOS | C | B | | D | E | | E | D | A | B | B | |
| Approach Delay | | 18.3 | | | 57.0 | | | 36.8 | | 12.1 | | |
| Approach LOS | | B | | | E | | | D | | B | | |
| Queue Length 50th (ft) | 45 | 157 | | 148 | 194 | | 107 | 52 | 5 | 53 | 65 | |
| Queue Length 95th (ft) | 56 | 215 | | 185 | 153 | | 133 | 59 | 50 | 26 | 56 | |
| Internal Link Dist (ft) | | 472 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 265 | 2704 | | 366 | 383 | | 209 | 404 | 617 | 499 | 1629 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.52 | 0.35 | | 0.51 | 0.67 | | 0.67 | 0.15 | 0.22 | 0.52 | 0.76 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 16 (11%), Referenced to phase 2:SWL and 6:EBL, Start of Green | | | |
| Natural Cycle: 120 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.78 | | | |
| Intersection Signal Delay: 22.5 | | Intersection LOS: C | |
| Intersection Capacity Utilization 58.2% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 23: Oak Meadow Dr. & S Royal Oaks

| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 90 | 1107 | 27 | 83 | 64 | 123 | 46 | 58 | 302 | 269 | 1133 | 93 |
| Future Volume (vph) | 90 | 1107 | 27 | 83 | 64 | 123 | 46 | 58 | 302 | 269 | 1133 | 93 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | 1% | | | | | -1% | 2% | | | | -2% | |
| Storage Length (ft) | | 135 | | | 100 | | 120 | 0 | | | 220 | 0 |
| Storage Lanes | | 3 | | | 1 | | 1 | 1 | | | 2 | 0 |
| Taper Length (ft) | | | | | 50 | | 50 | | | | 50 | |
| Lane Util. Factor | 1.00 | 0.76 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 0.95 |
| Frt | | 0.850 | | | | | | 0.850 | | | 0.987 | |
| Flt Protected | | | | 0.950 | 0.950 | | 0.950 | | | 0.950 | 0.956 | |
| Satd. Flow (prot) | 1764 | 3505 | 0 | 1736 | 1754 | 0 | 1752 | 1546 | 0 | 1805 | 3365 | 0 |
| Flt Permitted | 0.144 | | | 0.160 | 0.950 | | 0.672 | | | 0.098 | 0.956 | |
| Satd. Flow (perm) | 254 | 3505 | 0 | 292 | 1754 | 0 | 1239 | 1546 | 0 | 186 | 3365 | 0 |
| Right Turn on Red | | | Yes | | | | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 124 | | | | | | 168 | | | 76 | |
| Link Speed (mph) | 30 | | | | | 30 | 30 | | | | 30 | |
| Link Distance (ft) | 1624 | | | | | 433 | 515 | | | | 792 | |
| Travel Time (s) | 36.9 | | | | | 9.8 | 11.7 | | | | 18.0 | |
| Peak Hour Factor | 0.79 | 0.95 | 0.64 | 0.86 | 0.71 | 0.82 | 0.75 | 0.88 | 0.94 | 0.75 | 0.90 | 0.76 |
| Heavy Vehicles (%) | 0% | 1% | 2% | 1% | 0% | 0% | 2% | 0% | 0% | 1% | 1% | 0% |
| Adj. Flow (vph) | 114 | 1165 | 42 | 97 | 90 | 150 | 61 | 66 | 321 | 359 | 1259 | 122 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 114 | 1207 | 0 | 97 | 90 | 150 | 61 | 387 | 0 | 359 | 1381 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Right | Left | Left | Left | Left | Right | Right | Left | Left | Right |
| Median Width(ft) | 22 | | | | | 22 | 12 | | | | 35 | |
| Link Offset(ft) | 0 | | | | | 0 | 0 | | | | 0 | |
| Crosswalk Width(ft) | 16 | | | | | 16 | 16 | | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 | 0.99 | 1.03 | 0.99 |
| Turning Speed (mph) | | 9 | 9 | 15 | 15 | | 15 | 9 | 9 | 15 | 15 | 9 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | | 42 | 42 | 50 | 42 | 42 | | 42 | 226 | |
| Trailing Detector (ft) | -3 | 220 | | -3 | -3 | 0 | -3 | -3 | | -3 | 220 | |
| Detector 1 Position(ft) | -3 | 220 | | -3 | -3 | 0 | -3 | -3 | | -3 | 220 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 45 | 50 | 45 | 45 | | 45 | 6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | NA | custom | | custom | Prot | NA | D.Pm | Prot | | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | | 4 | 2! | | 8 | | 5 | 2! | |
| Permitted Phases | 6 | | | 8 | | | 4 | | | 2 | | |
| Detector Phase | 1 | 6 | | 8 | 4 | 2 | 4 | 8 | | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |

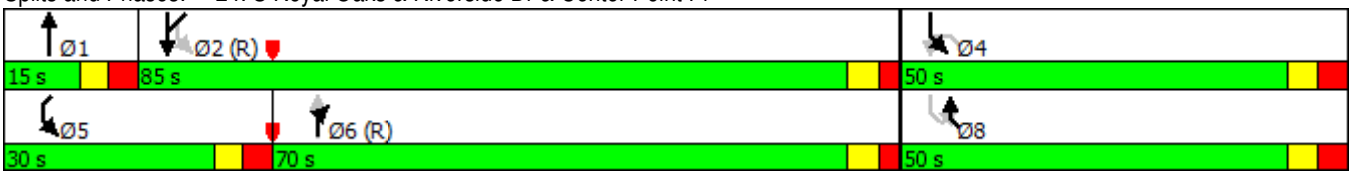
| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | | 7.0 | 7.0 | 10.0 | 7.0 | 7.0 | | 5.0 | 10.0 | |
| Minimum Split (s) | 15.0 | 70.0 | | 50.0 | 50.0 | 85.0 | 50.0 | 50.0 | | 30.0 | 85.0 | |
| Total Split (s) | 15.0 | 70.0 | | 50.0 | 50.0 | 85.0 | 50.0 | 50.0 | | 30.0 | 85.0 | |
| Total Split (%) | 10.0% | 46.7% | | 33.3% | 33.3% | 56.7% | 33.3% | 33.3% | | 20.0% | 56.7% | |
| Maximum Green (s) | 8.5 | 64.0 | | 43.0 | 43.0 | 79.0 | 43.0 | 43.0 | | 23.5 | 79.0 | |
| Yellow Time (s) | 3.0 | 3.5 | | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | | 3.5 | 3.5 | 2.5 | 3.5 | 3.5 | | 3.5 | 2.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | | -2.5 | -2.5 | | -2.5 | -2.5 | | -1.0 | -3.0 | |
| Total Lost Time (s) | 5.5 | 3.0 | | 4.5 | 4.5 | | 4.5 | 4.5 | | 5.5 | 3.0 | |
| Lead/Lag | Lead | Lag | | | | Lag | | | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Recall Mode | None | C-Min | | None | None | C-Min | None | None | | None | C-Min | |
| Walk Time (s) | | 7.0 | | 8.0 | 8.0 | 7.0 | 8.0 | 8.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 16.0 | | 35.0 | 32.0 | 20.0 | 32.0 | 35.0 | | | 20.0 | |
| Pedestrian Calls (#/hr) | | 0 | | 0 | 0 | 0 | 0 | 0 | | | 0 | |
| Act Effct Green (s) | 81.5 | 74.9 | | 37.6 | 37.6 | 0.0 | 37.6 | 37.6 | | 102.4 | 90.3 | |
| Actuated g/C Ratio | 0.54 | 0.50 | | 0.25 | 0.25 | 0.00 | 0.25 | 0.25 | | 0.68 | 0.60 | |
| v/c Ratio | 0.50 | 0.67 | | 1.33 | 0.21 | no cap | 0.20 | 0.75 | | 0.92 | 0.67 | |
| Control Delay | 28.8 | 37.6 | | 261.2 | 43.0 | | 42.8 | 37.5 | | 63.2 | 3.3 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.8 | |
| Total Delay | 28.8 | 37.6 | | 261.2 | 43.0 | Error | 42.8 | 37.5 | | 63.2 | 4.0 | |
| LOS | C | D | | F | D | F | D | D | | E | A | |
| Approach Delay | 36.8 | | | | | Err | 38.2 | | | | 16.2 | |
| Approach LOS | D | | | | | F | D | | | | B | |
| Queue Length 50th (ft) | 45 | 282 | | ~115 | 67 | 0 | 46 | 198 | | 245 | 41 | |
| Queue Length 95th (ft) | 101 | 552 | | #216 | 87 | 0 | 69 | 299 | | m184 | m17 | |
| Internal Link Dist (ft) | 1544 | | | | | 353 | 435 | | | | 712 | |
| Turn Bay Length (ft) | | 135 | | 100 | 100 | | 120 | | | 220 | 220 | |
| Base Capacity (vph) | 234 | 1812 | | 88 | 532 | 1 | 375 | 585 | | 391 | 2056 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 345 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Reduced v/c Ratio | 0.49 | 0.67 | | 1.10 | 0.17 | 150.00 | 0.16 | 0.66 | | 0.92 | 0.81 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 136 (91%), Referenced to phase 2:SBSW and 6:NBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: Err | | | |
| Intersection Signal Delay: Err | | Intersection LOS: F | |
| Intersection Capacity Utilization Err% | | ICU Level of Service H | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.
! Phase conflict between lane groups.

Splits and Phases: 24: S Royal Oaks & Riverside Dr & Center Point Pl



# HCS 2010 Two-Way Stop Control Summary Report

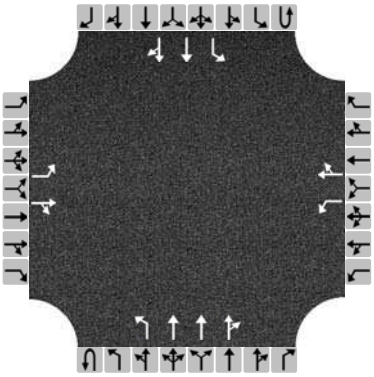
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | S. Royal Oaks and Rand |
| Jurisdiction | Franklin, TN |
| East/West Street | Rand Pl / Home Depot |
| North/South Street | S. Royal Oaks Blvd |
| Peak Hour Factor | 0.97 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 1 | 1 | 0 | | 1 | 1 | 0 | 0 | 1 | 3 | 0 | 0 | 1 | 2 | 0 |
| Configuration | | L | | TR | | L | | TR | | L | T | TR | | L | T | TR |
| Volume (veh/h) | | 26 | 1 | 9 | | 14 | 0 | 40 | | 10 | 1447 | 25 | | 64 | 659 | 51 |
| Percent Heavy Vehicles | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left + Thru | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 27 | | 10 | | 14 | | 41 | | 10 | | | | 66 | | |
| Capacity | | 171 | | 387 | | 98 | | 354 | | 882 | | | | 446 | | |
| v/c Ratio | | 0.16 | | 0.03 | | 0.14 | | 0.12 | | 0.01 | | | | 0.15 | | |
| 95% Queue Length | | 0.5 | | 0.1 | | 0.5 | | 0.4 | | 0.0 | | | | 0.5 | | |
| Control Delay (s/veh) | | 30.0 | | 14.5 | | 47.8 | | 16.5 | | 9.1 | | | | 14.5 | | |
| Level of Service (LOS) | | D | | B | | E | | C | | A | | | | B | | |
| Approach Delay (s/veh) | 25.8 | | | | 24.5 | | | | 0.1 | | | | 1.2 | | | |
| Approach LOS | D | | | | C | | | | A | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

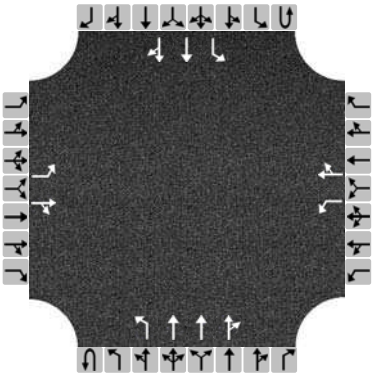
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | S. Royal Oaks and Rand |
| Jurisdiction | Franklin, TN |
| East/West Street | Rand Pl / Home Depot |
| North/South Street | S. Royal Oaks Blvd |
| Peak Hour Factor | 0.96 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 1 | 1 | 0 | | 1 | 1 | 0 | 0 | 1 | 3 | 0 | 0 | 1 | 2 | 0 |
| Configuration | | L | | TR | | L | | TR | | L | T | TR | | L | T | TR |
| Volume (veh/h) | | 26 | 3 | 16 | | 21 | 4 | 52 | | 6 | 1016 | 17 | | 45 | 1023 | 105 |
| Percent Heavy Vehicles | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left + Thru | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 27 | | 20 | | 22 | | 58 | | 6 | | | | 47 | | |
| Capacity | | 138 | | 328 | | 156 | | 413 | | 602 | | | | 656 | | |
| v/c Ratio | | 0.20 | | 0.06 | | 0.14 | | 0.14 | | 0.01 | | | | 0.07 | | |
| 95% Queue Length | | 0.7 | | 0.2 | | 0.5 | | 0.5 | | 0.0 | | | | 0.2 | | |
| Control Delay (s/veh) | | 37.4 | | 16.7 | | 31.9 | | 15.1 | | 11.0 | | | | 10.9 | | |
| Level of Service (LOS) | | E | | C | | D | | C | | B | | | | B | | |
| Approach Delay (s/veh) | 28.6 | | | | 19.8 | | | | 0.1 | | | | 0.4 | | | |
| Approach LOS | D | | | | C | | | | A | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

**APPENDIX D**
**TRIP GENERATION**

**TRIP GENERATION CALCULATIONS – Assisted Living**

The following calculations are based on the data compiled for ITE Land Use Code 254.

**Average Daily Traffic**

T = 2.74 (X)
T = 2.74 (**208**)
T = 570 vehicles

Enter = 0.50 (570) = 285 vehicles
Exit = 0.50 (570) = 285 vehicles

**AM traffic during peak hour of adjacent street**

T = 0.23 (X)
T = 0.23 (**208**)
T = 47 vehicles

Enter = 0.72 (47) = 34 vehicles
Exit = 0.28 (47) = 13 vehicles

**PM traffic during peak hour of adjacent street**

T = 0.37 (X)
T = 0.37 (**208**)
T = 77 vehicles

Enter = 0.39 (77) = 30 vehicles
Exit = 0.61 (77) = 47 vehicles

**TRIP GENERATION CALCULATIONS – Multi-Family (North)**

The following calculations are based on the data compiled for ITE Land Use Code 220.

**Average Daily Traffic**

T = 6.65 (X)
T = 6.65 (**240**)
T = 1,596 vehicle-trips

Enter = 0.50 (1,596) = 798 vehicles
Exit = 0.50 (1,596) = 798 vehicles

**A.M. traffic during peak hour of adjacent street**

T = 0.51 (X)
T = 0.51 (**240**)
T = 122 vehicle-trips

Enter = 0.20 (122) = 24 vehicles
Exit = 0.80 (122) = 98 vehicles

**P.M. traffic during peak hour of adjacent street**

T = 0.62 (X)
T = 0.62 (**240**)
T = 149 vehicle-trips

Enter = 0.65 (149) = 97 vehicles
Exit = 0.35 (149) = 52 vehicles

**TRIP GENERATION CALCULATIONS – Multi-Family (South)**

The following calculations are based on the data compiled for ITE Land Use Code 220.

**Average Daily Traffic**

T = 6.65 (X)
T = 6.65 (**115**)
T = 764 vehicle-trips

Enter = 0.50 (764) = 382 vehicles
Exit = 0.50 (764) = 382 vehicles

**A.M. traffic during peak hour of adjacent street**

T = 0.51 (X)
T = 0.51 (**115**)
T = 59 vehicle-trips

Enter = 0.20 (59) = 12 vehicles
Exit = 0.80 (59) = 47 vehicles

**P.M. traffic during peak hour of adjacent street**

T = 0.62 (X)
T = 0.62 (**115**)
T = 71 vehicle-trips

Enter = 0.65 (71) = 46 vehicles
Exit = 0.35 (71) = 25 vehicles

NEEL-SCHAFFER
Solutions you can build upon

engineers
planners
surveyors
environmental scientists
landscape architects

April 14, 2016
N-S Project No. 13194.001

Mr. Carl Baughman, P.E.
Traffic/Transportation Engineer
City of Franklin
109 3rd Avenue South
P. O. Box 305
Franklin, TN 37065-0305

**Subject: Review of Updated Traffic Impact Study**
**Epoch Apartments – Oak Meadow Drive**

Dear Carl:

Per your request, we have completed a review of the updated traffic study for the referenced proposed project. In response to staff and Neel-Schaffer comments, the applicant submitted a revised traffic study. This correspondence documents our follow-up remarks on the updated report.

- For the intersection of S. Royal Oaks Blvd and Riverside Dr., the study provided additional comments as requested (in new section 5.4 and updated section 6.0) about modifying the phasing of the traffic signal. The report addressed comments regarding the possibility of changing the signal phasing from its existing concurrent permissive-only side street phasing to protected-permitted left turn phasing. The study reported that the existing concurrent phasing results in more efficient (lower delay) operation, but that protected-permissive phasing might reduce driver indecision thereby allowing side street drivers to make more definitive turning movements. Our review did not find details documenting the protected-permissive phasing alternative in the appendix.

  We request, in conjunction with staff, that the study provide analysis print-outs in the appendix documenting the protected-permissive scenario. We desire to compare the AM and PM peak results of the two phasing options.

- The study, as requested, provided additional remarks (in new section 5.4) regarding level-of-service operation of Murfreesboro Rd at I-65 NB and SB ramps. The study attributed the continued unsatisfactory peak period levels-of-service to the significant traffic volumes traveling through the intersections/corridor. As mentioned in our original review memo, but not further addressed in the updated study, continued monitoring and updated traffic signal timings can help provide some mitigation.

- For the Eastern Home Depot Access Road and Project Access for the Northern Apartments intersection, we have two suggestions as potential improvement measures. First, we would recommend a more direct (less angled) connection between the apartment complex area and the Home Depot Access road. Also, we suggest that there be separate westbound left and right exit lanes (i.e. three-lane cross section) at the driveway intersection. The updated traffic study did not comment or address these remarks from the original review.

- For the Oak Meadow Drive and Eastern Project Access / Home Depot Access intersection, the updated traffic study did not address our original comments:
  - Emphasis that the design process consider and provide appropriate intersection sight distance for drivers exiting the south (NB) driveway access (recognizing the horizontal curve just to the east of the intersection)
  - Emphasis on addressing possible sight distance limitations for drivers traveling northbound/westbound on Oak Meadow Drive approaching the eastern driveway intersection. Proposed measures could include new signs, proper design/placement of proposed landscaping and removal of existing vegetation/overgrowth.
  - We recommend that the eastbound and westbound approaches of Oak Meadow Drive be modified to provide dedicated left-turn lanes as described in our original review

- For the Oak Meadow Drive and Western Project Access / Home Depot Access intersection, the updated traffic study did not address our original comments:
  - Recommendation of re-application of pavement markings on the Home Depot access road, including double-yellow centerline
  - Recommendation to modify the eastbound and westbound approaches of Oak Meadow Drive to provide dedicated left-turn lanes as described in our original review

- For the S. Royal Oaks Boulevard and Rand Place / Home Depot Access Road intersection, the updated traffic study did not address our original comments:
  - Recommendation for re-application of the westbound approach pavement markings as noted in our original review
  - We also suggest consideration be given to modifying the lane assignments for the westbound approach. Because of the predominant westbound right-turn movement, we suggest that the outside (curb) lane be converted to a right-turn only lane with the inside lane operating as a shared through-left lane. If pursued, this change would require new lane line pavement markings, turn arrow pavement markings and signing as mentioned in the original review

- Regarding Oak Meadow Drive, we suggest consideration be given to lowering the posted speed limit. We believe it may be appropriate to lower the speed limit along Oak Meadow Drive between S. Royal Oaks Blvd and the Home Depot eastern access driveway (currently 40mph) due to the proposed increase in active driveway connections and traffic volumes.

- The revised traffic study updated and/or adequately addressed all other comments provided in Neel-Schaffer's original review.

We appreciate the opportunity to provide our review comments and participate in the planning process. Please let us know if you need any additional information or have any questions.

Sincerely,
NEEL-SCHAFFER, INC.

Gregory Judy, P.E., PTOE
Engineer Manager

| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 28 | 1198 | 103 | 6 | 46 | 41 | 33 | 12 | 96 | 267 | 747 | 25 |
| Future Volume (vph) | 28 | 1198 | 103 | 6 | 46 | 41 | 33 | 12 | 96 | 267 | 747 | 25 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | 1% | | | | | -1% | 2% | | | | -2% | |
| Storage Length (ft) | | 135 | | | 100 | | 120 | 0 | | | 220 | 0 |
| Storage Lanes | | 3 | | | 1 | | 1 | 1 | | | 2 | 0 |
| Taper Length (ft) | | | | | 50 | | 50 | | | | 50 | |
| Lane Util. Factor | 1.00 | 0.88 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 0.95 |
| Frt | | 0.850 | 0.850 | | | | | 0.850 | | | 0.993 | |
| Flt Protected | | | | 0.950 | 0.950 | | 0.950 | | | 0.950 | 0.955 | |
| Satd. Flow (prot) | 1764 | 2707 | 1607 | 1754 | 1580 | 0 | 1787 | 1486 | 0 | 1787 | 3343 | 0 |
| Flt Permitted | 0.351 | | | 0.423 | 0.950 | | 0.691 | | | 0.137 | 0.955 | |
| Satd. Flow (perm) | 619 | 2707 | 1607 | 781 | 1580 | 0 | 1300 | 1486 | 0 | 258 | 3343 | 0 |
| Right Turn on Red | | | Yes | | | | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 82 | | | | | 112 | | | 82 | |
| Link Speed (mph) | 30 | | | | | 30 | 30 | | | | 30 | |
| Link Distance (ft) | 1624 | | | | | 433 | 515 | | | | 792 | |
| Travel Time (s) | 36.9 | | | | | 9.8 | 11.7 | | | | 18.0 | |
| Peak Hour Factor | 0.63 | 0.92 | 0.87 | 0.58 | 0.68 | 0.77 | 0.67 | 0.63 | 0.86 | 0.80 | 0.99 | 0.67 |
| Heavy Vehicles (%) | 0% | 1% | 0% | 0% | 11% | 0% | 0% | 10% | 3% | 2% | 2% | 4% |
| Adj. Flow (vph) | 44 | 1302 | 118 | 10 | 68 | 53 | 49 | 19 | 112 | 334 | 755 | 37 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 44 | 1302 | 118 | 10 | 68 | 53 | 49 | 131 | 0 | 334 | 792 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Right | Left | Left | Left | Left | Right | Right | Left | Left | Right |
| Median Width(ft) | 22 | | | | | 22 | 12 | | | | 35 | |
| Link Offset(ft) | 0 | | | | | 0 | 0 | | | | 0 | |
| Crosswalk Width(ft) | 16 | | | | | 16 | 16 | | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 | 0.99 | 1.03 | 0.99 |
| Turning Speed (mph) | | 9 | 9 | 15 | 15 | | 15 | 9 | 9 | 15 | 15 | 9 |
| Number of Detectors | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | 0 | 42 | 42 | 50 | 42 | 42 | | 42 | 226 | |
| Trailing Detector (ft) | -3 | 220 | 0 | -3 | -3 | 0 | -3 | -3 | | -3 | 220 | |
| Detector 1 Position(ft) | -3 | 220 | 0 | -3 | -3 | 0 | -3 | -3 | | -3 | 220 | |
| Detector 1 Size(ft) | 45 | 6 | 50 | 45 | 45 | 50 | 45 | 45 | | 45 | 6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | NA | custom | custom | custom | Prot | NA | D.Pm | Prot | | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | | 4 | | | 8 | | 5 | 2 | |
| Permitted Phases | 6 | | 6 | 8 | | | 4 | | | 2 | | |
| Detector Phase | 1 | 6 | | 8 | 4 | | 4 | 8 | | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |

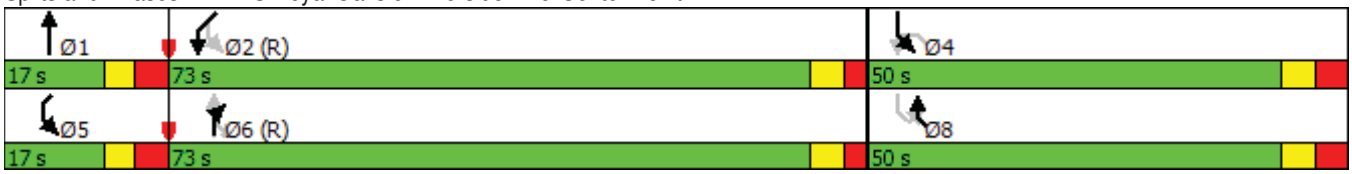
| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 7.0 | 7.0 | | 7.0 | 7.0 | | 5.0 | 10.0 | |
| Minimum Split (s) | 17.0 | 73.0 | 73.0 | 50.0 | 50.0 | | 50.0 | 50.0 | | 17.0 | 73.0 | |
| Total Split (s) | 17.0 | 73.0 | 73.0 | 50.0 | 50.0 | | 50.0 | 50.0 | | 17.0 | 73.0 | |
| Total Split (%) | 12.1% | 52.1% | 52.1% | 35.7% | 35.7% | | 35.7% | 35.7% | | 12.1% | 52.1% | |
| Maximum Green (s) | 10.5 | 67.0 | 67.0 | 43.0 | 43.0 | | 43.0 | 43.0 | | 10.5 | 67.0 | |
| Yellow Time (s) | 3.0 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | 2.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 2.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | -3.0 | -2.5 | -2.5 | | -2.5 | -2.5 | | -1.0 | -3.0 | |
| Total Lost Time (s) | 5.5 | 3.0 | 3.0 | 4.5 | 4.5 | | 4.5 | 4.5 | | 5.5 | 3.0 | |
| Lead/Lag | Lead | Lag | Lag | | | | | | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Recall Mode | None | C-Min | C-Min | None | None | | None | None | | None | C-Min | |
| Walk Time (s) | | 7.0 | 7.0 | 8.0 | 8.0 | | 8.0 | 8.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 16.0 | 16.0 | 35.0 | 32.0 | | 32.0 | 35.0 | | | 20.0 | |
| Pedestrian Calls (#/hr) | | 0 | 0 | 0 | 0 | | 0 | 0 | | | 0 | |
| Act Effct Green (s) | 106.2 | 101.1 | 101.1 | 14.4 | 14.4 | 0.0 | 14.4 | 14.4 | | 114.1 | 107.4 | |
| Actuated g/C Ratio | 0.76 | 0.72 | 0.72 | 0.10 | 0.10 | 0.00 | 0.10 | 0.10 | | 0.82 | 0.77 | |
| v/c Ratio | 0.08 | 0.67 | 0.10 | 0.12 | 0.42 | no cap | 0.37 | 0.52 | | 1.00 | 0.31 | |
| Control Delay | 3.3 | 13.0 | 2.6 | 58.5 | 65.8 | | 65.1 | 21.2 | | 70.3 | 8.3 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 3.3 | 13.0 | 2.6 | 58.5 | 65.8 | Error | 65.1 | 21.2 | | 70.3 | 8.3 | |
| LOS | A | B | A | E | E | F | E | C | | E | A | |
| Approach Delay | 11.9 | | | | | Err | 33.2 | | | | 26.7 | |
| Approach LOS | B | | | | | F | C | | | | C | |
| 90th %ile Green (s) | 7.5 | 93.3 | 93.3 | 16.7 | 16.7 | | 16.7 | 16.7 | | 10.5 | 96.3 | |
| 90th %ile Term Code | Gap | Coord | Coord | Hold | Gap | | Gap | Hold | | Max | Coord | |
| 70th %ile Green (s) | 6.9 | 96.2 | 96.2 | 13.8 | 13.8 | | 13.8 | 13.8 | | 10.5 | 99.8 | |
| 70th %ile Term Code | Gap | Coord | Coord | Hold | Gap | | Gap | Hold | | Max | Coord | |
| 50th %ile Green (s) | 6.6 | 98.1 | 98.1 | 11.9 | 11.9 | | 11.9 | 11.9 | | 10.5 | 102.0 | |
| 50th %ile Term Code | Gap | Coord | Coord | Hold | Gap | | Gap | Hold | | Max | Coord | |
| 30th %ile Green (s) | 6.3 | 100.0 | 100.0 | 10.0 | 10.0 | | 10.0 | 10.0 | | 10.5 | 104.2 | |
| 30th %ile Term Code | Gap | Coord | Coord | Hold | Gap | | Gap | Hold | | Max | Coord | |
| 10th %ile Green (s) | 0.0 | 102.8 | 102.8 | 7.2 | 7.2 | | 7.2 | 7.2 | | 10.5 | 119.8 | |
| 10th %ile Term Code | Skip | Coord | Coord | Hold | Hold | | Hold | Hold | | Max | Coord | |
| Stops (vph) | 6 | 624 | 11 | 6 | 41 | 0 | 30 | 25 | | 205 | 368 | |
| Fuel Used(gal) | 0 | 22 | 1 | 0 | 1 | 0 | 1 | 1 | | 7 | 8 | |
| CO Emissions (g/hr) | 28 | 1523 | 99 | 9 | 70 | 10 | 51 | 73 | | 462 | 567 | |
| NOx Emissions (g/hr) | 6 | 296 | 19 | 2 | 14 | 2 | 10 | 14 | | 90 | 110 | |
| VOC Emissions (g/hr) | 7 | 353 | 23 | 2 | 16 | 2 | 12 | 17 | | 107 | 131 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 6 | 326 | 8 | 8 | 59 | 0 | 42 | 16 | | 168 | 68 | |
| Queue Length 95th (ft) | 10 | 459 | 28 | 17 | 79 | 0 | 61 | 24 | | m#163 | m336 | |
| Internal Link Dist (ft) | 1544 | | | | | 353 | 435 | | | | 712 | |
| Turn Bay Length (ft) | | 135 | 135 | 100 | 100 | | 120 | | | 220 | 220 | |
| Base Capacity (vph) | 580 | 1954 | 1182 | 253 | 513 | 1 | 422 | 558 | | 335 | 2583 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |

| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.08 | 0.67 | 0.10 | 0.04 | 0.13 | 53.00 | 0.12 | 0.23 | | 1.00 | 0.31 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 139 (99%), Referenced to phase 2:SWL and 6:NBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: Err | | | |
| Intersection Signal Delay: Err | | Intersection LOS: F | |
| Intersection Capacity Utilization Err% | | ICU Level of Service H | |
| Analysis Period (min) 15 | | | |

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 24: S Royal Oaks & Riverside Dr & Center Point Pl



| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 90 | 1063 | 27 | 83 | 64 | 123 | 46 | 58 | 288 | 232 | 1063 | 93 |
| Future Volume (vph) | 90 | 1063 | 27 | 83 | 64 | 123 | 46 | 58 | 288 | 232 | 1063 | 93 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | 1% | | | | | -1% | 2% | | | | -2% | |
| Storage Length (ft) | | 135 | | | 100 | | 120 | 0 | | | 220 | 0 |
| Storage Lanes | | 3 | | | 1 | | 1 | 1 | | | 2 | 0 |
| Taper Length (ft) | | | | | 50 | | 50 | | | | 50 | |
| Lane Util. Factor | 1.00 | 0.88 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 0.95 |
| Frt | | 0.850 | 0.850 | | | | | 0.850 | | | 0.986 | |
| Flt Protected | | | | 0.950 | 0.950 | | 0.950 | | | 0.950 | 0.957 | |
| Satd. Flow (prot) | 1764 | 2707 | 1575 | 1736 | 1754 | 0 | 1752 | 1546 | 0 | 1805 | 3365 | 0 |
| Flt Permitted | 0.166 | | | 0.168 | 0.950 | | 0.670 | | | 0.116 | 0.957 | |
| Satd. Flow (perm) | 293 | 2707 | 1575 | 307 | 1754 | 0 | 1236 | 1546 | 0 | 220 | 3365 | 0 |
| Right Turn on Red | | | Yes | | | | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 124 | | | | | 158 | | | 76 | |
| Link Speed (mph) | 30 | | | | | 30 | 30 | | | | 30 | |
| Link Distance (ft) | 1624 | | | | | 433 | 515 | | | | 792 | |
| Travel Time (s) | 36.9 | | | | | 9.8 | 11.7 | | | | 18.0 | |
| Peak Hour Factor | 0.79 | 0.95 | 0.64 | 0.86 | 0.71 | 0.82 | 0.75 | 0.88 | 0.94 | 0.75 | 0.90 | 0.76 |
| Heavy Vehicles (%) | 0% | 1% | 2% | 1% | 0% | 0% | 2% | 0% | 0% | 1% | 1% | 0% |
| Adj. Flow (vph) | 114 | 1119 | 42 | 97 | 90 | 150 | 61 | 66 | 306 | 309 | 1181 | 122 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 114 | 1119 | 42 | 97 | 90 | 150 | 61 | 372 | 0 | 309 | 1303 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Right | Left | Left | Left | Left | Right | Right | Left | Left | Right |
| Median Width(ft) | 22 | | | | | 22 | 12 | | | | 35 | |
| Link Offset(ft) | 0 | | | | | 0 | 0 | | | | 0 | |
| Crosswalk Width(ft) | 16 | | | | | 16 | 16 | | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 | 0.99 | 1.03 | 0.99 |
| Turning Speed (mph) | | 9 | 9 | 15 | 15 | | 15 | 9 | 9 | 15 | 15 | 9 |
| Number of Detectors | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | 0 | 42 | 42 | 50 | 42 | 42 | | 42 | 226 | |
| Trailing Detector (ft) | -3 | 220 | 0 | -3 | -3 | 0 | -3 | -3 | | -3 | 220 | |
| Detector 1 Position(ft) | -3 | 220 | 0 | -3 | -3 | 0 | -3 | -3 | | -3 | 220 | |
| Detector 1 Size(ft) | 45 | 6 | 50 | 45 | 45 | 50 | 45 | 45 | | 45 | 6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | NA | custom | custom | custom | Prot | NA | D.Pm | Prot | | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | | 4 | 2! | | 8 | | 5 | 2! | |
| Permitted Phases | 6 | | 6 | 8 | | | 4 | | | 2 | | |
| Detector Phase | 1 | 6 | | 8 | 4 | 2 | 4 | 8 | | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |

| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 7.0 | 7.0 | 10.0 | 7.0 | 7.0 | | 5.0 | 10.0 | |
| Minimum Split (s) | 15.0 | 70.0 | 70.0 | 50.0 | 50.0 | 85.0 | 50.0 | 50.0 | | 30.0 | 85.0 | |
| Total Split (s) | 14.0 | 72.0 | 72.0 | 49.0 | 49.0 | 87.0 | 49.0 | 49.0 | | 29.0 | 87.0 | |
| Total Split (%) | 9.3% | 48.0% | 48.0% | 32.7% | 32.7% | 58.0% | 32.7% | 32.7% | | 19.3% | 58.0% | |
| Maximum Green (s) | 7.5 | 66.0 | 66.0 | 42.0 | 42.0 | 81.0 | 42.0 | 42.0 | | 22.5 | 81.0 | |
| Yellow Time (s) | 3.0 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | 2.5 | 3.5 | 3.5 | 2.5 | 3.5 | 3.5 | | 3.5 | 2.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | -3.0 | -2.5 | -2.5 | | -2.5 | -2.5 | | -1.0 | -3.0 | |
| Total Lost Time (s) | 5.5 | 3.0 | 3.0 | 4.5 | 4.5 | | 4.5 | 4.5 | | 5.5 | 3.0 | |
| Lead/Lag | Lead | Lag | Lag | | | Lag | | | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Recall Mode | None | C-Min | C-Min | None | None | C-Min | None | None | | None | C-Min | |
| Walk Time (s) | | 7.0 | 7.0 | 8.0 | 8.0 | 7.0 | 8.0 | 8.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 16.0 | 16.0 | 35.0 | 32.0 | 20.0 | 32.0 | 35.0 | | | 20.0 | |
| Pedestrian Calls (#/hr) | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | |
| Act Effct Green (s) | 84.9 | 79.0 | 79.0 | 36.4 | 36.4 | 0.0 | 36.4 | 36.4 | | 103.6 | 92.2 | |
| Actuated g/C Ratio | 0.57 | 0.53 | 0.53 | 0.24 | 0.24 | 0.00 | 0.24 | 0.24 | | 0.69 | 0.61 | |
| v/c Ratio | 0.46 | 0.79 | 0.05 | 1.31 | 0.21 | no cap | 0.20 | 0.75 | | 0.82 | 0.62 | |
| Control Delay | 17.9 | 35.9 | 0.1 | 250.3 | 44.0 | | 43.8 | 38.5 | | 41.1 | 13.1 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 1.5 | |
| Total Delay | 17.9 | 35.9 | 0.1 | 250.3 | 44.0 | Error | 43.8 | 38.5 | | 41.1 | 14.6 | |
| LOS | B | D | A | F | D | F | D | D | | D | B | |
| Approach Delay | 33.1 | | | | | Err | 39.3 | | | | 19.7 | |
| Approach LOS | C | | | | | F | D | | | | B | |
| 90th %ile Green (s) | 7.5 | 66.0 | 66.0 | 42.0 | 42.0 | 81.0 | 42.0 | 42.0 | | 22.5 | 81.0 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Hold | Coord | Hold | Max | | Max | Coord | |
| 70th %ile Green (s) | 7.5 | 66.0 | 66.0 | 42.0 | 42.0 | 81.0 | 42.0 | 42.0 | | 22.5 | 81.0 | |
| 70th %ile Term Code | Max | Coord | Coord | Max | Hold | Coord | Hold | Max | | Max | Coord | |
| 50th %ile Green (s) | 7.5 | 70.5 | 70.5 | 37.5 | 37.5 | 85.5 | 37.5 | 37.5 | | 22.5 | 85.5 | |
| 50th %ile Term Code | Max | Coord | Coord | Gap | Hold | Coord | Hold | Gap | | Max | Coord | |
| 30th %ile Green (s) | 7.5 | 79.5 | 79.5 | 29.9 | 29.9 | 93.1 | 29.9 | 29.9 | | 21.1 | 93.1 | |
| 30th %ile Term Code | Max | Coord | Coord | Gap | Hold | Coord | Hold | Gap | | Gap | Coord | |
| 10th %ile Green (s) | 6.8 | 98.0 | 98.0 | 18.3 | 18.3 | 105.4 | 18.3 | 18.3 | | 14.2 | 105.4 | |
| 10th %ile Term Code | Gap | Coord | Coord | Gap | Hold | Coord | Hold | Gap | | Gap | Coord | |
| Stops (vph) | 42 | 838 | 0 | 67 | 48 | 0 | 35 | 190 | | 209 | 817 | |
| Fuel Used(gal) | 2 | 26 | 0 | 5 | 1 | 0 | 1 | 5 | | 5 | 15 | |
| CO Emissions (g/hr) | 119 | 1808 | 24 | 341 | 74 | 29 | 55 | 360 | | 317 | 1030 | |
| NOx Emissions (g/hr) | 23 | 352 | 5 | 66 | 14 | 6 | 11 | 70 | | 62 | 200 | |
| VOC Emissions (g/hr) | 28 | 419 | 6 | 79 | 17 | 7 | 13 | 83 | | 73 | 239 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 37 | 530 | 0 | ~114 | 69 | 0 | 46 | 195 | | 162 | 645 | |
| Queue Length 95th (ft) | 58 | #692 | 0 | #214 | 88 | 0 | 70 | 293 | | m114 | m571 | |
| Internal Link Dist (ft) | 1544 | | | | | 353 | 435 | | | | 712 | |
| Turn Bay Length (ft) | | 135 | 135 | 100 | 100 | | 120 | | | 220 | 220 | |
| Base Capacity (vph) | 249 | 1425 | 888 | 91 | 520 | 1 | 366 | 569 | | 400 | 2097 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 558 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | |

| Lane Group | NBT | NBR | NBR2 | SBL2 | SBL | SBT | NWL | NWR | NWR2 | SWL2 | SWL | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.46 | 0.79 | 0.05 | 1.07 | 0.17 | 150.00 | 0.17 | 0.65 | | 0.77 | 0.85 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 123 (82%), Referenced to phase 2:SBSW and 6:NBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: Err | | | |
| Intersection Signal Delay: Err | | Intersection LOS: F | |
| Intersection Capacity Utilization Err% | | ICU Level of Service H | |
| Analysis Period (min) 15 | | | |

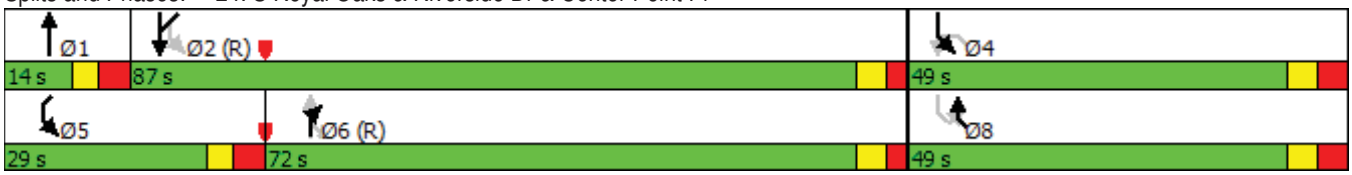
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

! Phase conflict between lane groups.

Splits and Phases: 24: S Royal Oaks & Riverside Dr & Center Point Pl



## SITE DATA

| | |
|---|---|
| PROJECT NAME | OAK MEADOWS EPOCH DEVELOPMENT<br>REZONING & PUD APPLICATION |
| PROJECT NUMBER: | TBD |
| LOTS: | 2 EXISTING, 3 PROPOSED |
| ADDRESS: | 840 & 880 OAK MEADOWS DR. |
| CITY: | FRANKLIN |
| COUNTY: | WILLIAMSON |
| STATE: | TENNESSEE |
| CIVIL DISTRICT: | 9TH |
| MAP, GROUP AND PARCEL NUMBERS: | MAP 79, PARCELS 88.00 (PORTION OF) & 101.19 |
| EXISTING ZONING: | GC (GENERAL COMMERCIAL) |
| PROPOSED ZONING: | SD-R (12) (SPECIFIC DEVELOPMENT RESIDENTIAL 12 UNITS/AC) |
| CHARACTER AREA OVERLAY: | MECO-5 |
| OTHER APPLICABLE OVERLAYS: | FFO & FWO |
| APPLICABLE DEVELOPMENT STANDARD: | CONVENTIONAL |
| ACREAGE OF SITE: | 13.06 + 17.33 = 30.39 ACRES |
| SQUARE FOOTAGE OF SITE: | 569,021 + 754,942 = 1,323,963 SQUARE FEET |
| MINIMUM REQUIRED SETBACK LINES: | ATTACHED RESIDENTIAL USE |
| YARD FRONTING COLLECTOR (OAK MEADOWS) | 40' |
| SIDE YARD | 15' |
| REAR YARD | 30' |
| OWNER (BOTH PARCELS): | E. WARNER BASS, TRUSTEE |
| ADDRESS: | 150 3RD AVE. SOUTH, SUITE 2800, NASHVILLE, TN 37201 |
| PHONE NO.: | 615.742.6400 |
| E-MAIL ADDRESS: | wbass@bassberry.com |
| CONTACT NAME: | MR. WARNER BASS |
| MINERAL RIGHTS: | CONTROLLED BY CURRENT PROPERTY OWNER |
| APPLICANT: | CRUNK ENGINEERING LLC |
| ADDRESS: | 1894 GEN. GEORGE PATTON DR., SUITE 600<br>FRANKLIN, TN 37067 |
| PHONE NO.: | 615.873.1795 |
| E-MAIL ADDRESS: | adam@crunkeng.com |
| CONTACT NAME: | MR. ADAM CRUNK, P.E. |

DENSITY

| | |
|---|---|
| ATTACHED DWELLING UNITS | 355 UNITS |
| LAND AREA | 30.39 ACRES |
| LAND AREA WITHIN FLOODPLAIN OVERLAY | 8.32 ACRES |
| OVERALL DENSITY | 11.7 UNITS/ACRE |
| NET DENSITY (MINUS OVERLAY CONSTRAINT) | 16.1 UNITS/ACRE |

BUILDING HEIGHT

| | |
|---|---|
| ALLOWABLE | 6 STORIES MAXIMUM |
| PROPOSED | NORTH PARCEL - 4 STORIES<br>SOUTH PARCEL 2/3 STORIES (2 STORY FACING STREET) |

PROPOSED LANDSCAPE SURFACE RATIO: NORTH SITE - 0.42; SOUTH SITE - 0.56; COMBINED - 0.50
MINIMUM LANDSCAPE SURFACE RATIO: 0.20

PARKING

EXISTING 0

REQUIRED (1.5/1BR + 2.5/2BR + 3/3BR)

| NORTH SITE | | SOUTH SITE | |
|---|---|---|---|
| 1BR - 104 UNITS * 1.5 = | 156 SPACES | 1BR - 45 UNITS * 1.5 = | 68 SPACES |
| 2BR - 112 UNITS * 2.5 = | 280 SPACES | 2BR - 50 UNITS * 2.5 = | 125 SPACES |
| 3BR - 24 UNITS * 3.0 = | 72 SPACES | 3BR - 20 UNITS * 3.0 = | 60 SPACES |
| TOTAL REQUIRED | = 508 SPACES | TOTAL REQUIRED | = 253 SPACES |
| INCLUDING 9 ADA SPACES | | INCLUDING 7 ADA SPACES | |

MAXIMUM PARKING NORTH SITE - 610 SPACES; SOUTH SITE - 304 SPACES

*MODIFICATION OF STANDARD REQUEST TO REDUCE PARKING REQUIREMENT TO 1.75 PER UNIT
NORTH SITE = 240 X 1.75 = 420 SPACES
SOUTH SITE = 115 X 1.75 = 202 SPACES

PROPOSED

| NORTH SITE | | SOUTH SITE (APTS. ONLY) | |
|---|---|---|---|
| REGULAR SPACES | 329 | REGULAR SPACES | 198 |
| COMPACT SPACES (22 % OF TOTAL) | 84 | COMPACT SPACES (8 % OF TOTAL) | 19 |
| ADA SPACES | 16 | ADA SPACES | 8 |
| TOTAL PROVIDED | 429 | TOTAL PROVIDED | 225 |
| | | SOUTH SITE (AMENITY CTR.) | |
| | | REGULAR SPACES | 24 |
| | | COMPACT SPACES (0% OF TOTAL) | 0 |
| | | ADA SPACES | 2 |
| | | TOTAL PROVIDED | 26 |

TREE CANOPY:

| | | |
|---|---|---|
| EXISTING CANOPY COVERAGE | NORTH SITE - 9% | SOUTH SITE - 65% |
| REQUIRED PERCENTAGE TO REMAIN | NORTH SITE - 54% | SOUTH SITE - 36% |
| PROPOSED PERCENTAGE TO REMAIN | NORTH SITE - 54% | SOUTH SITE - 42% |

PARKLAND DEDICATION: FEE IN LIEU OF FOR 5.37 ACRES, 355 TOTAL UNITS PROPOSED

OPEN SPACE:

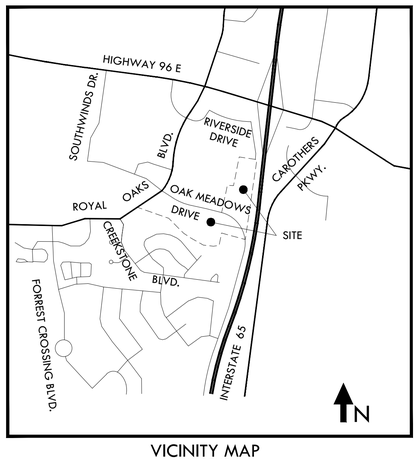
| | |
|---|---|
| TOTAL OPEN SPACE REQ'D (15% OF 30.39 AC.) | 4.56 AC. |
| FORMAL OPEN SPACE REQUIRED (33% OF OPEN SPACE REQUIRED) | 1.52 AC. |
| | 1.65 AC. PROVIDED |
| INFORMAL OPEN SPACE REQUIRED (67% OF OPEN SPACE REQUIRED) | 3.04 AC. |
| | 8.9 AC. PROVIDED |

USE BUFFER: 50-FT CLASS C INCOMPATIBLE LAND USE BUFFER (SOUTH PORTION OF SOUTH SITE)
40-FT INTERSTATE BUFFER (EAST PORTION OF NORTH SITE)

### NOTES:

PROPERTY IS LOCATED ON MAP 79 AS A PORTION OF LOT 88.00 AND PARCEL 101.19 CONTAINING 30.39 ACRES.

PARCEL 88.00 DOES LIE WITHIN THE 100-YEAR FLOOD PLAIN AS INDICATED BY FIRM MAP NO. 47187C0212F DATED SEPTEMBER 29, 2006.




VICINITY MAP
NO SCALE

# REZONING

# The Epoch Development

# REZONING SUBMITTAL

## Franklin, Williamson County, Tennessee

CITY OF FRANKLIN PROJECT NO. 6085

APRIL 7 2016

PREPARED FOR:

## EPOCH RESIDENTIAL

359 Carolina Avenue
Winter Park, Florida
(407) 644-9055

STATEMENT OF IMPACT - POLICE, FIRE, SOLID WASTE, PARKS:
The proposed project will add 355 multi-family units. The property is currently undeveloped within the existing City Limits of the City of Franklin. Therefore, no new land is being developed outside the existing jurisdiction of City of Franklin Police, Fire, or Solid Waste services.

The project is approximately a 4 mile driving distance from the Police Station; 1.5 mile driving distance from the nearest fire station on Murfreesboro Rd.
The project will have two dumpster locations for solid waste. One serving 240 units and the other serving 115 units.
No new parkland is being dedicated as part of this project. However, this project will contribute to parkland funds.

STATEMENT OF IMPACT - STORMWATER:

The proposed development contains two site features that will be protected during construction. The south site contains a wetland area as well as a stream, Watson Branch. the site has been designed not to impact these site features. The required buffers for each feature have been shown on these plans.

STATEMENT OF IMPACT - TRANSPORTATION:
The proposed project will add 355 multi-family units with access along Oak Meadow Drive and Riverside Drive. The primary road corridor serving the project is the major arterial South Royal Oaks Boulevard. Based on the traffic study performed for this project, the majority of traffic will be directed in the northernly direction toward Cool Springs.

STATEMENT OF IMPACTS - WATER AND SEWER:
The proposed project is the construction of 355 new attached dwelling units with a mixture of one, two, and three bedroom units. The project will result in a projected flow of 101,250 GPD. The Northern site will be served by water off of the existing 10" main in the old Riverside Drive ROW, and sewer at the existing manhole behind the Home Depot. The Southern site will be served by water with a new 8" main along Oak Meadow Dr. that will connect from Royal Oaks Blvd. and tie into the 10" main along the old Riverside Drive ROW, and sewer will be served by the existing 24" main that runs along Watson Branch on the subject property. Reclaimed water is not located in the project vicinity.

| SHEET NO. | SHEET TITLE |
|---|---|
| C0.0 | COVER SHEET |
| C1.0 | OVERALL EXISTING CONDITIONS |
| C1.1 | NORTH SITE EXISTING CONDITIONS |
| C1.2 | SOUTH SITE EXISTING CONDITIONS |


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


ENGINEERING CRUNK

WILSON CAIN REGISTERED LANDSCAPE ARCHITECT AGRICULTURE No. 114180 STATE OF TENNESSEE 4/7

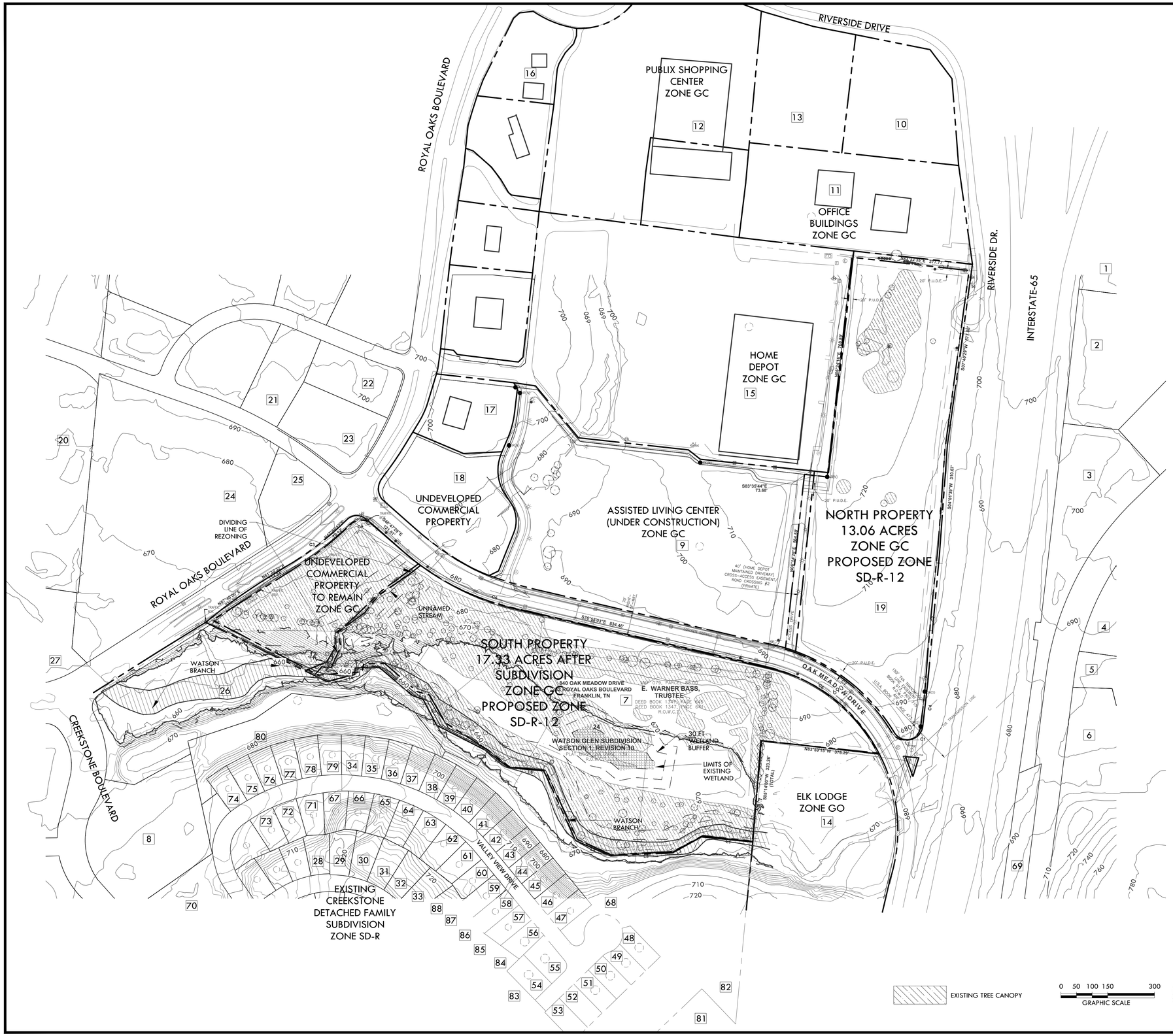
THE EPOCH DEVELOPMENT
REZONING SUBMITTAL
COF #6085 FRANKLIN, TN

| REVISIONS | |
|---|---|
| No. | DATE |

04/07/16 15001

C0.0

COVER SHEET




| ID | PRCUID | DEED / PLAT | LAND USE | OWNER | ZONING |
|---|---|---|---|---|---|
| 1 | 079---06905 | DB 3844 DP 619 PB116 PP114 | HOTEL | BRE/LQ PROP LLC | GC |
| 2 | 079---06906 | DB 2966 DP 435 PB22 PP11 | AUTO DLR | ADKINS RODNEY G | GC |
| 3 | 079---07600 | DB 4341 DP763 PB22 PP11 | CHURCH | CHURCH GATE THE | GC |
| 4 | 079---08000 | DB6337 DP70 PB61 PP69 | REC | SOAR ADVENTURE TOWER LLC | GC |
| 5 | 079---08200 | DB5165 DP555 | UNDEV. | NICHOLS J DONALD | SD-R |
| 6 | 079---08300 | DB1350 DP525 | ATTACHED RESID. | UNITED DOMINION REALTY LP | GC |
| 7 | 079---08800 | DB1347 DP645 PB29 PP139 | UNDEV. | BASS E WARNER TR | GC |
| 8 | 079---10001 | DB2192 DP320 PB31 PP125 | DAYCARE | WOOD & WOOD LLC | GO |
| 9 | 079---10100 | DB6533 DP243 PB62 PP45 | ASST. LVG | DOMINION SENIOR LIVING OF FRANKLIN L | GC |
| 10 | 079---10101 | DB5434 DP690 | OFFICE | 5107 LLC | GC |
| 11 | 079---10102 | DB2200 DP199 PB19 PP59 | OFFICE | LIN DON REALTY LLC | GC |
| 12 | 079---10103 | DB5459 DP859 PB59 PP3 | RETAIL | PUBLIX TENNESSEE LLC | GC |
| 13 | 079---10104 | DB6168 DP806 PB22 PP120 | ASST. LVG | FRANKLIN TN SENIOR CARE PROPERTY LLC | GC |
| 14 | 079---10105 | | REC | NASHVILLE LODGE #72 BPO ELKS | GO |
| 15 | 079---10110 | DB4406 DP792 PB29 PP138 | RETAIL | HD DEVELOPMENT OF MARYLAND INC | GC |
| 16 | 079---10114 | DB5459 DP859 PB29 PP139 | RETAIL | PUBLIX TENNESSEE LLC | GC |
| 17 | 079---10116 | DB1792 DP29 PB29 PP139 | RETAIL | FIRST-CITIZENS BANK AND TR CO | GC |
| 18 | 079---10117 | PB 43 PP40 | UNDEV. | BASS E WARNER TR | GC |
| 19 | 079---10119 | PB 43 PP40 | UNDEV. | BASS E WARNER TR | GC |
| 20 | 079I-A01401 | DB4197 DP993 PB41 PP33 | UNDEV. | SWJ2 TENNESSEE LLC | RM-20 |
| 21 | 079O-A00300 | DB4200 DP849 PB27 PP4 | INSTIT. | CHURCH CORNERSTONE-MINISTRIES INC | GC |
| 22 | 079O-A00301 | DB5790 DP107 PB29 PP10 | RETAIL | MAGLI CHERYL S FAMILY TRUST | GC |
| 23 | 079O-A00302 | DB5871 DP528 PB26 PP10 | RETAIL | LCJ LLC | GC |
| 24 | 079O-A00400 | DB794 DP881 PB12 PP76 | | UNITED STATES POSTAL SERV | CI |
| 25 | 079O-A00401 | DB1946 DP286 PB12 PP76 | RETAIL | COMMUNITY BANK | GC |
| 26 | 079O-G02500 | DB5136 DP628 | UNDEV. | CADENCE BANK NA | GO |
| 27 | 079O-O20000 | PB47 PP142 | UNDEV. | ROYAL OAKS PARK SOUTH | GO |
| 28 | 079O-O00100 | DB5814 DP815 PB55 PP146 | RESIDENTIAL | THURM DAVID M | SD-R |
| 29 | 079O-O00200 | DB5807 DP985 PB55 PP146 | RESIDENTIAL | HAMILTON MALLORY | SD-R |
| 30 | 079O-O00300 | DB6624 DP480 PB55 PP146 | RESIDENTIAL | LYLE JORDAN WILLIAM | SD-R |
| 31 | 079O-O00400 | DB5780 DP386 PB55 PP146 | RESIDENTIAL | EVANGELISTA BERNARDINO JR | SD-R |
| 32 | 079O-O00500 | DB5841 DP984 PB55 PP146 | RESIDENTIAL | CASTANEDA ORESTES | SD-R |
| 33 | 079O-O00600 | DB5809 DP135 PB55 PP146 | RESIDENTIAL | VOSS STEPHEN M | SD-R |
| 34 | 079O-E00100 | DB6336 DP118 PB58 PP10 | RESIDENTIAL | KHOT SOHAM | SD-R |
| 35 | 079O-E00200 | DB6190 DP252 PB58 PP10 | RESIDENTIAL | GOOCH RYAN M | SD-R |
| 36 | 079O-E00300 | DB6218 DP405 PB58 PP10 | RESIDENTIAL | SULLIVAN JOHN | SD-R |
| 37 | 079O-E00400 | DB6232 DP972 PB58 PP10 | RESIDENTIAL | CULLEN ROBERT BARRY | SD-R |
| 38 | 079O-E00500 | DB6231 DP1 PB58 PP10 | RESIDENTIAL | MILLER ROBERT FRANK | SD-R |
| 39 | 079O-E00600 | DB6288 DP734 PB58 PP10 | RESIDENTIAL | DHARANI KHAIRUNISSA | SD-R |
| 40 | 079O-E00700 | DB6218 DP407 PB58 PP10 | RESIDENTIAL | KNOX CONSUELIA S | SD-R |
| 41 | 079O-E00800 | DB6229 DP797 PB58 PP10 | RESIDENTIAL | DAWKINS BRETTON GUY | SD-R |
| 42 | 079O-E00900 | DB6296 DP854 PB58 PP10 | RESIDENTIAL | COMEAUX MARGARET A | SD-R |
| 43 | 079O-E01000 | DB6273 DP312 PB58 PP10 | RESIDENTIAL | SMITH CHRISTOPHER S | SD-R |
| 44 | 079O-E01100 | DB6281 DP281 PB58 PP10 | RESIDENTIAL | DANIELS THOMAS | SD-R |
| 45 | 079O-E01200 | DB6341 DP640 PB58 PP10 | RESIDENTIAL | SUNDARAM BARATH SHANMUGA | SD-R |
| 46 | 079O-E01300 | DB6331 DP190 PB58 PP10 | RESIDENTIAL | HOSSAIN MOHAMMAD | SD-R |
| 47 | 079O-E01400 | DB6264 DP154 PB58 PP10 | RESIDENTIAL | MAPLESDEN LAWRENCE | SD-R |
| 48 | 079O-E01500 | DB6346 DP779 PB58 PP10 | RESIDENTIAL | BECHARD BRIAN | SD-R |
| 49 | 079O-E01600 | DB6329 DP817 PB58 PP10 | RESIDENTIAL | VIDYAM SATHEESH | SD-R |
| 50 | 079O-E01700 | DB6145 DP158 PB58 PP10 | RESIDENTIAL | RUSSO JOHN M | SD-R |
| 51 | 079O-E01800 | DB6177 DP164 PB58 PP10 | RESIDENTIAL | OLIGLEY J PATRICK | SD-R |
| 52 | 079O-E01900 | DB6151 DP238 PB58 PP10 | RESIDENTIAL | BONHAM SYDNEY | SD-R |
| 53 | 079O-E02000 | DB6156 DP254 PB58 PP10 | RESIDENTIAL | BURGER JORDAN | SD-R |
| 54 | 079O-E02100 | DB6172 DP871 PB58 PP10 | RESIDENTIAL | NOLAN MICHAEL S TRUST | SD-R |
| 55 | 079O-E02200 | DB6195 DP626 PB58 PP10 | RESIDENTIAL | PARSI SREEKANTH | SD-R |
| 56 | 079O-E02300 | DB6329 DP771 PB58 PP10 | RESIDENTIAL | KOLLI MURALL KRISHNA | SD-R |
| 57 | 079O-E02400 | DB6252 DP619 PB58 PP10 | RESIDENTIAL | KAMAN VENKATESH | SD-R |
| 58 | 079O-E02500 | DB6231 DP816 PB58 PP10 | RESIDENTIAL | RAJENDRAN THAMIL S | SD-R |
| 59 | 079O-E02600 | DB6195 DP601 PB58 PP10 | RESIDENTIAL | DOPPALAPUDI SRIKANTH | SD-R |
| 60 | 079O-E02700 | DB6182 DP362 PB58 PP10 | RESIDENTIAL | CHINTAKINDI VARUN K | SD-R |
| 61 | 079O-E02800 | DB6177 DP138 PB58 PP10 | RESIDENTIAL | KRISHNAN JAGADEESWARAN | SD-R |
| 62 | 079O-E02900 | DB6152 DP63 PB58 PP10 | RESIDENTIAL | MOHAMED ABDUL R J | SD-R |
| 63 | 079O-E03000 | DB6153 DP125 PB58 PP10 | RESIDENTIAL | PICHAIMUTHU NARAYANAN | SD-R |
| 64 | 079O-E03100 | DB6100 DP536 PB58 PP10 | RESIDENTIAL | ZELLER JAMES S JR | SD-R |
| 65 | 079O-E03200 | DB6583 DP472 PB58 PP10 | RESIDENTIAL | MURRAY KIMBERLY | SD-R |
| 66 | 079O-E03300 | DB6172 DP802 PB58 PP10 | RESIDENTIAL | ZIPPER NATHAN M | SD-R |
| 67 | 079O-E03400 | DB6154 DP157 PB58 PP10 | RESIDENTIAL | VIGIL MARIO G | SD-R |
| 68 | 079O-E03500 | DB6104 DP222 PB58 PP10 | RESIDENTIAL | CREEKSTONES HOMEOWNERS ASSOCIATION I | SD-R |
| 69 | 089---02609 | DB3915 DP 891 PB14 PP17 | RESIDENTIAL | A T & T CORP BY & THROUGH | R-2 |
| 70 | 089B-004200 | DB5309 DP243 PB54 PP20 | RESIDENTIAL | CREEKSTONE HOMEOWNERS ASSOCIATION IN | SD-R |
| 71 | 089B-004600 | DB5727 DP67 PB54 PP20 | RESIDENTIAL | BLACKSHER NICOLE E | SD-R |
| 72 | 089B-004700 | DB6656 DP836 PB54 PP20 | RESIDENTIAL | DRUSE JONATHAN | SD-R |
| 73 | 089B-004800 | DB5674 DP620 PB54 PP20 | RESIDENTIAL | KUMAR RATNA | SD-R |
| 74 | 089B-005000 | DB6412 DP384 PB54 PP20 | RESIDENTIAL | BLANKENSHIP JON I | SD-R |
| 75 | 089B-005100 | DB5710 DP738 PB54 PP20 | RESIDENTIAL | BURRELL GERALD MARK | SD-R |
| 76 | 089B-005200 | DB5716 DP104 PB54 PP20 | RESIDENTIAL | BUCKNER RICHARD D | SD-R |
| 77 | 089B-005300 | DB5604 DP513 PB54 PP20 | RESIDENTIAL | LERCHE MICHAEL | SD-R |
| 78 | 089B-005400 | DB6046 DP929 PB54 PP20 | RESIDENTIAL | RUSSELL KAREN KINGSBURY | SD-R |
| 79 | 089B-005500 | DB5747 DP463 PB54 PP20 | RESIDENTIAL | THEURER DAVID S | SD-R |
| 80 | 089B-005600 | DB5309 DP243 PB54 PP20 | RESIDENTIAL | CREEKSTONE HOMEOWNERS ASSOCIATION IN | SD-R |
| 81 | 089B-P01500 | DB6057 DP780 PB56 PP76 | RESIDENTIAL | BARLOW JOHN | SD-R |
| 82 | 089B-P01600 | DB6119 DP165 PB56 PP76 | RESIDENTIAL | ERWIN DEVAN A | SD-R |
| 83 | 089B-P02000 | DB6031 DP735 PB56 PP76 | RESIDENTIAL | PATEL NIKUNJ M | SD-R |
| 84 | 089B-P02100 | DB5983 DP439 PB56 PP76 | RESIDENTIAL | JANI BHAVESHKUMAR | SD-R |
| 85 | 089B-P02200 | DB5989 DP962 PB56 PP76 | RESIDENTIAL | HARRIS JOHN | SD-R |
| 86 | 089B-P02300 | DB6003 DP115 PB56 PP76 | RESIDENTIAL | LEDGISTER KEVIN ARTHUR | SD-R |
| 87 | 089B-P02400 | DB6377 DP104 PB56 PP76 | RESIDENTIAL | JOHANSEN MICHAEL | SD-R |
| 88 | 089B-P02500 | DB5899 DP690 PB56 PP76 | RESIDENTIAL | COLLIER EDWARD W III | SD-R |


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


# THE EPOCH DEVELOPMENT

REZONING SUBMITTAL

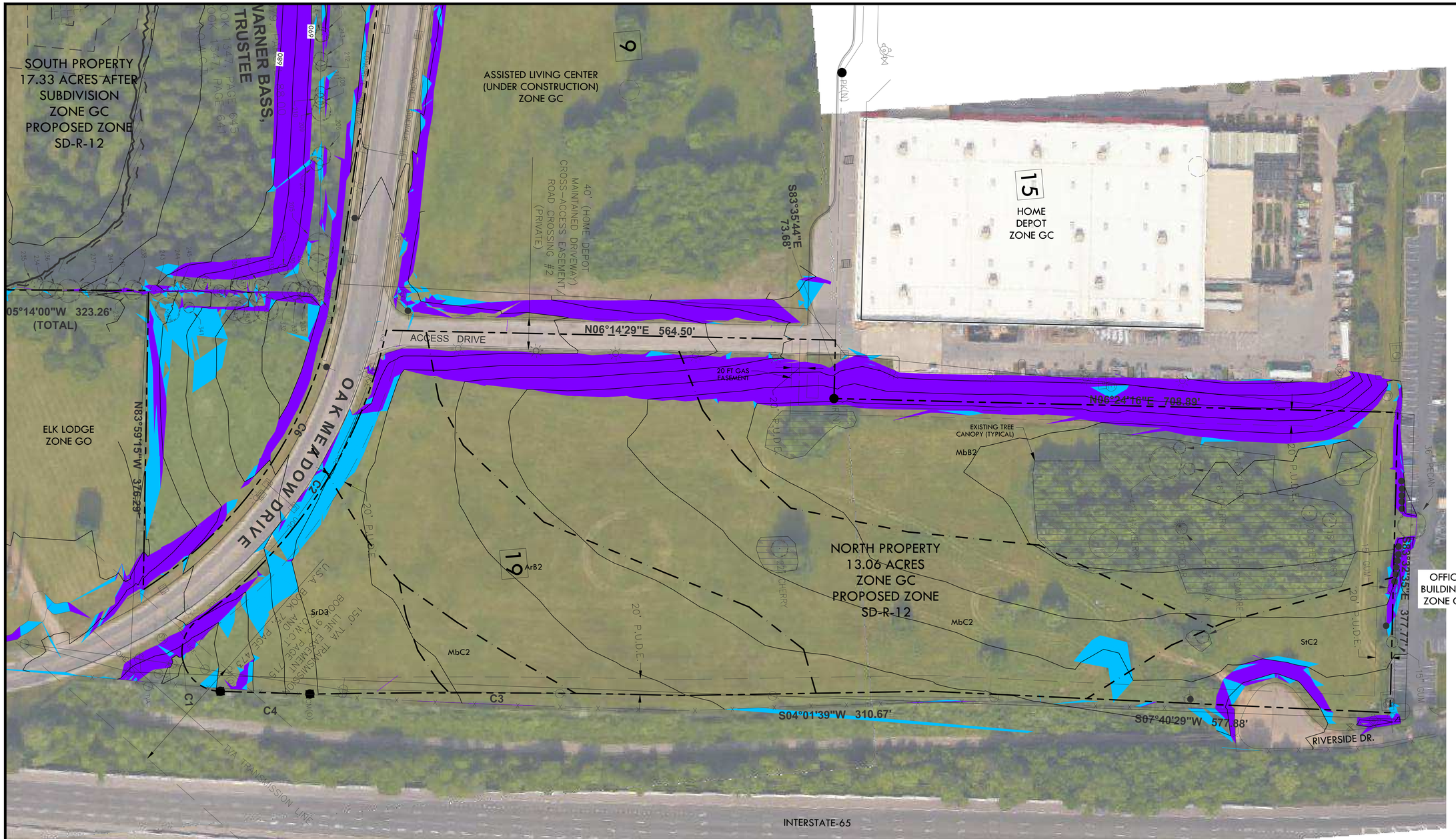
COF #6085 FRANKLIN, TN

| REVISIONS | |
|---|---|
| No. | DATE |
| | |

04/07/16 15001

# C1.0

OVERALL EXISTING CONDITIONS PLAN




SLOPE LEGEND

- GREATER THAN 14% AND LESS THAN 20% SLOPE
- GREATER THAN 20% SLOPE

SOIL TYPES

| | |
|---|---|
| ArB2 | Armour silt loam, 2% to 5 % slopes, eroded |
| CaC2 | Captina silt loam, phosphatic, 5% to 12% slopes, eroded |
| Eg | Egam silt loam, phosphatic |
| Hu | Huntington silt loam, phosphatic |
| InE3 | Inman silty clay loam, 20% to 30% slopes, severely eroded |
| MbB2 | Maury silt loam, 2% to 5% slopes, eroded |
| MbC2 | Maury silt loam, 5% to 12% slopes, eroded |
| SrC3 | Stiversville clay loam, 5% to 12% slopes, eroded |
| SrD3 | Stiversville clay loam, 12% to 20% slopes, severely eroded |
| StC2 | Stiversville silt loam, 5% to 12% slopes, eroded |

CURVE TABLE

| CURVE | RADIUS | LENGTH | DELTA | TANGENT | CHORD | CHD BRG |
|---|---|---|---|---|---|---|
| C1 | 50.00' | 123.89' | 141°58'19" | 145.10 | 94.54' | S77°58'06"W |
| C2 | 607.96' | 443.66' | 41°48'42" | 232.23 | 433.88' | N51°57'06"W |
| C3 | 11300.00' | 470.04' | 2°23'00" | 235.06 | 470.01' | S05°13'09"W |
| C4 | 11300.00' | 112.73' | 0°34'18" | 56.37 | 112.73' | S06°41'48"W |

0 30 60 120
GRAPHIC SCALE

CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM

# THE EPOCH DEVELOPMENT

REZONING SUBMITTAL

COF #6085 FRANKLIN, TN

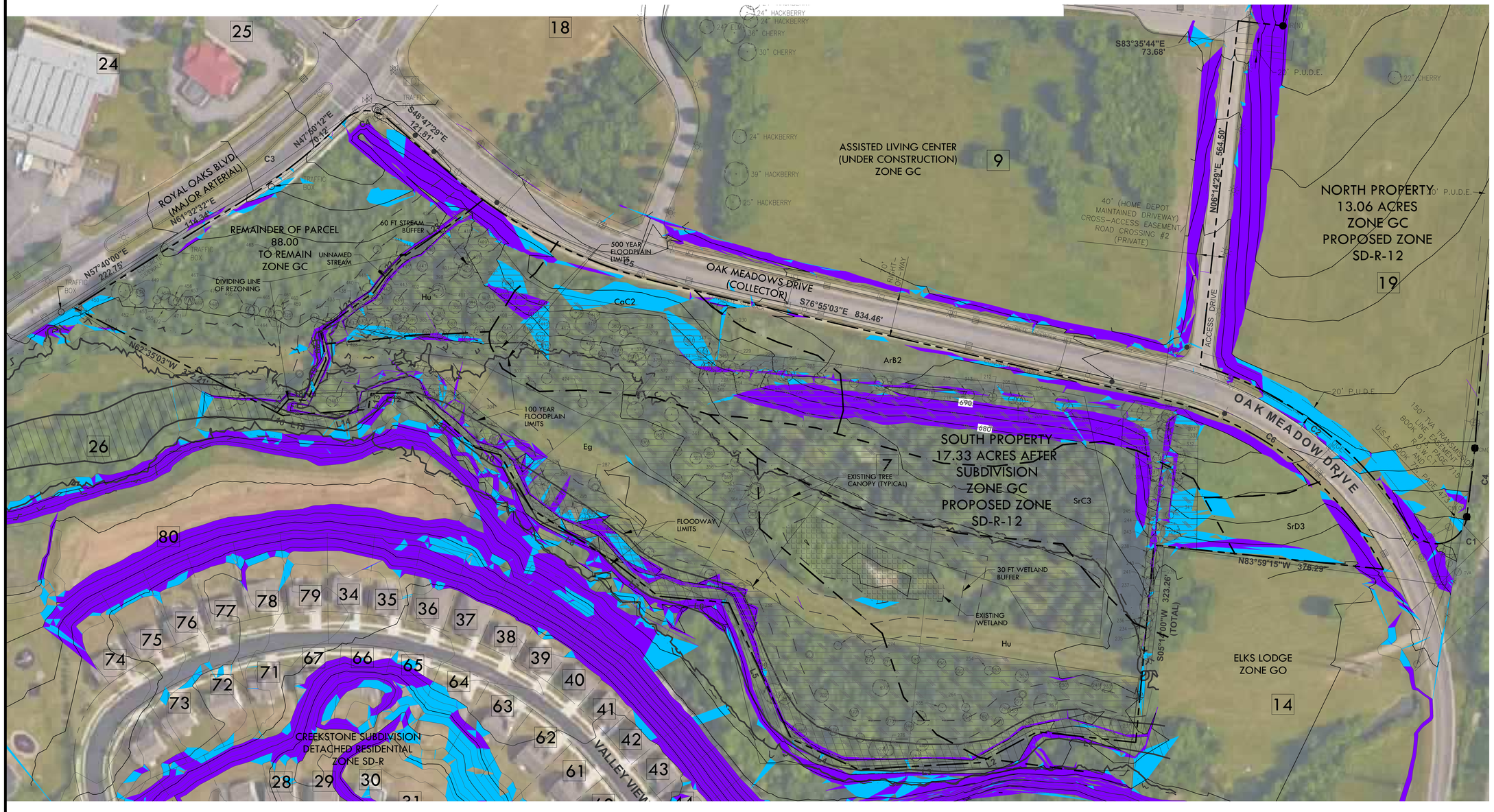
REVISIONS

| No. | DATE |
|---|---|
| | |

04/07/16 15001

# C1.1

NORTH SITE
EXISTING
CONDITIONS PLAN




SLOPE LEGEND

- GREATER THAN 14% AND LESS THAN 20% SLOPE
- GREATER THAN 20% SLOPE

SOIL TYPES

| | |
|---|---|
| ArB2 | Armour silt loam, 2% to 5 % slopes, eroded |
| CaC2 | Captina silt loam, phosphatic, 5% to 12% slopes, eroded |
| Eg | Egam silt loam, phosphatic |
| Hu | Huntington silt loam, phosphatic |
| InE3 | Inman silty clay loam, 20% to 30% slopes, severely eroded |
| MbB2 | Maury silt loam, 2% to 5% slopes, eroded |
| MbC2 | Maury silt loam, 5% to 12% slopes, eroded |
| SrC3 | Stiversville clay loam, 5% to 12% slopes, eroded |
| SrD3 | Stiversville clay loam, 12% to 20% slopes, severely eroded |
| StC2 | Stiversville silt loam, 5% to 12% slopes, eroded |

0 40 80 160
GRAPHIC SCALE

N


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


ANNI WILSON CRUNK
REGISTERED ENGINEER
AGRICULTURE
COMMERCE
No. 114180
STATE OF TENNESSEE
4/7/16

# THE EPOCH DEVELOPMENT

REZONING SUBMITTAL

COF #6085 FRANKLIN, TN

REVISIONS

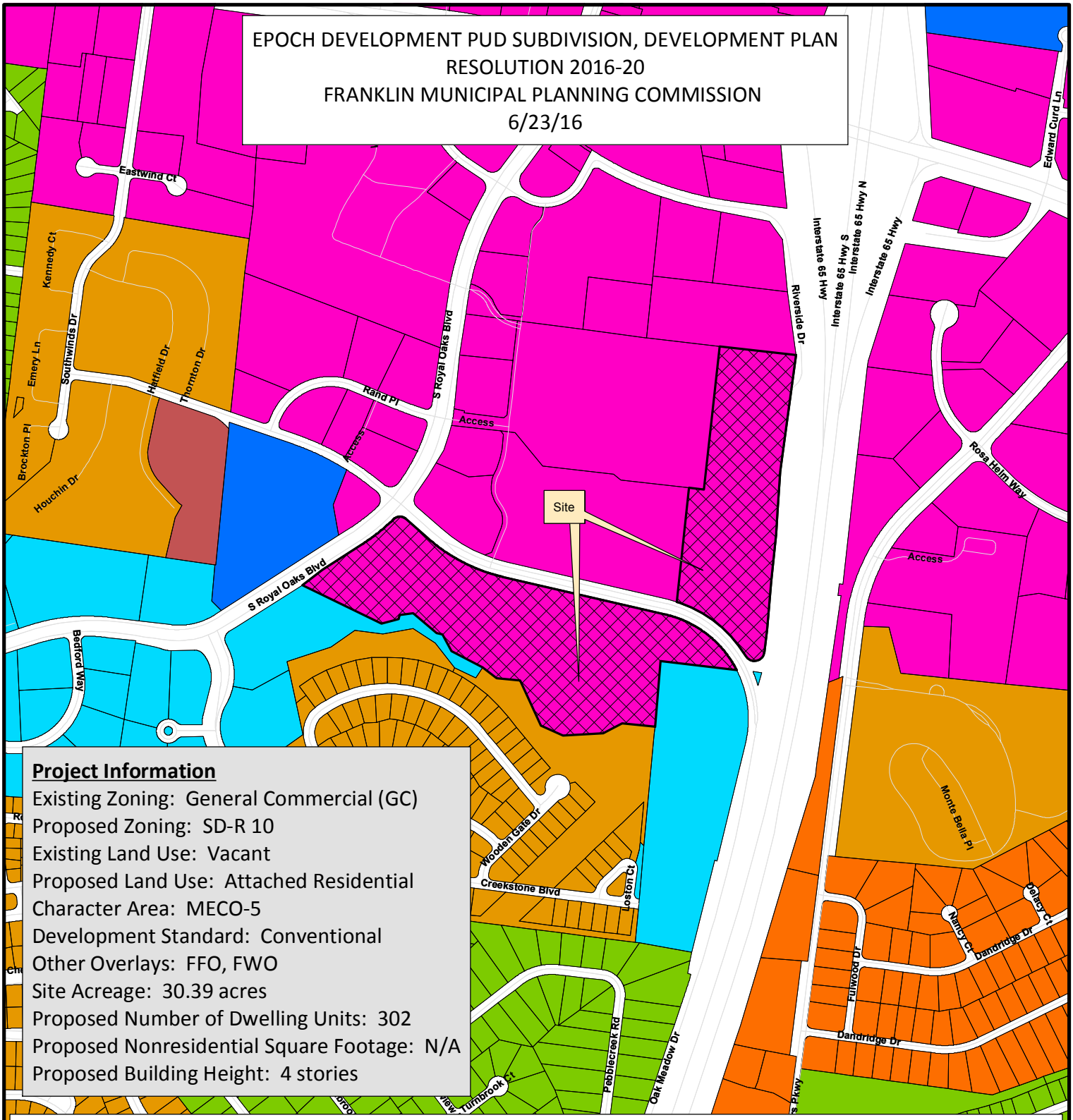
| No. | DATE |
|---|---|
| | |

04/07/16 15001

# C1.2

SOUTH SITE EXISTING CONDITIONS PLAN

# EPOCH DEVELOPMENT PUD SUBDIVISION, DEVELOPMENT PLAN
# RESOLUTION 2016-20
# FRANKLIN MUNICIPAL PLANNING COMMISSION
# 6/23/16




**Project Information**

Existing Zoning: General Commercial (GC)
Proposed Zoning: SD-R 10
Existing Land Use: Vacant
Proposed Land Use: Attached Residential
Character Area: MECO-5
Development Standard: Conventional
Other Overlays: FFO, FWO
Site Acreage: 30.39 acres
Proposed Number of Dwelling Units: 302
Proposed Nonresidential Square Footage: N/A
Proposed Building Height: 4 stories

- Epoch Development PUD
- AG Agricultural District
- ER Estate Residential
- R-1 Residential District
- R-2 Residential District
- R-3 Residential District
- R-6 Historic Core Residential District
- RM-10 Attached 10 Residential District
- RM-15 Attached 15 Residential District
- RM-20 Attached 20 Residential District
- SD-R Specific Development-Residential
- SD-X Specific Development-Variety
- OR Office Residential District
- GO General Office District
- CC Central Commercial District
- NC Neighborhood Commercial District
- GC General Commercial District
- LI Light Industrial District
- HI Heavy Industrial District
- CI Civic and Institutional District

N

0 250 500 1,000
Feet

This map was created by the Franklin Planning Department.
It was compiled from the most authentic information available.
The City is not responsible for any errors or omissions contained hereon.
All data and materials (c) copyright 2016. All rights reserved.

**COF no: 6086**

**CONDITIONS OF APPROVAL:**

## Engineering - 2015 Site Plan Checklist

### General Comments

#### 1. C3.0 - Overall Grading & Drainage Plan

- "The previous comment was not completely addressed. These issues must be addressed. Provide the discharge point and the swale or grassy area for the swimming pool discharge. Swimming pool backwash is not permitted to flow into the sewer system or any bioretention or stormwater quality area. Provide the capacity of the downstream stormwater pipes and structures." The pool water discharge must flow into a swale or grassy area. This water must discharge into an area that is easily monitored and does not cause harm to the larger vegetation in the stream buffer or the landscape buffer.

## Water/Sewer

### 2016-05-09 PUD SUBMITTAL - The Epoch Development.pdf

#### 2. Sanitary sewer

- As per our last meeting with the sanitary sewer line being revised the applicant shall show the slopes for the North parcel. A adequate slope is required so as to provide safer conditions for maintenance and the equipment that is needed for maintenance. Applicant shall provide ground profiles for a better understanding of the layout and revise the site to provide safe operation for maintenance to the line.

## Zoning

### General Comments

#### 3. FFO

- Comment to remain open as general note for project consideration.

**RESOLUTION 2016-20**

**TO BE ENTITLED: "A RESOLUTION APPROVING A DEVELOPMENT PLAN FOR EPOCH DEVELOPMENT PUD SUBDIVISION, FOR THE PROPERTY LOCATED WEST OF INTERSTATE 65, AT 840 AND 880 OAK MEADOW DRIVE."**

**WHEREAS**, the Board of Mayor and Alderman (BOMA) of the City of Franklin, Tennessee, has, or will, approve the zoning for the property as part of Ordinance 2016-008; and

**WHEREAS,** the Planned Unit Development (PUD) process is a review procedure that is intended to encourage innovative land planning and design and avoid the monotony sometimes associated with large developments by:

(a) Reducing or eliminating the inflexibility that sometimes results from strict application of zoning standards that were designed primarily for individual lots;

(b) Allowing greater freedom in selecting the means to provide access, light, open space, and design amenities;

(c) Encouraging a sensitive design that respects the surrounding established land use character and natural or man-made features of the site including, but not limited to, trees, historic features, streams, hillsides, and floodplains;

(d) Promoting quality design and environmentally sensitive development by allowing development to take advantage of special site characteristics, locations, and land uses; and

(e) Allowing deviations from certain zoning standards that would otherwise apply if not contrary to the general spirit and intent of this ordinance; and

**WHEREAS**, the PUD process requires the approval of a Development Plan that is reviewed and approved by BOMA, after a public hearing and a recommendation by the Franklin Municipal Planning Commission.

**NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF MAYOR AND ALDERMAN OF THE CITY OF FRANKLIN, TENNESSEE, AS FOLLOWS:**

**SECTION I.** That the legal description of the property included in the Development Plan is as follows:

PREMISES CONSIDERED

| Map-Parcel | Acres |
|---|---|
| 79-88 (portion of) | 13.06 |
| 79.101.19 | 17.33 |
| Total | 30.39 |

**LOT 24**
**MAP 79, PORTION OF PARCEL 88.00**
**SURVEY TRACT 1**

A TRACT OF LAND IN THE NINTH CIVIL DISTRICT OF WILLIAMSON COUNTY, CITY OF FRANKLIN, TENNESSEE AND BEING GENERALLY BOUNDED ON THE NORTH BY OAK MEADOW DRIVE, (RIGHT-OF-WAY WIDTH VARIES), ON THE EAST BY NASHVILLE LODGE NO. 72, B.P.O. ELKS,

RECORDED IN DEED BOOK 1708, PAGE 12, REGISTER'S OFFICE FOR WILLIAMSON COUNTY, TENNESSEE (R.O.W.C.,T.) ON THE SOUTH BY OPEN SPACE LOT 808 AS SHOWN ON THE PLAN ENTITLED "CREEKSTONE COMMONS, P.U.D SUBDIVISION, SECTION FOUR" OF RECORD IN PLAT BOOK P58, PAGE 10, R.O.W.C.,T. AND LOT 27 AS SHOWN ON THE PLAN ENTITLED "CREEKSTONE COMMONS, REVISION FOUR" OF RECORD IN PLAT BOOK P49, PAGE 110, R.O.W.C.,T. AND ON THE WEST BY THE REMAINDER OF LOT 24 OF FINAL PLAN OF WATSON GLEN SUBDIVISION, SECTION 1, REVISION 10, OF RECORD IN PLAT BOOK 29, PAGE 139, R.O.W.C.T AND BEING DESCRIBED ACCORDING TO A SURVEY DATED OCTOBER 15, 2015 AND PREPARED BY KEVIN L. BIRDWELL, R.L.S. NO. 1797 WHOSE ADDRESS IS RAGAN SMITH ASSOCIATES, 315 WOODLAND STREET, NASHVILLE, TN 37206 AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING IN THE EAST RIGHT-OF-WAY LINE OF SOUTH ROYAL OAKS BOULEVARD AND BEING THE SOUTH END OF A CURVE AT THE INTERSECTION OF THE EAST RIGHT-OF-WAY LINE OF SOUTH ROYAL OAKS BOULEVARD AND THE SOUTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE AND PROCEEDING AS FOLLOWS:

THENCE, WITH A CURVE TO THE RIGHT HAVING A RADIUS OF 50.00 FEET, AN ARC LENGTH OF 72.76 FEET, A CENTRAL ANGLE OF 83 DEGREES 22 MINUTES 19 SECONDS, AND A CHORD BEARING AND DISTANCE OF NORTH 89 DEGREES 31 MINUTES 21 SECONDS EAST, 66.50 FEET TO AN IRON ROD (NEW) WITH CAP STAMPED (RSA) IN THE SOUTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE;

THENCE, WITH THE SOUTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE THE FOLLOWING TWO CALLS:

1. SOUTH 48 DEGREES 47 MINUTES 29 SECONDS EAST, 121.81 FEET;
2. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 820.00 FEET, AN ARC LENGTH OF 71.61 FEET, A CENTRAL ANGLE OF 05 DEGREES 00 MINUTES 12 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 51 DEGREES 17 MINUTES 35 SECONDS EAST, 71.58 FEET TO AN IRON ROD (NEW) WITH CAP STAMPED (RSA), THE **POINT OF BEGINNING** OF THE HEREIN DESCRIBED TRACT OF LAND AND PROCEEEDING AS FOLLOWS:

THENCE, WITH SAID SOUTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE THE FOLLOWING THREE CALLS:

1. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 820.00 FEET, AN ARC LENGTH OF 330.94 FEET, A CENTRAL ANGLE OF 23 DEGREES 07 MINUTES 24 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 65 DEGREES 21 MINUTES 21 SECONDS EAST, 328.69 FEET TO AN IRON ROD (OLD) WITH CAP STAMPED (RSA);
2. SOUTH 76 DEGREES 55 MINUTES 03 SECONDS EAST, 834.46 FEET TO AN IRON ROD (NEW)WITH CAP STAMPED (RSA);
3. WITH A CURVE TO THE RIGHT HAVING A RADIUS OF 537.96 FEET, AN ARC LENGTH OF 464.57 FEET, A CENTRAL ANGLE OF 49 DEGREES 28 MINUTES 46 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 52 DEGREES 10 MINUTES 40 SECONDS EAST, 450.27 FEET TO AN IRON ROD (NEW)WITH CAP STAMPED (RSA);

THENCE, LEAVING THE SOUTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE AND WITH THE NORTH LINE OF THE NASHVILLE LODGE NO. 72, B.P.O. ELKS PROPERTY, NORTH 83 DEGREES 59 MINUTES 15 SECONDS WEST, 376.29 FEET TO A 1/2 INCH DIAMETER IRON ROD (OLD),

THENCE, WITH THE WEST LINE OF THE NASHVILLE LODGE NO. 72, B.P.O. ELKS PROPERTY, SOUTH 05 DEGREES 14 MINUTES 00 SECONDS WEST, PASSING A WITNESS IRON ROD (NEW) ON THE NORTH SIDE OF WATSON BRANCH AT A DISTANCE OF 298.26 AND A TOTAL DISTANCE OF 323.26 FEET TO A POINT IN THE CENTER OF WATSON BRANCH, SAID POINT BEING THE NORTHEAST CORNER OF LOT 808 ON SAID PLAN OF CREEKSTONE COMMONS P.U.D. SUDIVISION, SECTION FOUR;

THENCE, WITH THE CENTERLINE OF WATSON BRANCH AND THE NORTH LINE OF LOT 808 OF SAID CREEKSTONE COMMONS P.U.D. SUBDIVISION, SECTION FOUR AND THE NORTH LINE OF LOT 27 ON SAID PLAN OF CREEKSTONE COMMONS SUBDIVISION, REVISION 4 THE FOLLOWING SIXTEEN BEARINGS AND DISTANCES:

1. NORTH 83 DEGREES 48 MINUTES 10 SECONDS WEST, 161.22 FEET;
2. SOUTH 61 DEGREES 46 MINUTES 08 SECONDS WEST, 106.65 FEET;
3. SOUTH 86 DEGREES 48 MINUTES 30 SECONDS WEST, 198.12 FEET;

4. NORTH 65 DEGREES 28 MINUTES 52 SECONDS WEST, 120.02 FEET;
5. NORTH 24 DEGREES 43 MINUTES 04 SECONDS WEST, 244.21 FEET;
6. NORTH 84 DEGREES 36 MINUTES 00 SECONDS WEST, 115.35 FEET;
7. NORTH 52 DEGREES 04 MINUTES 01 SECONDS WEST, 87.70 FEET;
8. NORTH 57 DEGREES 18 MINUTES 12 SECONDS WEST, 163.19 FEET;
9. NORTH 29 DEGREES 52 MINUTES 55 SECONDS WEST, 101.80 FEET;
10. NORTH 74 DEGREES 02 MINUTES 09 SECONDS WEST, 41.15 FEET;
11. NORTH 48 DEGREES 56 MINUTES 27 SECONDS WEST, 137.25 FEET;
12. SOUTH 88 DEGREES 57 MINUTES 25 SECONDS WEST, 67.60 FEET,
13. SOUTH 10 DEGREES 32 MINUTES 54 SECONDS WEST, 26.12 FEET,
14. SOUTH 74 DEGREES 19 MINUTES 35 SECONDS WEST, 89.75 FEET,
15. NORTH 75 DEGREES 22 MINUTES 06 SECONDS WEST, 55.08 FEET,
16. NORTH 62 DEGREES 35 MINUTES 03 SECONDS WEST, 10.27 FEET,

THENCE, LEAVING WATSON BRANCH WITH A THE CENTERLINE OF A DRAINAGE DITCH AND SEVERING SAID LOT 24 OF FINAL PLAN OF WATSON GLEN SUBDIVISION, SECTION 1, REVISION 10, THE FOLLOWING SEVEN BEARINGS AND DISTANCES:

1. NORTH 39 DEGREES 40 MINUTES 55 SECONDS EAST, 27.30 FEET,
2. SOUTH 89 DEGREES 07 MINUTES 57 SECONDS EAST, 31.47 FEET,
3. NORTH 25 DEGREES 32 MINUTES 12 SECONDS EAST, 70.78 FEET,
4. NORTH 10 DEGREES 00 MINUTES 40 SECONDS WEST, 49.37 FEET,
5. NORTH 54 DEGREES 59 MINUTES 41 SECONDS EAST, 103.02 FEET,
6. NORTH 40 DEGREES 36 MINUTES 36 SECONDS EAST, 74.71 FEET,
7. NORTH 53 DEGREES 28 MINUTES 05 SECONDS EAST, 164.68 FEET TO THE POINT OF BEGINNING AND CONTAINING 754,942 SQUARE FEET OR 17.33 ACRES, MORE OR LESS.

**and**

## LOT 32
## MAP 79, PARCEL 101.00

A TRACT OF LAND IN THE NINTH CIVIL DISTRICT OF WILLIAMSON COUNTY, CITY OF FRANKLIN, TENNESSEE, AND BEING LOT 32 AS SHOWN ON THE FINAL PLAT ENTITLED “WATSON GLEN SUBDIVISION, SECTION 2, REVISION 1, RESUBDIVISION OF LOT 31” OF RECORD IN PLAT BOOK P62, PAGE 45, REGISTER'S OFFICE FOR WILLIAMSON COUNTY TENNESSEE (R.O.W.C.T.). AND BEING GENERALLY BOUNDED ON THE NORTH BY LOT 10 AS SHOWN ON PLAN ENTITLED “WATSON GLEN SUBDIVISION, SECTION 2” OF RECORD IN PLAT BOOK 13, PAGE 85, R.O.W.C.T., ON THE EAST BY RIVERSIDE DRIVE (IMPROVED AND UNIMPROVED ROAD, RIGHT-OF-WAY WIDTH VARIES), ON THE SOUTH BY OAK MEADOW DRIVE (RIGHT-OF-WAY WITH VARIES), AND ON THE WEST BY LOT 2 AS SHOWN ON THE PLAN ENTITLED “WATSON GLEN SUBDIVISION, SECTION 1, REVISION 10, (RESUBDIVISION OF LOT 2 AND OF RIVERSIDE BUSINESS PARK SUBDIVISION, SECTION 1, REVISION 4, LOT 11) OF RECORD IN PLAT BOOK 29, PAGE 139, R.O.W.C.T. AND LOT 31 ON SAID PLAN ENTITLED “WATSON GLEN SUBDIVISION, SECTION 2, REVISION 1, RESUBDIVISION OF LOT 31” OF RECORD IN PLAT BOOK P62, PAGE 45, R.OW.C.T., AND BEING DESCRIBED ACCORDING TO A SURVEY DATED OCTOBER 15, 2015 AND PREPARED BY KEVIN L BIRDWELL, R.L.S. NO. 1797 WHOSE ADDRESS IS RAGAN SMITH ASSOCIATES, 315 WOODLAND STREET, NASHVILLE, TN 37206 AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

**COMMENCING** AT AN IRON ROD (OLD) WITH CAP STAMPED “RAGAN-SMITH ASSOCIATES” (RSA), SAID PIN BEING IN THE EASTERLY RIGHT-OF-WAY OF SOUTH ROYAL OAKS BOULEVARD AND BEING THE NORTH END OF A CURVE AT THE INTERSECTION OF THE EAST RIGHT-OF-WAY LINE OF SOUTH ROYAL OAKS BOULEVARD AND THE NORTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE AND BEING A WESTERLY CORNER OF LOT 30 OF THE FINAL PLAT ENTITLED “WATSON GLEN SUBDIVISION, SECTION 2 OF RECORD IN PLAT BOOK P43, PAGE 40, R.O.W.C.T.;

THENCE, WITH A CURVE TO THE LEFT HAVING A RADIUS OF 50.00 FEET, AN ARC LENGTH OF 73.83 FEET, A CENTRAL ANGLE OF 84 DEGREES 35 MINUTES 53 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 06 DEGREES 29 MINUTES 38 SECONDS EAST, 67.30 FEET TO AN IRON ROD (OLD) WITH CAP STAMPED (RSA) IN THE NORTHERLY RIGHT-OF-WAY OF OAK MEADOW DRIVE (RIGHT-OF-WAY WIDTH VARIES);

THENCE, CONTINUING WITH SAID RIGHT-OF-WAY AND WITH THE SOUTHERLY LINE OF SAID LOT 30 THE FOLLOWING TWO CALLS:

1. SOUTH 48 DEGREES 47 MINUTES 29 SECONDS EAST, 157.42 FEET IRON ROD (OLD) WITH CAP STAMPED (RSA);

2. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 750.00 FEET, AN ARC LENGTH OF 251.97 FEET, A CENTRAL ANGLE OF 19 DEGREES 14 MINUTES 55 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 58 DEGREES 24 MINUTES 57 SECONDS EAST, 250.78 FEET TO AN IRON ROD (OLD) WITH CAP STAMPED (RSA) AT THE SOUTHWEST CORNER OF LOT 31 ON THE PLAN ENTITLED "WATSON GLEN SUBDIVISION, SECTION 2, REVISON 1, RESUBDIVISION OF LOT 31" OF RECORD IN PLAT BOOK P62, PAGE 45, R.O.W.C.T.;
THENCE, CONTINUING WITH SAID RIGHT-OF-WAY AND WITH THE SOUTHERLY LINE OF SAID LOT 31 THE FOLLOWING THREE CALLS:
1. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 750.00 FEET, AN ARC LENGTH OF 116.20 FEET, A CENTRAL ANGLE OF 08 DEGREES 52 MINUTES 38 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 72 DEGREES 28 MINUTES 44 SECONDS EAST, 116.09 FEET TO AN IRON ROD (OLD) WITH CAP STAMPED (RSA);
2. SOUTH 76 DEGREES 55 MINUTES 03 SECONDS EAST, 811.13 FEET TO AN IRON ROD (OLD);
3. WITH A CURVE TO THE RIGHT HAVING A RADIUS OF 607.96 FEET, AN ARC LENGTH OF 43.08 FEET, A CENTRAL ANGLE OF 04 DEGREES 03 MINUTES 37 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 74 DEGREES 53 MINUTES 15 SECONDS EAST, 43.07 FEET TO A PK NAIL (OLD) IN THE CENTERLINE OF AN ACCESS DRIVE, THE **POINT OF BEGINNING** OF THE HEREIN DESCRIBED TRACT OF LAND AND PROCEEEDING AS FOLLOWS:
4. THENCE, LEAVING SAID RIGHT-OF-WAY OF OAK MEADOW DRIVE WITH THE CENTERLINE OF SAID ACCESS DRIVE AND THE EAST LINE OF SAID LOT 31 ON THE PLAN ENTITLED "WATSON GLEN SUBDIVISION, SECTION 2, REVISON 1, RESUBDIVISION OF LOT 31" OF RECORD IN PLAT BOOK P62, PAGE 45, R.O.W.C.T.;NORTH 06 DEGREES 14 MINUTES 29 SECONDS EAST, 564.50 FEET TO A PK NAIL (OLD) IN THE SOUTH LINE OF LOT 2 AS SHOWN ON THE PLAN ENTITLED "WATSON GLEN SUBDIVISION, SECTION 1, REVISION 10, (RESUBDIVISION OF LOT 2 AND OF RIVERSIDE BUSINESS PARK SUBDIVISION, SECTION 1, REVISION 4, LOT 11);
THENCE, WITH THE SOUTH AND EAST LINE OF SAID LOT 2, THE FOLLOWING TWO BEARINGS AND DISTANCES:
1. SOUTH 83 DEGREES 35 MINUTES 44 SECONDS EAST, 73.68 FEET TO AN IRON ROD (OLD) WITH CAP STAMPED (RSA);
2. NORTH 06 DEGREES 24 MINUTES 16 SECONDS EAST, 708.89 FEET TO PUNCH HOLE IN A LIGHT BASE IN THE SOUTH LINE OF SAID LOT 10 OF FINAL PLAT ENTITLED "WATSON GLEN SUBDIVISION, SECTION 2";
THENCE, WITH THE SOUTH LINE OF SAID LOT 10, SOUTH 83 DEGREES 32 MINUTES 35 SECONDS EAST, 377.77 FEET TO CONCRETE MONUMENT OLD IN THE WESTERLY RIGHT-OF-WAY OF RIVERSIDE DRIVE (RIGHT-OF-WAY WIDTH VARIES);
THENCE, WITH THE WESTERLY RIGHT-OF-WAY OF RIVERSIDE DRIVE (IMPROVED AND UNIMPROVED ROAD), THE FOLLOWING FOUR CALLS:
1. SOUTH 07 DEGREES 40 MINUTES 29 SECONDS WEST, 577.88 FEET TO AN IRON ROD (OLD);
2. SOUTH 04 DEGREES 01 MINUTES 39 SECONDS WEST, 310.67 FEET TO AN IRON ROD (OLD);
3. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 11300.00 FEET, AN ARC LENGTH OF 470.04 FEET, A CENTRAL ANGLE OF 02 DEGREES 23 MINUTES 00 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 05 DEGREES 13 MINUTES 09 SECONDS WEST, 470.01 FEET TO A CONCRETE MONUMENT (OLD);
4. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 11300.00 FEET, AN ARC LENGTH OF 112.73 FEET, A CENTRAL ANGLE OF 00 DEGREES 34 MINUTES 18 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 06 DEGREES 41 MINUTES 48 SECONDS WEST, 112.73 FEET TO A CONCRETE MONUMENT (OLD);
THENCE, LEAVING SAID RIGHT-OF-WAY OF RIVERSIDE DRIVE AND WITH THE NORTH RIGHT-OF-WAY OF OAK MEADOW DRIVE (RIGHT-OF-WAY WIDTH VARIES) THE FOLLOWING TWO CALLS:
1. WITH A CURVE TO THE RIGHT HAVING A RADIUS OF 50.00 FEET, AN ARC LENGTH OF 123.89 FEET, A CENTRAL ANGLE OF 141 DEGREES 58 MINUTES 19 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 77 DEGREES 58 MINUTES 06 SECONDS WEST, 94.54 FEET TO AN IRON ROD (OLD);
2. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 607.96 FEET, AN ARC LENGTH OF 443.66 FEET, A CENTRAL ANGLE OF 41 DEGREES 48 MINUTES 42 SECONDS, AND A CHORD BEARING AND DISTANCE OF NORTH 51 DEGREES 57 MINUTES 06 SECONDS WEST, 433.88 FEET TO THE **POINT OF BEGINNING** AND CONTAINING 569,021 SQUARE FEET OR 13.06 ACRES, MORE OR LESS.

**SECTION II:** That the attached Location Map and Development Plan shall serve the purpose of further delimiting the geographical boundaries as described by this Resolution.

**SECTION III:** That the overall entitlements for the Epoch Development PUD Subdivision are as follows:

| Entitlements | Epoch Development |
|---|---|
| Base Zone District | SD-R 10.0 |
| Character Area Overlay | MECO-5 |
| Other Zoning Overlays | FFO, FWO |
| Development Standard | Conventional |
| Number of Dwelling Units | 302 |
| Number of Nonresidential Square Footage | 0 |
| Number of Hotel Rooms | 0 |
| Connectivity Index | n/a |
| Open Space Requirements | 4.56 acres |
| Number of Phases in Development | 1 |

**SECTION IV:** That the Development Plan, the exhibits accompanying the Development Plan, and all conditions and restrictions placed upon the Development Plan by the Franklin Municipal Planning Commission and this Board shall be made a part of this Resolution as though copied verbatim herein, and that a permanent record of the Development Plan, the exhibits accompanying the Development Plan, and all such conditions and restrictions shall be kept in the Franklin Planning and Sustainability Department.

**SECTION V.** That this Resolution shall take effect from and after its passage on its first and final reading, the health, safety, and welfare of the citizens requiring it.

_____
**ERIC S. STUCKEY**
City Administrator

_____
**DR. KEN MOORE**
Mayor

Approved as to form by:

_____
Shauna R. Billingsley
City Attorney

PREAPPLICATION CONFERENCE: _____02/04/16_____

BOMA/FMPC JOINT CONCEPTUAL WORKSHOP: _____02/25/16_____

NEIGHBORHOOD MEETING: _____03/02/16_____



Law Dept. approved 05.23.16

PLANNING COMMISSION RECOMMENDED APPROVAL: _____

PUBLIC HEARING AND BOMA APPROVAL: _____

## CREEKSTONE SUBDIVISION CROSS SECTION THROUGH WATSON BRANCH






BRICK TRASH ENCLOSURE EXAMPLE

## SITE DATA

| | |
|---|---|
| PROJECT NAME | THE EPOCH DEVELOPMENT<br>REZONING & PUD APPLICATION |
| PROJECT NUMBER: | 6086 |
| LOTS: | 2 EXISTING, 5 PROPOSED |
| ADDRESS: | 840 & 880 OAK MEADOWS DR. |
| CITY: | FRANKLIN |
| COUNTY: | WILLIAMSON |
| STATE: | TENNESSEE |
| CIVIL DISTRICT: | 9TH |
| MAP, GROUP AND PARCEL NUMBERS: | MAP 79, PARCELS 88.00 (PORTION OF) & 101.19 |
| EXISTING ZONING: | GC (GENERAL COMMERCIAL) |
| PROPOSED ZONING: | SD-R (10) (SPECIFIC DEVELOPMENT RESIDENTIAL 10 UNITS/AC) |
| CHARACTER AREA OVERLAY: | MECO-5 |
| OTHER APPLICABLE OVERLAYS: | FFO & FWO |
| APPLICABLE DEVELOPMENT STANDARD: | CONVENTIONAL |
| ACREAGE OF SITE: | 13.06 + 17.33 = 30.39 ACRES |
| SQUARE FOOTAGE OF SITE: | 569,021 + 754,942 = 1,323,963 SQUARE FEET |
| MINIMUM REQUIRED SETBACK LINES: | ATTACHED RESIDENTIAL USE |
| YARD FRONTING COLLECTOR (OAK MEADOWS) | 40' |
| SIDE YARD | 15' |
| REAR YARD | 30' |
| OWNER (BOTH PARCELS): | E. WARNER BASS, TRUSTEE |
| ADDRESS: | 150 3RD AVE. SOUTH, SUITE 2800, NASHVILLE, TN 37201 |
| PHONE NO.: | 615.742.6400 |
| E-MAIL ADDRESS: | wbass@bassberry.com |
| CONTACT NAME: | MR. WARNER BASS |
| MINERAL RIGHTS: | CONTROLLED BY CURRENT PROPERTY OWNER |
| APPLICANT: | CRUNK ENGINEERING LLC |
| ADDRESS: | 1894 GEN. GEORGE PATTON DR., SUITE 600<br>FRANKLIN, TN 37067 |
| PHONE NO.: | 615.873.1795 |
| E-MAIL ADDRESS: | adam@crunkeng.com |
| CONTACT NAME: | MR. ADAM CRUNK, P.E. |
| DENSITY | |
| ATTACHED DWELLING UNITS | 302 UNITS |
| LAND AREA | 30.39 ACRES |
| LAND AREA WITHIN FLOODPLAIN OVERLAY | 8.32 ACRES |
| OVERALL DENSITY | 9.9 UNITS/ACRE |
| NET DENSITY (MINUS OVERLAY CONSTRAINT) | 13.7 UNITS/ACRE |
| BUILDING HEIGHT | |
| ALLOWABLE | 6 STORIES MAXIMUM |
| PROPOSED | NORTH PARCEL - 4 STORIES<br>SOUTH PARCEL 2/3 STORIES (2 STORY FACING STREET) |
| PROPOSED LANDSCAPE SURFACE RATIO: | NORTH SITE - 0.53; SOUTH SITE - 0.76; COMBINED - 0.66 |
| MINIMUM LANDSCAPE SURFACE RATIO: | 0.20 |

PARKING

| | NORTH SITE | SOUTH SITE |
|---|---|---|
| EXISTING | 0 | |
| REQUIRED (1.5/1BR + 2.5/2BR + 3/3BR) | | |
| | 1BR - 72 UNITS * 1.5 = 108 SPACES | 1BR - 28 UNITS * 1.5 = 42 SPACES |
| | 2BR - 116 UNITS * 2.5 = 290 SPACES | 2BR - 50 UNITS * 2.5 = 125 SPACES |
| | 3BR - 16 UNITS * 3.0 = 48 SPACES | 3BR - 20 UNITS * 3.0 = 60 SPACES |
| | TOTAL REQUIRED = 446 SPACES | TOTAL REQUIRED = 227 SPACES |
| | INCLUDING 9 ADA SPACES | INCLUDING 7 ADA SPACES |
| MAXIMUM PARKING | NORTH SITE - 536 SPACES; | SOUTH SITE - 273 SPACES |

PROPOSED

| NORTH SITE | | SOUTH SITE | |
|---|---|---|---|
| REGULAR SPACES | 430 | REGULAR SPACES | 186 |
| COMPACT SPACE (0 % OF TOTAL) | 0 | COMPACT SPACES (14 % OF TOTAL) | 31 |
| ADA SPACES | 16 | ADA SPACES | 10 |
| TOTAL PROVIDED | 446 | TOTAL PROVIDED | 227 |

TREE CANOPY:
SITE HAS BEEN WALKED WITH LARRY MIZZELL TO IDENTIFY TREES TO BE REMOVED. TREE CANOPY REQUIREMENTS WILL BE ADDRESSED AT SITE PLAN REVIEW TO COMPLY WITH ZONING ORDINANCE.

| | |
|---|---|
| PARKLAND DEDICATION: | FEE IN LIEU OF FOR 4.64 ACRES, 302 TOTAL UNITS PROPOSED |
| OPEN SPACE: | |
| TOTAL OPEN SPACE REQ'D (15% OF 30.39 AC.) | 4.56 AC. |
| FORMAL OPEN SPACE REQUIRED (33% OF OPEN SPACE REQUIRED) | 1.52 AC.<br>2.4 AC. PROVIDED |
| INFORMAL OPEN SPACE REQUIRED (67% OF OPEN SPACE REQUIRED) | 3.04 AC.<br>8.0 AC. PROVIDED |
| USE BUFFER: | 50-FT CLASS C INCOMPATIBLE LAND USE BUFFER (SOUTH PORTION OF SOUTH SITE)<br>40-FT INTERSTATE BUFFER (EAST PORTION OF NORTH SITE) |

### PROJECT NOTES:

1) The proposed project complies with the Land Use Plan as it was amended in December 2015 to allow for attached residential uses along with a mixture of other uses. The project is in the McEwen Character Area, Special Area 5. Conventional standards are proposed project since that is the predominant design character of the fully developed surrounding area. The project will remain compatible with its surroundings by proposing two story buildings on the southern site to act as a transition from single family uses to the south and commercial developments to the north. The Northern site will have four story heights to match the adjacent office buildings to the north. The Northern site lends itself to a denser development due to its proximity to the interstate, and surrounding commercial uses.
2) The architectural intent can be best described by the attached elevations proposed for the project. The Southern site intent is to have more of a single family or townhome look. The Northern site intent is to blend with the southern site and new assisted living center that is currently under construction.
3) There are no planned phases of the project. The intent is to begin construction on both parcels at the end of 2016, with the possibility of opening units on the southern property in 2018 and having fully completed the northern property by 2019.

PROPERTY IS LOCATED ON MAP 79 AS A PORTION OF LOT 88.00 AND PARCEL 101.19 CONTAINING 30.39 ACRES.

PARCEL 88.00 DOES LIE WITHIN THE 100-YEAR FLOOD PLAIN AS INDICATED BY FIRM MAP NO. 47187C0212F DATED SEPTEMBER 29, 2006.

### STATEMENT OF IMPACT:

The proposed project will add 302 multi-family units. The property is currently undeveloped within the existing City Limits of the City of Franklin. Therefore, no new land is being developed outside the existing jurisdiction of City of Franklin Police, Fire, or Solid Waste services.

The project is approximately a 4 mile driving distance from the Police Station; 1.5 mile driving distance from the nearest fire station on Murfreesboro Rd.
The project will have two dumpster locations for solid waste. One serving 204 units and the other serving 98 units.
No new parkland is being dedicated as part of this project. However, this project will contribute to parkland funds.

0 50 100 150 300
GRAPHIC SCALE


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

FRANKLIN, TN

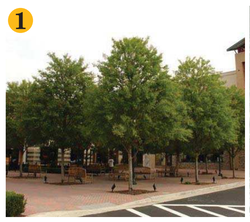
COF #6086

| REVISIONS | | |
|---|---|---|
| No. | DATE | |

06/02/16 15001

# C2.0

OVERALL DEVELOPMENT PLAN



FORMAL OPEN SPACE - 0.75 ACRES

FORMAL OPEN SPACE (GRILL) - 0.15 ACRES

TOTAL OF 204 UNITS ON NORTH PARCEL

| CURVE TABLE | | | | | | |
|---|---|---|---|---|---|---|
| CURVE | RADIUS | LENGTH | DELTA | TANGENT | CHORD | CHD BRG |
| C1 | 50.00' | 123.89' | 141°58'19" | 145.10 | 94.54' | S77°58'06"W |
| C2 | 607.96' | 443.66' | 41°48'42" | 232.23 | 433.88' | N51°57'06"W |
| C3 | 11300.00' | 470.04' | 2°23'00" | 235.06 | 470.01' | S05°13'09"W |
| C4 | 11300.00' | 112.73' | 0°34'18" | 56.37 | 112.73' | S06°41'48"W |

0 30 60 120
GRAPHIC SCALE

CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM

ENGINEERING CRUNK

ADAM WILSON CRUNK
REGISTERED PROFESSIONAL ENGINEER
AGRICULTURE
No. 114180
STATE OF TENNESSEE
6/2/16

# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

FRANKLIN, TN

COF #6086

REVISIONS

| No. | DATE |
|---|---|
| | |

06/02/16 15001

# C2.1

NORTH SITE DEVELOPMENT PLAN

**LINE TABLE**

| LINE | BEARING | DISTANCE |
|---|---|---|
| L1 | N83°48'10"W | 161.22' |
| L2 | S61°46'08"W | 106.65' |
| L3 | S86°48'30"W | 198.12' |
| L4 | N65°28'52"W | 120.02' |
| L5 | N24°43'04"W | 244.21' |
| L6 | N84°36'00"W | 115.35' |
| L7 | N52°04'01"W | 87.70' |
| L8 | N57°18'12"W | 163.19' |
| L9 | N29°52'55"W | 101.80' |
| L10 | N74°02'09"W | 41.15' |
| L11 | N48°56'27"W | 137.25' |
| L12 | S88°57'25"W | 67.60' |
| L13 | S10°32'54"W | 26.12' |

**LINE TABLE**

| LINE | BEARING | DISTANCE |
|---|---|---|
| L14 | S74°19'35"W | 89.75' |
| L15 | N75°22'06"W | 55.08' |
| L16 | N62°35'03"W | 10.27' |
| L17 | N39°40'55"E | 27.30' |
| L18 | S89°07'57"E | 31.47' |
| L19 | N25°32'12"E | 70.78' |
| L20 | N10°00'40"W | 49.37' |
| L21 | N54°59'41"E | 103.02' |
| L22 | N40°36'36"E | 74.71' |
| L23 | N53°28'05"E | 164.68' |

**CURVE TABLE**

| CURVE | RADIUS | LENGTH | DELTA | TANGENT | CHORD | CHD BRG |
|---|---|---|---|---|---|---|
| C5 | 820.00' | 330.94' | 23°07'24" | 167.75 | 328.69' | S65°21'21"E |
| C6 | 537.96' | 464.57' | 49°28'46" | 247.89 | 450.27' | S52°10'40"E |

TOTAL OF 98 UNITS ON SOUTH PARCEL

0 40 80 160
GRAPHIC SCALE

N


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

COF #6086 FRANKLIN, TN

REVISIONS

| No. | DATE |
|---|---|
| | |

06/02/16 15001

# C2.2

SOUTH SITE DEVELOPMENT PLAN

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09

NORTH ELEVATION
(OAK MEADOW DRIVE)

SOUTH PARCEL

GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1/16" = 1'-0"

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# BUILDING ELEVATIONS

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE



PROJECT #6068

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
No. 105419
STATE OF TENNESSEE
2016.05.09

SOUTH ELEVATION

GRAPHIC SCALE
16 0 4 8 16
( IN INCHES )
1/16" = 1'-0"

SOUTH PARCEL

PAGE 18
PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# BUILDING ELEVATIONS
2016-05-09

# THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
DEPARTMENT OF AGRICULTURE
COMMERCE
NO. 10541
STATE OF TENNESSEE
2016.05.09

GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1/16" = 1'-0"

ELEVATION

NORTH PARCEL

PAGE 29

PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# BUILDING ELEVATIONS

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
DEPARTMENT OF AGRICULTURE
COMMERCE
NO. 105419
STATE OF TENNESSEE
2016.05.09

SIDE ELEVATION

NORTH PARCEL

GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1/16" = 1'-0"



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# BUILDING ELEVATIONS

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

GRAPHIC SCALE

8 0 2 4 8

( IN INCHES )
1/8" = 1'-0"

AMENITY / CLUBHOUSE CENTER
ELEVATION

SOUTH PARCEL

KENNETH LINEHAN
REGISTERED ARCHITECT
No. 105419
STATE OF TENNESSEE
2016.05.09

PAGE 32

PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# BUILDING ELEVATIONS

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC 2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 10541
STATE OF TENNESSEE
2016.05.09

POOL PAVILION ELEVATION

NORTH PARCEL

GRAPHIC SCALE

8 0 2 4 8

( IN INCHES )
1/8" = 1'-0"



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

BUILDING ELEVATIONS
2016-05-09

THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 10541
STATE OF TENNESSEE
2016.05.09

VIEW LOOKING WEST

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09

VIEW LOOKING EAST

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
DEPARTMENT OF AGRICULTURE AND COMMERCE
No. 10541
STATE OF TENNESSEE
2016.05.09

VIEW LOOKING SOUTH

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59



FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 10541
STATE OF TENNESSEE
2016.05.09

VIEW LOOKING EAST

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59


PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 10541
STATE OF TENNESSEE
2016.05.09

VIEW LOOKING EAST ON OAK MEADOW DR.

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE

2016.05.09

VIEW LOOKING EAST ON OAK MEADOW DR.

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 10541
STATE OF TENNESSEE
2016.05.09

VIEW LOOKING SOUTHEAST ON OAK MEADOW DR.

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 10541
STATE OF TENNESSEE
2016.05.09

VIEW LOOKING SOUTHWEST ON OAK MEADOW DR.

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09

VIEW LOOKING SOUTHWEST ON OAK MEADOW DR.

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09

VIEW LOOKING NORTHWEST ON OAK MEADOW DR.

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 10541
STATE OF TENNESSEE
2016.05.09

VIEW LOOKING SOUTHWEST

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59



FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09

VIEW LOOKING NORTH

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

## SITE DATA

| | |
|---|---|
| PROJECT NAME | THE EPOCH DEVELOPMENT<br>REZONING & PUD APPLICATION |
| PROJECT NUMBER: | 6086 |
| LOTS: | 2 EXISTING, 5 PROPOSED |
| ADDRESS: | 840 & 880 OAK MEADOWS DR. |
| CITY: | FRANKLIN |
| COUNTY: | WILLIAMSON |
| STATE: | TENNESSEE |
| CIVIL DISTRICT: | 9TH |
| MAP, GROUP AND PARCEL NUMBERS: | MAP 79, PARCELS 88.00 (PORTION OF) & 101.19 |
| EXISTING ZONING: | GC (GENERAL COMMERCIAL) |
| PROPOSED ZONING: | SD-R (10) (SPECIFIC DEVELOPMENT RESIDENTIAL 10 UNITS/AC) |
| CHARACTER AREA OVERLAY: | MECO-5 |
| OTHER APPLICABLE OVERLAYS: | FFO & FWO |
| APPLICABLE DEVELOPMENT STANDARD: | CONVENTIONAL |
| ACREAGE OF SITE: | 13.06 + 17.33 = 30.39 ACRES |
| SQUARE FOOTAGE OF SITE: | 569,021 + 754,942 = 1,323,963 SQUARE FEET |
| MINIMUM REQUIRED SETBACK LINES: | ATTACHED RESIDENTIAL USE |
| YARD FRONTING COLLECTOR (OAK MEADOWS) | 40' |
| SIDE YARD | 15' |
| REAR YARD | 30' |
| OWNER (BOTH PARCELS): | E. WARNER BASS, TRUSTEE |
| ADDRESS: | 150 3RD AVE. SOUTH, SUITE 2800, NASHVILLE, TN 37201 |
| PHONE NO.: | 615.742.6400 |
| E-MAIL ADDRESS: | wbass@bassberry.com |
| CONTACT NAME: | MR. WARNER BASS |
| MINERAL RIGHTS: | CONTROLLED BY CURRENT PROPERTY OWNER |
| APPLICANT: | CRUNK ENGINEERING LLC |
| ADDRESS: | 1894 GEN. GEORGE PATTON DR., SUITE 600<br>FRANKLIN, TN 37067 |
| PHONE NO.: | 615.873.1795 |
| E-MAIL ADDRESS: | adam@crunkeng.com |
| CONTACT NAME: | MR. ADAM CRUNK, P.E. |

DENSITY

| | |
|---|---|
| ATTACHED DWELLING UNITS | 302 UNITS |
| LAND AREA | 30.39 ACRES |
| LAND AREA WITHIN FLOODPLAIN OVERLAY | 8.32 ACRES |
| OVERALL DENSITY | 9.9 UNITS/ACRE |
| NET DENSITY (MINUS OVERLAY CONSTRAINT) | 13.7 UNITS/ACRE |

BUILDING HEIGHT

| | |
|---|---|
| ALLOWABLE | 6 STORIES MAXIMUM |
| PROPOSED | NORTH PARCEL - 4 STORIES<br>SOUTH PARCEL 2/3 STORIES (2 STORY FACING STREET) |

| | |
|---|---|
| PROPOSED LANDSCAPE SURFACE RATIO: | NORTH SITE - 0.53; SOUTH SITE - 0.76; COMBINED - 0.66 |
| MINIMUM LANDSCAPE SURFACE RATIO: | 0.20 |

PARKING

EXISTING 0

REQUIRED (1.5/1BR + 2.5/2BR + 3/3BR)

| NORTH SITE | | SOUTH SITE | |
|---|---|---|---|
| 1BR - 72 UNITS * 1.5 = | 108 SPACES | 1BR - 28 UNITS * 1.5 = | 42 SPACES |
| 2BR - 116 UNITS * 2.5 = | 290 SPACES | 2BR - 50 UNITS * 2.5 = | 125 SPACES |
| 3BR - 16 UNITS * 3.0 = | 48 SPACES | 3BR - 20 UNITS * 3.0 = | 60 SPACES |
| TOTAL REQUIRED | = 446 SPACES | TOTAL REQUIRED | = 227 SPACES |
| INCLUDING 9 ADA SPACES | | INCLUDING 7 ADA SPACES | |

MAXIMUM PARKING: NORTH SITE - 536 SPACES; SOUTH SITE - 273 SPACES

PROPOSED

| NORTH SITE | | SOUTH SITE | |
|---|---|---|---|
| REGULAR SPACES | 430 | REGULAR SPACES | 186 |
| COMPACT SPACE (0 % OF TOTAL) | 0 | COMPACT SPACES (14 % OF TOTAL) | 31 |
| ADA SPACES | 16 | ADA SPACES | 10 |
| TOTAL PROVIDED | 446 | TOTAL PROVIDED | 227 |

TREE CANOPY:

SITE HAS BEEN WALKED WITH LARRY MIZZELL TO IDENTIFY TREES TO BE REMOVED. TREE CANOPY REQUIREMENTS WILL BE ADDRESSED AT SITE PLAN REVIEW TO COMPLY WITH ZONING ORDINANCE.

PARKLAND DEDICATION: FEE IN LIEU OF FOR 4.64 ACRES, 302 TOTAL UNITS PROPOSED

OPEN SPACE:

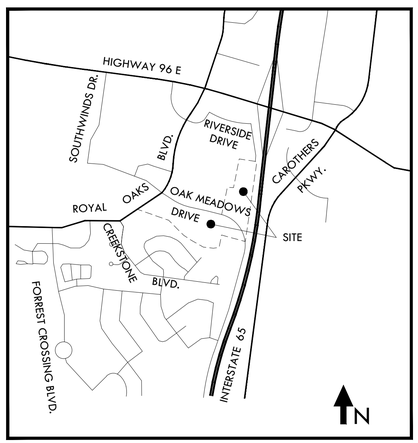
| | |
|---|---|
| TOTAL OPEN SPACE REQ'D (15% OF 30.39 AC.) | 4.56 AC. |
| FORMAL OPEN SPACE REQUIRED (33% OF OPEN SPACE REQUIRED) | 1.52 AC.<br>2.4 AC. PROVIDED |
| INFORMAL OPEN SPACE REQUIRED (67% OF OPEN SPACE REQUIRED) | 3.04 AC.<br>8.0 AC. PROVIDED |

USE BUFFER: 50-FT CLASS C INCOMPATIBLE LAND USE BUFFER (SOUTH PORTION OF SOUTH SITE)
40-FT INTERSTATE BUFFER (EAST PORTION OF NORTH SITE)

### NOTES:

PROPERTY IS LOCATED ON MAP 79 AS A PORTION OF LOT 88.00 AND PARCEL 101.19 CONTAINING 30.39 ACRES.

PARCEL 88.00 DOES LIE WITHIN THE 100-YEAR FLOOD PLAIN AS INDICATED BY FIRM MAP NO. 47187C0212F DATED SEPTEMBER 29, 2006.




VICINITY MAP
NO SCALE

# REZONING & PUD

# The Epoch Development

# PUD SUBDIVISION, DEVELOPMENT PLAN

## Franklin, Williamson County, Tennessee

## CITY OF FRANKLIN PROJECT NO. 6086

JUNE 2 2016

PREPARED FOR:

## EPOCH RESIDENTIAL

359 Carolina Avenue
Winter Park, Florida
(407) 644-9055

DESIGN MODIFICATION REQUEST:

A DESIGN MODIFICATION ALLOWING A BUILDING LENGTH OF 215 FT, AS OPPOSED TO 200 FT, IS REQUESTED BASED ON THE CRITERIA OUTLINED IN THE ZONING ORDINANCE SECTION 5.3.11 (2) AS FOLLOWS:

1. THE BUILDINGS ARE ORIENTED IN A WAY TO MINIMIZE THE VIEW-SHED IMPACT TO TRAVELERS ALONG I-65 AND OAK MEADOW DRIVE. THE BUILDINGS HAVE AN UNDULATING FACADE THAT MINIMIZES IMPACT OF THE BROAD VIEW OF THE BUILDING. IF THE DESIGN MODIFICATION WAS DISAPPROVED, THEN THE BUILDING WOULD GET LONGER IN THE OTHER DIRECTION. NO DETRIMENTAL IMPACTS ARE ANTICIPATED TO THE PUBLIC HEALTH, SAFETY, OR WELFARE.
2. THE DESIGN MODIFICATION IS BEING SOUGHT AS A SPECIFIC DESIGN TO THIS PARCEL TO UTILIZE THE SITE AS EFFICIENTLY AS POSSIBLE. THEREFORE THIS REQUEST IS SPECIFIC TO THIS PROJECT, AND IN FACT, IS NOT BEING REQUESTED ON THE SOUTHERN PARCEL.
3. THE DESIGN MODIFICATION IS NECESSARY TO MAXIMIZE THE EFFICIENCY OF THE SITE AND PROVIDE VIABLE LIVING SPACES WITHIN THE PROPOSED DWELLING UNITS.
4. THE DESIGN MODIFICATION WILL IN NO WAY VARY THE PROVISIONS OF THE LAND USE ORDINANCE AS WE BELIEVE THE REQUEST IS MINOR IN NATURE AND NOT NOTICEABLE TO THE NAKED EYE.

FEE IN LIEU OF REQUEST:

1. PARKLAND DEDICATION.

## INDEX OF SHEETS


| SHEET NO. | SHEET TITLE |
|---|---|
| C0.0 | COVER SHEET |
| C1.0 | OVERALL EXISTING CONDITIONS |
| C1.1 | NORTH SITE EXISTING CONDITIONS |
| C1.2 | SOUTH SITE EXISTING CONDITIONS |
| C2.0 | OVERALL DEVELOPMENT PLAN |
| C2.1 | NORTH SITE DEVELOPMENT PLAN |
| C2.2 | SOUTH SITE DEVELOPMENT PLAN |
| C2.3 | GENERAL LIGHTING PLAN |
| C3.0 | OVERALL GRADING & DRAINAGE PLAN |
| C3.1 | SOUTH SITE GRADING & DRAINAGE PLAN |
| C3.2 | SOUTH & NORTH SITE GRADING & DRAINAGE PLAN |
| C3.3 | NORTH SITE GRADING & DRAINAGE PLAN |
| C4.0 | OVERALL ACCESS PLAN |
| C4.1 | NORTH SITE ACCESS PLAN |
| C4.2 | SOUTH SITE ACCESS PLAN |
| C5.0 | OVERALL UTILITY PLAN |
| C5.1 | NORTH SITE UTILITY PLAN |
| C5.2 | SOUTH SITE UTILITY PLAN |
| PAGES 1 -45 | SEE ARCHITECTURAL TABLE OF CONTENTS |


KENNETH LINEHAN REGISTERED ARCHITECT AGRICULTURE COMMERCE No. 7054 STATE OF TENNESSEE
2016.05.04


ARCHITECT OF RECORD:
KENNETH LINEHAN, AIA, LEED AP
FUGLEBURG KOCH ARCHITECTS
2555 TEMPLE TRAIL
WINTER PARK, FL 32789
407-629-0595
kenl@fuglebergkoch.com



CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


ENGINEERING CRUNK

WILSON CAIN REGISTERED LANDSCAPE ARCHITECT AGRICULTURE COMMERCE No. 114100 STATE OF TENNESSEE 6/2/16

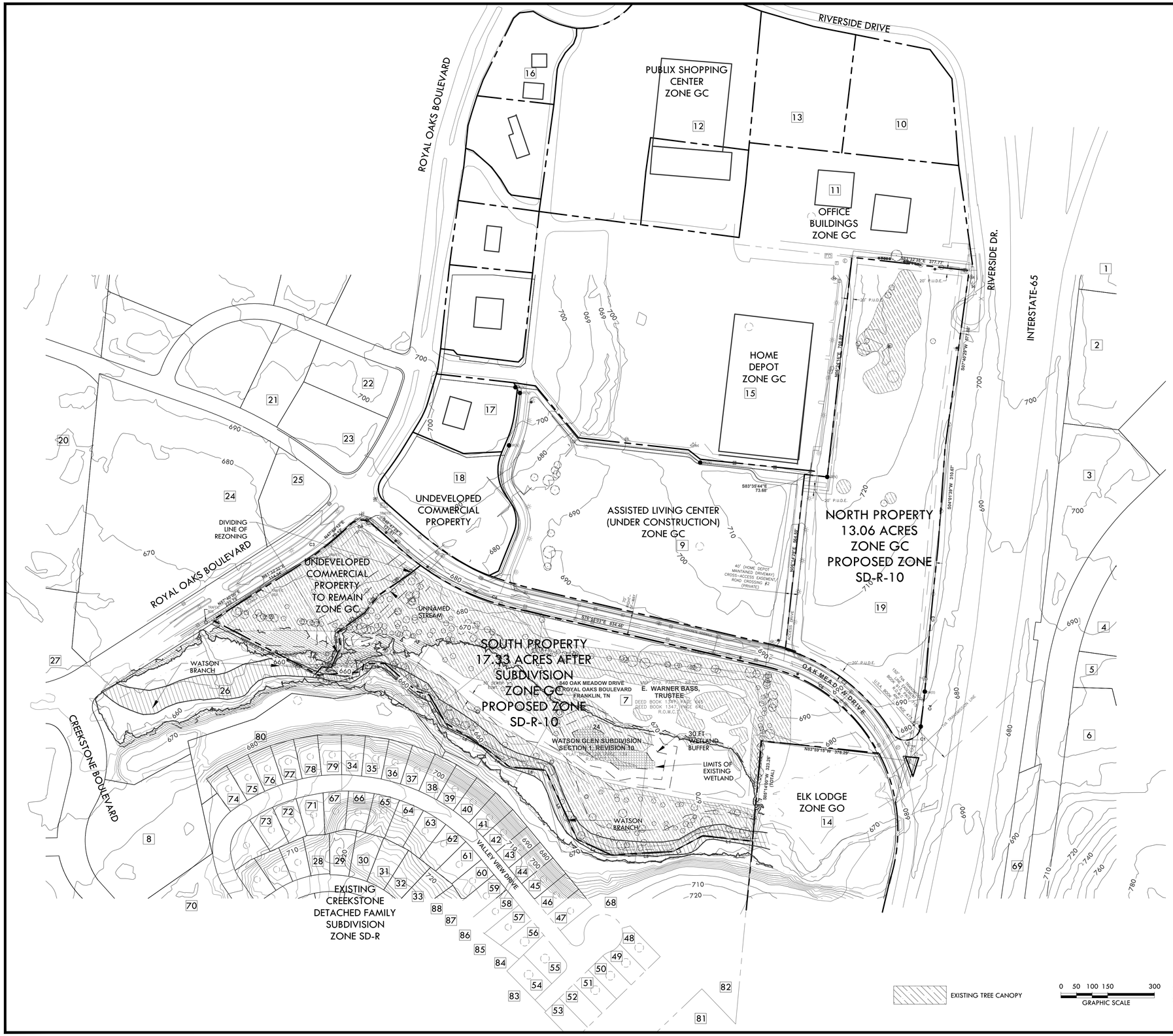
THE EPOCH DEVELOPMENT
PUD SUBDIVISION, DEVELOPMENT PLAN
COF #6086 FRANKLIN, TN

| REVISIONS | |
|---|---|
| No. | DATE |

06/02/16 15001

C0.0

COVER SHEET




| ID | PRCUID | DEED / PLAT | LAND USE | OWNER | ZONING |
|---|---|---|---|---|---|
| 1 | 079---06905 | DB 3844 DP 619 PB16 PP114 | HOTEL | BRE/LQ PROP LLC | GC |
| 2 | 079---06906 | DB 2966 DP 435 PB22 PP11 | AUTO DLR | ADKINS RODNEY G | GC |
| 3 | 079---07600 | DB 4341 DP763 PB22 PP11 | CHURCH | CHURCH GATE THE | GC |
| 4 | 079---08000 | DB6337 DP70 PB61 PP69 | REC | SOAR ADVENTURE TOWER LLC | GC |
| 5 | 079---08200 | DB5165 DP555 | UNDEV. | NICHOLS J DONALD | SD-R |
| 6 | 079---08300 | DB1350 DP525 | ATTACHED RESID. | UNITED DOMINION REALTY LP | GC |
| 7 | 079---08800 | DB1347 DP645 PB29 PP139 | UNDEV. | BASS E WARNER TR | GC |
| 8 | 079---10001 | DB2192 DP320 PB31 PP125 | DAYCARE | WOOD & WOOD LLC | GO |
| 9 | 079---10100 | DB6533 DP243 PB62 PP45 | ASST. LVG | DOMINION SENIOR LIVING OF FRANKLIN L | GC |
| 10 | 079---10101 | DB5434 DP660 | OFFICE | 5107 LLC | GC |
| 11 | 079---10102 | DB2200 DP199 PB19 PP59 | OFFICE | UN DON REALTY LLC | GC |
| 12 | 079---10103 | DB5459 DP859 PB99 PP3 | RETAIL | PUBLIX TENNESSEE LLC | GC |
| 13 | 079---10104 | DB6168 DP806 PB22 PP120 | ASST. LVG | FRANKLIN TN SENIOR CARE PROPERTY LLC | GC |
| 14 | 079---10105 | - | REC | NASHVILLE LODGE #72 BPO ELKS | GO |
| 15 | 079---10110 | DB4406 DP792 PB29 PP139 | RETAIL | HD DEVELOPMENT OF MARYLAND INC | GC |
| 16 | 079---10114 | DB5459 DP859 PB29 PP139 | RETAIL | PUBLIX TENNESSEE LLC | GC |
| 17 | 079---10116 | DB3792 DP29 PB29 PP139 | RETAIL | FIRST-CITIZENS BANK AND TR CO | GC |
| 18 | 079---10117 | PB 43 PP40 | UNDEV. | BASS E WARNER TR | GC |
| 19 | 079---10119 | PB 43 PP40 | UNDEV. | BASS E WARNER TR | GC |
| 20 | 079O-A01401 | DB4197 DP993 PB41 PP33 | UNDEV. | SWJ2 TENNESSEE LLC | RM-20 |
| 21 | 079O-A03300 | DB4200 DP849 PB27 PP4 | INSTIT. | CHURCH CORNERSTONE MINISTRIES INC | GC |
| 22 | 079O-A03901 | DB5790 DP107 PB29 PP10 | RETAIL | MAGLI CHERYL S FAMILY TRUST | GC |
| 23 | 079O-A03902 | DB5871 DP528 PB26 PP10 | RETAIL | LCJ LLC | GC |
| 24 | 079O-A04400 | DB794 DP881 PB12 PP76 | | UNITED STATES POSTAL SERV | CI |
| 25 | 079O-A04401 | DB1946 DP286 PB12 PP76 | RETAIL | COMMUNITY BANK | GC |
| 26 | 079O-C02500 | DB5136 DP628 | UNDEV. | CADENCE BANK NA | GO |
| 27 | 079O-C02800 | PB47 PP142 | UNDEV. | ROYAL OAKS PARK SOUTH | GO |
| 28 | 079O-D00100 | DB5814 DP815 PB55 PP146 | RESIDENTIAL | THURM DAVID M | SD-R |
| 29 | 079O-D00200 | DB5807 DP985 PB55 PP146 | RESIDENTIAL | HAMILTON MALLORY | SD-R |
| 30 | 079O-D00300 | DB4624 DP480 PB55 PP146 | RESIDENTIAL | LYLE JORDAN WILLIAM | SD-R |
| 31 | 079O-D00400 | DB5780 DP388 PB55 PP146 | RESIDENTIAL | EVANGELISTA BERNARDINO JR | SD-R |
| 32 | 079O-D00500 | DB5841 DP984 PB55 PP146 | RESIDENTIAL | CASTANEDA ORESTES | SD-R |
| 33 | 079O-D00600 | DB5809 DP135 PB55 PP146 | RESIDENTIAL | VOSS STEPHEN M | SD-R |
| 34 | 079O-E00100 | DB6536 DP118 PB58 PP10 | RESIDENTIAL | KHOT SOHAM | SD-R |
| 35 | 079O-E00200 | DB6190 DP252 PB58 PP10 | RESIDENTIAL | GOOCH RYAN M | SD-R |
| 36 | 079O-E00300 | DB6218 DP405 PB58 PP10 | RESIDENTIAL | SULLIVAN JOHN | SD-R |
| 37 | 079O-E00400 | DB6232 DP972 PB58 PP10 | RESIDENTIAL | CULLEN ROBERT BARRY | SD-R |
| 38 | 079O-E00500 | DB6231 DP1 PB58 PP10 | RESIDENTIAL | MILLER ROBERT FRANK | SD-R |
| 39 | 079O-E00600 | DB6288 DP734 PB58 PP10 | RESIDENTIAL | DHARANI KHAIRUNISSA | SD-R |
| 40 | 079O-E00700 | DB6218 DP407 PB58 PP10 | RESIDENTIAL | KNOX CONSUELA S | SD-R |
| 41 | 079O-E00800 | DB6229 DP797 PB58 PP10 | RESIDENTIAL | DAWKINS BRETTON GUY | SD-R |
| 42 | 079O-E00900 | DB6296 DP854 PB58 PP10 | RESIDENTIAL | COMEAUX MARGARET A | SD-R |
| 43 | 079O-E01000 | DB6273 DP312 PB58 PP10 | RESIDENTIAL | SMITH CHRISTOPHER S | SD-R |
| 44 | 079O-E01100 | DB6281 DP281 PB58 PP10 | RESIDENTIAL | DANIELS THOMAS | SD-R |
| 45 | 079O-E01200 | DB6541 DP640 PB58 PP10 | RESIDENTIAL | SUNDARAM BARATH SHANMUGA | SD-R |
| 46 | 079O-E01300 | DB6331 DP190 PB58 PP10 | RESIDENTIAL | HOSSAIN MOHAMMAD | SD-R |
| 47 | 079O-E01400 | DB6264 DP154 PB58 PP10 | RESIDENTIAL | MAPLESDEN LAWRENCE | SD-R |
| 48 | 079O-E01500 | DB6346 DP779 PB58 PP10 | RESIDENTIAL | BECHARD BRIAN | SD-R |
| 49 | 079O-E01600 | DB6529 DP837 PB58 PP10 | RESIDENTIAL | VIDYAM SATHEESH | SD-R |
| 50 | 079O-E01700 | DB6145 DP168 PB58 PP10 | RESIDENTIAL | RUSSO JOHN M | SD-R |
| 51 | 079O-E01800 | DB6177 DP164 PB58 PP10 | RESIDENTIAL | QUIGLEY J PATRICK | SD-R |
| 52 | 079O-E01900 | DB6151 DP238 PB58 PP10 | RESIDENTIAL | BONHAM SYDNEY | SD-R |
| 53 | 079O-E02000 | DB6156 DP254 PB58 PP10 | RESIDENTIAL | BURGER JORDAN | SD-R |
| 54 | 079O-E02100 | DB6172 DP871 PB58 PP10 | RESIDENTIAL | NOLAN MICHAEL S TRUST | SD-R |
| 55 | 079O-E02200 | DB6195 DP626 PB58 PP10 | RESIDENTIAL | PARSI SREEKANTH | SD-R |
| 56 | 079O-E02300 | DB6529 DP771 PB58 PP10 | RESIDENTIAL | KOLLI MURALL KRISHNA | SD-R |
| 57 | 079O-E02400 | DB6252 DP619 PB58 PP10 | RESIDENTIAL | RAMAN VENKATESH | SD-R |
| 58 | 079O-E02500 | DB6231 DP816 PB58 PP10 | RESIDENTIAL | RAJENDRAN THAMIL S | SD-R |
| 59 | 079O-E02600 | DB6195 DP601 PB58 PP10 | RESIDENTIAL | DOPPALAPUDI SRIKANTH | SD-R |
| 60 | 079O-E02700 | DB6182 DP362 PB58 PP10 | RESIDENTIAL | CHINTAKINDI VARUN K | SD-R |
| 61 | 079O-E02800 | DB6177 DP138 PB58 PP10 | RESIDENTIAL | KRISHNAN JAGADEESWARAN | SD-R |
| 62 | 079O-E02900 | DB6152 DP63 PB58 PP10 | RESIDENTIAL | MOHAMED ABDUL R J | SD-R |
| 63 | 079O-E03000 | DB6153 DP125 PB58 PP10 | RESIDENTIAL | PICHAIMUTHU NARAYANAN | SD-R |
| 64 | 079O-E03100 | DB6160 DP536 PB58 PP10 | RESIDENTIAL | ZELLER JAMES S JR | SD-R |
| 65 | 079O-E03200 | DB6583 DP472 PB58 PP10 | RESIDENTIAL | MURRAY KIMBERLY | SD-R |
| 66 | 079O-E03300 | DB6172 DP802 PB58 PP10 | RESIDENTIAL | ZIPPER NATHAN M | SD-R |
| 67 | 079O-E03400 | DB6154 DP157 PB58 PP10 | RESIDENTIAL | VIGIL MARIO G | SD-R |
| 68 | 079O-E03500 | DB6104 DP222 PB58 PP10 | RESIDENTIAL | CREEKSTONES HOMEOWNERS ASSOCIATION I | SD-R |
| 69 | 089---02609 | DB1915 DP 891 PB149 P17 | RESIDENTIAL | A T & T CORP BY & THROUGH | R-2 |
| 70 | 089B-O04200 | DB5309 DP243 PB54 PP20 | RESIDENTIAL | CREEKSTONE HOMEOWNERS ASSOCIATION IN | SD-R |
| 71 | 089B-O04600 | DB5727 DP67 PB54 PP20 | RESIDENTIAL | BLACKSHER NICOLE E | SD-R |
| 72 | 089B-O04700 | DB6656 DP836 PB54 PP20 | RESIDENTIAL | DRUSE JONATHAN | SD-R |
| 73 | 089B-O04800 | DB5674 DP620 PB54 PP20 | RESIDENTIAL | KUMAR RATNA | SD-R |
| 74 | 089B-O05000 | DB6412 DP384 PB54 PP20 | RESIDENTIAL | BLANKENSHIP JON I | SD-R |
| 75 | 089B-O05100 | DB5710 DP738 PB54 PP20 | RESIDENTIAL | BURRELL GERALD MARK | SD-R |
| 76 | 089B-O05200 | DB5716 DP104 PB54 PP20 | RESIDENTIAL | BUCKNER RICHARD D | SD-R |
| 77 | 089B-O05300 | DB5604 DP513 PB54 PP20 | RESIDENTIAL | LERCHE MICHAEL | SD-R |
| 78 | 089B-O05400 | DB6046 DP929 PB54 PP20 | RESIDENTIAL | RUSSELL KAREN KINGSBURY | SD-R |
| 79 | 089B-O05500 | DB5747 DP463 PB54 PP20 | RESIDENTIAL | THEURER DAVID S | SD-R |
| 80 | 089B-O05600 | DB5309 DP243 PB54 PP20 | RESIDENTIAL | CREEKSTONE HOMEOWNERS ASSOCIATION IN | SD-R |
| 81 | 089B-P01500 | DB6057 DP780 PB56 PP76 | RESIDENTIAL | BARLOW JOHN | SD-R |
| 82 | 089B-P01600 | DB6119 DP165 PB56 PP76 | RESIDENTIAL | ERWIN DEVAN A | SD-R |
| 83 | 089B-P02000 | DB6031 DP735 PB56 PP76 | RESIDENTIAL | PATEL NIKUNJ M | SD-R |
| 84 | 089B-P02100 | DB5983 DP439 PB56 PP76 | RESIDENTIAL | JANI BHAVESHKUMAR | SD-R |
| 85 | 089B-P02200 | DB5989 DP962 PB56 PP76 | RESIDENTIAL | HARRIS JOHN | SD-R |
| 86 | 089B-P02300 | DB6000 DP115 PB56 PP76 | RESIDENTIAL | LEDGISTER KEVIN ARTHUR | SD-R |
| 87 | 089B-P02400 | DB6377 DP104 PB56 PP76 | RESIDENTIAL | JOHANSEN MICHAEL | SD-R |
| 88 | 089B-P02500 | DB5899 DP690 PB56 PP76 | RESIDENTIAL | COLLIER EDWARD W III | SD-R |


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


CRUNK ENGINEERING

WILSON COUNTY CERTIFICATE OF AUTHORIZATION AGRICULTURE 6/2 COMMERCE No. 114180 STATE OF TENNESSEE

# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

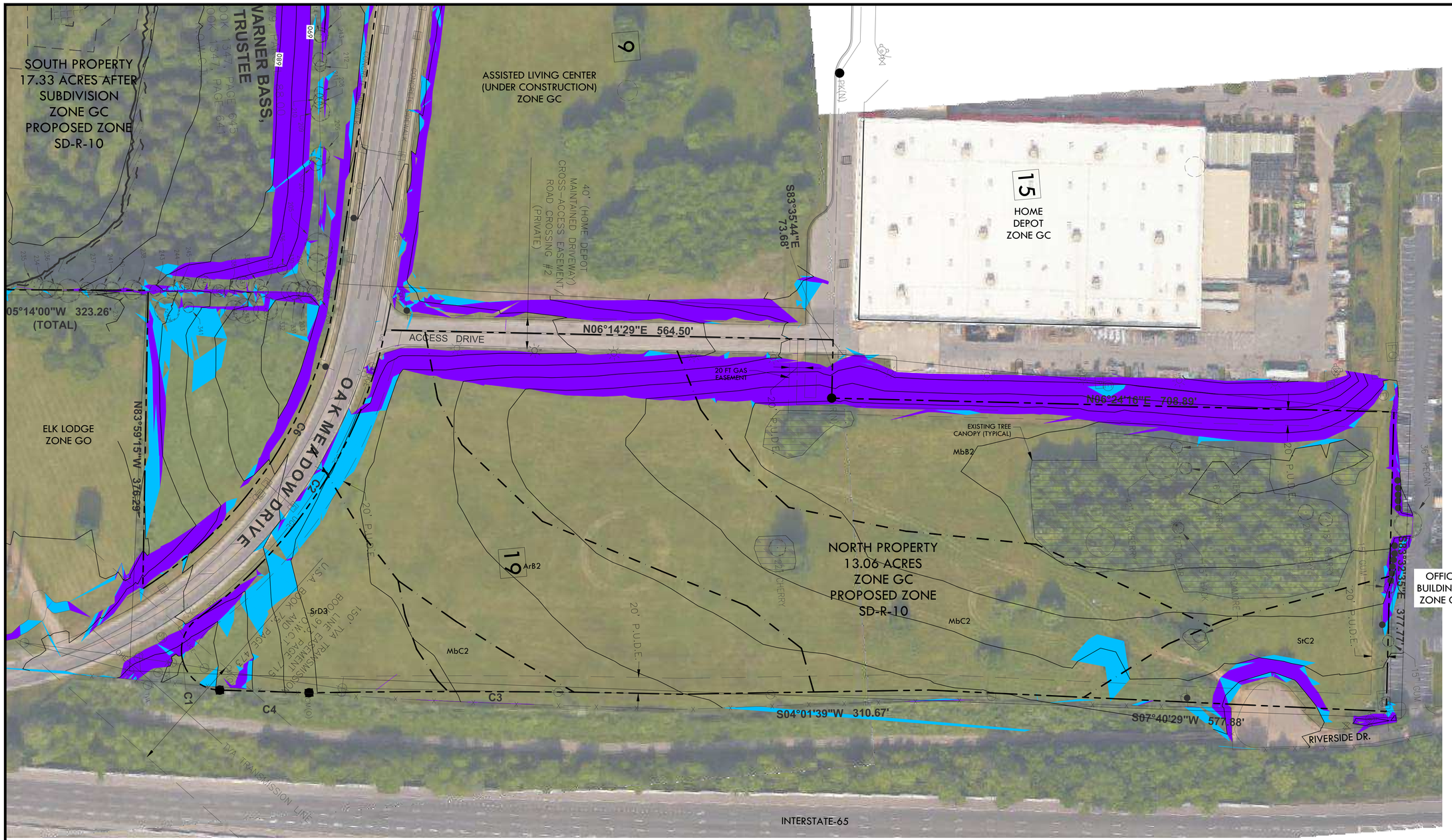
COF #6086 FRANKLIN, TN

| REVISIONS | |
|---|---|
| No. | DATE |
| | |

06/02/16 15001

# C1.0

OVERALL EXISTING CONDITIONS PLAN




SLOPE LEGEND

- GREATER THAN 14% AND LESS THAN 20% SLOPE
- GREATER THAN 20% SLOPE

SOIL TYPES

| | |
|---|---|
| ArB2 | Armour silt loam, 2% to 5 % slopes, eroded |
| CaC2 | Captina silt loam, phosphatic, 5% to 12% slopes, eroded |
| Eg | Egam silt loam, phosphatic |
| Hu | Huntington silt loam, phosphatic |
| InE3 | Inman silty clay loam, 20% to 30% slopes, severely eroded |
| MbB2 | Maury silt loam, 2% to 5% slopes, eroded |
| MbC2 | Maury silt loam, 5% to 12% slopes, eroded |
| SrC3 | Stiversville clay loam, 5% to 12% slopes, eroded |
| SrD3 | Stiversville clay loam, 12% to 20% slopes, severely eroded |
| StC2 | Stiversville silt loam, 5% to 12% slopes, eroded |

CURVE TABLE

| CURVE | RADIUS | LENGTH | DELTA | TANGENT | CHORD | CHD BRG |
|---|---|---|---|---|---|---|
| C1 | 50.00' | 123.89' | 141°58'19" | 145.10 | 94.54' | S77°58'06"W |
| C2 | 607.96' | 443.66' | 41°48'42" | 232.23 | 433.88' | N51°57'06"W |
| C3 | 11300.00' | 470.04' | 2°23'00" | 235.06 | 470.01' | S05°13'09"W |
| C4 | 11300.00' | 112.73' | 0°34'18" | 56.37 | 112.73' | S06°41'48"W |

0 30 60 120
GRAPHIC SCALE

CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM

ENGINEERING CRUNK

WILSON CALDWELL ZALEWSKI LICENSED PROFESSIONAL LANDSCAPE ARCHITECT AGRICULTURE 6/2/16 No. 114180 STATE OF TENNESSEE

# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

COF #6086 FRANKLIN, TN

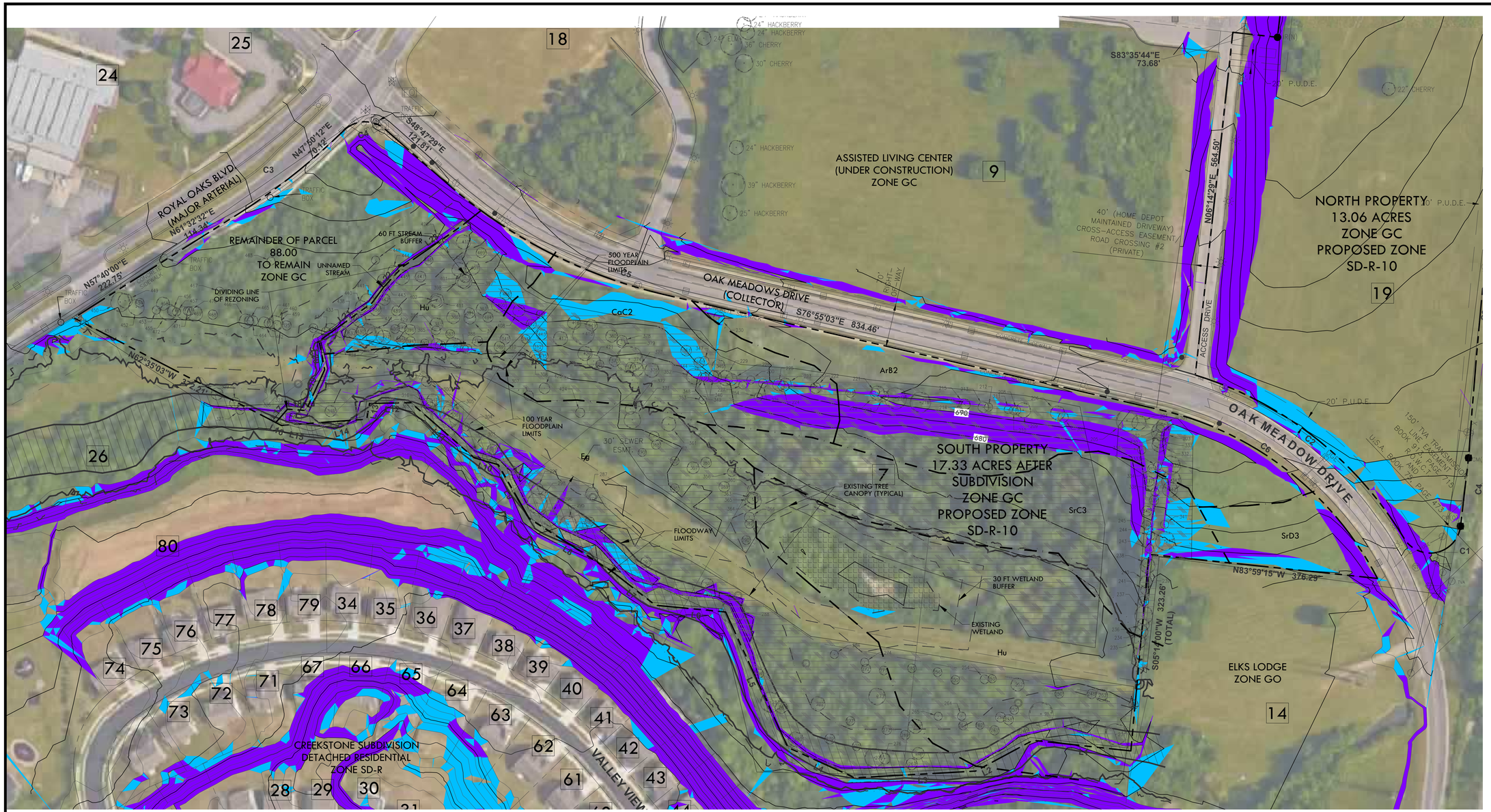
REVISIONS

| No. | DATE |
|---|---|

06/02/16 15001

# C1.1

NORTH SITE EXISTING CONDITIONS PLAN




SLOPE LEGEND

- GREATER THAN 14% AND LESS THAN 20% SLOPE
- GREATER THAN 20% SLOPE

SOIL TYPES

| | |
|---|---|
| ArB2 | Armour silt loam, 2% to 5 % slopes, eroded |
| CaC2 | Captina silt loam, phosphatic, 5% to 12% slopes, eroded |
| Eg | Egam silt loam, phosphatic |
| Hu | Huntington silt loam, phosphatic |
| InE3 | Inman silty clay loam, 20% to 30% slopes, severely eroded |
| MbB2 | Maury silt loam, 2% to 5% slopes, eroded |
| MbC2 | Maury silt loam, 5% to 12% slopes, eroded |
| SrC3 | Stiversville clay loam, 5% to 12% slopes, eroded |
| SrD3 | Stiversville clay loam, 12% to 20% slopes, severely eroded |
| StC2 | Stiversville silt loam, 5% to 12% slopes, eroded |

0 40 80 160
GRAPHIC SCALE

N


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

COF #6086 FRANKLIN, TN

REVISIONS

| No. | DATE |
|---|---|
| | |

06/02/16 15001

# C1.2

SOUTH SITE EXISTING CONDITIONS PLAN

## CREEKSTONE SUBDIVISION CROSS SECTION THROUGH WATSON BRANCH






BRICK TRASH ENCLOSURE EXAMPLE

## SITE DATA

| | |
|---|---|
| PROJECT NAME | THE EPOCH DEVELOPMENT<br>REZONING & PUD APPLICATION |
| PROJECT NUMBER: | 6086 |
| LOTS: | 2 EXISTING, 5 PROPOSED |
| ADDRESS: | 840 & 880 OAK MEADOWS DR. |
| CITY: | FRANKLIN |
| COUNTY: | WILLIAMSON |
| STATE: | TENNESSEE |
| CIVIL DISTRICT: | 9TH |
| MAP, GROUP AND PARCEL NUMBERS: | MAP 79, PARCELS 88.00 (PORTION OF) & 101.19 |
| EXISTING ZONING: | GC (GENERAL COMMERCIAL) |
| PROPOSED ZONING: | SD-R (10) (SPECIFIC DEVELOPMENT RESIDENTIAL 10 UNITS/AC) |
| CHARACTER AREA OVERLAY: | MECO-5 |
| OTHER APPLICABLE OVERLAYS: | FFO & FWO |
| APPLICABLE DEVELOPMENT STANDARD: | CONVENTIONAL |
| ACREAGE OF SITE: | 13.06 + 17.33 = 30.39 ACRES |
| SQUARE FOOTAGE OF SITE: | 569,021 + 754,942 = 1,323,963 SQUARE FEET |
| MINIMUM REQUIRED SETBACK LINES: | ATTACHED RESIDENTIAL USE |
| YARD FRONTING COLLECTOR (OAK MEADOWS) | 40' |
| SIDE YARD | 15' |
| REAR YARD | 30' |
| OWNER (BOTH PARCELS): | E. WARNER BASS, TRUSTEE |
| ADDRESS: | 150 3RD AVE. SOUTH, SUITE 2800, NASHVILLE, TN 37201 |
| PHONE NO.: | 615.742.6400 |
| E-MAIL ADDRESS: | wbass@bassberry.com |
| CONTACT NAME: | MR. WARNER BASS |
| MINERAL RIGHTS: | CONTROLLED BY CURRENT PROPERTY OWNER |
| APPLICANT: | CRUNK ENGINEERING LLC |
| ADDRESS: | 1894 GEN. GEORGE PATTON DR., SUITE 600<br>FRANKLIN, TN 37067 |
| PHONE NO.: | 615.873.1795 |
| E-MAIL ADDRESS: | adam@crunkeng.com |
| CONTACT NAME: | MR. ADAM CRUNK, P.E. |
| DENSITY | |
| ATTACHED DWELLING UNITS | 302 UNITS |
| LAND AREA | 30.39 ACRES |
| LAND AREA WITHIN FLOODPLAIN OVERLAY | 8.32 ACRES |
| OVERALL DENSITY | 9.9 UNITS/ACRE |
| NET DENSITY (MINUS OVERLAY CONSTRAINT) | 13.7 UNITS/ACRE |
| BUILDING HEIGHT | |
| ALLOWABLE | 6 STORIES MAXIMUM |
| PROPOSED | NORTH PARCEL - 4 STORIES<br>SOUTH PARCEL 2/3 STORIES (2 STORY FACING STREET) |
| PROPOSED LANDSCAPE SURFACE RATIO: | NORTH SITE - 0.53; SOUTH SITE - 0.76; COMBINED - 0.66 |
| MINIMUM LANDSCAPE SURFACE RATIO: | 0.20 |

PARKING

| | NORTH SITE | SOUTH SITE |
|---|---|---|
| EXISTING | 0 | |
| REQUIRED (1.5/1BR + 2.5/2BR + 3/3BR) | | |
| | 1BR - 72 UNITS * 1.5 = 108 SPACES | 1BR - 28 UNITS * 1.5 = 42 SPACES |
| | 2BR - 116 UNITS * 2.5 = 290 SPACES | 2BR - 50 UNITS * 2.5 = 125 SPACES |
| | 3BR - 16 UNITS * 3.0 = 48 SPACES | 3BR - 20 UNITS * 3.0 = 60 SPACES |
| | TOTAL REQUIRED = 446 SPACES | TOTAL REQUIRED = 227 SPACES |
| | INCLUDING 9 ADA SPACES | INCLUDING 7 ADA SPACES |
| MAXIMUM PARKING | NORTH SITE - 536 SPACES; | SOUTH SITE - 273 SPACES |

PROPOSED

| NORTH SITE | | SOUTH SITE | |
|---|---|---|---|
| REGULAR SPACES | 430 | REGULAR SPACES | 186 |
| COMPACT SPACE (0 % OF TOTAL) | 0 | COMPACT SPACES (14 % OF TOTAL) | 31 |
| ADA SPACES | 16 | ADA SPACES | 10 |
| TOTAL PROVIDED | 446 | TOTAL PROVIDED | 227 |

TREE CANOPY:
SITE HAS BEEN WALKED WITH LARRY MIZZELL TO IDENTIFY TREES TO BE REMOVED. TREE CANOPY REQUIREMENTS WILL BE ADDRESSED AT SITE PLAN REVIEW TO COMPLY WITH ZONING ORDINANCE.

| | |
|---|---|
| PARKLAND DEDICATION: | FEE IN LIEU OF FOR 4.64 ACRES, 302 TOTAL UNITS PROPOSED |
| OPEN SPACE: | |
| TOTAL OPEN SPACE REQ'D (15% OF 30.39 AC.) | 4.56 AC. |
| FORMAL OPEN SPACE REQUIRED (33% OF OPEN SPACE REQUIRED) | 1.52 AC.<br>2.4 AC. PROVIDED |
| INFORMAL OPEN SPACE REQUIRED (67% OF OPEN SPACE REQUIRED) | 3.04 AC.<br>8.0 AC. PROVIDED |
| USE BUFFER: | 50-FT CLASS C INCOMPATIBLE LAND USE BUFFER (SOUTH PORTION OF SOUTH SITE)<br>40-FT INTERSTATE BUFFER (EAST PORTION OF NORTH SITE) |

### PROJECT NOTES:

1) The proposed project complies with the Land Use Plan as it was amended in December 2015 to allow for attached residential uses along with a mixture of other uses. The project is in the McEwen Character Area, Special Area 5. Conventional standards are proposed project since that is the predominant design character of the fully developed surrounding area. The project will remain compatible with its surroundings by proposing two story buildings on the southern site to act as a transition from single family uses to the south and commercial developments to the north. The Northern site will have four story heights to match the adjacent office buildings to the north. The Northern site lends itself to a denser development due to its proximity to the interstate, and surrounding commercial uses.
2) The architectural intent can be best described by the attached elevations proposed for the project. The Southern site intent is to have more of a single family or townhome look. The Northern site intent is to blend with the southern site and new assisted living center that is currently under construction.
3) There are no planned phases of the project. The intent is to begin construction on both parcels at the end of 2016, with the possibility of opening units on the southern property in 2018 and having fully completed the northern property by 2019.

PROPERTY IS LOCATED ON MAP 79 AS A PORTION OF LOT 88.00 AND PARCEL 101.19 CONTAINING 30.39 ACRES.

PARCEL 88.00 DOES LIE WITHIN THE 100-YEAR FLOOD PLAIN AS INDICATED BY FIRM MAP NO. 47187C0212F DATED SEPTEMBER 29, 2006.

### STATEMENT OF IMPACT:

The proposed project will add 302 multi-family units. The property is currently undeveloped within the existing City Limits of the City of Franklin. Therefore, no new land is being developed outside the existing jurisdiction of City of Franklin Police, Fire, or Solid Waste services.

The project is approximately a 4 mile driving distance from the Police Station; 1.5 mile driving distance from the nearest fire station on Murfreesboro Rd.
The project will have two dumpster locations for solid waste. One serving 204 units and the other serving 98 units.
No new parkland is being dedicated as part of this project. However, this project will contribute to parkland funds.

0 50 100 150 300
GRAPHIC SCALE


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

FRANKLIN, TN

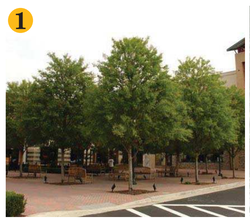
COF #6086

| REVISIONS | | |
|---|---|---|
| No. | DATE | |

06/02/16 15001

# C2.0

OVERALL DEVELOPMENT PLAN



FORMAL OPEN SPACE - 0.75 ACRES

FORMAL OPEN SPACE (GRILL) - 0.15 ACRES

TOTAL OF 204 UNITS ON NORTH PARCEL

| CURVE TABLE | | | | | | |
|---|---|---|---|---|---|---|
| CURVE | RADIUS | LENGTH | DELTA | TANGENT | CHORD | CHD BRG |
| C1 | 50.00' | 123.89' | 141°58'19" | 145.10 | 94.54' | S77°58'06"W |
| C2 | 607.96' | 443.66' | 41°48'42" | 232.23 | 433.88' | N51°57'06"W |
| C3 | 11300.00' | 470.04' | 2°23'00" | 235.06 | 470.01' | S05°13'09"W |
| C4 | 11300.00' | 112.73' | 0°34'18" | 56.37 | 112.73' | S06°41'48"W |

0 30 60 120
GRAPHIC SCALE

CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM

ENGINEERING CRUNK

ADAM WILSON CRUNK
REGISTERED PROFESSIONAL ENGINEER
AGRICULTURE
No. 114180
STATE OF TENNESSEE
6/2/16

# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

FRANKLIN, TN

COF #6086

REVISIONS

| No. | DATE |
|---|---|
| | |

06/02/16 15001

# C2.1

NORTH SITE DEVELOPMENT PLAN

**LINE TABLE**

| LINE | BEARING | DISTANCE |
|---|---|---|
| L1 | N83°48'10"W | 161.22' |
| L2 | S61°46'08"W | 106.65' |
| L3 | S86°48'30"W | 198.12' |
| L4 | N65°28'52"W | 120.02' |
| L5 | N24°43'04"W | 244.21' |
| L6 | N84°36'00"W | 115.35' |
| L7 | N52°04'01"W | 87.70' |
| L8 | N57°18'12"W | 163.19' |
| L9 | N29°52'55"W | 101.80' |
| L10 | N74°02'09"W | 41.15' |
| L11 | N48°56'27"W | 137.25' |
| L12 | S88°57'25"W | 67.60' |
| L13 | S10°32'54"W | 26.12' |

**LINE TABLE**

| LINE | BEARING | DISTANCE |
|---|---|---|
| L14 | S74°19'35"W | 89.75' |
| L15 | N75°22'06"W | 55.08' |
| L16 | N62°35'03"W | 10.27' |
| L17 | N39°40'55"E | 27.30' |
| L18 | S89°07'57"E | 31.47' |
| L19 | N25°32'12"E | 70.78' |
| L20 | N10°00'40"W | 49.37' |
| L21 | N54°59'41"E | 103.02' |
| L22 | N40°36'36"E | 74.71' |
| L23 | N53°28'05"E | 164.68' |

**CURVE TABLE**

| CURVE | RADIUS | LENGTH | DELTA | TANGENT | CHORD | CHD BRG |
|---|---|---|---|---|---|---|
| C5 | 820.00' | 330.94' | 23°07'24" | 167.75 | 328.69' | S65°21'21"E |
| C6 | 537.96' | 464.57' | 49°28'46" | 247.89 | 450.27' | S52°10'40"E |

TOTAL OF 98 UNITS ON SOUTH PARCEL

0 40 80 160
GRAPHIC SCALE

N


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

COF #6086 FRANKLIN, TN

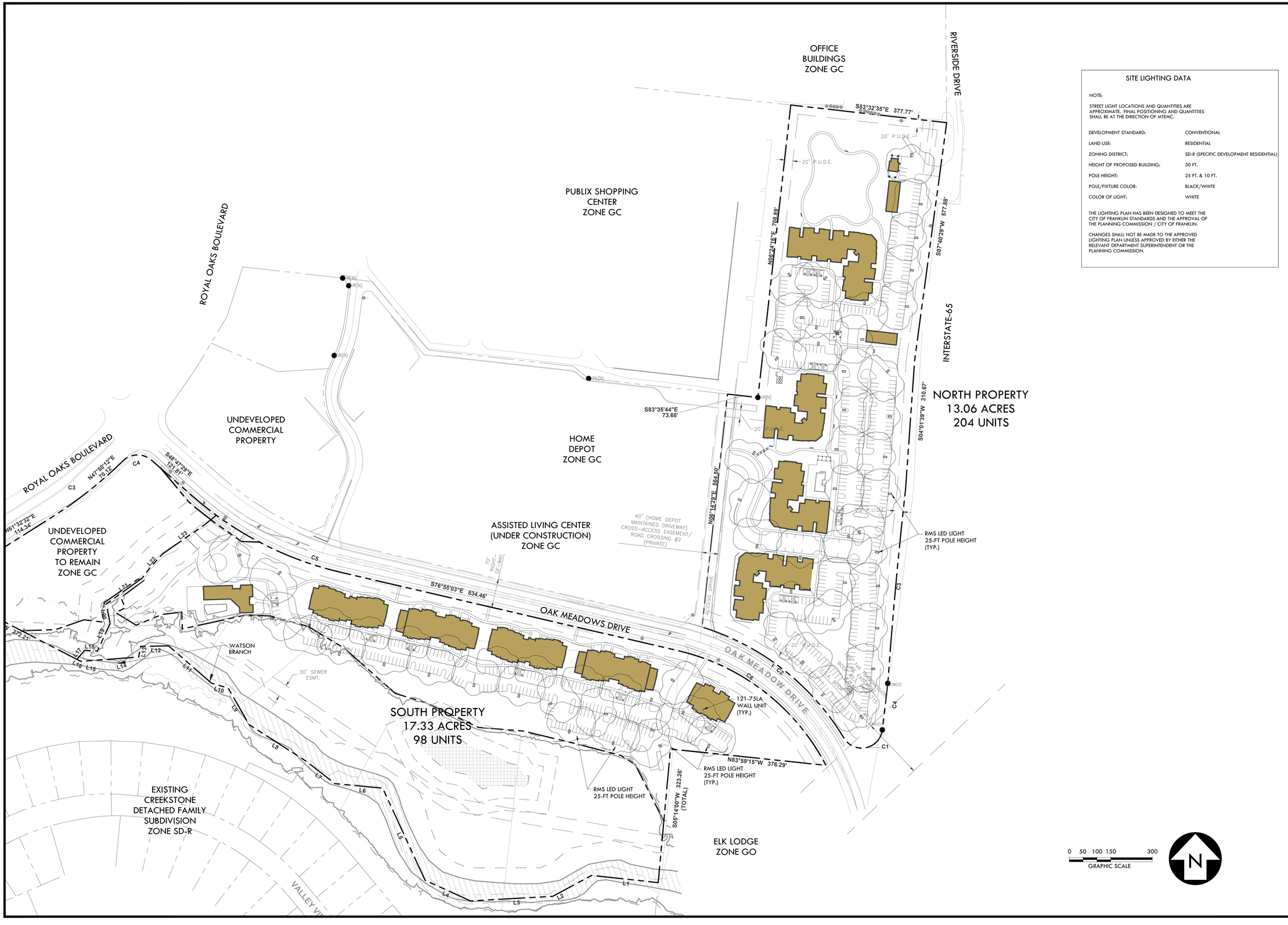
REVISIONS

| No. | DATE |
|---|---|
| | |

06/02/16 15001

# C2.2

SOUTH SITE DEVELOPMENT PLAN




## SITE LIGHTING DATA

NOTE:

STREET LIGHT LOCATIONS AND QUANTITIES ARE APPROXIMATE. FINAL POSITIONING AND QUANTITIES SHALL BE AT THE DIRECTION OF MTEMC.

| | |
|---|---|
| DEVELOPMENT STANDARD: | CONVENTIONAL |
| LAND USE: | RESIDENTIAL |
| ZONING DISTRICT: | SD-R (SPECIFIC DEVELOPMENT RESIDENTIAL) |
| HEIGHT OF PROPOSED BUILDING: | 30 FT. |
| POLE HEIGHT: | 25 FT. & 10 FT. |
| POLE/FIXTURE COLOR: | BLACK/WHITE |
| COLOR OF LIGHT: | WHITE |

THE LIGHTING PLAN HAS BEEN DESIGNED TO MEET THE CITY OF FRANKLIN STANDARDS AND THE APPROVAL OF THE PLANNING COMMISSION / CITY OF FRANKLIN.

CHANGES SHALL NOT BE MADE TO THE APPROVED LIGHTING PLAN UNLESS APPROVED BY EITHER THE RELEVANT DEPARTMENT SUPERINTENDENT OR THE PLANNING COMMISSION.

CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM

# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

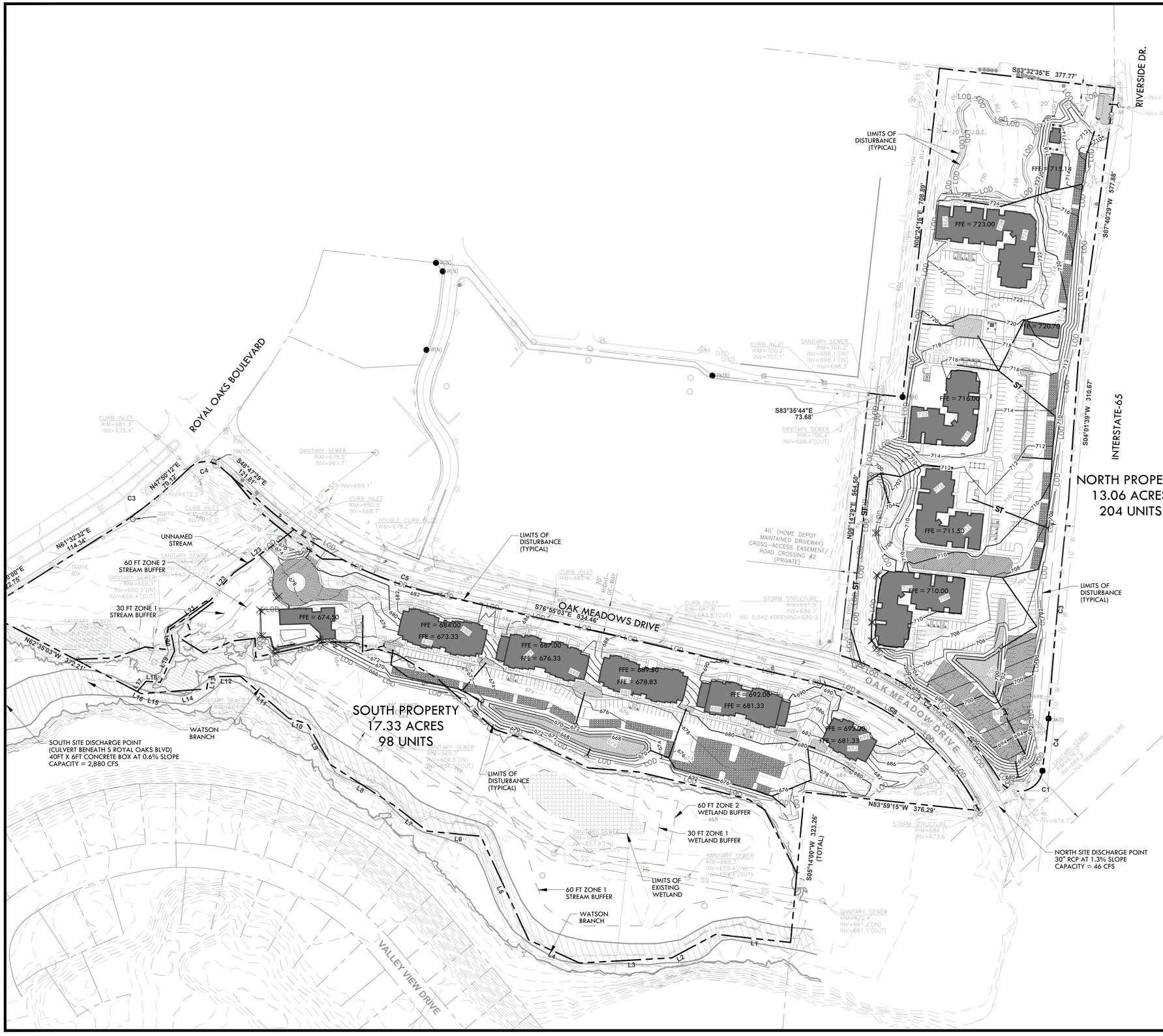
COF #6086 FRANKLIN, TN

| REVISIONS | |
|---|---|
| No. | DATE |

06/02/16 15001

# C2.3

GENERAL LIGHTING PLAN




Grading & Drainage General Notes

1. Grading Permit is required for any project disturbing more than 10,000 sf, adding more than 5,000 sf of impervious surface or for any site grading requiring stockpiling of material.
2. The Developer shall provide the necessary labor and supervision required to support field testing by the independent testing firm and inspections by City officials at no cost to the City. Test reports of field testing if applicable shall be submitted directly to the Street Department. Defects disclosed by tests shall be rectified.
3. An authorized representative of the City shall make a final inspection of the project after completion to determine acceptability of the work and for release of performance bonds if required. Before this final inspection can be made, the Engineer responsible for the project shall certify in writing to the City Engineer that the work has been completed in accordance with approved plans and specifications.
4. Drainage facilities including, but not limited to, culverts, detention basins and ditches, as well as the roadway sub-grade, base stone and binder & surface coarse shall be inspected, tested and given approval at each stage of installation prior to proceeding to the next stage of construction. Final construction inspection for approval and acceptance of streets and drainage systems will not be granted until all work has been completed in accordance with the approved
5. Locating and coordination for the relocation of existing utilities is the responsibility of the contractor. Tennessee's One-Call and the City of Franklin utility location service shall be utilized in addition to coordination with local utility owners. The contractor shall at all times protect existing utilities and will be responsible for costs due to damage caused to any utility lines.

STORMWATER NARRATIVE

THE PROPOSED DEVELOPMENT IS DIVIDED INTO TWO SITE AREAS, A 13.06 ACRE NORTH SITE AND A 17.33 ACRE SOUTH SITE. THE NORTH SITE OUTFALLS TO AN EXISTING PIPE IN THE SOUTHEAST CORNER OF THE SITE THAT CROSSES OAK MEADOWS DRIVE TO WATSON BRANCH. THE SOUTH SITE SLOPES TO THE SOUTH INTO WATSON BRANCH WHICH RUNS ALONG THE SOUTHERN PROPERTY LINE. EACH SITE WILL CONTAIN RAIN GARDEN/BIO-RETENTION AREAS THAT WILL TREAT THE NEW IMPERVIOUS AREAS. PERVIOUS PAVEMENT AREAS WILL BE PROVIDED IN DESIGNED LOCATIONS WITHIN THE PARKING LOTS TO PROVIDE ADDITIONAL STORMWATER TREATMENT. THESE AREAS WILL THEN BE ROUTED TO A STORMWATER DETENTION AREA ADJACENT TO THE OUTFALL LOCATIONS FOR BOTH SITED TO ENSURE THE SITE MEETS THE DETENTION REQUIREMENTS.

IMPACT STATEMENT:

THE PROPOSED DEVELOPMENT CONTAINS TWO SITE FEATURES THAT WILL BE PROTECTED DURING CONSTRUCTION. THE SOUTH SITE CONTAINS A WETLAND AREA AS WELL AS A STREAM, WATSON BRANCH. THE SITE HAS BEEN DESIGNED NOT TO IMPACT THESE SITE FEATURES. THE REQUIRED BUFFERS FOR EACH FEATURE HAVE BEEN SHOWN ON THESE PLANS.

GRADING & DRAINAGE DATA CHART

- SITE AREA
  - NORTH = 13.06 AC
  - SOUTH = 17.33 AC
  - TOTAL = 30.39
- IMPERVIOUS AREA
  - NORTH = 5.07 AC
  - SOUTH = 3.36 AC
  - TOTAL = 8.43 AC
- DISTURBED AREA
  - NORTH = 10.0 AC
  - SOUTH = 7.8 AC
  - TOTAL = 17.8 AC
- Rv VALUE = 0.406*
- PEAK FLOW RUNOFF * T.B.D

*PROPOSED DEVELOPMENT WILL COMPLY WITH CITY OF FRANKLIN STORMWATER REQUIREMENTS TO PROVIDE A TREATED Rv VALUE OF LESS THAN OR EQUAL TO 0.200. THE PROPOSED DEVELOPMENT WILL DETAIN THE PEAK FLOWS FOR THE 2 YEAR THROUGH 100 YEAR STROM EVENTS.

STREAM BUFFER NOTE:

THERE SHALL BE NO MOWING, CLEARING, GRADING, CONSTRUCTION, STORAGE, OR DISTURBANCE OF VEGETATION IN RIPARIAN BUFFERS EXCEPT AS PERMITTED BY THE CITY ENGINEER, OR HIS DESIGNEE.

PERVIOUS CONCRETE NOTE:

PERVIOUS CONCRETE INSTALLATION IS TO BE PERFORMED PER ACI522.1-13: SPECIFICATION FOR PERVIOUS CONCRETE PAVEMENT. ALL PERVIOUS CONCRETE MUST BE PLACED AND FINISHED BY A NATIONAL READY MIXED CONCRETE ASSOCIATION (NRMCA)-CERTIFIED PERVIOUS CONCRETE INSTALLER OR CRAFTSMAN. NRMCA-CERTIFIED TECHNICIANS MAY PLACE AND FINISH THE PERVIOUS CONCRETE ONLY UNDER THE DIRECT SUPERVISION OF AN ON-SITE NRMCA-CERTIFIED CRAFTSMAN.


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


ENGINEERING CRUNK

JEFF WILSON CARR — REGISTERED — AGRICULTURE — COMMERCE — No. 114180 — STATE OF TENNESSEE — 6/2/16

# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

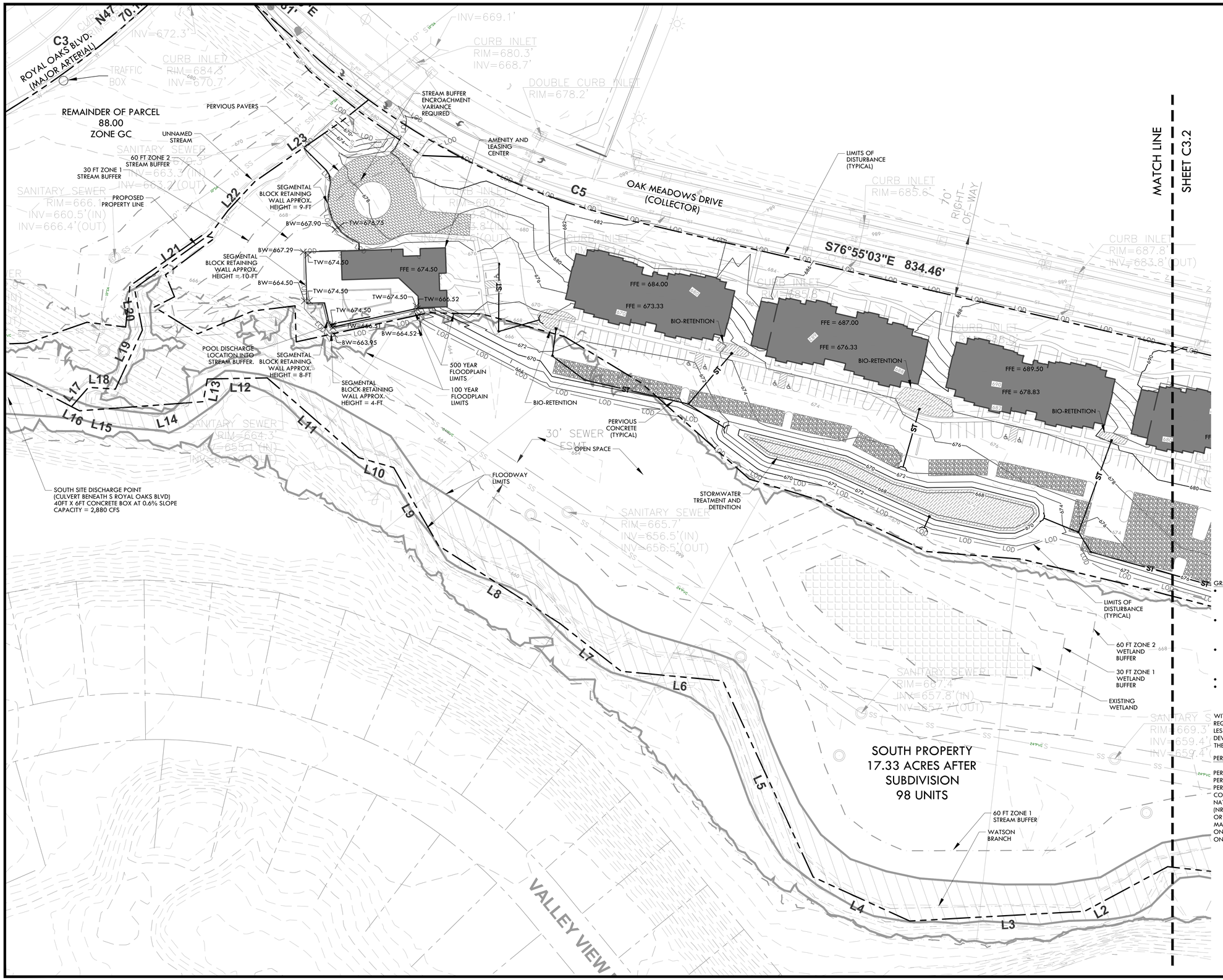
COF #6086 FRANKLIN, TN

| REVISIONS | | |
|---|---|---|
| No. | DATE | |

06/02/16 15001

# C3.0

OVERALL GRADING PLAN




GRADING & DRAINAGE DATA CHART

- SITE AREA
  - NORTH = 13.06 AC
  - SOUTH = 17.33 AC
  - TOTAL = 30.39
- IMPERVIOUS AREA
  - NORTH = 5.07 AC
  - SOUTH = 3.36 AC
  - TOTAL = 8.43 AC
- DISTURBED AREA
  - NORTH = 10.0 AC
  - SOUTH = 7.8 AC
  - TOTAL = 17.8 AC
- Rv VALUE = 0.406*
- PEAK FLOW RUNOFF * T.B.D

*PROPOSED DEVELOPMENT WILL COMPLY WITH CITY OF FRANKLIN STORMWATER REQUIREMENTS TO PROVIDE A TREATED Rv VALUE OF LESS THAN OR EQUAL TO 0.200. THE PROPOSED DEVELOPMENT WILL DETAIN THE PEAK FLOWS FOR THE 2 YEAR THROUGH 100 YEAR STROM EVENTS.

PERVIOUS CONCRETE NOTE:

PERVIOUS CONCRETE INSTALLATION IS TO BE PERFORMED PER ACI522.1-13: SPECIFICATION FOR PERVIOUS CONCRETE PAVEMENT. ALL PERVIOUS CONCRETE MUST BE PLACED AND FINISHED BY A NATIONAL READY MIXED CONCRETE ASSOCIATION (NRMCA)-CERTIFIED PERVIOUS CONCRETE INSTALLER OR CRAFTSMAN. NRMCA-CERTIFIED TECHNICIANS MAY PLACE AND FINISH THE PERVIOUS CONCRETE ONLY UNDER THE DIRECT SUPERVISION OF AN ON-SITE NRMCA-CERTIFIED CRAFTSMAN.


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


CRUNK ENGINEERING

WILSON CAUDLE REGISTERED LANDSCAPE ARCHITECT AGRICULTURE 6/2/16 No. 114180 STATE OF TENNESSEE

# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

FRANKLIN, TN

COF #6086

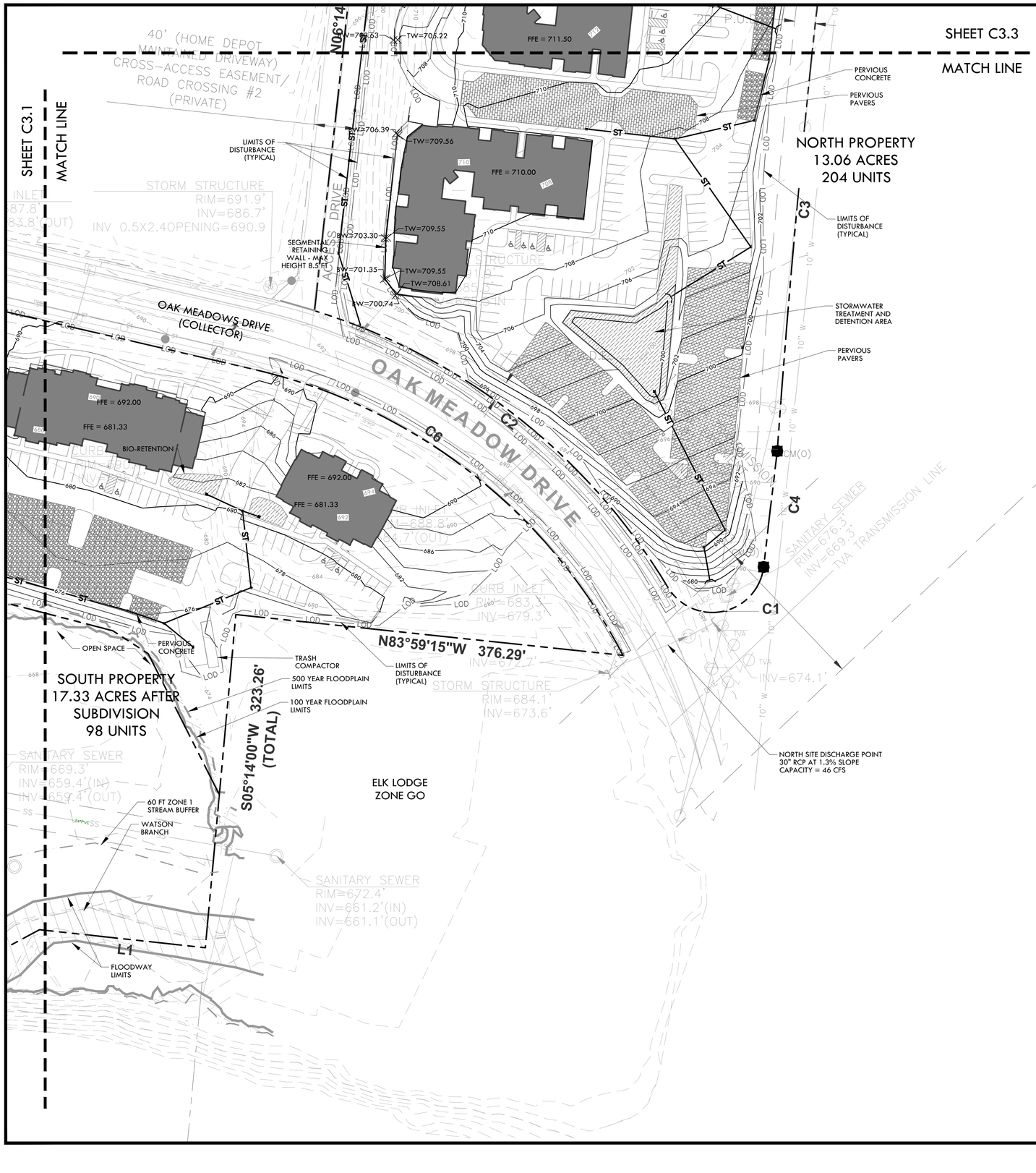
REVISIONS

| No. | DATE |
|---|---|

06/02/16 15001

# C3.1

SOUTH SITE GRADING PLAN




GRADING & DRAINAGE DATA CHART

- SITE AREA
  - NORTH = 13.06 AC
  - SOUTH = 17.33 AC
  - TOTAL = 30.39
- IMPERVIOUS AREA
  - NORTH = 5.07 AC
  - SOUTH = 3.36 AC
  - TOTAL = 8.43 AC
- DISTURBED AREA
  - NORTH = 10.0 AC
  - SOUTH = 7.8 AC
  - TOTAL = 17.8 AC
- Rv VALUE = 0.406*
- PEAK FLOW RUNOFF *
  - T.B.D

*PROPOSED DEVELOPMENT WILL COMPLY WITH CITY OF FRANKLIN STORMWATER REQUIREMENTS TO PROVIDE A TREATED Rv VALUE OF LESS THAN OR EQUAL TO 0.200. THE PROPOSED DEVELOPMENT WILL DETAIN THE PEAK FLOWS FOR THE 2 YEAR THROUGH 100 YEAR STROM EVENTS.

PERVIOUS CONCRETE NOTE:

PERVIOUS CONCRETE INSTALLATION IS TO BE PERFORMED PER ACI522.1-13: SPECIFICATION FOR PERVIOUS CONCRETE PAVEMENT. ALL PERVIOUS CONCRETE MUST BE PLACED AND FINISHED BY A NATIONAL READY MIXED CONCRETE ASSOCIATION (NRMCA)-CERTIFIED PERVIOUS CONCRETE INSTALLER OR CRAFTSMAN. NRMCA-CERTIFIED TECHNICIANS MAY PLACE AND FINISH THE PERVIOUS CONCRETE ONLY UNDER THE DIRECT SUPERVISION OF AN ON-SITE NRMCA-CERTIFIED CRAFTSMAN.

0 10 20 30 40 50 100
GRAPHIC SCALE

N

CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM

ENGINEERING CRUNK

WILSON CAMPBELL REGISTERED LANDSCAPE ARCHITECT AGRICULTURE 6/2/16 No. 114180 STATE OF TENNESSEE

# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

FRANKLIN, TN

COF #6086

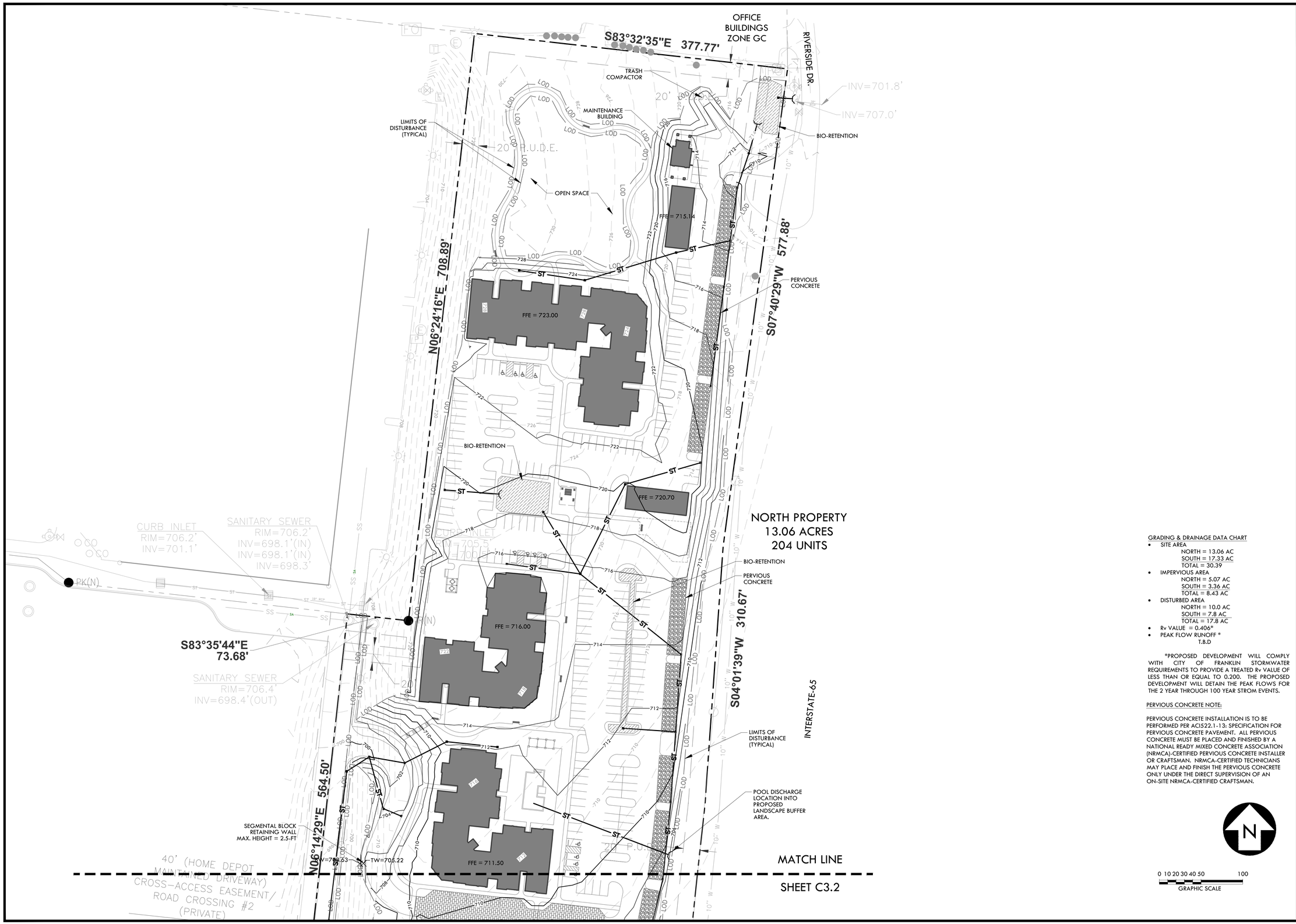
REVISIONS

| No. | DATE |
|---|---|

06/02/16 15001

# C3.2

SOUTH & NORTH SITE GRADING PLAN




GRADING & DRAINAGE DATA CHART

- SITE AREA
  - NORTH = 13.06 AC
  - SOUTH = 17.33 AC
  - TOTAL = 30.39
- IMPERVIOUS AREA
  - NORTH = 5.07 AC
  - SOUTH = 3.36 AC
  - TOTAL = 8.43 AC
- DISTURBED AREA
  - NORTH = 10.0 AC
  - SOUTH = 7.8 AC
  - TOTAL = 17.8 AC
- Rv VALUE = 0.406*
- PEAK FLOW RUNOFF *
  - T.B.D

*PROPOSED DEVELOPMENT WILL COMPLY WITH CITY OF FRANKLIN STORMWATER REQUIREMENTS TO PROVIDE A TREATED Rv VALUE OF LESS THAN OR EQUAL TO 0.200. THE PROPOSED DEVELOPMENT WILL DETAIN THE PEAK FLOWS FOR THE 2 YEAR THROUGH 100 YEAR STROM EVENTS.

PERVIOUS CONCRETE NOTE:

PERVIOUS CONCRETE INSTALLATION IS TO BE PERFORMED PER ACI522.1-13: SPECIFICATION FOR PERVIOUS CONCRETE PAVEMENT. ALL PERVIOUS CONCRETE MUST BE PLACED AND FINISHED BY A NATIONAL READY MIXED CONCRETE ASSOCIATION (NRMCA)-CERTIFIED PERVIOUS CONCRETE INSTALLER OR CRAFTSMAN. NRMCA-CERTIFIED TECHNICIANS MAY PLACE AND FINISH THE PERVIOUS CONCRETE ONLY UNDER THE DIRECT SUPERVISION OF AN ON-SITE NRMCA-CERTIFIED CRAFTSMAN.

N

0 10 20 30 40 50 100
GRAPHIC SCALE


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


CRUNK ENGINEERING

WILSON CRUNK REGISTERED ENGINEER AGRICULTURE No. 114180 STATE OF TENNESSEE 6/2/16

# THE EPOCH DEVELOPMENT

PUD SUDBIVISION, DEVELOPMENT PLAN

COF #6086 FRANKLIN, TN

| REVISIONS | |
|---|---|
| No. | DATE |

06/02/16 15001

# C3.3

NORTH SITE GRADING PLAN

NOTE THAT NO NEW R.O.W. IS PROPOSED FOR THIS PROJECT. REFER TO TRAFFIC STUDY FOR INFORMATION REGARDING L.O.S.

STATEMENT OF IMPACT:
The proposed project will add 302 multi-family units with access along Oak Meadow Drive and Riverside Drive. The primary road corridor serving the project is the major arterial South Royal Oaks Boulevard. Based on the traffic study performed for this project, the majority of traffic will be directed in the northernly direction toward Cool Springs.

R.O.W. & Access General Notes

1. Prior to beginning any construction, the Developer and/or Contractor, shall obtain all necessary permits as required by law. Such permits may include, but are not limited to, those required by State of Tennessee, Williamson County and other City of Franklin agencies.
2. All off-site work within the public right-ofway shall require an approved traffic control plan which complies with the MUTCD. No off-site excavation may be undertaken in any street, road, alley or right-of-way of any utility or temporary construction easement of the City of Franklin by any entity unless 72-hour notice has been given to the City of Franklin Traffic Operations Center. The contractor shall have an approved traffic control plan onsite during construction.
3. Construction materials shall be fully tested in accordance with the designations and requirements within the referenced "TDOT Standard Specifications" sections, unless otherwise noted within the "Standard Specifications" section of the City of Franklin Transportation & Street Technical Standards.
4. An authorized representative of the City shall make a final inspection of the project after completion to determine acceptability of the work and for release of performance bonds if required. Before this final inspection can be made, the Engineer responsible for the project shall certify in writing to the City Engineer that the work has been completed in accordance with approved plans and specifications.
5. Locating and coordination for the relocation of existing utilities is the responsibility of the contractor. Tennessee's One-Call and the City of Franklin utility location service shall be utilized in addition to coordination with local utility owners. The contractor shall at all times protect existing utilities and will be responsible for costs due to damage caused to any utility lines.
6. All temporary striping shall conform to "Standard Specifications for Road and Bridge Construction," published by TDOT, the latest revision except as herein amended. When approved, temporary striping shall be required prior to the opening of a street for travel where pavement and/or permanent striping cannot be completed due to weather and/or time constraints.
7. Thermoplastic pavement markings should be used on all public and private City street projects. Thermoplastic traffic striping and pavement markings shall conform to Section 716.03 "Thermoplastic Pavement Markings", of the Tennessee Department of Transportation Specifications (TDOT), and to the City of Franklin Transportation & Street Technical Standards.

The Epoch Development R.O.W. & Access Data Chart
Daily Trip Generation: 2,360 veh per day
Peak Hour Trip Generation: 145 AM / 143 PM veh per hour
Traffic Impact Study Required: YES
Circulation Plan Required: NO

Access Management
Min. Distance Between Intersection: 600 FT
Min. Distance Between high volume/alleys & Intersections: 300 FT
Min. Distance Between driveway & Intersections: 300 ft
Driveway Width (two-way): 24 ft
Driveway Approach Street Configuration: 15 ft Radius Return or Curb Cut.

FIRE TRUCK TURNING MOVEMENT INFORMATION

Number of Front Axles 1
Front Track Width = 8'
Wheels on Each Front Axle = 2
Number of Rear Axles = 2
Rear Track Width = 8'
Wheel Base = 21.316' (Front Axle to Front Rear Axle)
Rear Axle Spacing = 4.417'
Body Length = 50.0417
Width = 8.333'
Rear Overhang = 22.1424'
Body Style = Fire Truck
Turning Radius Wall to Wall = 42'


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


WILSON CRUNK REGISTERED ENGINEER AGRICULTURE COMMERCE No. 114180 STATE OF TENNESSEE 6/2/16

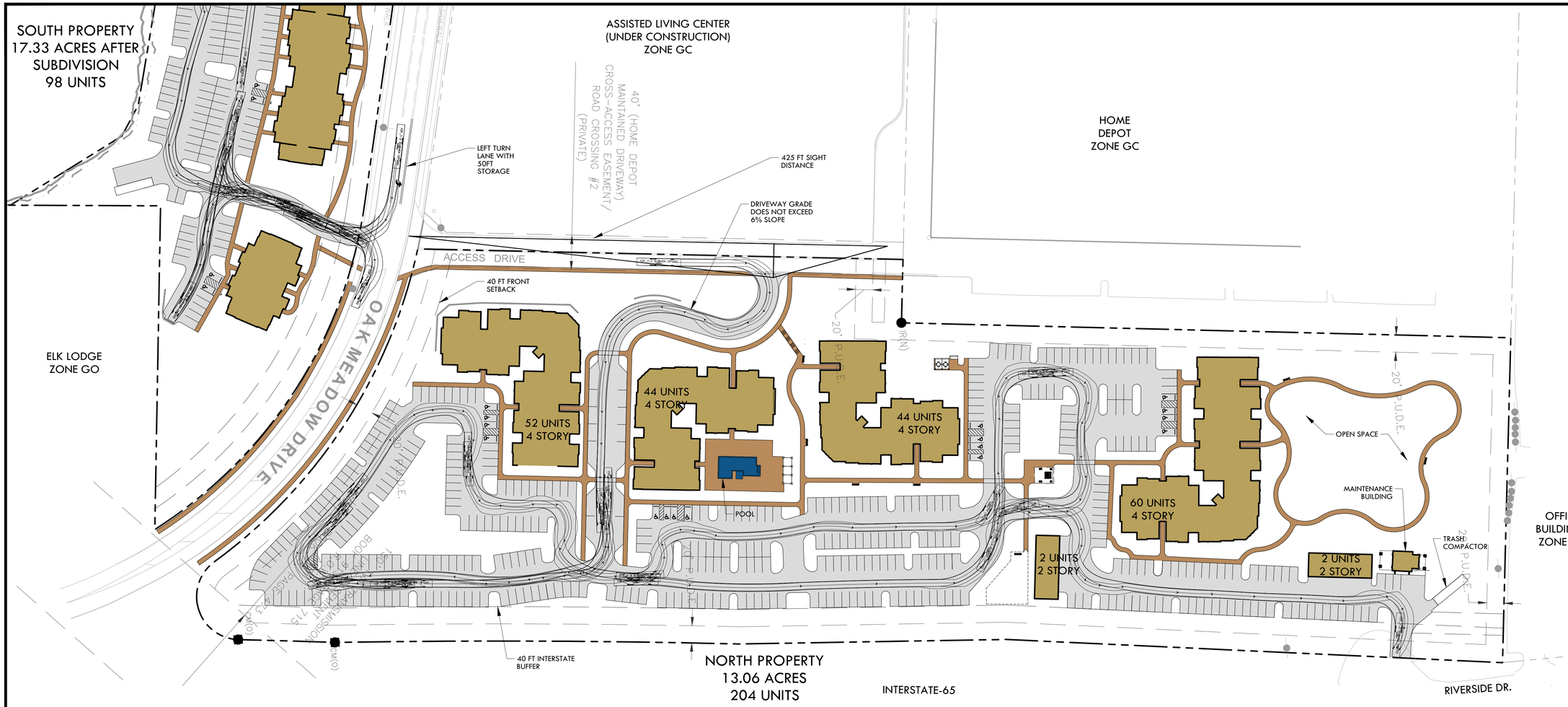
# THE EPOCH DEVELOPMENT
PUD SUDBIVISION, DEVELOPMENT PLAN
COF #6086 FRANKLIN, TN

REVISIONS

| No. | DATE |
|---|---|
| | |

06/02/16 15001

# C4.0
OVERALL ACCESS PLAN




FIRE TRUCK TURNING MOVEMENT INFORMATION

Number of Front Axles 1
Front Track Width = 8'
Wheels on Each Front Axle = 2
Number of Rear Axles = 2
Rear Track Width = 8'
Wheel Base = 21.316' (Front Axle to Front Rear Axle)
Rear Axle Spacing = 4.417'
Body Length = 50.0417'
Width = 8.333'
Rear Overhang = 22.1424'
Body Style = Fire Truck
Turning Radius Wall to Wall = 42'

0 30 60 120
GRAPHIC SCALE

CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM

# THE EPOCH DEVELOPMENT

PUD SUDBIVISION, DEVELOPMENT PLAN

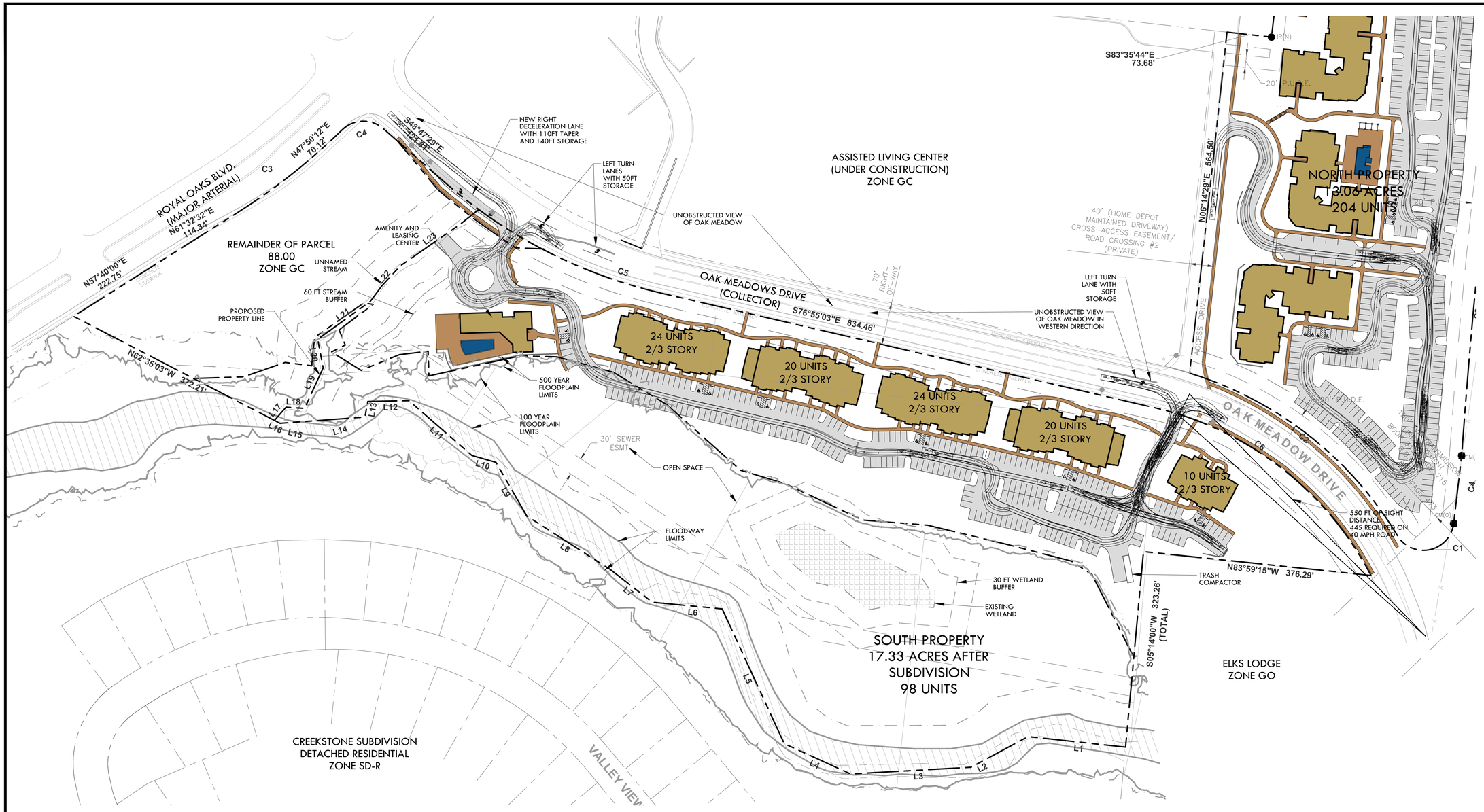
COF #6086 FRANKLIN, TN

| REVISIONS | |
|---|---|
| No. | DATE |

06/02/16 15001

# C4.1

NORTH SITE
ACCESS
PLAN




FIRE TRUCK TURNING MOVEMENT INFORMATION

Number of Front Axles 1
Front Track Width = 8'
Wheels on Each Front Axle = 2
Number of Rear Axles = 2
Rear Track Width = 8'
Wheel Base = 21.316' (Front Axle to Front Rear Axle)
Rear Axle Spacing = 4.417'
Body Length = 50.0417'
Width = 8.333'
Rear Overhang = 22.1424'
Body Style = Fire Truck
Turning Radius Wall to Wall = 42'

0 40 80 160
GRAPHIC SCALE

N


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

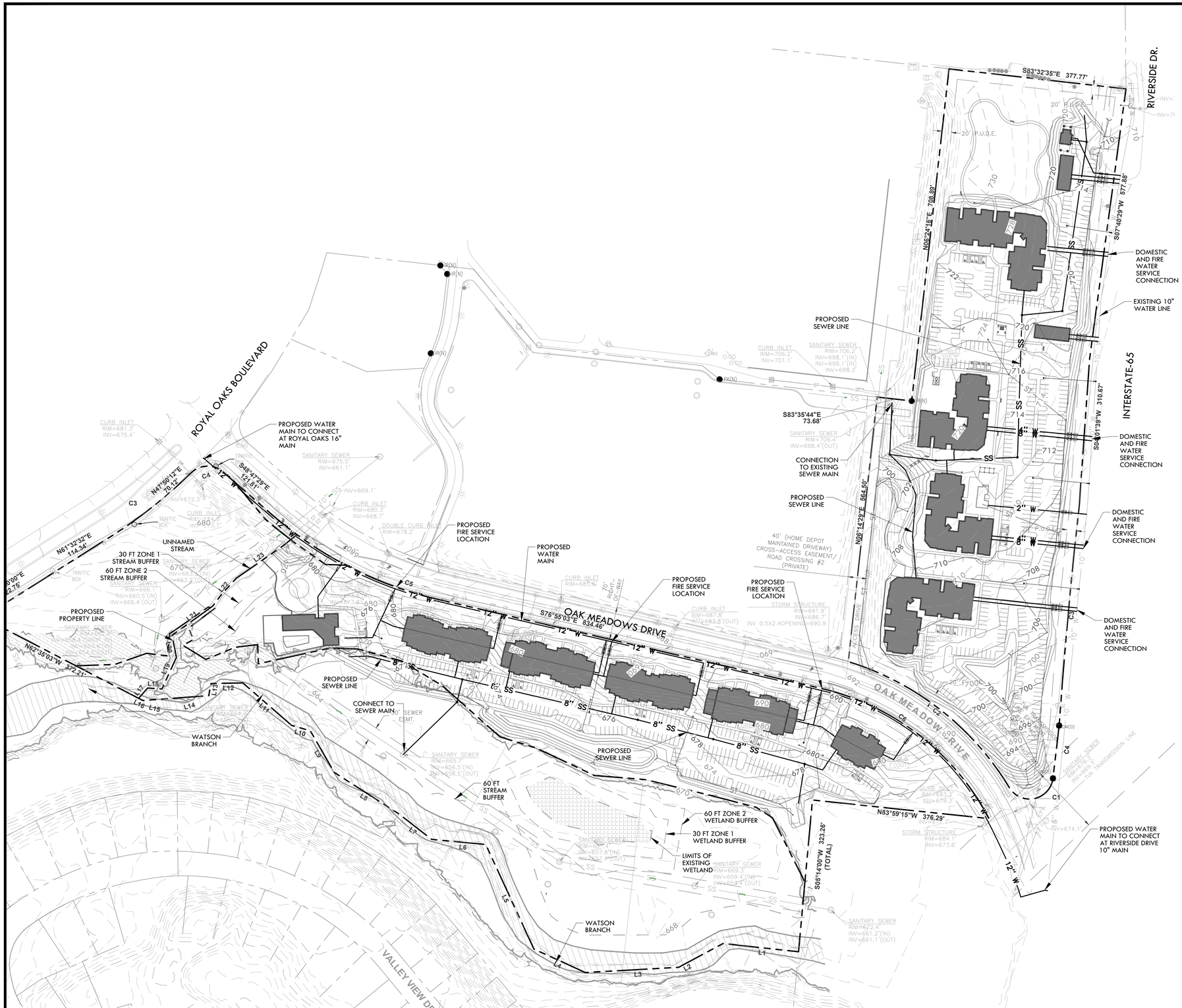
COF #6086 FRANKLIN, TN

| REVISIONS | |
|---|---|
| No. | DATE |

06/02/16 15001

# C4.2

SOUTH SITE ACCESS PLAN




STATEMENT OF IMPACTS

The proposed project is the construction of 302 new attached dwelling units with a mixture of one, two, and three bedroom units. The project will result in a projected flow of 87,400 GPD. The Northern site will be served by water off of the existing 10" main in the old Riverside Drive ROW, and sewer at the existing manhole behind the Home Depot. The Southern site will be served by water with a new 12" main along Oak Meadow Dr. that will connect from Royal Oaks Blvd. and tie into the 10" main along the old Riverside Drive ROW, and sewer will be served by the existing 24" main that runs along Watson Branch on the subject property. Reclaimed water is not located in the project vicinity.

Water & Sewer General Notes

1. All persons who undertake the construction of water, sewer and/or reclaimed water lines located in, or affecting services provided by the City of Franklin shall comply with the requirements and regulations set forth in the "General Requirements & Technical Specifications, Water Management Department, City of Franklin, Tennessee" latest edition, along with any amendments, additions, or alteration that may thereafter be adopted by the board of mayor and aldermen by resolution.
2. Contractor shall obtain Water & Sewer Infrastructure Installation Permit prior to scheduling required Pre-Construction Site Meeting. Contractor shall complete the PreConstruction Site Meeting prior to commencing with construction.
3. Contractor shall obtain and keep all of the following items on the jobsite at all times during construction:
   a. Approved, Stamped and Signed Water and/or Sewer Plans
   b. Water & Sewer Infrastructure Installation Permit, with all steps completed and signed by appropriate City employees.
   c. Copy of approved availability request response letter.
   d. A copy of all approved Cut Sheets.
4. Acceptance of City of Franklin public water infrastructure, sanitary sewer infrastructure and/or reclaimed water infrastructure shall become the responsibility of the City of Franklin, TN following approval from the City of Franklin Inspectors and acceptance by the Franklin Municipal Planning Commission. The Acceptance date shall be based on the day maintenance sureties are established by the Franklin Municipal Planning Commission.
5. Prior to the acceptance of City of Franklin public water infrastructure, sanitary sewer infrastructure and/or reclaimed water infrastructure the contractor shall be required to submit as-built drawings to the Planning and Sustainability Department.
6. All off-site work within the public right-of-way shall require an approved traffic control plan which complies with the MUTCD. No off-site excavation may be undertaken in any street, road, alley or right-of-way of any utility or temporary construction easement of the City of Franklin by any entity unless 72-hour notice has been given to the City of Franklin Traffic Operations Center. The contractor shall have an approved traffic control plan onsite during construction.
7. Any damages caused to existing utilities during construction shall, at his own expense, be replaced or repaired to original condition and quality, as approved by the owner and representative of the appropriate utility company, by the Contractor.
8. The City of Franklin is not a member of TN one call, contractor's responsibility to contact Franklin Water Management, no less than 72 hours prior to commencing work.
   City of Franklin Water Management Contact:
   124 Lumber Dr.
   Franklin, TN 37064
   Attn: Utility Inspector
   (615) 794-4554

WATER & SEWER DATA CHART

| | |
|---|---|
| Facility Type: | APARTMENTS |
| Unit Flow in GPD: | 250 GPD for 1-bedroom |
| | 300 GPD for 2-bedroom |
| | 350 GPD for 3-bedroom |
| Number of Units: | 100 1-bedroom |
| | 166 2-bedroom |
| | 36 3-bedroom |
| Total Flow in GPD: | 87,400 GPD |


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


CRUNK ENGINEERING

WILSON CRAIG DAVIS REGISTERED AGRICULTURE 6/2/16 COMMERCE No. 114180 STATE OF TENNESSEE

# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

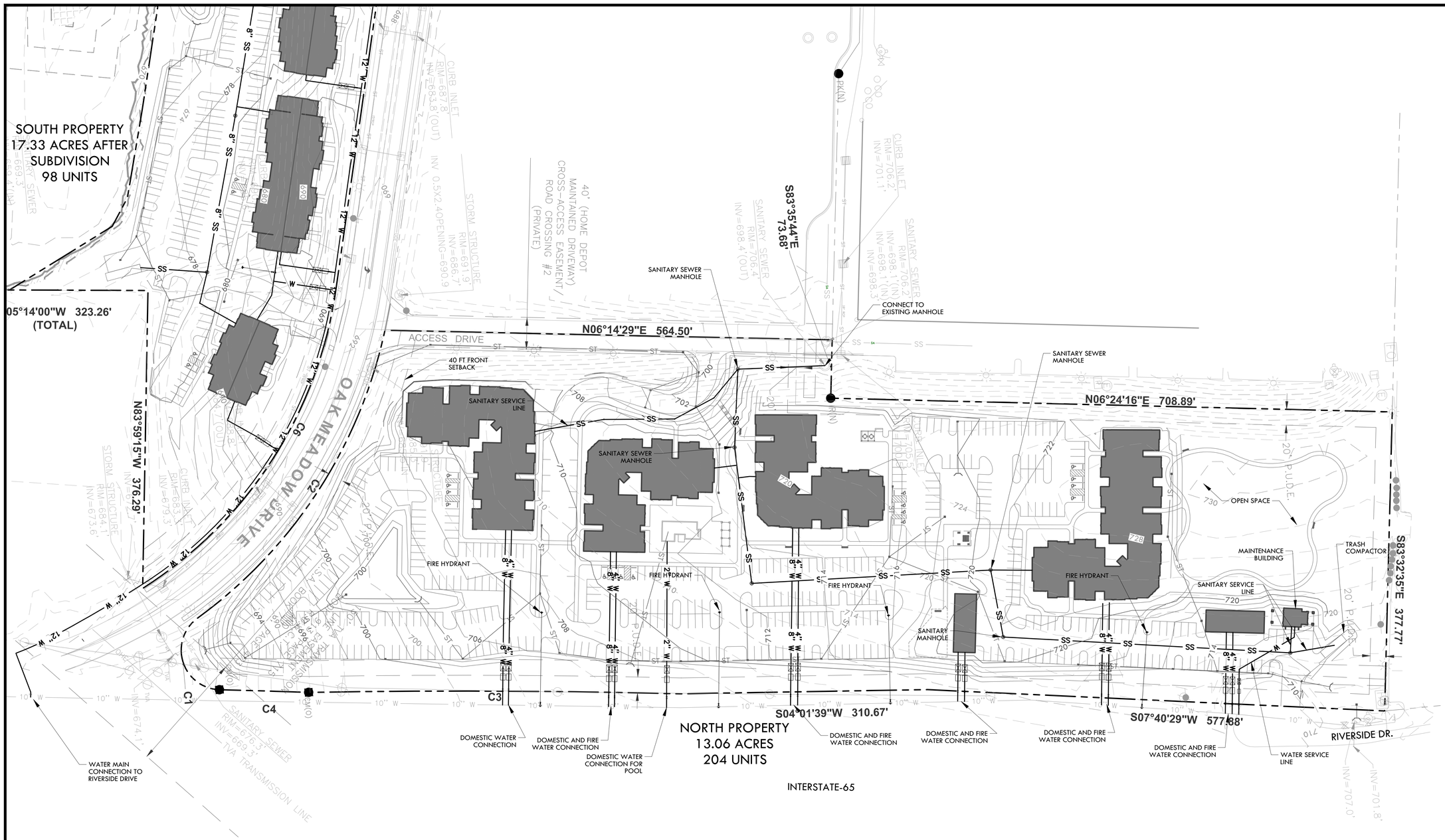
COF #6086 FRANKLIN, TN

| REVISIONS | | |
|---|---|---|
| No. | DATE | |

06/02/16 15001

# C5.0

OVERALL UTILITY PLAN




CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM

CRUNK ENGINEERING

JEFFREY WILSON CRUNK
REGISTERED PROFESSIONAL ENGINEER
AGRICULTURE
6/2/16
COMMERCE
114180
STATE OF TENNESSEE

# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

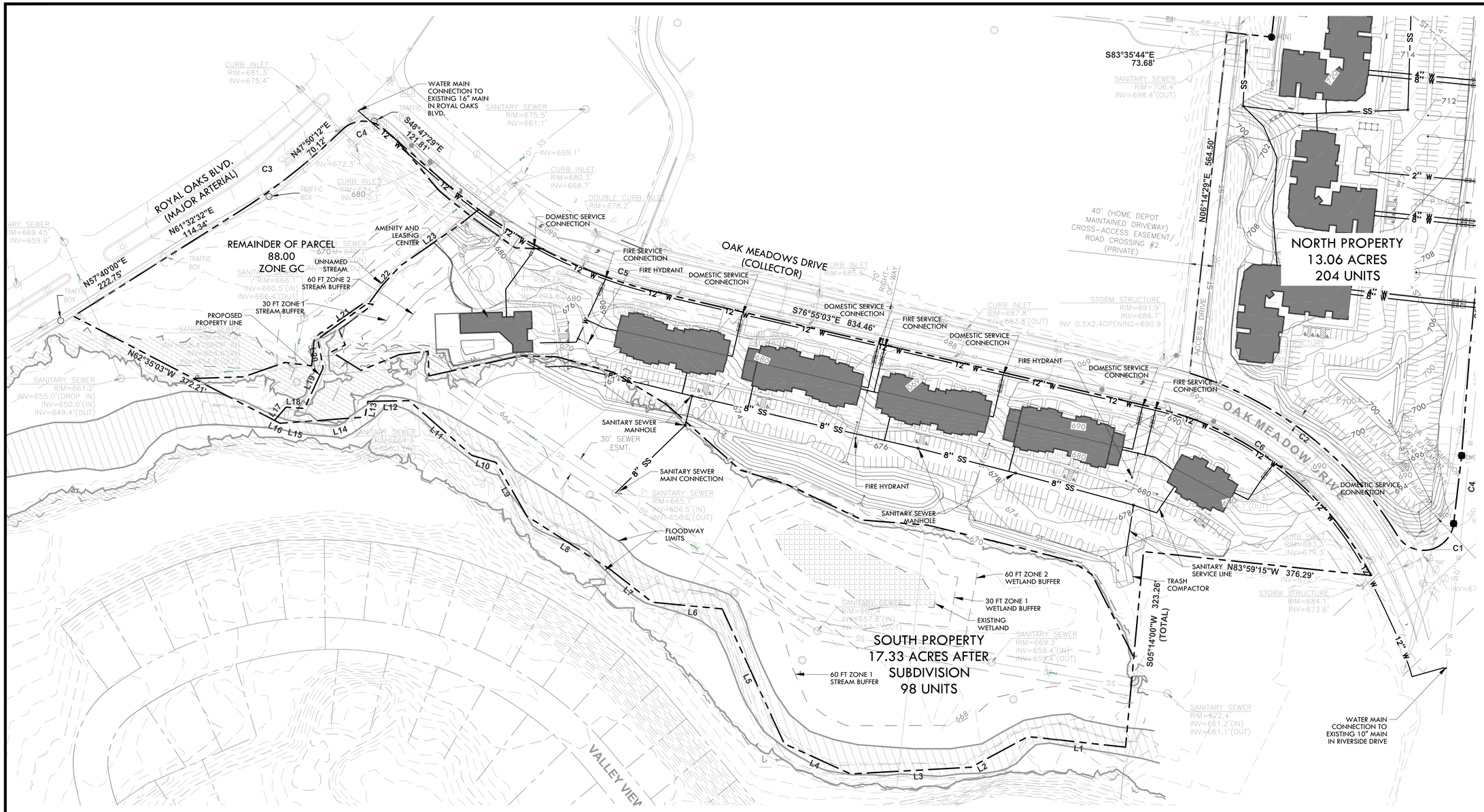
COF #6086 FRANKLIN, TN

| REVISIONS | |
|---|---|
| No. | DATE |

06/02/16 15001

# C5.1

NORTH SITE UTILITY PLAN




CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM

CRUNK ENGINEERING

WILSON CAUDLE REGISTERED LANDSCAPE ARCHITECT AGRICULTURE 6/2/16 COMMERCE No. 114180 STATE OF TENNESSEE

# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

COF #6086 FRANKLIN, TN

| REVISIONS | |
|---|---|
| No. | DATE |

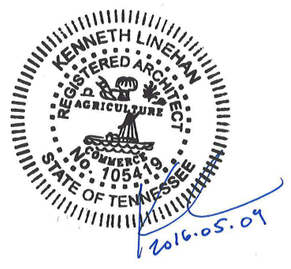
06/02/16 15001

# C5.2

SOUTH SITE UTILITY PLAN

# TABLE OF CONTENTS


1 COVER PAGE
2 BUILDING PLAN - SOUTH PARCEL BLDG S1 LOWER LEVEL
3 BUILDING PLAN - SOUTH PARCEL BLDG S1 GROUND LEVEL
4 BUILDING PLAN - SOUTH PARCEL BLDG S1 SECOND LEVEL
5 BUILDING PLAN - SOUTH PARCEL BLDG S2 LOWER LEVEL
6 BUILDING PLAN - SOUTH PARCEL BLDG S2 GROUND LEVEL
7 BUILDING PLAN - SOUTH PARCEL BLDG S2 SECOND LEVEL
8 BUILDING PLAN - SOUTH PARCEL BLDG S3 LOWER LEVEL
9 BUILDING PLAN - SOUTH PARCEL BLDG S3 GROUND LEVEL
10 BUILDING PLAN - SOUTH PARCEL BLDG S3 SECOND LEVEL
11 UNIT PLANS - SOUTH PARCEL
12 UNIT PLANS - SOUTH PARCEL
13 UNIT PLANS - SOUTH PARCEL
14 UNIT PLANS - SOUTH PARCEL
15 UNIT PLANS - SOUTH PARCEL
16 BUILDING ELEVATION - SOUTH PARCEL
17 BUILDING ELEVATION - SOUTH PARCEL
18 BUILDING PLAN - NORTH PARCEL BLDG N1
19 BUILDING PLAN - NORTH PARCEL BLDG N2
20 BUILDING PLAN - NORTH PARCEL BLDG N3
21 BUILDING PLAN - NORTH PARCEL BLDG N4 GROUND
22 BUILDING PLAN - NORTH PARCEL BLDG N4 SECOND
23 UNIT PLANS - NORTH PARCEL
24 UNIT PLANS - NORTH PARCEL
25 UNIT PLANS - NORTH PARCEL
26 UNIT PLANS - NORTH PARCEL
27 UNIT PLANS - NORTH PARCEL
28 BUILDING ELEVATION - NORTH PARCEL
29 BUILDING ELEVATION - NORTH PARCEL
30 CLUBHOUSE / PAVILION PLANS
31 CLUBHOUSE ELEVATION
32 PAVILION ELEVATION
33 - 45 PROJECT PERSPECTIVES




PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT COVER SHEET

2016-05-09

# THE EPOCH DEVELOPMENT

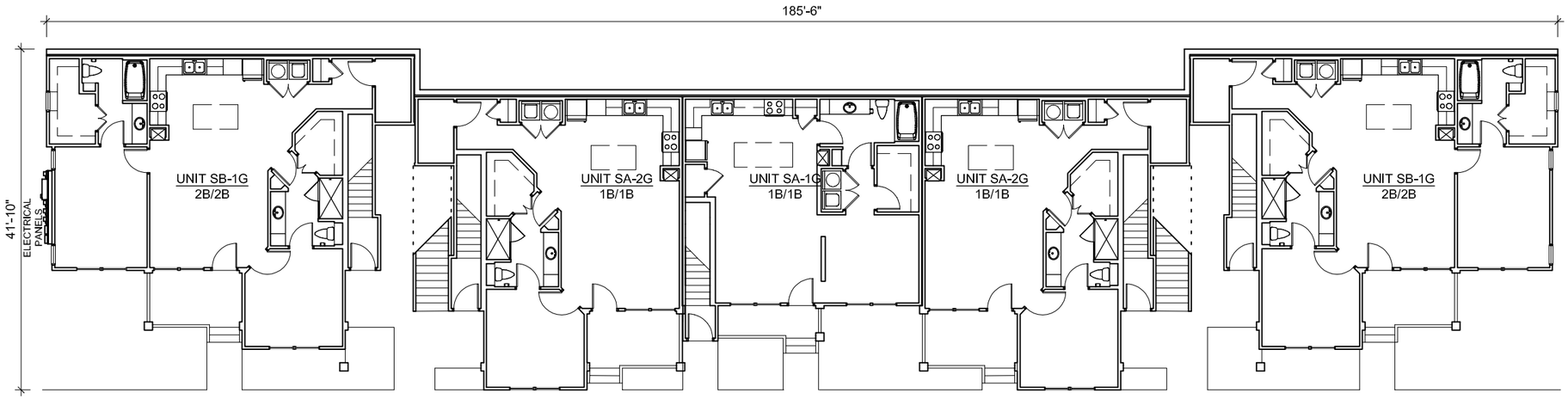
FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

AREA

| | |
|---|---|
| 1ST FLOOR: | 6,128 SF |
| 2ND FLOOR: | 11,961 SF |
| 3RD FLOOR: | 9,672 SF |
| TOTAL: | 27,761 SF |

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09




BUILDING TYPE S1 - LOWER FLOOR
(BUILDINGS #1 & #3)

SOUTH PARCEL

GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1/16" = 1'-0"



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

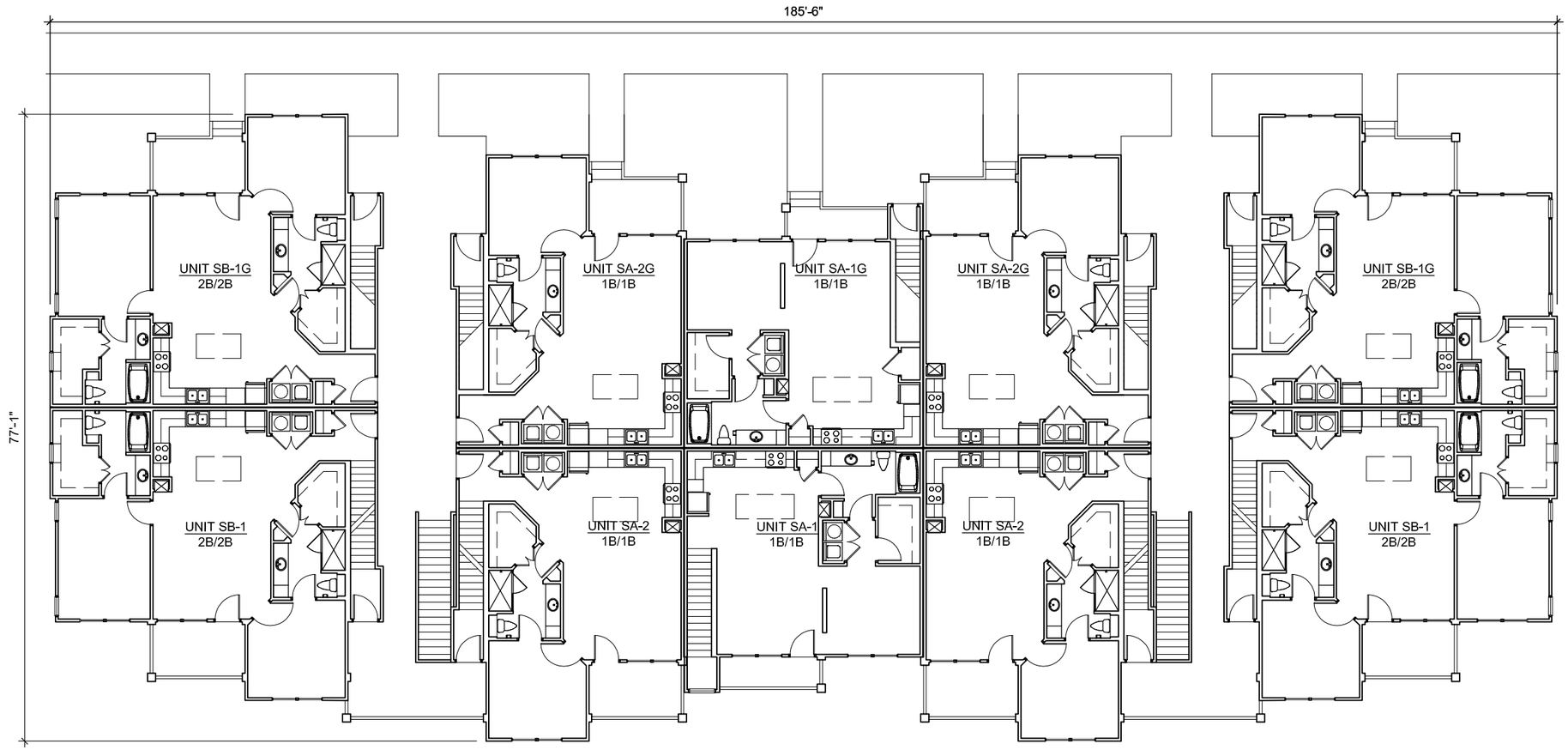
BUILDING PLANS
2016-05-09

THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

AREA

| | |
|---|---|
| 1ST FLOOR: | 6,128 SF |
| 2ND FLOOR: | 11,961 SF |
| 3RD FLOOR: | 9,672 SF |
| TOTAL: | 27,761 SF |




BUILDING TYPE S1 - GROUND FLOOR
(BUILDINGS #1 & #3)

SOUTH PARCEL

GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1/16" = 1'-0"

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

PAGE 3

PROJECT #6068

BUILDING PLANS
2016-05-09

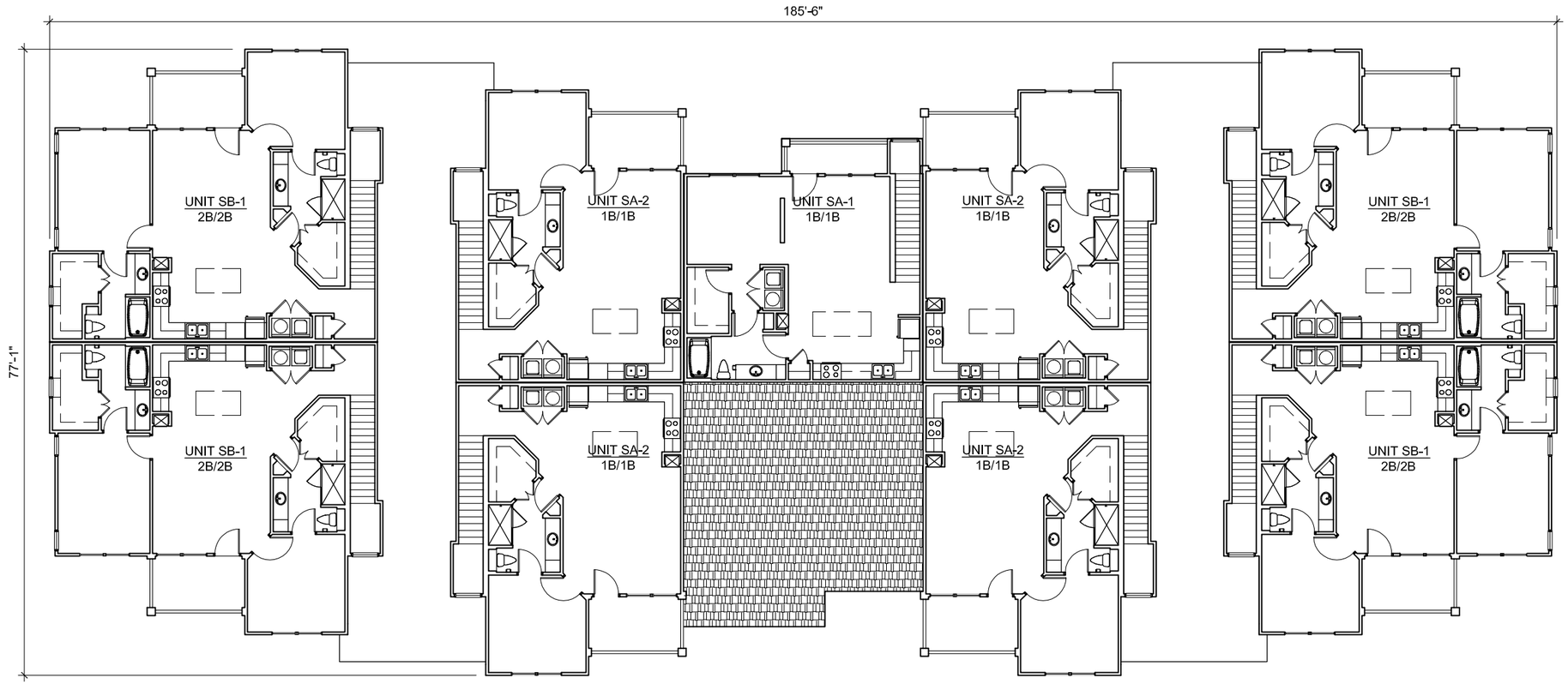
THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

AREA

| | |
|---|---|
| 1ST FLOOR: | 6,128 SF |
| 2ND FLOOR: | 11,961 SF |
| 3RD FLOOR: | 9,672 SF |
| TOTAL: | 27,761 SF |

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09




BUILDING TYPE S1 - SECOND FLOOR
(BUILDINGS #1 & #3)

SOUTH PARCEL

GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1/16" = 1'-0"

FUGLEBERG KOCH

EPOCH RESIDENTIAL™



PROJECT #6068

# BUILDING PLANS

2016-05-09

# THE EPOCH DEVELOPMENT

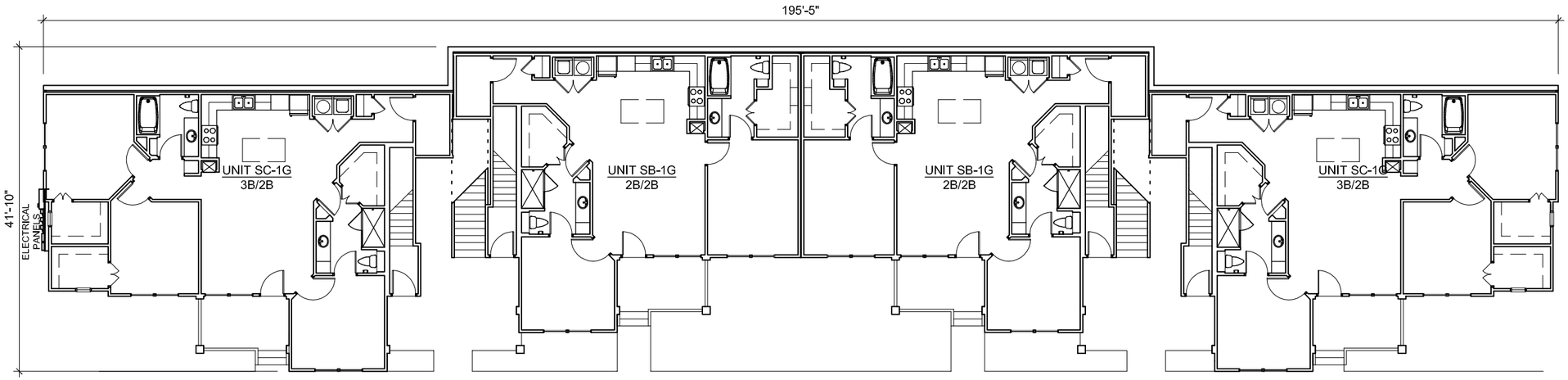
FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

AREA

| | |
|---|---|
| 1ST FLOOR: | 6,349 SF |
| 2ND FLOOR: | 12,371 SF |
| 3RD FLOOR: | 8,872 SF |
| TOTAL: | 27,592 SF |

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09




BUILDING TYPE S2 - LOWER FLOOR
(BUILDINGS #2 & #4)

SOUTH PARCEL

GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1/16" = 1'-0"



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

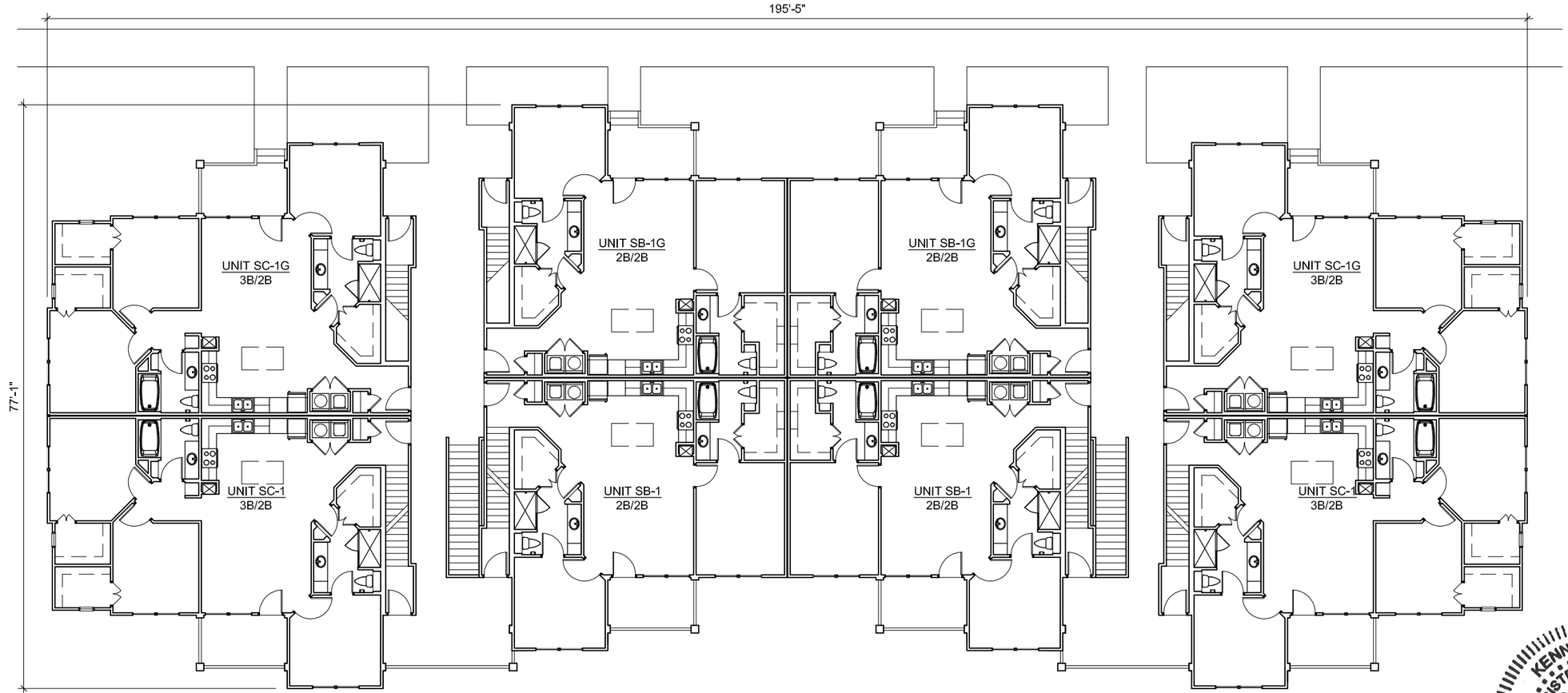
BUILDING PLANS
2016-05-09

THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

AREA

| | |
|---|---|
| 1ST FLOOR: | 6,349 SF |
| 2ND FLOOR: | 12,371 SF |
| 3RD FLOOR: | 8,872 SF |
| TOTAL: | 27,592 SF |




GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1/16" = 1'-0"

BUILDING TYPE S2 - GROUND FLOOR
(BUILDINGS #2 & #4)

SOUTH PARCEL

KENNETH LINEHAN
REGISTERED ARCHITECT
DEPT. OF AGRICULTURE
DEPT. OF COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

BUILDING PLANS
2016-05-09

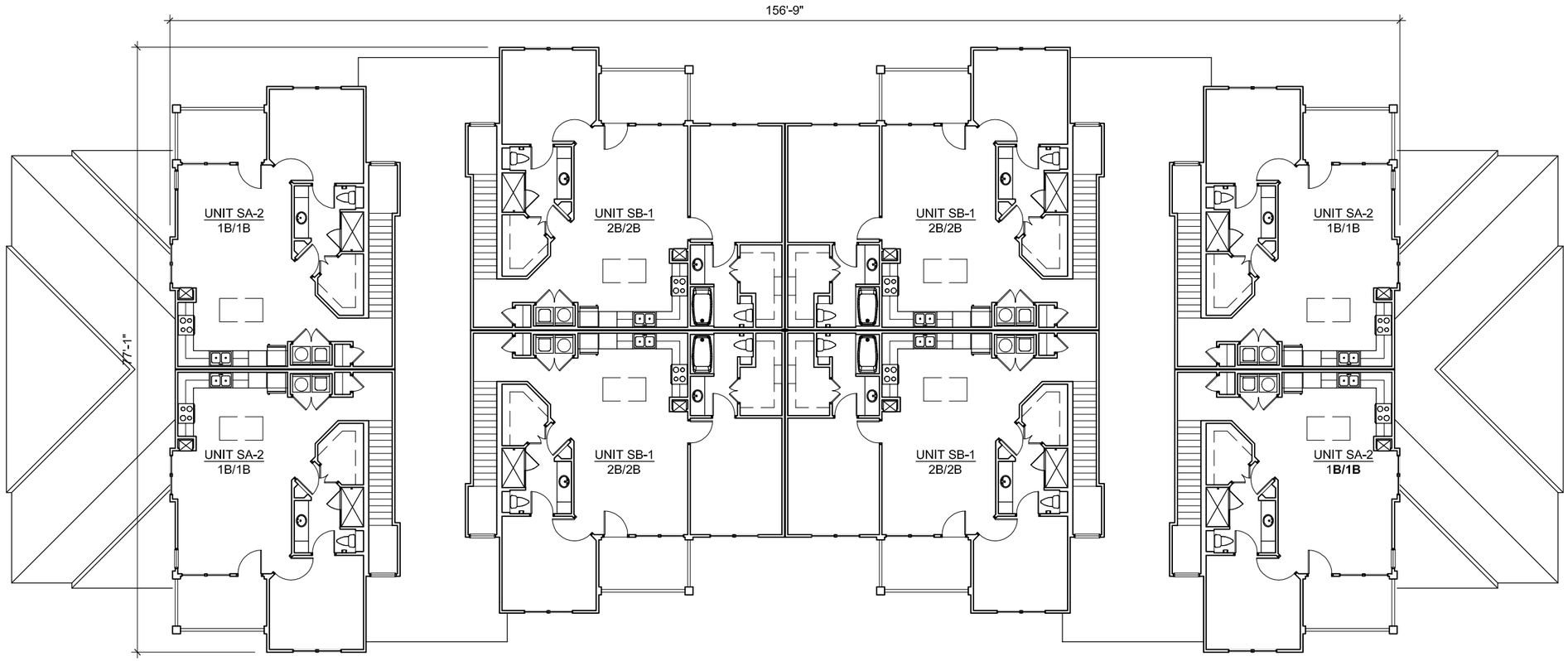
THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

AREA

| | |
|---|---|
| 1ST FLOOR: | 6,349 SF |
| 2ND FLOOR: | 12,371 SF |
| 3RD FLOOR: | 8,872 SF |
| TOTAL: | 27,592 SF |

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09




BUILDING TYPE S2 - SECOND FLOOR
(BUILDINGS #2 & #4)

## SOUTH PARCEL

GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1/16" = 1'-0"

FUGLEBERG KOCH

EPOCH RESIDENTIAL™



PROJECT #6068

# BUILDING PLANS

2016-05-09

# THE EPOCH DEVELOPMENT

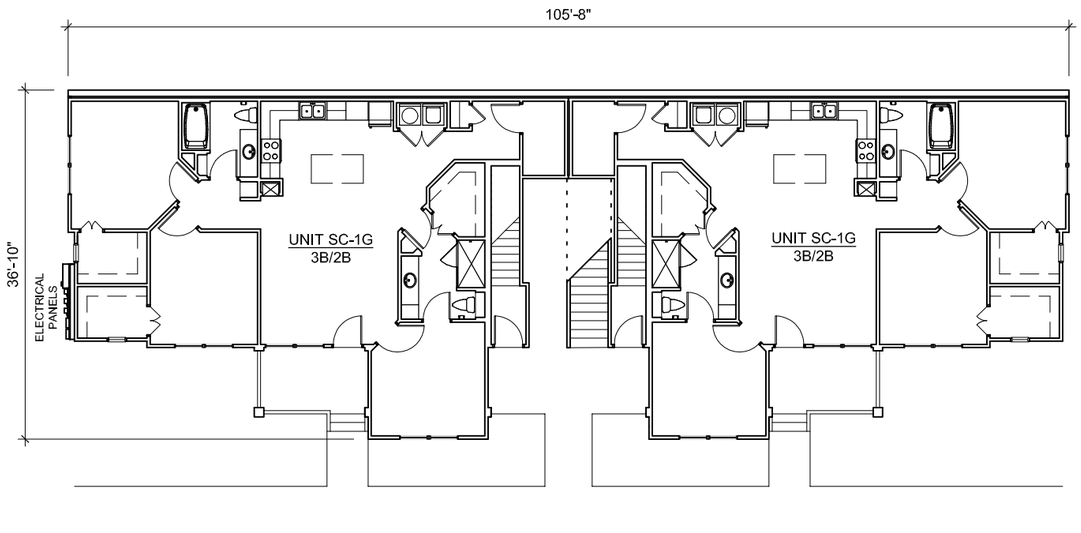
FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

AREA

| | |
|---|---|
| 1ST FLOOR: | 3,264 SF |
| 2ND FLOOR: | 6,528 SF |
| 3RD FLOOR: | 4,386 SF |
| TOTAL: | 14,178 SF |

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09




BUILDING TYPE S3 - LOWER FLOOR
(BUILDING #5)

## SOUTH PARCEL

GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1/16" = 1'-0"



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# BUILDING PLANS

2016-05-09

# THE EPOCH DEVELOPMENT

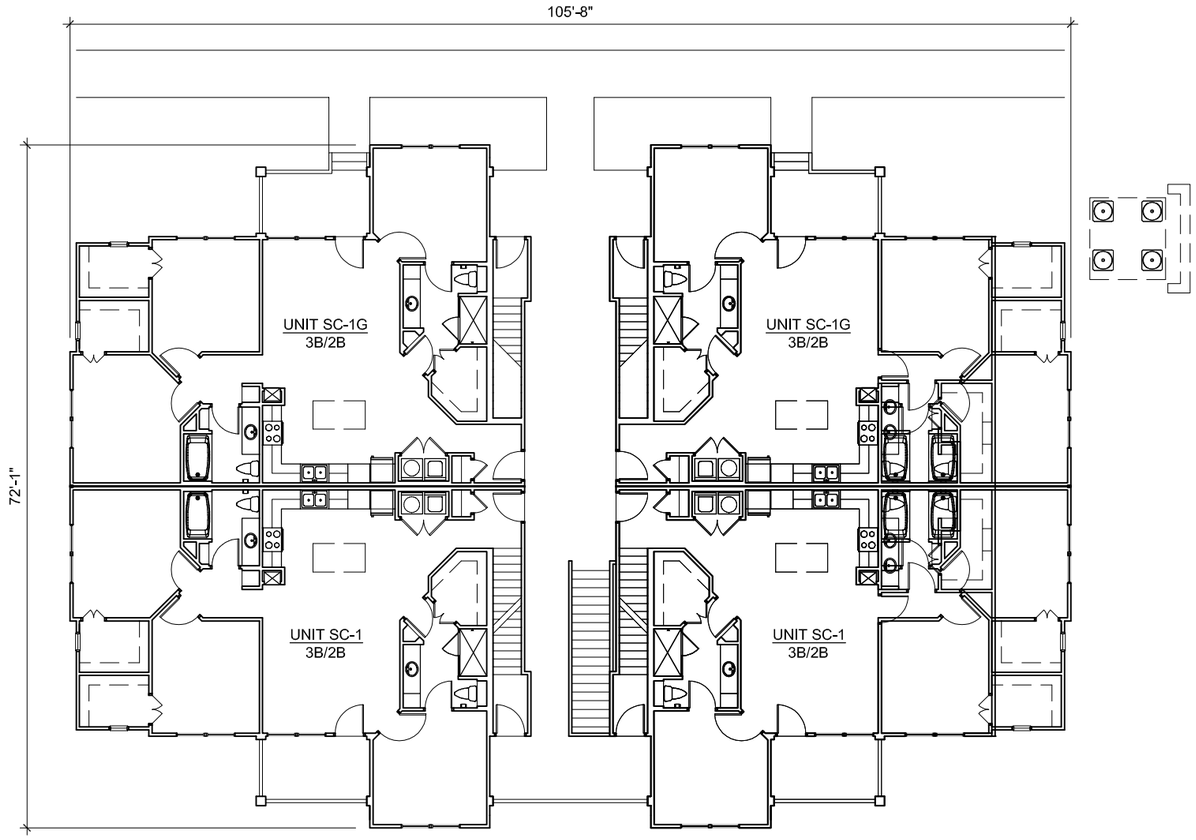
FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

AREA

| | |
|---|---|
| 1ST FLOOR: | 3,264 SF |
| 2ND FLOOR: | 6,528 SF |
| 3RD FLOOR: | 4,386 SF |
| TOTAL: | 14,178 SF |

KENNETH LINEHAN
REGISTERED ARCHITECT
DEPARTMENT OF COMMERCE AND INSURANCE
No. 105419
STATE OF TENNESSEE
2016.05.09




BUILDING TYPE S3 - GROUND FLOOR
(BUILDING #5)

SOUTH PARCEL

GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1/16" = 1'-0"

PAGE 9

PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

BUILDING PLANS
2016-05-09

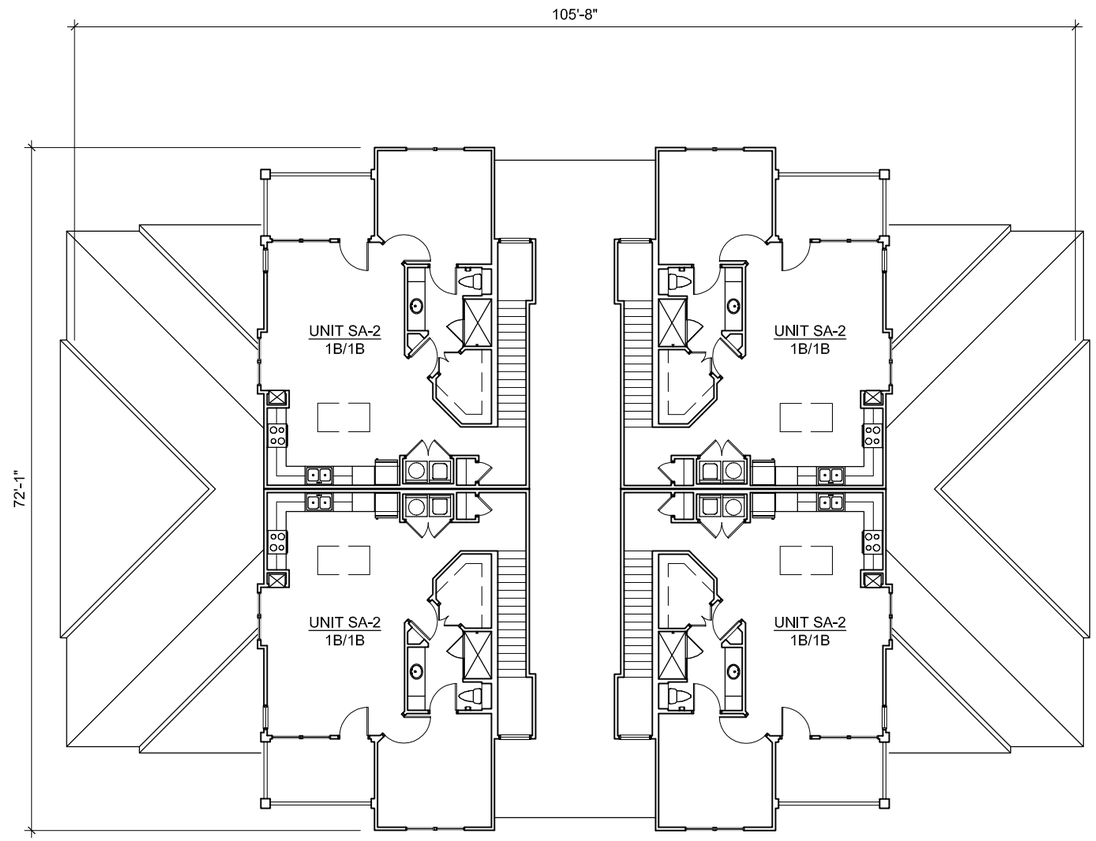
THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

AREA

| | |
|---|---|
| 1ST FLOOR: | 3,264 SF |
| 2ND FLOOR: | 6,528 SF |
| 3RD FLOOR: | 4,386 SF |
| TOTAL: | 14,178 SF |

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09




BUILDING TYPE S3 - SECOND FLOOR
(BUILDING #5)

SOUTH PARCEL

GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1/16" = 1'-0"

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

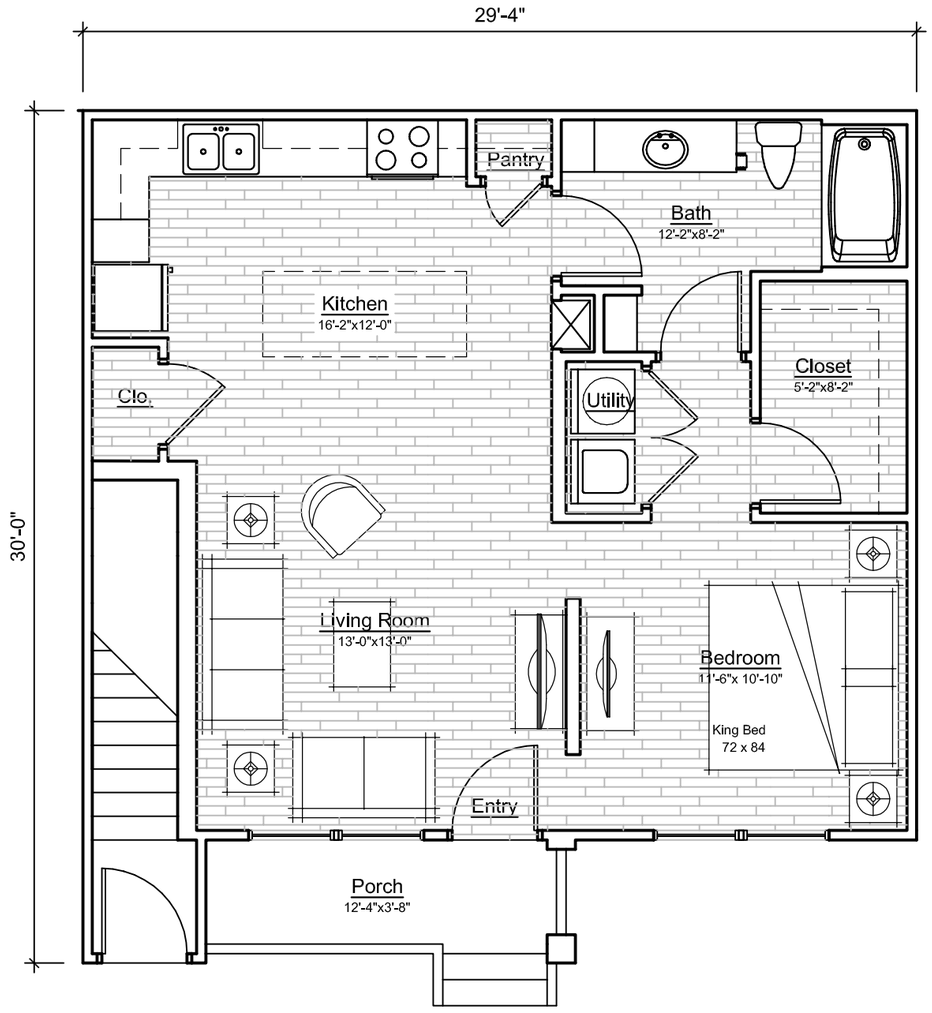


PROJECT #6068

BUILDING PLANS
2016-05-09

THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

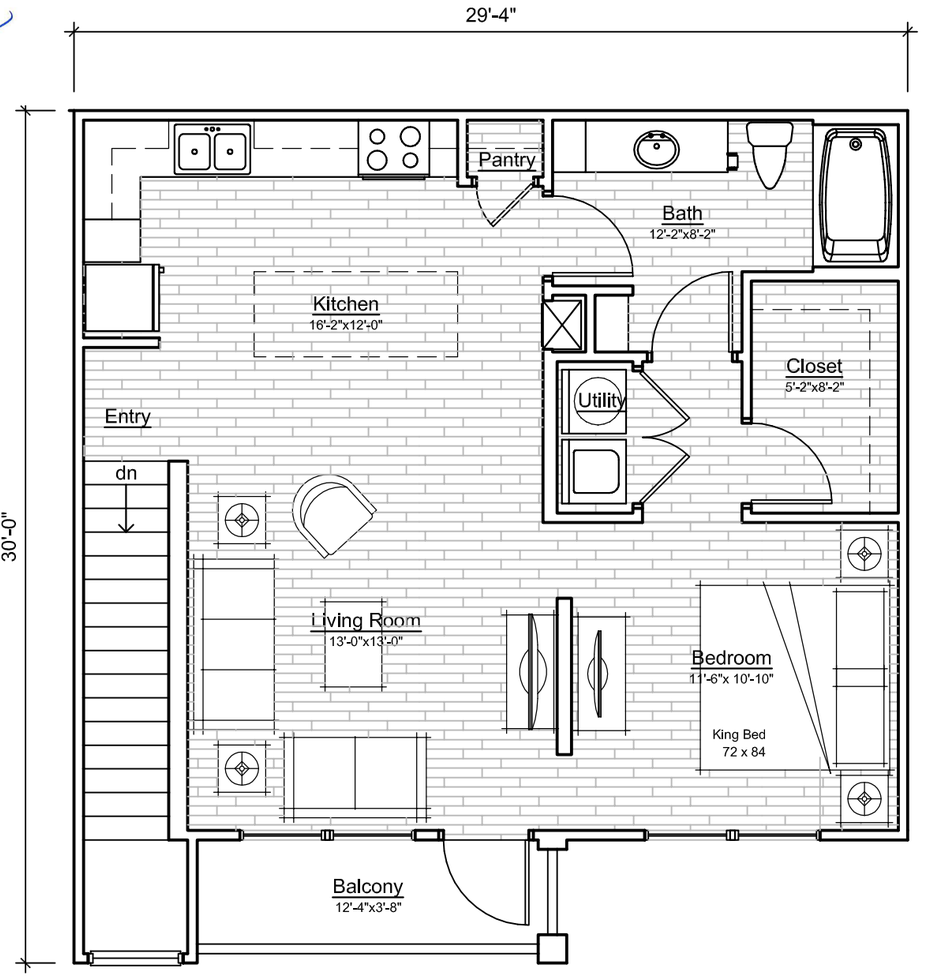
© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705




## UNIT SA-1G - 1 BED / 1 BATH W/ PORCH

SCALE: 3/16" = 1'-0"

| | | |
|---|---|---|
| LIVING | = | 702 S.F. |
| PORCH | = | 56 S.F. |
| TOTAL | = | 758 S.F. |




## UNIT SA-1 - 1 BED / 1 BATH W/ BALCONY

SCALE: 3/16" = 1'-0"

| | | |
|---|---|---|
| LIVING | = | 772 S.F. |
| BALCONY | = | 88 S.F. |
| TOTAL | = | 860 S.F. |



PROJECT #6068

FUGLEBERG KOCH

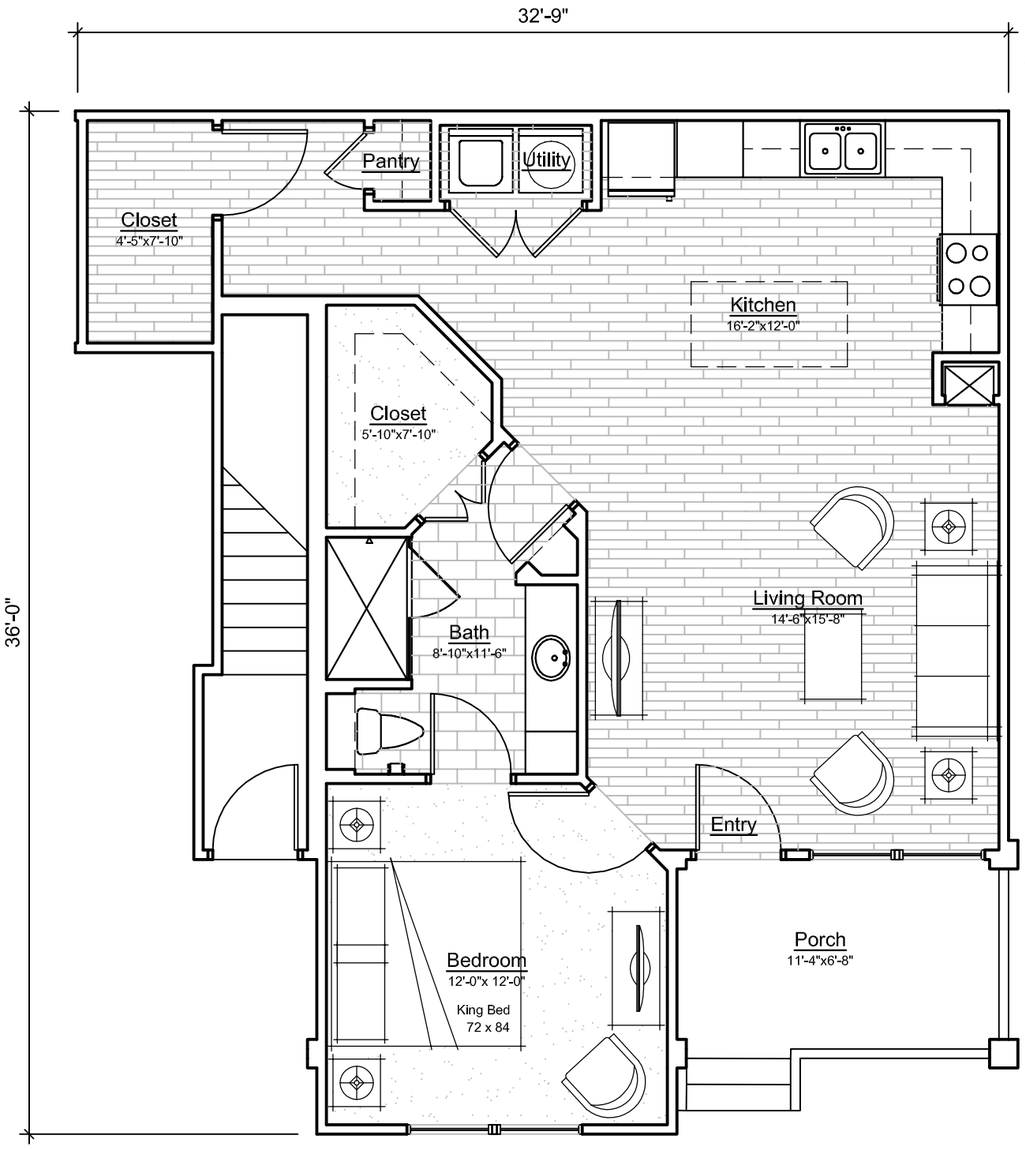
EPOCH RESIDENTIAL™ SOUTH PARCEL UNIT PLANS

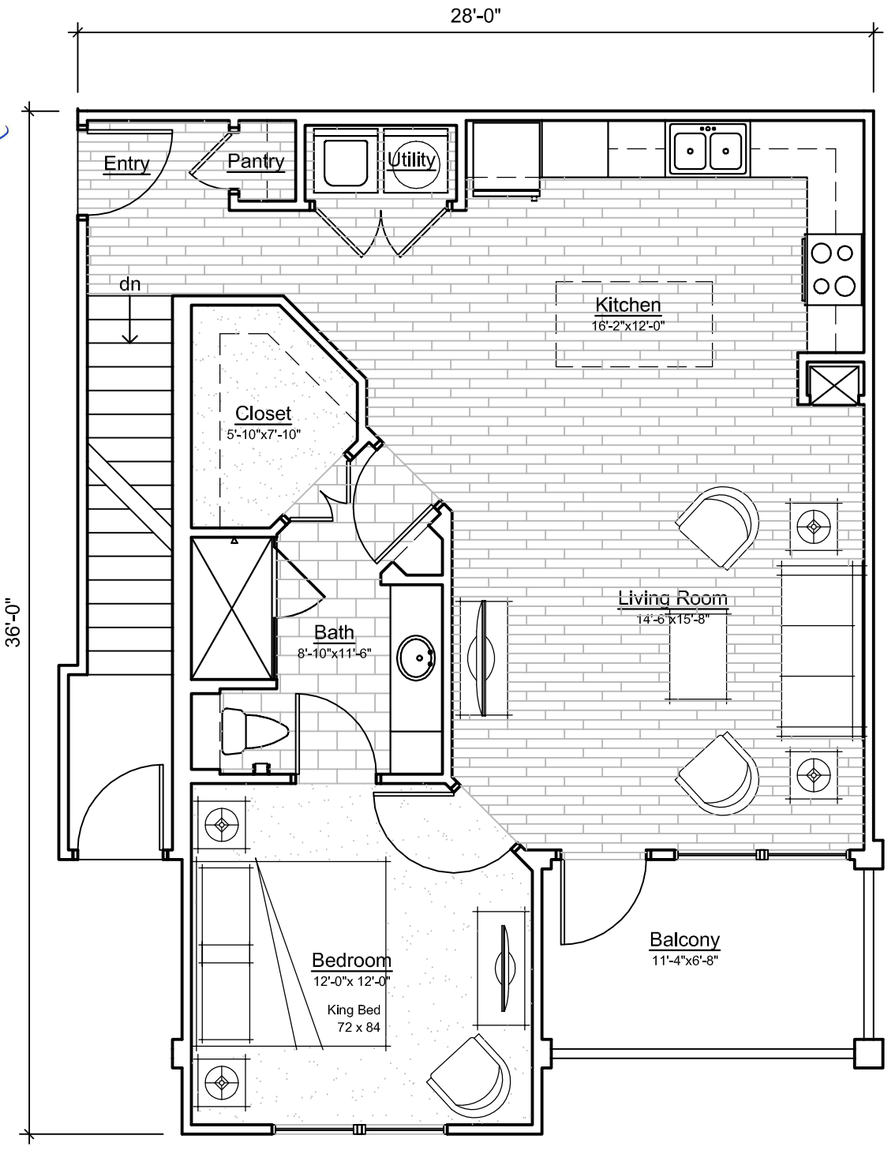
2016-05-09

THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705




KENNETH LINEHAN REGISTERED ARCHITECT DEPARTMENT OF AGRICULTURE COMMERCE NO. 105419 STATE OF TENNESSEE 2016.05.09

## UNIT SA-2G - 1 BED / 1 BATH W/ PORCH

SCALE: 3/16" = 1'-0"

| | | |
|---|---|---|
| LIVING | = | 829 S.F. |
| PORCH | = | 88 S.F. |
| TOTAL | = | 917 S.F. |

## UNIT SA-2 - 1 BED / 1 BATH W/ BALCONY

| | | |
|---|---|---|
| LIVING | = | 866 S.F. |
| BALCONY | = | 88 S.F. |
| TOTAL | = | 954 S.F. |

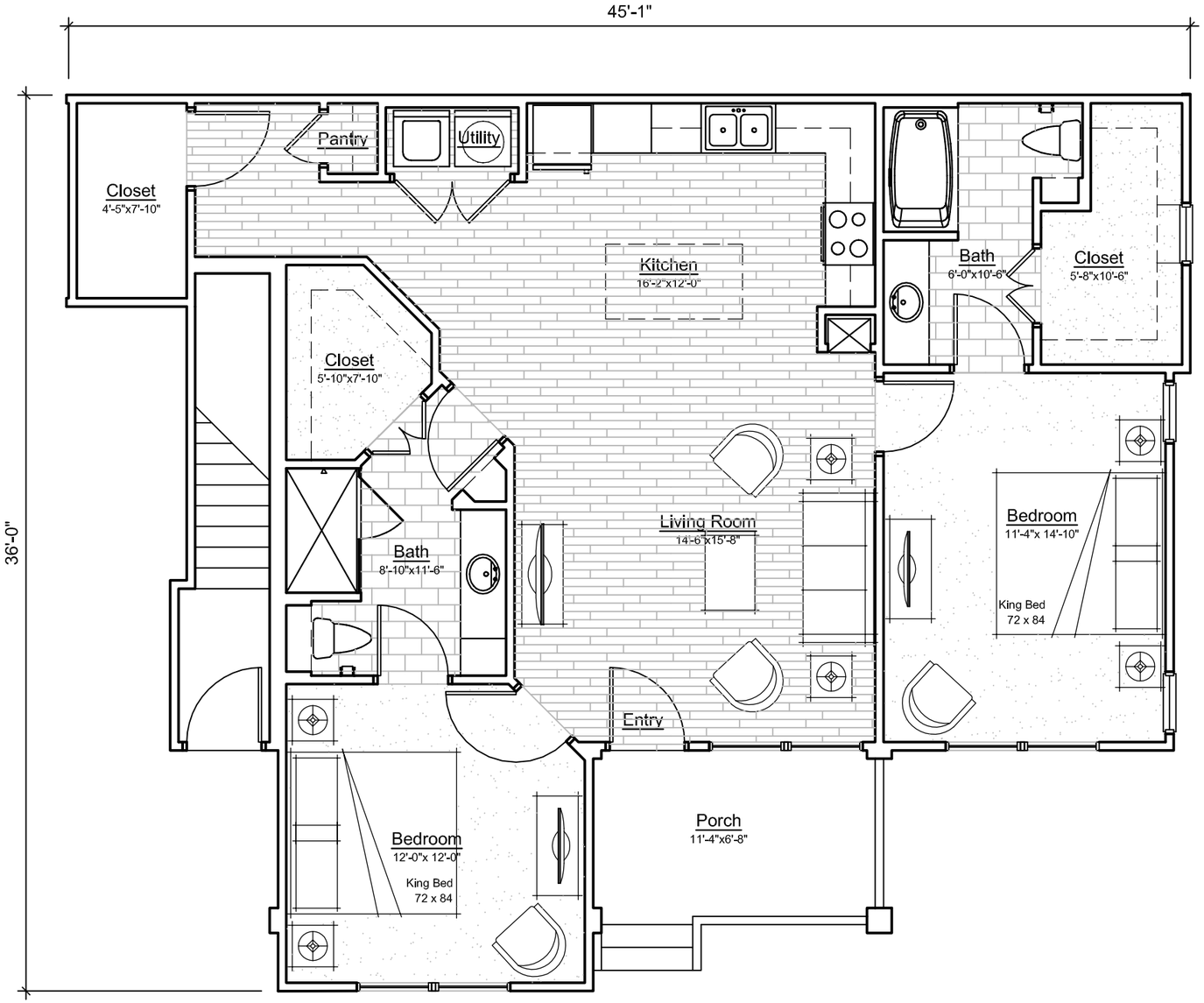


FUGLEBERG KOCH

EPOCH RESIDENTIAL™ SOUTH PARCEL UNIT PLANS | THE EPOCH DEVELOPMENT

2016-05-09 | FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705




KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09

## UNIT SB-1G - 2 BED / 2 BATH W/ PORCH

SCALE: 3/16" = 1'-0"

| | | |
|---|---|---|
| LIVING | = | 1,144 S.F. |
| PORCH | = | 88 S.F. |
| TOTAL | = | 1,232 S.F. |



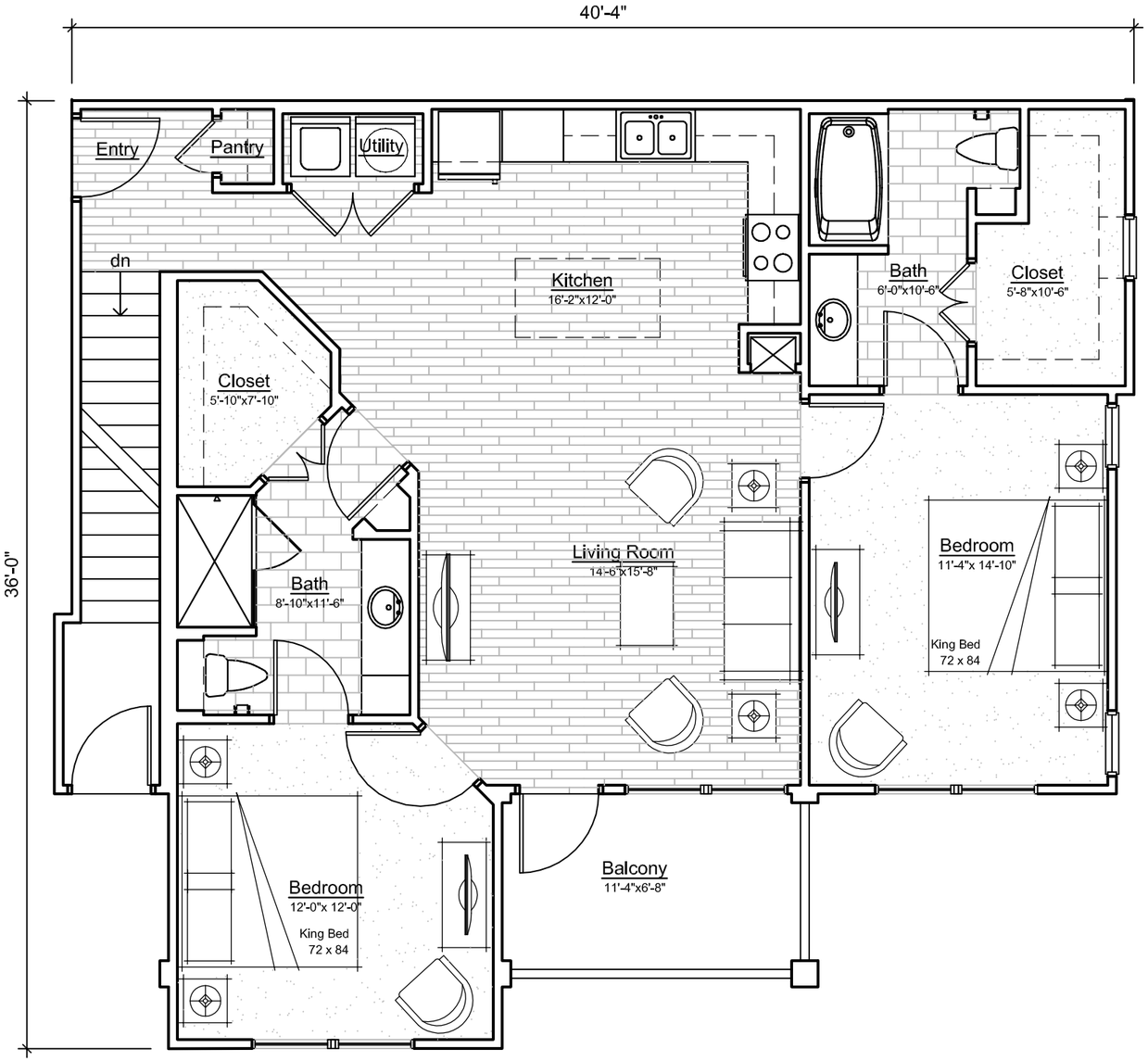
PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™ SOUTH PARCEL UNIT PLANS | THE EPOCH DEVELOPMENT

2016-05-09 | FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705




KENNETH LINEHAN
REGISTERED ARCHITECT
DEPARTMENT OF AGRICULTURE
No. 105419
STATE OF TENNESSEE
2016.05.09

## UNIT SB-1 - 2 BED / 2 BATH W/ BALCONY

SCALE: 3/16" = 1'-0"

| | | |
|---|---|---|
| LIVING | = | 1,181 S.F. |
| BALCONY | = | 88 S.F. |
| TOTAL | = | 1,269 S.F. |



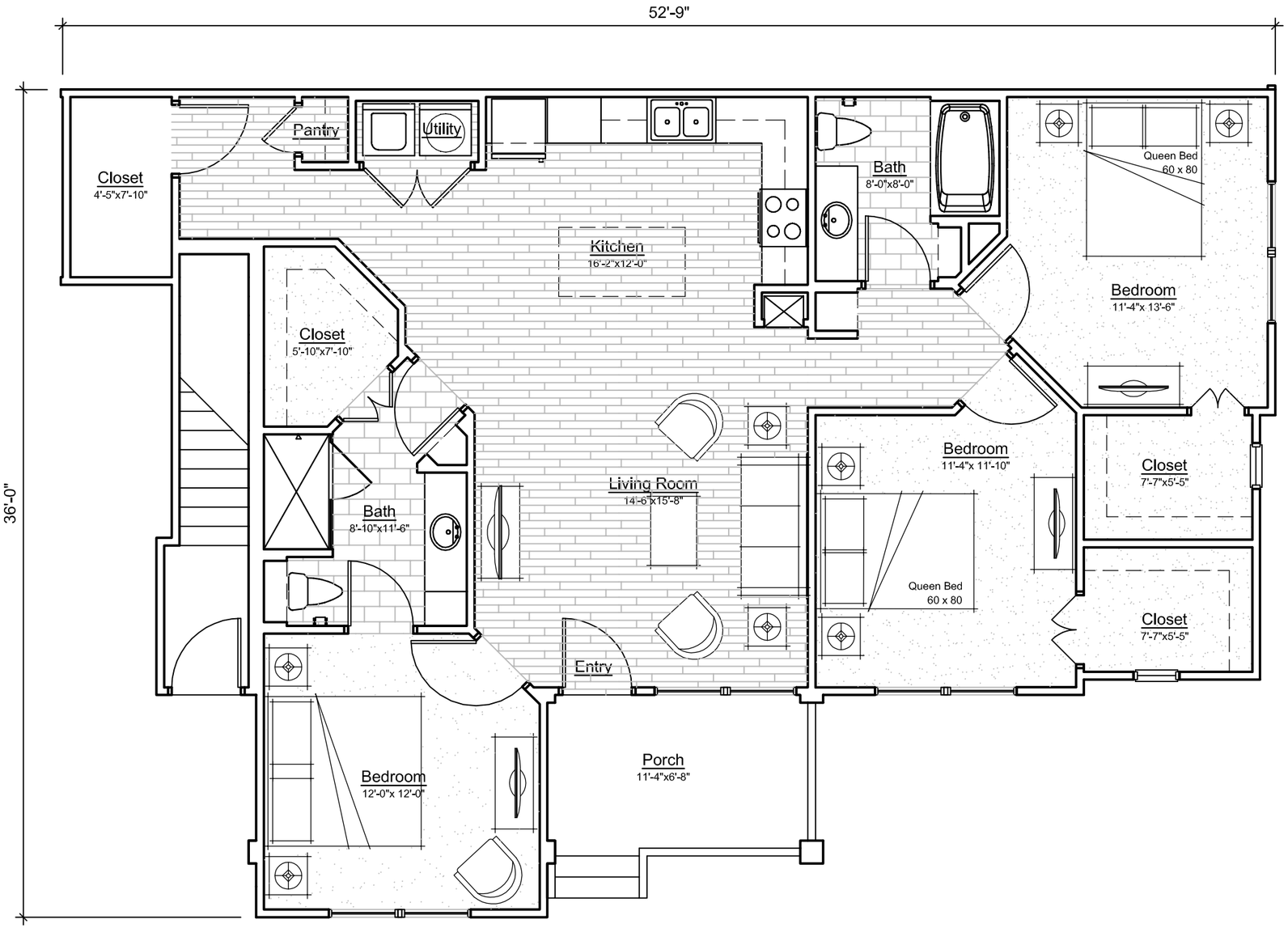
PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™ SOUTH PARCEL UNIT PLANS | THE EPOCH DEVELOPMENT

2016-05-09 | FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705




KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09

## UNIT SC-1G - 3 BED / 2 BATH W/ PORCH

SCALE: 3/16" = 1'-0"

| | | |
|---|---|---|
| LIVING | = | 1,343 S.F. |
| PORCH | = | 88 S.F. |
| TOTAL | = | 1,431 S.F. |



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™ SOUTH PARCEL UNIT PLANS | THE EPOCH DEVELOPMENT

2016-05-09 | FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09

## UNIT SC-1 - 3 BED / 2 BATH W/ BALCONY

SCALE: 3/16" = 1'-0"

| | | |
|---|---|---|
| LIVING | = | 1,380 S.F. |
| BALCONY | = | 88 S.F. |
| TOTAL | = | 1,468 S.F. |



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™ SOUTH PARCEL UNIT PLANS | THE EPOCH DEVELOPMENT

2016-05-09 | FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09

NORTH ELEVATION
(OAK MEADOW DRIVE)

SOUTH PARCEL

GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1/16" = 1'-0"

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# BUILDING ELEVATIONS

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE



PROJECT #6068

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
No. 105419
STATE OF TENNESSEE
2016.05.09

SOUTH ELEVATION

GRAPHIC SCALE
16 0 4 8 16
( IN INCHES )
1/16" = 1'-0"

SOUTH PARCEL

PAGE 18
PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

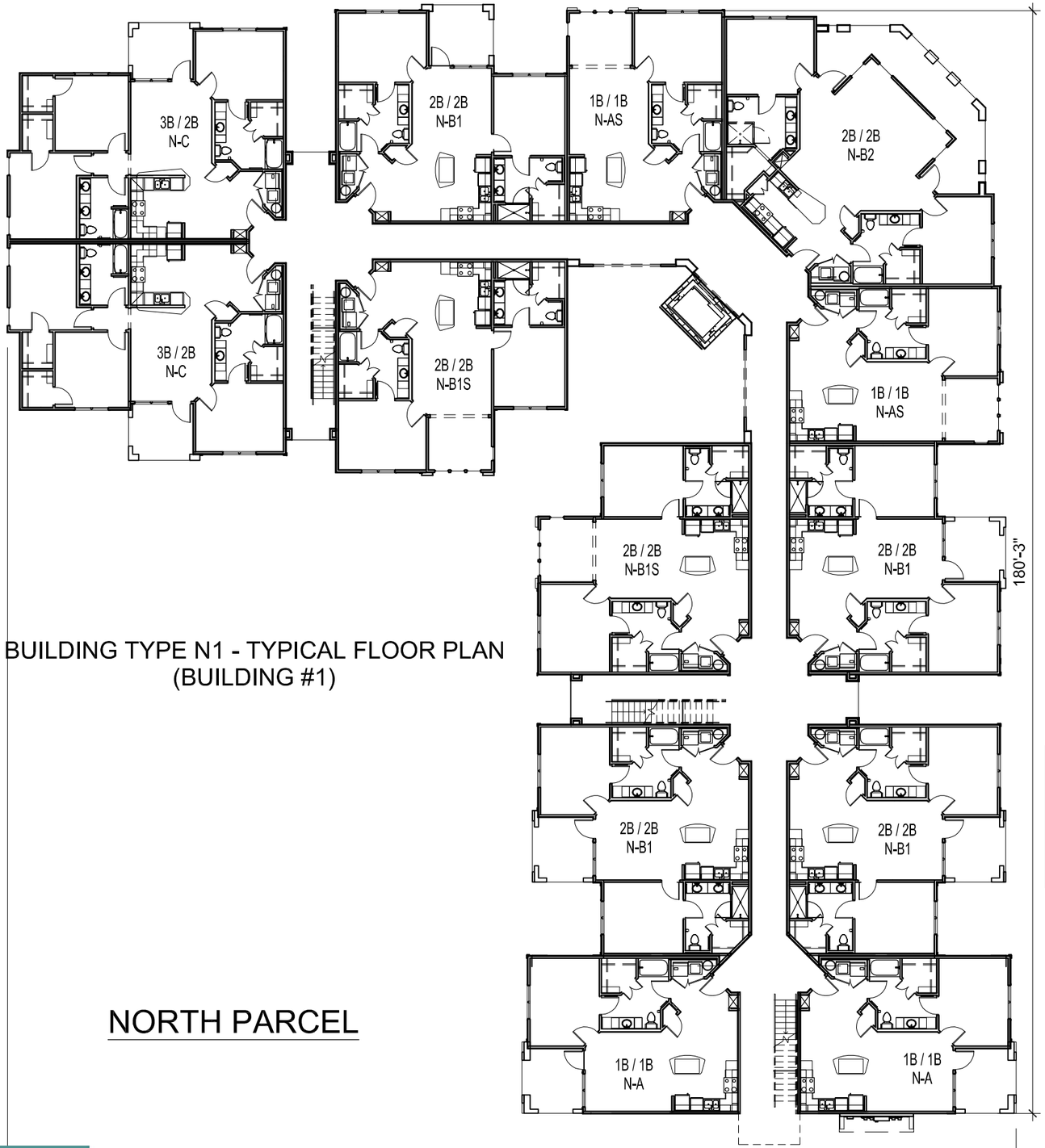
# BUILDING ELEVATIONS
2016-05-09

# THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

AREA

| | |
|---|---|
| 1ST FLOOR: | 17,471 SF |
| 2ND FLOOR: | 17,471 SF |
| 3RD FLOOR: | 17,471 SF |
| 4TH FLOOR: | 17,471 SF |
| TOTAL: | 69,884 SF |




BUILDING TYPE N1 - TYPICAL FLOOR PLAN
(BUILDING #1)

NORTH PARCEL

| BUILDING TYPES | | Type | N1 | N2 | N3 | N4 | | |
|---|---|---|---|---|---|---|---|---|
| No. of Bldgs | | # | 1 | 2 | 1 | 2 | No. Units | Site Mix % |
| UNITS | 1b/1b | N-A | 16 | 32 | 24 | 0 | 72 | 35.3% |
| | 2b/2b | N-B1 | 24 | 32 | 24 | 0 | 80 | 39.2% |
| | 2b/2b | N-B2 | 4 | 8 | 4 | 0 | 16 | 7.8% |
| | 2b/2b Carriage | N-B3 | 0 | 0 | 0 | 4 | 4 | 2.0% |
| | 3b/2b | N-C | 8 | 16 | 8 | 0 | 32 | 15.7% |
| TOTAL | | | 52 | 88 | 60 | 4 | 204 | 100% |
| GARAGES | | | 0 | 0 | 0 | 12 | 12 | |

GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1'-0"=20'-0"

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09

PAGE 19

PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# BUILDING PLANS

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

AREA

| | |
|---|---|
| 1ST FLOOR: | 14,661 SF |
| 2ND FLOOR: | 14,661 SF |
| 3RD FLOOR: | 14,661 SF |
| 4TH FLOOR: | 14,661 SF |
| TOTAL: | 58,644 SF |

BUILDING TYPE N2 - TYPICAL FLOOR PLAN
(BUILDINGS #2 & #3)

| BUILDING TYPES | | Type | N1 | N2 | N3 | N4 | No. Units | Site Mix % |
|---|---|---|---|---|---|---|---|---|
| No. of Bldgs | | # | 1 | 2 | 1 | 2 | | |
| UNITS | 1b/1b | N-A | 16 | 32 | 24 | 0 | 72 | 35.3% |
| | 2b/2b | N-B1 | 24 | 32 | 24 | 0 | 80 | 39.2% |
| | 2b/2b | N-B2 | 4 | 8 | 4 | 0 | 16 | 7.8% |
| | 2b2b Carriage | N-B3 | 0 | 0 | 0 | 4 | 4 | 2.0% |
| | 3b/2b | N-C | 8 | 16 | 8 | 0 | 32 | 15.7% |
| TOTAL | | | 52 | 88 | 60 | 4 | 204 | 100% |
| GARAGES | | | 0 | 0 | 0 | 12 | 12 | |

GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1'-0"=20'-0"

NORTH PARCEL

PAGE 20

PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

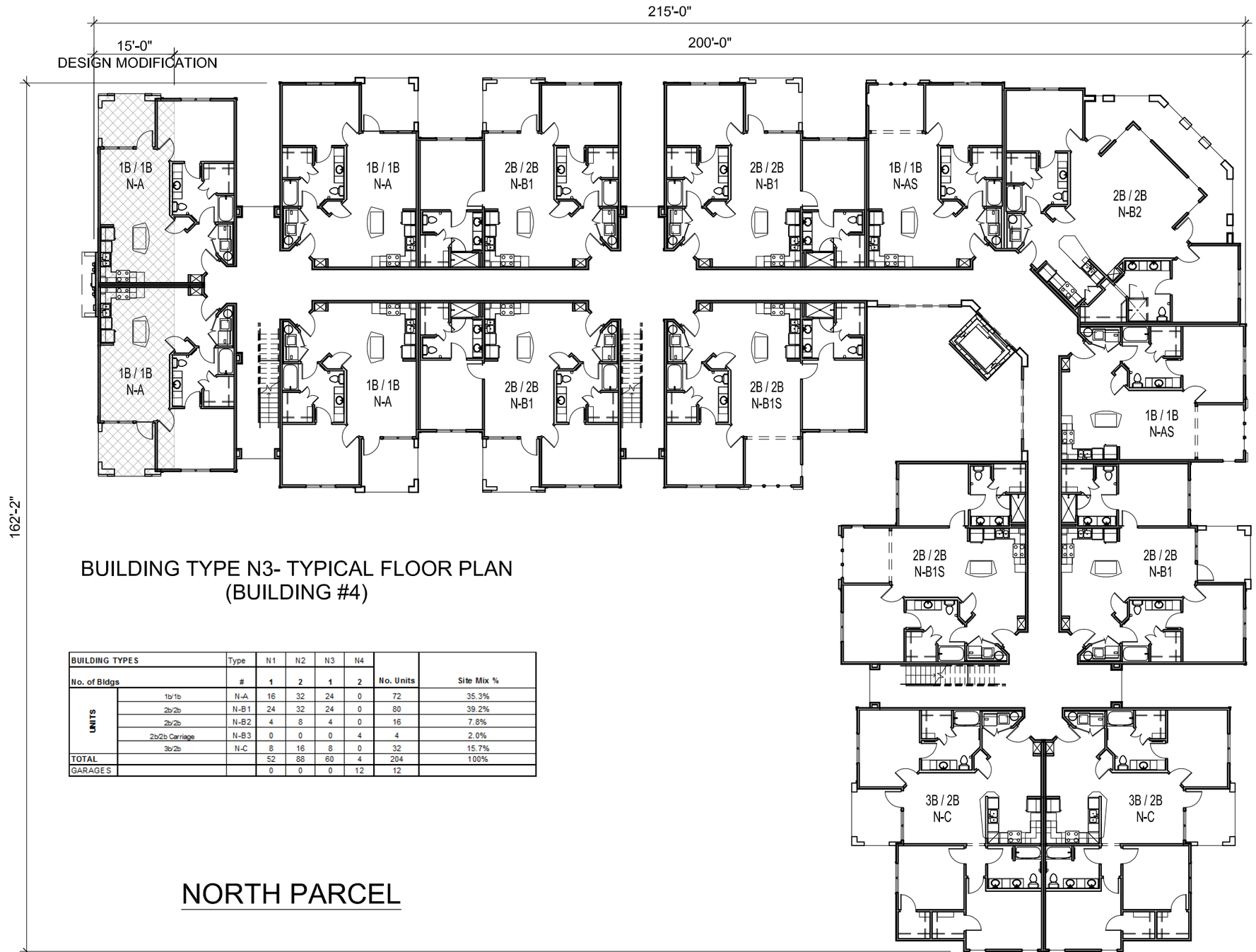
# BUILDING PLANS
2016-05-09

# THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

AREA

| | |
|---|---|
| 1ST FLOOR: | 19,637 SF |
| 2ND FLOOR: | 19,637 SF |
| 3RD FLOOR: | 19,637 SF |
| 4TH FLOOR: | 19,637 SF |
| TOTAL: | 78,548 SF |




## BUILDING TYPE N3- TYPICAL FLOOR PLAN (BUILDING #4)

| BUILDING TYPES | | Type | N1 | N2 | N3 | N4 | No. Units | Site Mix % |
|---|---|---|---|---|---|---|---|---|
| No. of Bldgs | | # | 1 | 2 | 1 | 2 | | |
| UNITS | 1b/1b | N-A | 16 | 32 | 24 | 0 | 72 | 35.3% |
| | 2b/2b | N-B1 | 24 | 32 | 24 | 0 | 80 | 39.2% |
| | 2b/2b | N-B2 | 4 | 8 | 4 | 0 | 16 | 7.8% |
| | 2b/2b Carriage | N-B3 | 0 | 0 | 0 | 4 | 4 | 2.0% |
| | 3b/2b | N-C | 8 | 16 | 8 | 0 | 32 | 15.7% |
| TOTAL | | | 52 | 88 | 60 | 4 | 204 | 100% |
| GARAGES | | | 0 | 0 | 0 | 12 | 12 | |

KENNETH LINEHAN
REGISTERED ARCHITECT
DEPARTMENT OF AGRICULTURE
NO. 105419
STATE OF TENNESSEE
2016.05.09

GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1'-0"=20'-0"

## NORTH PARCEL

PAGE 21

PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# BUILDING PLANS
2016-05-09

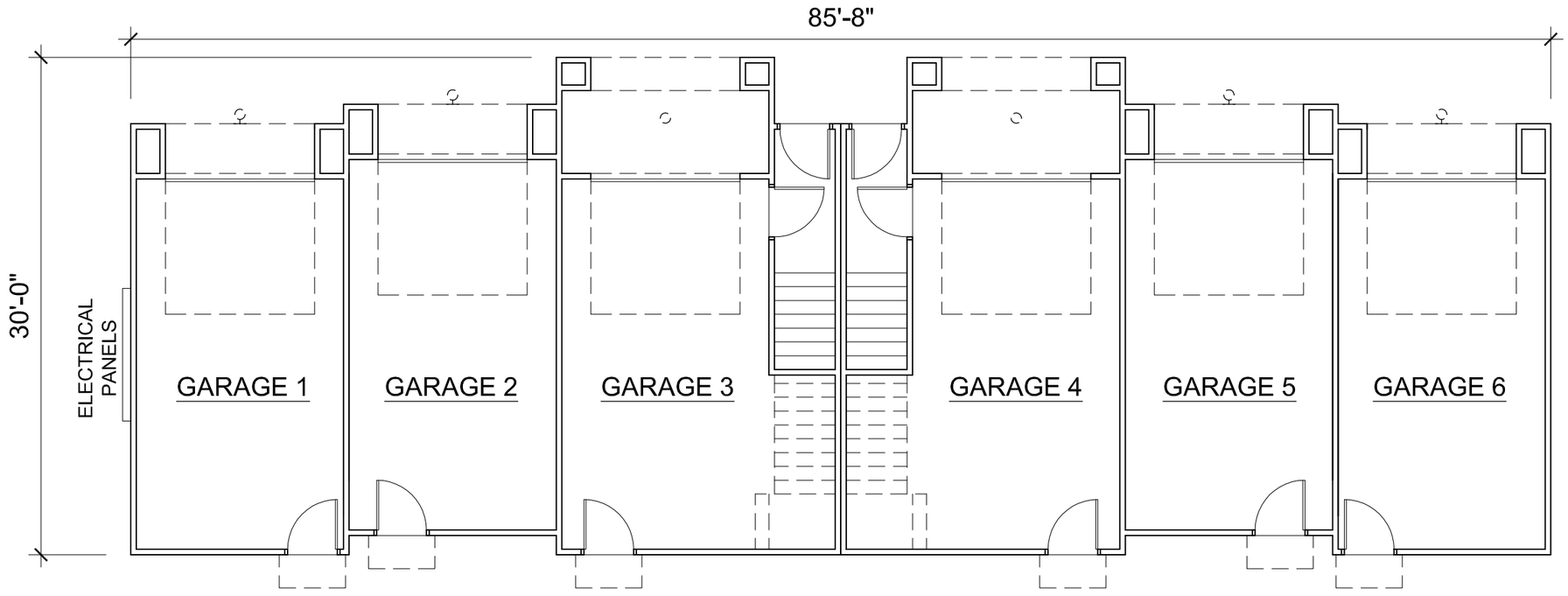
# THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

AREA

| | |
|---|---|
| 1ST FLOOR: | 1,998 SF |
| 2ND FLOOR: | 2,233 SF |
| TOTAL: | 4,231 SF |

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09




BUILDING TYPE N4- GROUND FLOOR PLAN
(BUILDINGS #5 & #6)

| BUILDING TYPES | | Type | N1 | N2 | N3 | N4 | No. Units | Site Mix % |
|---|---|---|---|---|---|---|---|---|
| No. of Bldgs | | # | 1 | 2 | 1 | 2 | | |
| UNITS | 1b/1b | N-A | 16 | 32 | 24 | 0 | 72 | 35.3% |
| | 2b/2b | N-B1 | 24 | 32 | 24 | 0 | 80 | 39.2% |
| | 2b/2b | N-B2 | 4 | 8 | 4 | 0 | 16 | 7.8% |
| | 2b/2b Carriage | N-B3 | 0 | 0 | 0 | 4 | 4 | 2.0% |
| | 3b/2b | N-C | 8 | 16 | 8 | 0 | 32 | 15.7% |
| TOTAL | | | 52 | 88 | 60 | 4 | 204 | 100% |
| GARAGES | | | 0 | 0 | 0 | 12 | 12 | |

NORTH PARCEL

GRAPHIC SCALE

4 0 1 2 4

( IN INCHES )
3/16" = 1'-0"



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# BUILDING PLANS
2016-05-09

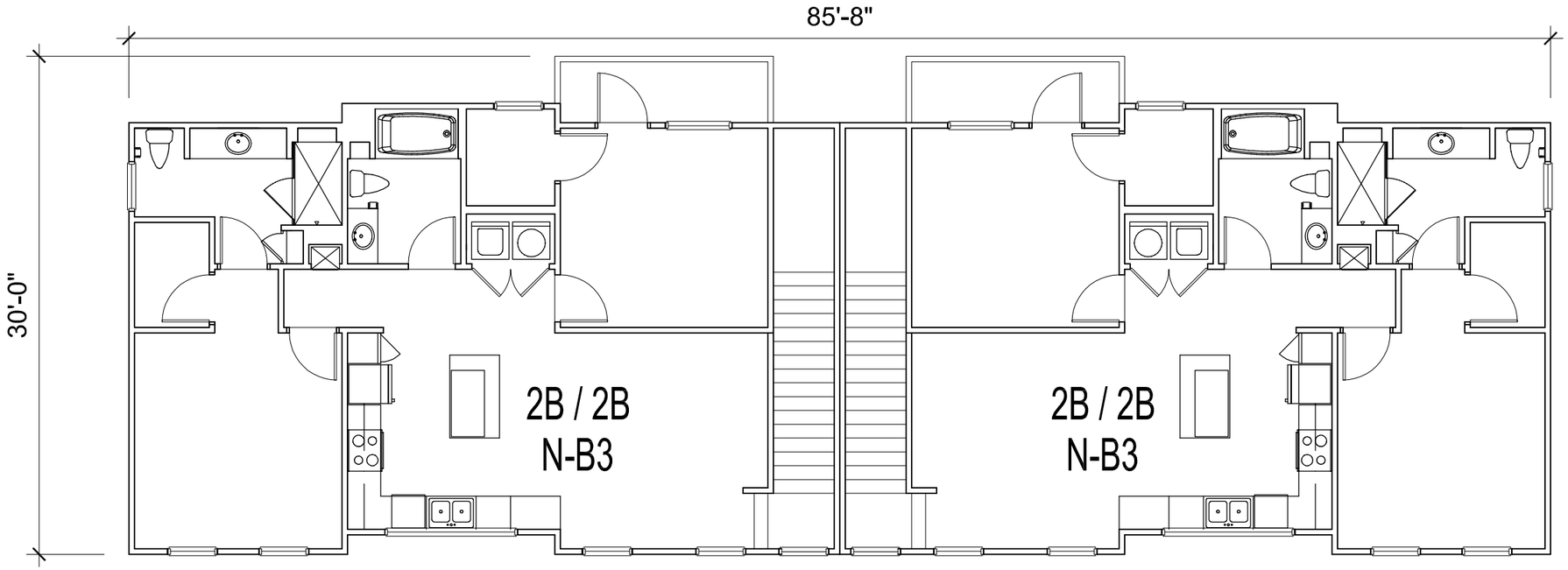
# THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

AREA

| | |
|---|---|
| 1ST FLOOR: | 1,998 SF |
| 2ND FLOOR: | 2,233 SF |
| TOTAL: | 4,231 SF |

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09




BUILDING TYPE N4- SECOND FLOOR PLAN
(BUILDINGS #5 & #6)

| BUILDING TYPES | | Type | N1 | N2 | N3 | N4 | | |
|---|---|---|---|---|---|---|---|---|
| No. of Bldgs | | # | 1 | 2 | 1 | 2 | No. Units | Site Mix % |
| UNITS | 1b/1b | N-A | 16 | 32 | 24 | 0 | 72 | 35.3% |
| | 2b/2b | N-B1 | 24 | 32 | 24 | 0 | 80 | 39.2% |
| | 2b/2b | N-B2 | 4 | 8 | 4 | 0 | 16 | 7.8% |
| | 2b/2b Carriage | N-B3 | 0 | 0 | 0 | 4 | 4 | 2.0% |
| | 3b/2b | N-C | 8 | 16 | 8 | 0 | 32 | 15.7% |
| TOTAL | | | 52 | 88 | 60 | 4 | 204 | 100% |
| GARAGES | | | 0 | 0 | 0 | 12 | 12 | |

GRAPHIC SCALE

4 0 1 2 4

( IN INCHES )
3/16" = 1'-0"

NORTH PARCEL



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# BUILDING PLANS
2016-05-09

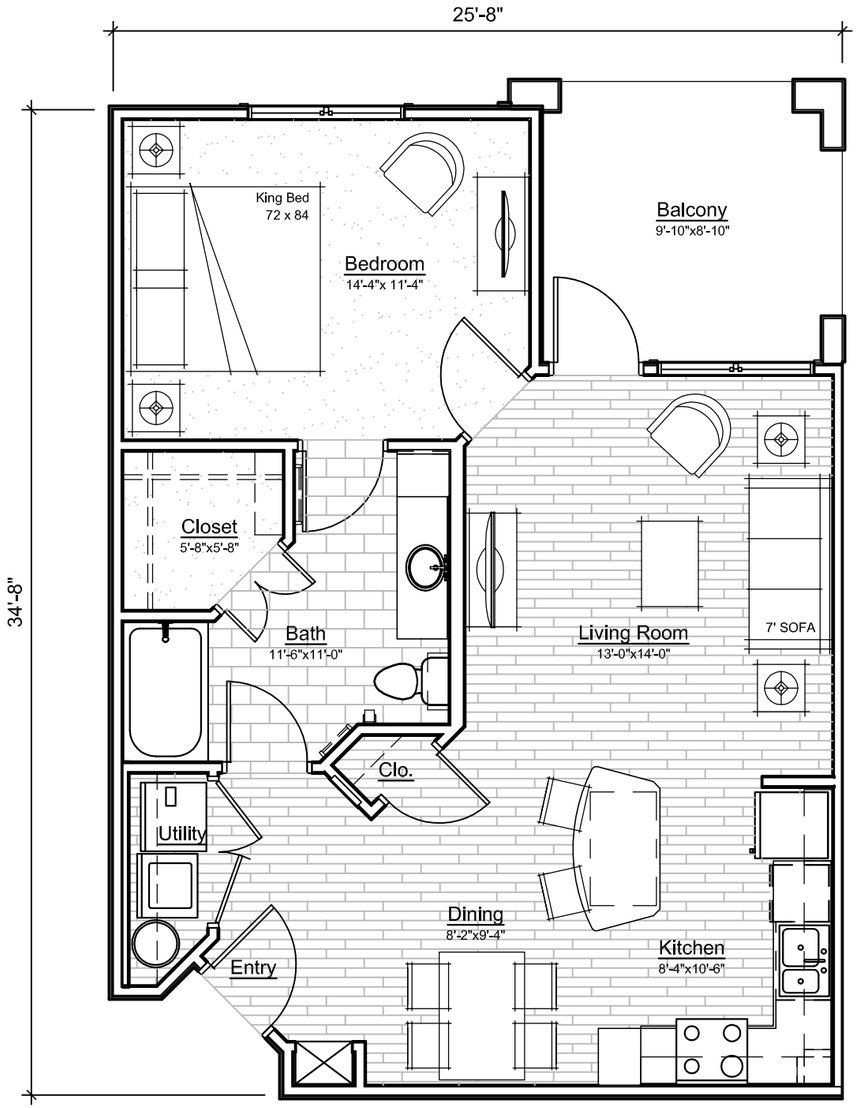
# THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

GRAPHIC SCALE

4 0 1 2 4

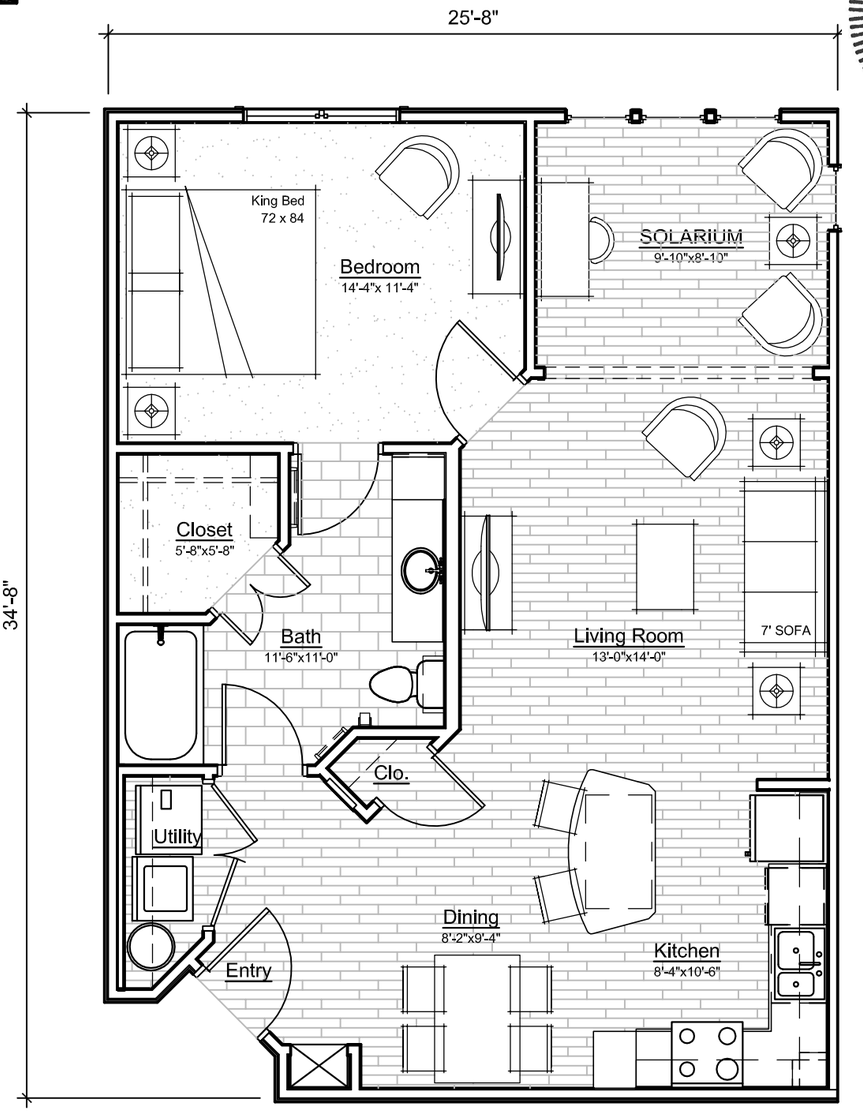
( IN INCHES )
3/16" = 1'-0"




UNIT N-A - 1 BED / 1 BATH W/ BALCONY

SCALE: 3/16" = 1'-0"

| | | |
|---|---|---|
| LIVING | = | 789 S.F. |
| BALCONY | = | 102 S.F. |
| TOTAL | = | 891 S.F. |




UNIT N-AS - 1 BED / 1 BATH W/ SOLARIUM LIVING = 891 S.F.

SCALE: 3/16" = 1'-0"

KENNETH LINEHAN REGISTERED ARCHITECT AGRICULTURE COMMERCE No. 105419 STATE OF TENNESSEE 2016.05.09



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™ NORTH PARCEL UNIT PLANS | THE EPOCH DEVELOPMENT

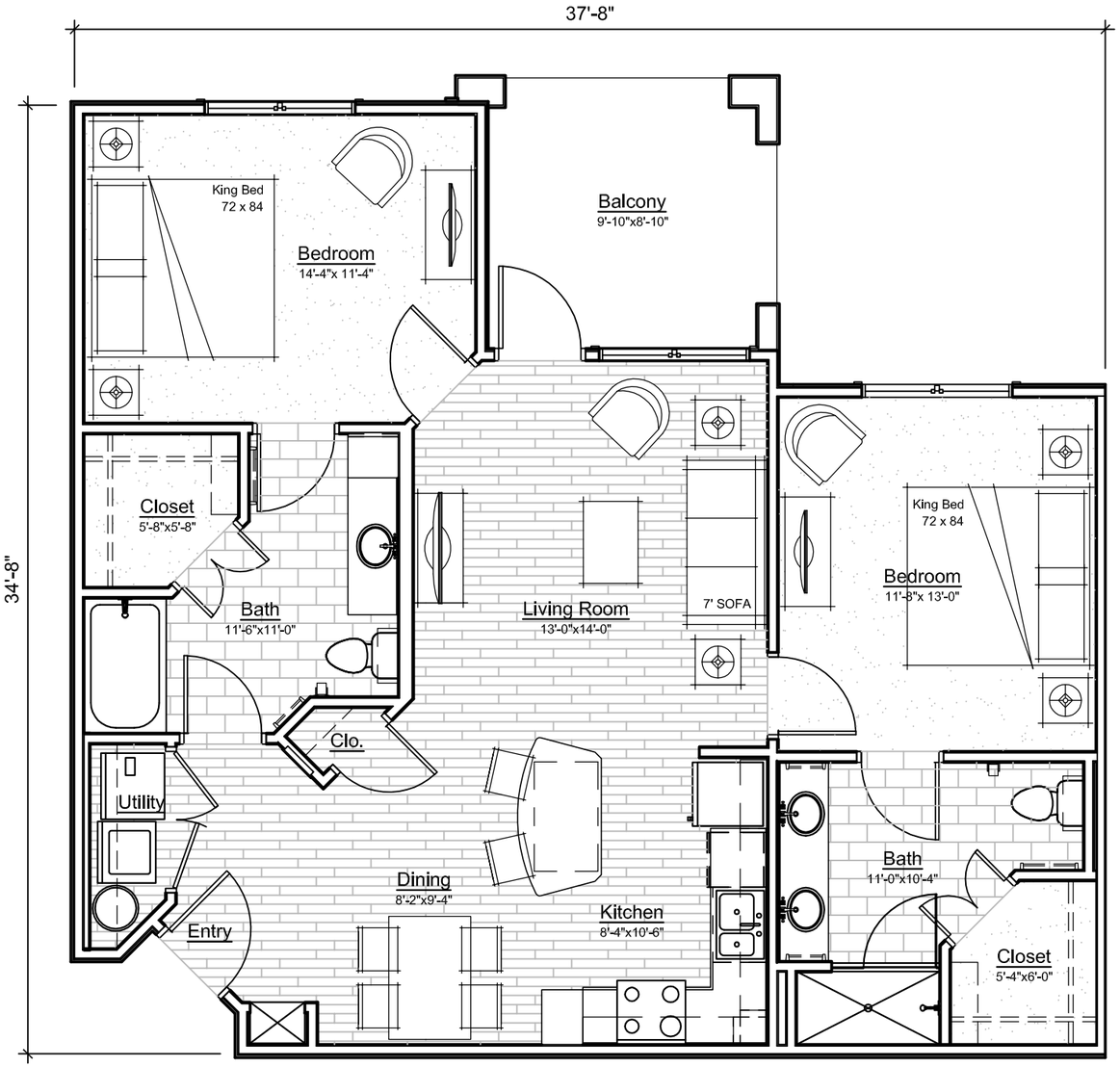
2016-05-09 | FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

GRAPHIC SCALE

4 0 1 2 4

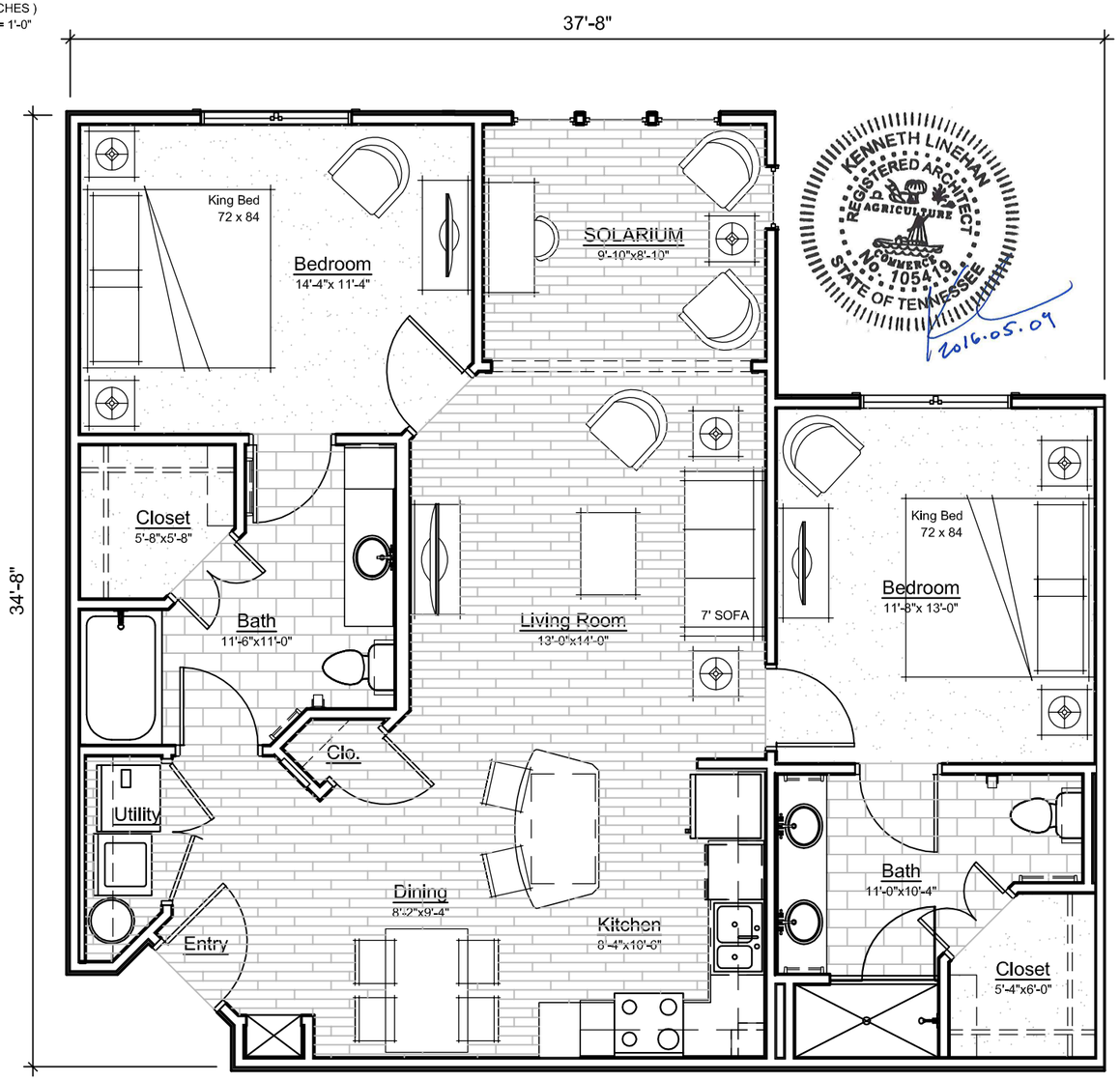
( IN INCHES )
3/16" = 1'-0"




UNIT N-B1 - 2 BED / 2 BATH W/ BALCONY

SCALE: 3/16" = 1'-0"

| | | |
|---|---|---|
| LIVING | = | 1,072 S.F. |
| BALCONY | = | 108 S.F. |
| TOTAL | = | 1,180 S.F. |




KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09

UNIT N-B1S - 2 BED / 2 BATH W/ SOLARIUM

SCALE: 3/16" = 1'-0"

LIVING = 1,180 S.F.



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# NORTH PARCEL UNIT PLANS

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09

GRAPHIC SCALE

4 0 1 2 4

( IN INCHES )
3/16" = 1'-0"

UNIT N-B2 - 2 BED / 2 BATH W/ BALCONY

SCALE: 3/16" = 1'-0"

| | | |
|---|---|---|
| LIVING | = | 1,347 S.F. |
| BALCONY | = | 309 S.F. |
| TOTAL | = | 1,656 S.F. |

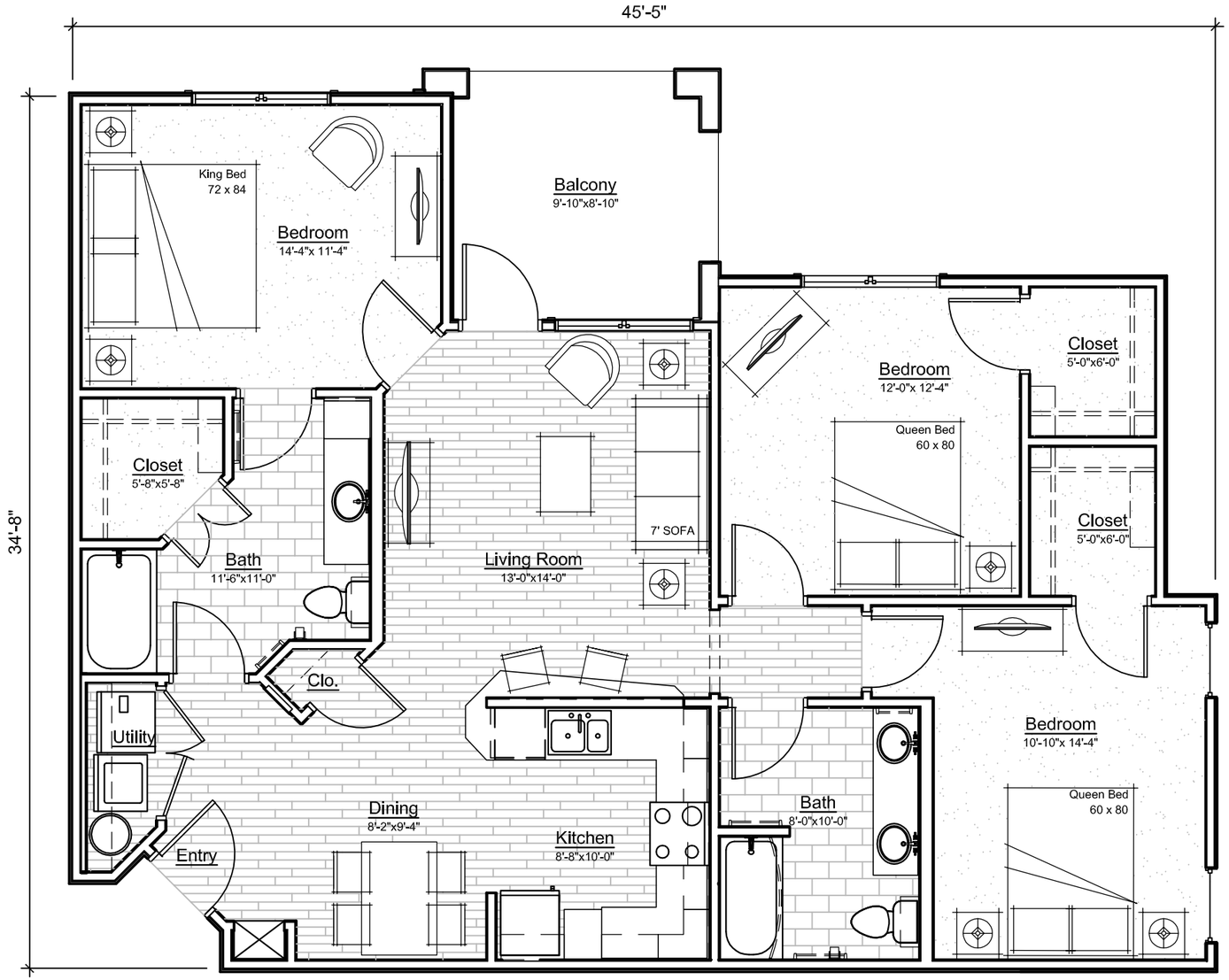


FUGLEBERG KOCH

EPOCH RESIDENTIAL™ NORTH PARCEL UNIT PLANS | THE EPOCH DEVELOPMENT

2016-05-09 | FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705




GRAPHIC SCALE

4 0 1 2 4

( IN INCHES )
3/16" = 1'-0"

## UNIT N-C - 3 BED / 2 BATH W/ BALCONY

SCALE: 3/16" = 1'-0"

| | | |
|---|---|---|
| LIVING | = | 1,304 S.F. |
| BALCONY | = | 108 S.F. |
| TOTAL | = | 1,412 S.F. |

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09

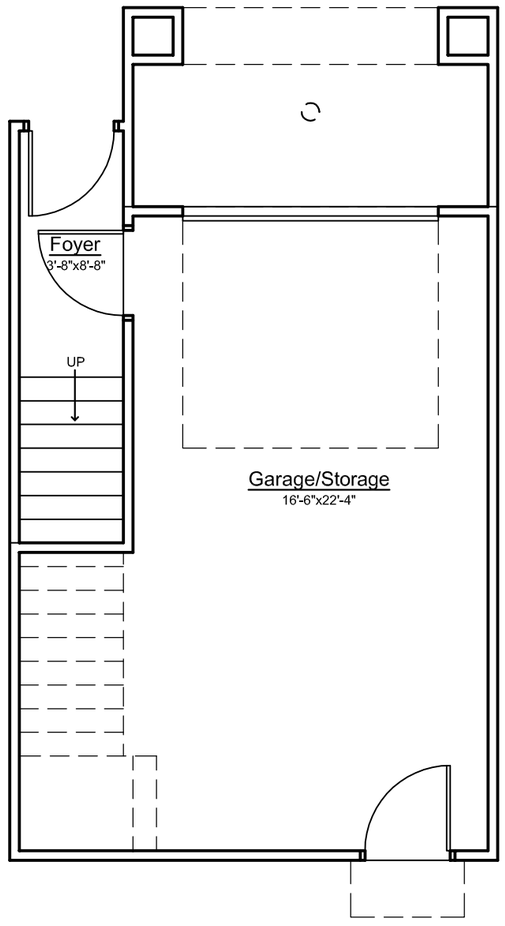


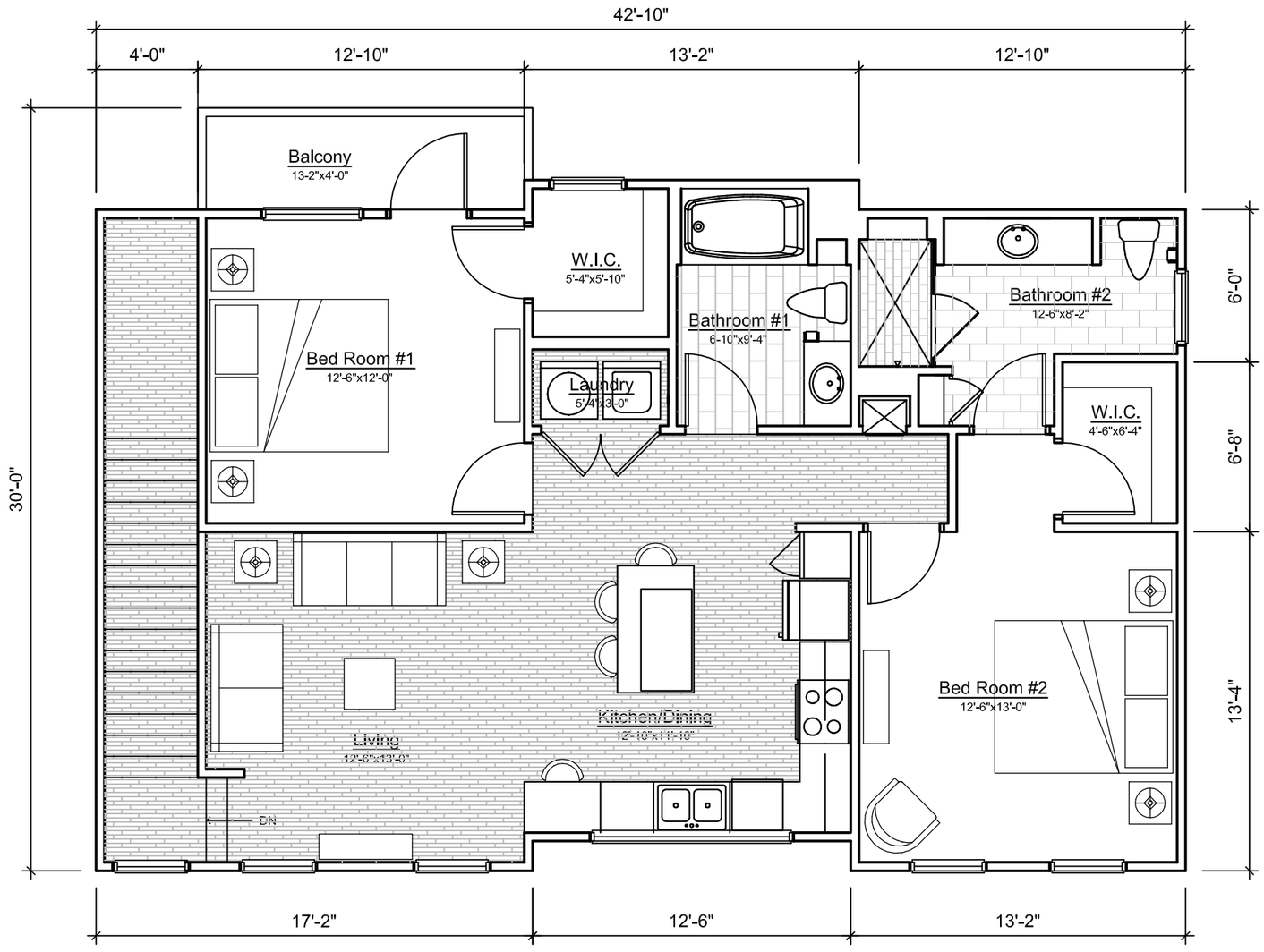
FUGLEBERG KOCH

EPOCH RESIDENTIAL™ NORTH PARCEL UNIT PLANS
2016-05-09

THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705




GRAPHIC SCALE

4 0 1 2 4

( IN INCHES )
3/16" = 1'-0"

KENNETH LINEHAN REGISTERED ARCHITECT DEPARTMENT OF AGRICULTURE COMMERCE TO No. 10541 STATE OF TENNESSEE
2016.05.09

## UNIT N-B3 - 2 BED / 2 BATH CARRIAGE HOME

SCALE: 3/16" = 1'-0"

| | | |
|---|---|---|
| LIVING | = | 1,114 S.F. |
| BALCONY | = | 52 S.F. |
| GARAGE | = | 348 S.F. |
| TOTAL | = | 1,514 S.F. |


PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™ NORTH PARCEL UNIT PLANS | THE EPOCH DEVELOPMENT

2016-05-09 | FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
DEPARTMENT OF AGRICULTURE
COMMERCE
NO. 10541
STATE OF TENNESSEE
2016.05.09

GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1/16" = 1'-0"

ELEVATION

NORTH PARCEL

PAGE 29

PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# BUILDING ELEVATIONS

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
DEPARTMENT OF AGRICULTURE
COMMERCE
NO. 105419
STATE OF TENNESSEE
2016.05.09

SIDE ELEVATION

NORTH PARCEL

GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1/16" = 1'-0"



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

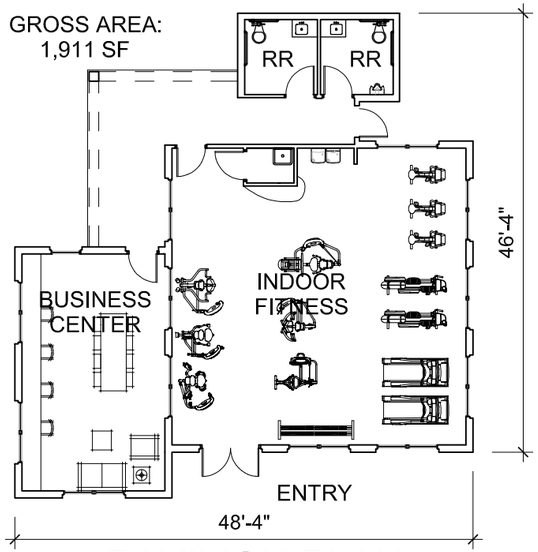
# BUILDING ELEVATIONS

2016-05-09

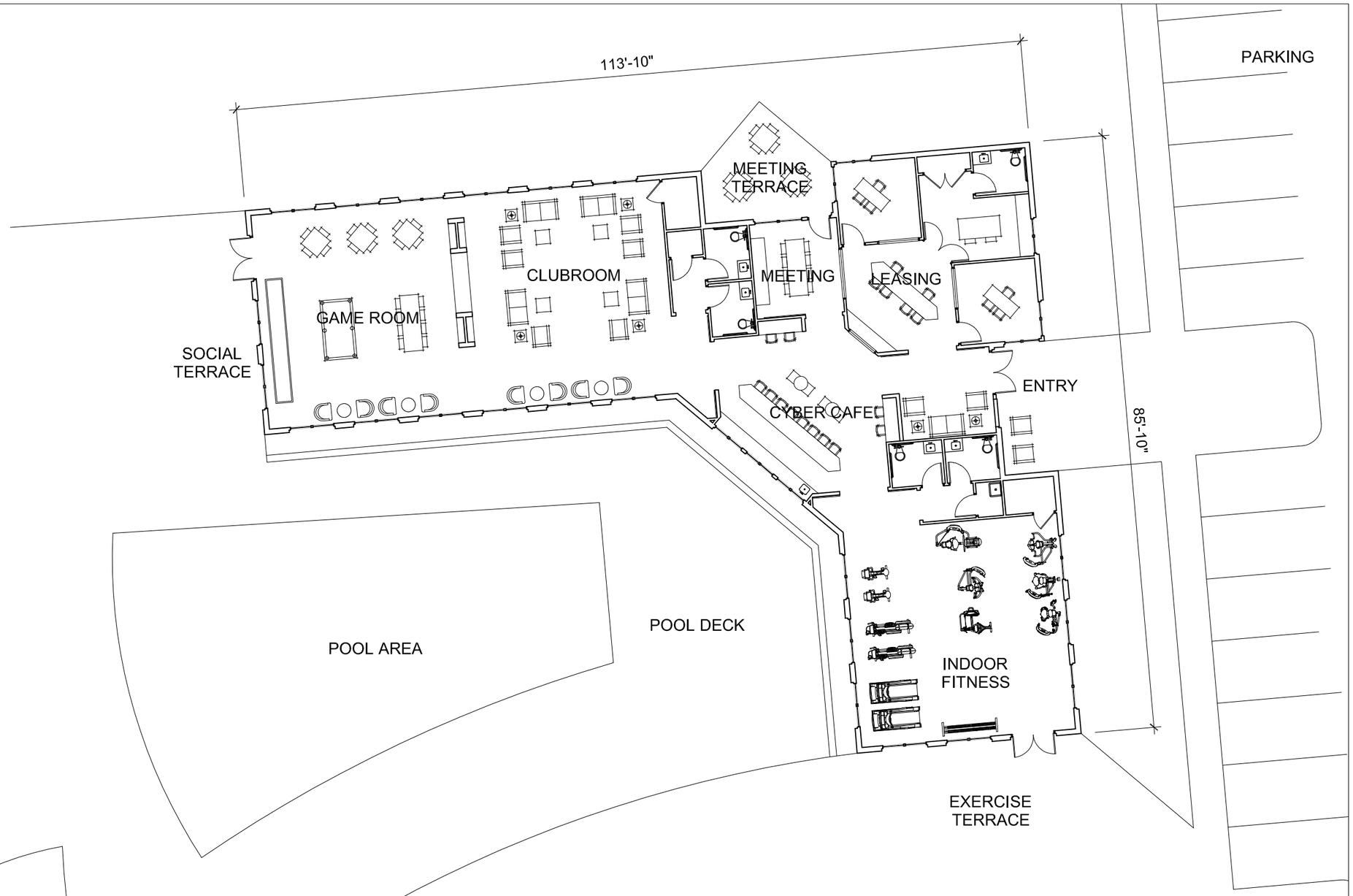
# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705




# PAVILION PLAN
# NORTH PARCEL




KENNETH LINEHAN
REGISTERED ARCHITECT
DEPARTMENT OF AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09

GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1/16" = 1'-0"

GROSS AREA - 5,370 SF

# SOUTH PARCEL

PAGE 31

PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# CLUBHOUSE PLAN
2016-05-09

# THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

GRAPHIC SCALE

8 0 2 4 8

( IN INCHES )
1/8" = 1'-0"

AMENITY / CLUBHOUSE CENTER
ELEVATION

SOUTH PARCEL

KENNETH LINEHAN
REGISTERED ARCHITECT
No. 105419
STATE OF TENNESSEE
2016.05.09

PAGE 32

PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# BUILDING ELEVATIONS

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC 2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 10541
STATE OF TENNESSEE
2016.05.09

POOL PAVILION ELEVATION

NORTH PARCEL

GRAPHIC SCALE

8 0 2 4 8

( IN INCHES )
1/8" = 1'-0"



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

BUILDING ELEVATIONS
2016-05-09

THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 10541
STATE OF TENNESSEE
2016.05.09

VIEW LOOKING WEST

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09

VIEW LOOKING EAST

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
DEPARTMENT OF AGRICULTURE AND COMMERCE
No. 10541
STATE OF TENNESSEE
2016.05.09

VIEW LOOKING SOUTH

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59



FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 10541
STATE OF TENNESSEE
2016.05.09

VIEW LOOKING EAST

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59


PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 10541
STATE OF TENNESSEE
2016.05.09

VIEW LOOKING EAST ON OAK MEADOW DR.

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE

2016.05.09

VIEW LOOKING EAST ON OAK MEADOW DR.

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 10541
STATE OF TENNESSEE
2016.05.09

VIEW LOOKING SOUTHEAST ON OAK MEADOW DR.

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 10541
STATE OF TENNESSEE
2016.05.09

VIEW LOOKING SOUTHWEST ON OAK MEADOW DR.

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09

VIEW LOOKING SOUTHWEST ON OAK MEADOW DR.

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09

VIEW LOOKING NORTHWEST ON OAK MEADOW DR.

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 10541
STATE OF TENNESSEE
2016.05.09

VIEW LOOKING SOUTHWEST

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59



FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

KENNETH LINEHAN
REGISTERED ARCHITECT
AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE
2016.05.09

VIEW LOOKING NORTH

MOVEABLE IMAGE WEBSITE: http://view.mylumion.com/?p=89ufkq59



PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# PROJECT PERSPECTIVES

2016-05-09

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

F i s c h b a c h
Transportation Group, LLC
Traffic Engineering and Planning

# Traffic Impact Study

# Epoch Apartments
# Oak Meadow Drive
# Franklin, TN

Prepared May 2016
(Originally Prepared April 2016)
For Epoch Residential

**FTG, LLC**
**P.O. Box 682736**
**Franklin, TN 37068**
**(615) 771-8022 phone**
**Gillian@FTGtraffic.com**

**Traffic Impact Study**

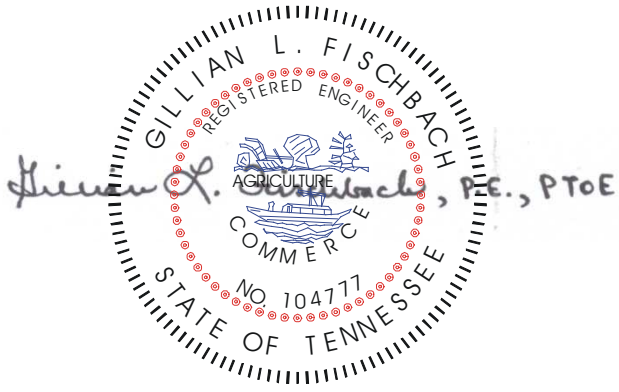
# Epoch Apartments
# Oak Meadow Drive

## Franklin, Tennessee

**Prepared May 2016**
**(Originally Prepared April 2016)**


**PREPARED FOR:**
Epoch Residential
359 Carolina Avenue
Winter Park, FL 32789

**PREPARED BY:**
Ms. Gillian L. Fischbach, P.E., PTOE
Fischbach Transportation Group (FTG, LLC)
P.O. Box 682736
Franklin, TN 37068
Phone: (615) 771-8022
FTG Project Number: 10728

## Table of Contents

1. INTRODUCTION ..... 4
2. PROJECT DESCRIPTION ..... 5
FIGURE 1. LOCATION OF THE PROJECT SITE ..... 6
FIGURE 2A. CURRENT PROJECT SITE PLAN (SOUTHERN APARTMENT SITE) ..... 7
FIGURE 2B. CURRENT PROJECT SITE PLAN (NORTHERN APARTMENT SITE) ..... 8
FIGURE 2C. SITE PLAN FOR FUTURE COMMERCIAL DEVELOPMENT ..... 9
3. EXISTING TRAFFIC VOLUMES ..... 10
FIGURE 3. EXISTING LANEAGE WITHIN THE STUDY AREA ..... 11
FIGURE 4. EXISTING PEAK HOUR TRAFFIC VOLUMES ..... 12
TABLE 1. DESCRIPTIONS OF LOS FOR SIGNALIZED INTERSECTIONS ..... 13
TABLE 2. DESCRIPTIONS OF LOS FOR UNSIGNALIZED INTERSECTIONS ..... 14
TABLE 3. EXISTING PEAK HOUR LEVELS OF SERVICE ..... 15
4. PROJECTION OF BACKGROUND TRAFFIC VOLUMES ..... 18
TABLE 4. HISTORICAL TRAFFIC VOLUMES IN THE STUDY AREA ..... 18
FIGURE 5A. INITIAL YEAR 2018 BACKGROUND TRAFFIC VOLUMES ..... 19
TABLE 5. TRIP GENERATION (SOMERBY ASSISTED LIVING FACILITY) ..... 20
FIGURE 5B. DIRECTIONAL DISTRIBUTION OF ASSISTED LIVING TRAFFIC ..... 21
FIGURE 5C. PEAK HOUR TRAFFIC GENERATED BY ASSISTED LIVING ..... 22
FIGURE 5D. FINAL BACKGROUND TRAFFIC VOLUMES ..... 23
TABLE 5. BACKGROUND PEAK HOUR LEVELS OF SERVICE ..... 24
5. IMPACTS OF PROPOSED DEVELOPMENT ..... 27
5.1 TRIP GENERATION ..... 27
TABLE 6A. TRIP GENERATION FOR THE PROPOSED PROJECT ..... 27
TABLE 6B. TRIP GENERATION FOR ALTERNATIVE LAND USES ..... 28
5.2 TRIP DISTRIBUTION AND TRAFFIC ASSIGNMENT ..... 29
FIGURE 6A. DIRECTIONAL DISTRIBUTION OF SITE TRAFFIC (SOUTHERN SITE) ..... 30
FIGURE 6B. DIRECTIONAL DISTRIBUTION OF SITE TRAFFIC (NORTHERN SITE) ..... 31
FIGURE 6C. DIRECTIONAL DISTRIBUTION OF SITE TRAFFIC (FUTURE RETAIL) ..... 32
FIGURE 7A. PEAK HOUR SITE TRAFFIC (SOUTHERN SITE) ..... 33
FIGURE 7B. PEAK HOUR SITE TRAFFIC (NORTHERN SITE) ..... 34
FIGURE 7C. PEAK HOUR SITE TRAFFIC (FUTURE RETAIL) ..... 35

FIGURE 7D. TOTAL PEAK HOUR SITE TRAFFIC (TOTAL BOTH SITES) .....36
5.3 CAPACITY ANALYSES.....37
FIGURE 8. TOTAL PROJECTED PEAK HOUR TRAFFIC VOLUMES.....38
TABLE 7. PROJECTED PEAK HOUR LEVELS OF SERVICE.....39
5.4 CAPACITY ANALYSIS COMPARISON .....43
TABLE 8. COMPARISON OF AM PEAK HOUR LEVELS OF SERVICE .....45
TABLE 9. COMPARISON OF PM PEAK HOUR LEVELS OF SERVICE.....45
6. CONCLUSIONS AND RECOMMENDATIONS .....46
APPENDIX A.....49
APPENDIX B.....53
APPENDIX C.....62
APPENDIX D.....205

## 1. INTRODUCTION

This traffic study has been prepared in order to identify the traffic impacts of a multi-family residential development that is proposed to be constructed on the north and south sides of Oak Meadow Drive, east of S. Royal Oaks Boulevard, in Franklin, Tennessee.

For the purposes of this study, existing and background traffic volumes were established, and capacity analyses were conducted for these conditions. Also, trip generation calculations were performed, and the trips which are expected to be generated by the proposed project were distributed to the roadway system and added to the background traffic volumes. The roadways and intersections which provide access to the site were then re-evaluated to determine the traffic impacts of the proposed project. Access needs for the project were evaluated, and the necessary roadway and/or traffic control improvements were identified. This report presents the results of these analyses and the subsequent recommendations.

It is important to note that the scope of this Traffic Impact Study was provided by the City of Franklin Engineering Department and their third-party private consultant, Neel-Schaffer, Inc. The approved scope is included in in Appendix A.

## 2. PROJECT DESCRIPTION

The location of the proposed project is shown in Figure 1. As shown, the project site is located on the north and south sides of Oak Meadow Drive, east of S. Royal Oaks Boulevard, in Franklin, Tennessee. The current project site plan is shown in Figures 2A and 2B. As shown, the proposed plan includes 98 apartments on the south side of Oak Meadow Drive and 204 apartments on the north side of Oak Meadow Drive.

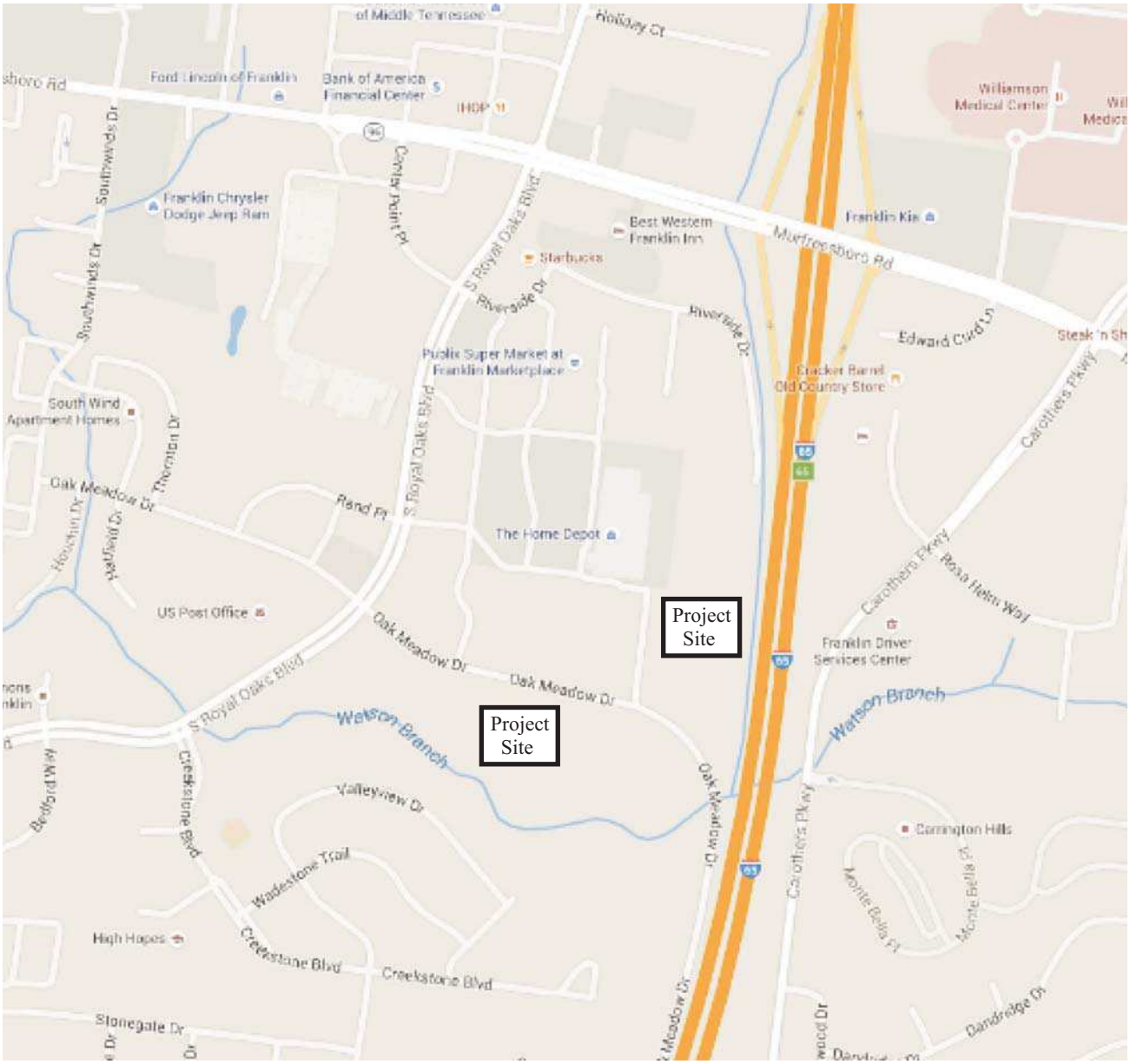
Access for the southern portion of the site will be provided at two locations on Oak Meadow Drive, and access for the northern portion of the site will be provided at one location on the eastern access for the Home Depot shopping center on the north side of Oak Meadow Drive. Also, secondary access for the northern portion of the site will be provided at the existing terminus of Riverside Drive.

Also, it is possible that, in the future, a commercial site will be developed in the southeast quadrant of the intersection of S. Royal Oaks Boulevard and Oak Meadow Drive. For the purposes of this study, it was assumed that 15,000 sq.ft. of specialty retail space will be constructed on this site as shown in Figure 2C. Also, for the purposes of this study, it was assumed that sole access for the future commercial site will be provided on Oak Meadow Drive at the western access proposed for the apartments.

In large part, economic and market considerations will dictate the pace and timing with which the proposed project is actually completed. The analyses conducted within this study are based on the estimation that the entire project will be completed within two years.

.

F i s c h b a c h
Transportation Group, LLC
**Traffic Engineering and Planning**




N

**No Scale**

**Figure 1.**
**Location of the Project Site**

| LINE TABLE | | |
|---|---|---|
| LINE | BEARING | DISTANCE |
| L1 | N83°48'10"W | 161.22' |
| L2 | S61°46'08"W | 106.65' |
| L3 | S86°48'30"W | 198.12' |
| L4 | N65°28'52"W | 120.02' |
| L5 | N24°43'04"W | 244.21' |
| L6 | N84°36'00"W | 115.35' |
| L7 | N52°04'01"W | 87.70' |
| L8 | N57°18'12"W | 163.19' |
| L9 | N29°52'55"W | 101.80' |
| L10 | N74°02'09"W | 41.15' |
| L11 | N48°56'27"W | 137.25' |
| L12 | S88°57'25"W | 67.60' |
| L13 | S10°32'54"W | 26.12' |

| LINE TABLE | | |
|---|---|---|
| LINE | BEARING | DISTANCE |
| L14 | S74°19'35"W | 89.75' |
| L15 | N75°22'06"W | 55.08' |
| L16 | N62°35'03"W | 10.27' |
| L17 | N39°40'55"E | 27.30' |
| L18 | S89°07'57"E | 31.47' |
| L19 | N25°32'12"E | 70.78' |
| L20 | N10°00'40"W | 49.37' |
| L21 | N54°59'41"E | 103.02' |
| L22 | N40°36'36"E | 74.71' |
| L23 | N53°28'05"E | 164.68' |

| CURVE TABLE | | | | | | |
|---|---|---|---|---|---|---|
| CURVE | RADIUS | LENGTH | DELTA | TANGENT | CHORD | CHD BRG |
| C5 | 820.00' | 330.94' | 23°07'24" | 167.75 | 328.69' | S65°21'21"E |
| C6 | 537.96' | 464.57' | 49°28'46" | 247.89 | 450.27' | S52°10'40"E |

TOTAL OF 98 UNITS ON SOUTH PARCEL

0 40 80 160
GRAPHIC SCALE

N

CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM

# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

COF #6086 FRANKLIN, TN

REVISIONS

| No. | DATE |
|---|---|
| | |

04/07/16 15001

# C2.2

SOUTH SITE DEVELOPMENT PLAN

SOUTH PROPERTY
17.33 ACRES AFTER
SUBDIVISION
98 UNITS

ASSISTED LIVING CENTER
(UNDER CONSTRUCTION)
ZONE GC

HOME
DEPOT
ZONE GC

ELK LODGE
ZONE GO

40 FT FRONT SETBACK

EXISTING 20' PUDE

52 UNITS
4 STORY

44 UNITS
4 STORY

44 UNITS
4 STORY

60 UNITS
4 STORY

2 UNITS
2 STORY

2 UNITS
2 STORY

TRASH
COMPACTOR AND
ENCLOSURE

MAINTENANCE
BUILDING

OFFICE
BUILDINGS
ZONE GC

EXISTING 20' PUDE

40 FT FRONT SETBACK

STORMWATER
DETENTION/TREATMENT
AREA

40 FT INTERSTATE
BUFFER

EXISTING TVA
EASEMENT

NORTH PROPERTY
13.06 ACRES
204 UNITS

EXISTING 20' PUDE

RIVERSIDE DR.

INTERSTATE-65

TOTAL OF 204 UNITS ON NORTH PARCEL

| CURVE TABLE | | | | | | |
|---|---|---|---|---|---|---|
| CURVE | RADIUS | LENGTH | DELTA | TANGENT | CHORD | CHD BRG |
| C1 | 50.00' | 123.89' | 141°58'19" | 145.10 | 94.54' | S77°58'06"W |
| C2 | 607.96' | 443.66' | 41°48'42" | 232.23 | 433.88' | N51°57'06"W |
| C3 | 11300.00' | 470.04' | 2°23'00" | 235.06 | 470.01' | S05°13'09"W |
| C4 | 11300.00' | 112.73' | 0°34'18" | 56.37 | 112.73' | S06°41'48"W |

0 30 60 120
GRAPHIC SCALE

N


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


ENGINEERING CRUNK

WILSON CRUNK
REGISTERED
LANDSCAPE
ARCHITECT
AGRICULTURE
5/16
No. 114180
STATE OF TENNESSEE

# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

COF #6086 FRANKLIN, TN

REVISIONS

| No. | DATE |
|---|---|

04/07/16 15001

C2.1

NORTH SITE
DEVELOPMENT
PLAN

## SITE DATA TABLE

| |
|---|
| 15,000 SQ-FT RETAIL SPACE |
| REQUIRED PARKING (3 SPACES PER 1,000 SQ-FT) = 45 |
| PROVIDED PARKING = 55 SPACES |
| PROPOSED PROPERTY AREA = 3.5± ACRES |

S. ROYAL OAKS BLVD

OAK MEADOWS DR.

BUILDING SETBACK

434.01

88.80

220.09

New Left Turn Lane

Existing driveway serving Post Office

Full access intersection proposed

We understand this connection may not be possible, which is why we are proposing access into the Epoch Development site.

60.0 FT

15,000 SQ-FT RETAIL BUILDING

DETENTION AREA

DUMPSTER

RETAINING WALL

60-FT STREAM BUFFER

EXISTING STREAM

PROPOSED PROPERTY LINE

Epoch Development Site

100-YR FLOOD PLAIN

WATSON BRANCH

0 10 20 30 60

GRAPHIC SCALE

N


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


# PROPOSED RETAIL SITE
AT
ROYAL OAKS & OAK MEADOWS DRIVE
FRANKLIN, TN

REVISIONS

| No. | DATE |
|---|---|

04/27/15 15001

C1.0

SCHEMATIC SITE PLAN OVERALL

# 3. EXISTING TRAFFIC VOLUMES

In order to quantify the impact of the traffic that will be generated by the proposed project, peak hour traffic volumes were counted at the following locations:

1. Oak Meadow Drive and the project accesses
2. S. Royal Oaks Boulevard and Oak Meadow Drive
3. S. Royal Oaks Boulevard and Rand Place / Access for Home Depot
4. S. Royal Oaks Boulevard and Riverside Drive / Center Point Place

Also, the City of Franklin requested that peak hour traffic counts be collected for signal timing purposes at the following intersections:

5. Murfreesboro Road and Royal Oaks Boulevard
6. Murfreesboro Road and the Ramps for Southbound I-65
7. Murfreesboro Road and the Ramps for Northbound I-65

This data was collected during the morning and afternoon peak hours on typical weekdays in February 2016 when schools were in session. The raw traffic volumes are included in Appendix B. The existing laneage at the intersections within the study area is shown in Figure 3, and the existing peak hour traffic volumes are shown in Figure 4.

Using the existing peak hour traffic volumes shown in Figure 4, capacity analyses were conducted for the intersections counted. Specifically, in order to identify current peak hour levels of operation within the study area, the capacity calculations were performed according to the methods outlined in the Highway Capacity Manual 2010 (HCM2010). These analyses result in the determination of a Level of Service (LOS), which is a measure of evaluation is used to describe how well an intersection or roadway operates. LOS A represents free flow traffic operations, and LOS F suggests that the traffic demand exceeds the available capacity. In an urbanized area, LOS D is typically considered to be the minimum acceptable LOS. Table 1 presents the descriptions of LOS for signalized intersections, and Table 2 presents the descriptions of LOS for unsignalized intersections.

It is important to note that the City of Franklin Engineering Department provided the Synchro software files that were used to identify existing operations at the signalized intersections within the study area. Specifically, the files were updated to include the February 2016 traffic volumes. Also, the files were updated to reflect the recently-approved City ordinance that prohibits right-turns-on-red for the northbound right turns on S. Royal Oaks Boulevard at Murfreesboro Road.

The results of the capacity analyses for the existing peak hour traffic volumes are shown in Table 3, and Appendix C includes the capacity analyses worksheets.

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning

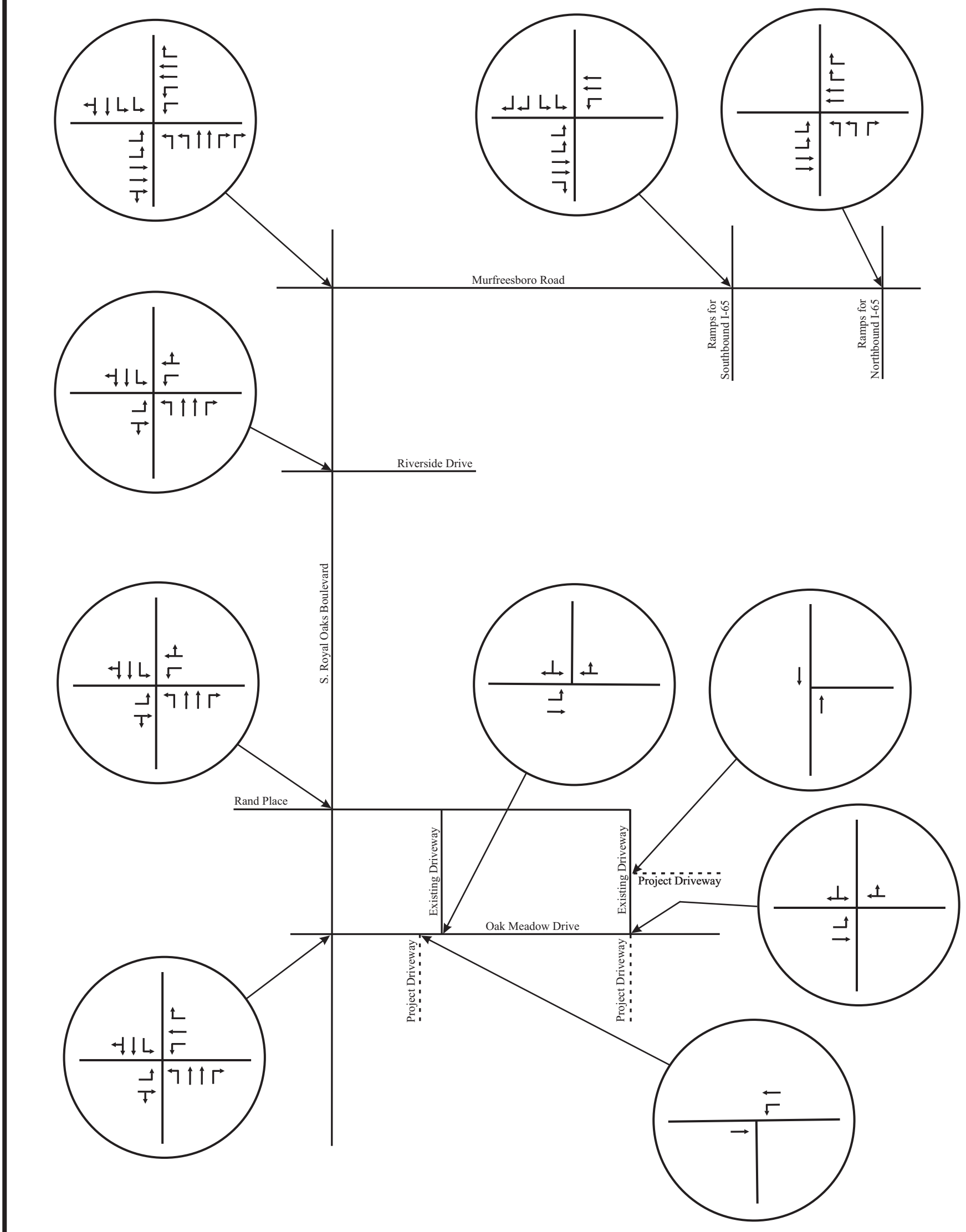
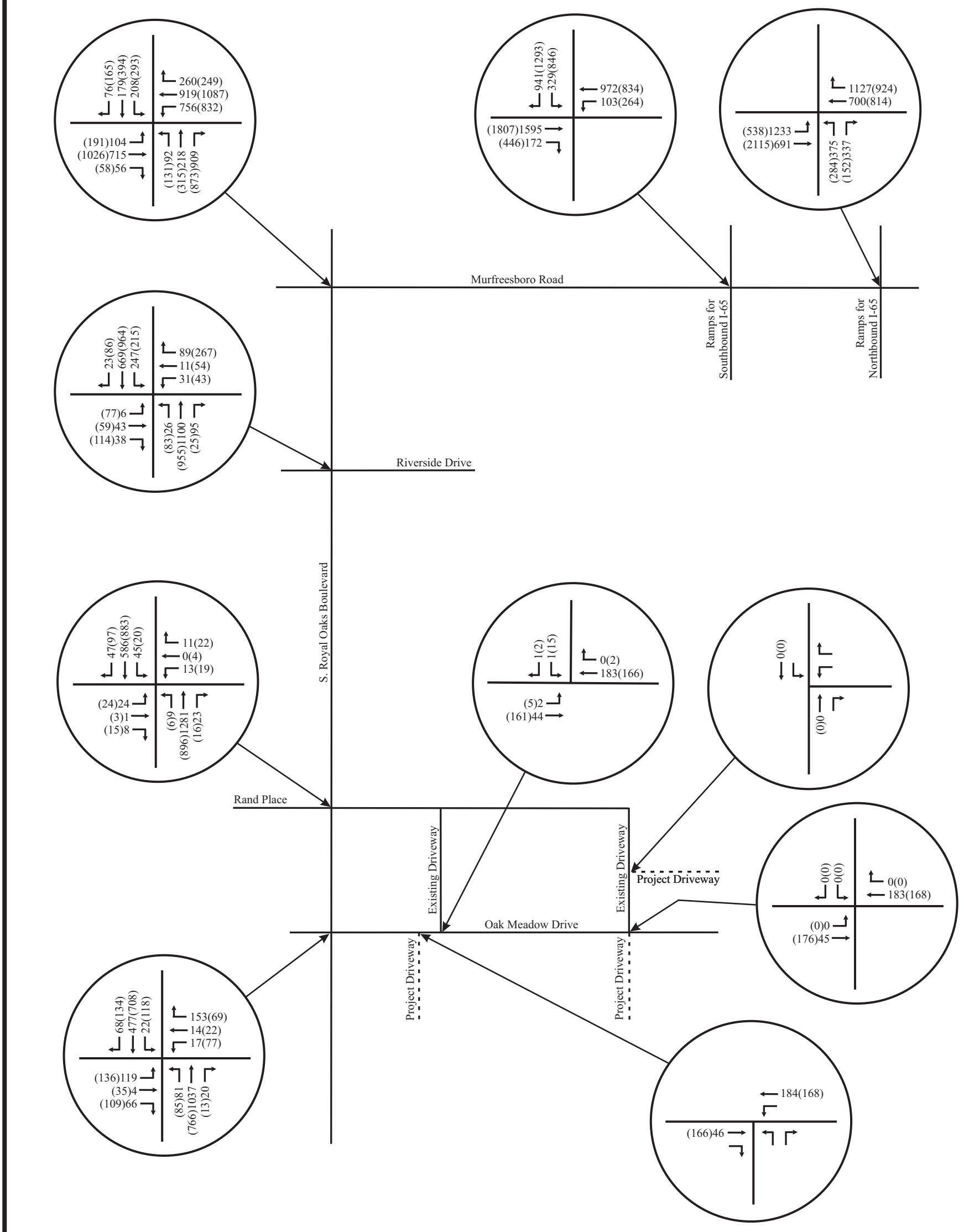



**Figure 3.**
**Existing Laneage at the Intersections within the Study Area**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning




**No Scale**

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

**Figure 4.**
**Existing Peak Hour Traffic Volumes within the Study Area**

**TABLE 1. DESCRIPTIONS OF LOS FOR SIGNALIZED INTERSECTIONS**

| Level of Service | Description | Average Control Delay per Vehicle (sec) |
|---|---|---|
| A | Operations with very low control delay. Progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay. | ≤ 10 |
| B | Operations with stable flows. This generally occurs with good progression, short cycle lengths, or both. More vehicles stop than for LOS A, causing higher levels of average delay. | > 10 and ≤ 20 |
| C | Operations with stable flow. Occurs with fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, although many still pass through the intersection without stopping. | > 20 and ≤ 35 |
| D | Approaching unstable flow. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop. | > 35 and ≤ 55 |
| E | Unstable flow. In many cases, this is considered to be the limit for acceptable delay. These high delays generally indicate poor progression, long cycle lengths, and high v/c ratios. | > 55 and ≤ 80 |
| F | Unacceptable delay. This condition often occurs with oversaturation or with high v/c ratios. Poor progression and long cycle lengths may also cause such delay levels. | > 80 |

Source: Highway Capacity Manual 2010 (HCM2010)

**TABLE 2. DESCRIPTIONS OF LOS FOR UNSIGNALIZED INTERSECTIONS**

| Level of Service | Description | Average Control Delay (sec/veh) |
|---|---|---|
| A | Minimal delay | ≤ 10 |
| B | Brief delay | > 10 and ≤ 15 |
| C | Average delay | > 15 and ≤ 25 |
| D | Significant delay | > 25 and ≤ 35 |
| E | Long delay | > 35 and ≤ 50 |
| F | Extreme delay | > 50 |

Source: Highway Capacity Manual 2010 (HCM 2010)

**TABLE 3. EXISTING PEAK HOUR LEVELS OF SERVICE**

| INTERSECTION | TURNING MOVEMENT | AM PEAK HOUR | | PM PEAK HOUR | |
|---|---|---|---|---|---|
| | | LEVEL OF SERVICE | 95TH %-ILE QUEUE | LEVEL OF SERVICE | 95TH %-ILE QUEUE |
| **Oak Meadow Drive and the Eastern Access for Home Depot** | Eastbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Southbound Left and Right Turns | LOS A | 1 veh | LOS A | 1 veh |
| **Oak Meadow Drive and the Western Access for Home Depot** | Eastbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Southbound Left and Right Turns | LOS A | 1 veh | LOS B | 1 veh |
| **S. Royal Oaks Boulevard and Oak Meadow Drive** (signalized) | Northbound Left Turns | LOS A | 32 feet | LOS B | 47 feet |
| | Northbound Thrus | LOS B | 308 feet | LOS B | 268 feet |
| | Northbound Right Turns | LOS A | 0 feet | LOS A | 0 feet |
| | Southbound Left Turns | LOS A | 12 feet | LOS A | 64 feet |
| | Southbound Thrus/Right Turns | LOS A | 130 feet | LOS C | 356 feet |
| | Eastbound Left Turns | LOS D | 120 feet | LOS D | 137 feet |
| | Eastbound Thrus/Right Turns | LOS B | 13 feet | LOS C | 63 feet |
| | Westbound Left Turns | LOS C | 27 feet | LOS D | 82 feet |
| | Westbound Thrus | LOS D | 25 feet | LOS D | 35 feet |
| | Westbound Right Turns | LOS B | 88 feet | LOS A | 33 feet |
| | **Overall Intersection** | **LOS B** | | **LOS C** | |
| **S. Royal Oaks Boulevard and Rand Place / Home Depot Access** | Northbound Left Turns | LOS A | 1 veh | LOS B | 1 veh |
| | Southbound Left Turns | LOS B | 1 veh | LOS B | 1 veh |
| | Eastbound Left Turns | LOS D | 1 veh | LOS D | 1 veh |
| | Eastbound Thrus/Right Turns | LOS B | 1 veh | LOS B | 1 veh |

| | | | | | |
|---|---|---|---|---|---|
| | Westbound Left Turns | LOS E | 1 veh | LOS D | 1 veh |
| | Westbound Thrus/Right Turns | LOS B | 1 veh | LOS B | 1 veh |
| **S. Royal Oaks Boulevard and Riverside Drive / Center Point Place** (signalized) | Northbound Left Turns | LOS A | 11 feet | LOS B | 55 feet |
| | Northbound Thrus | LOS B | 320 feet | LOS C | 464 feet |
| | Northbound Right Turns | LOS A | 26 feet | LOS A | 0 feet |
| | Southbound Left Turns | LOS D | 161 feet | LOS C | 91 feet |
| | Southbound Thrus/Right Turns | LOS A | 85 feet | LOS A | 161 feet |
| | Eastbound Left Turns | LOS D | 18 feet | LOS F | 214 feet |
| | Eastbound Thrus/Right Turns | LOS D | 99 feet | LOS C | 141 feet |
| | Westbound Left Turns | LOS E | 58 feet | LOS D | 70 veh |
| | Westbound Thrus/Right Turns | LOS B | 24 feet | LOS D | 255 veh |
| | **Overall Intersection** | **LOS B** | | **LOS C** | |
| **Murfreesboro Road and Royal Oaks Boulevard** (signalized) | Eastbound Left Turns | LOS E | 88 feet | LOS E | 144 feet |
| | Eastbound Thrus / Right Turns | LOS D | 310 feet | LOS D | 336 feet |
| | Westbound Left Turns | LOS D | 412 feet | LOS F | 499 feet |
| | Westbound Thrus | LOS D | 539 feet | LOS D | 492 feet |
| | Westbound Right Turns | LOS A | 80 feet | LOS B | 120 feet |
| | Northbound Left Turns | LOS E | 73 feet | LOS E | 103 feet |
| | Northbound Thrus | LOS D | 146 feet | LOS E | 218 feet |
| | Northbound Right Turns | LOS C | 567 feet | LOS D | 617 feet |
| | Southbound Left Turns | LOS E | 148 feet | LOS F | 242 feet |

| | | | | | |
|---|---|---|---|---|---|
| | Southbound Thrus / Right Turns | LOS D | 141 feet | LOS E | 398 feet |
| | **Overall Intersection** | **LOS D** | | **LOS E** | |
| **Murfreesboro Road and Ramps for Southbound I-65** (signalized) | Eastbound Thrus | LOS C | 330 feet | LOS E | 609 feet |
| | Eastbound Right Turns | LOS A | 51 feet | LOS C | 265 feet |
| | Westbound Left Turns | LOS E | 156 feet | LOS F | 465 feet |
| | Westbound Thrus | LOS B | 273 feet | LOS C | 337 feet |
| | Southbound Left Turns | LOS D | 164 feet | LOS D | 465 feet |
| | Southbound Right Turns | LOS E | 617 feet | LOS F | 1065 feet |
| | **Overall Intersection** | **LOS C** | | **LOS E** | |
| **Murfreesboro Road and Ramps for Northbound I-65** (signalized) | Eastbound Left Turns | LOS F | 913 feet | LOS E | 341 feet |
| | Eastbound Thrus | LOS A | 71 feet | LOS C | 370 feet |
| | Westbound Thrus | LOS D | 337 feet | LOS C | 406 feet |
| | Westbound Right Turns | LOS C | 502 feet | LOS A | 234 feet |
| | Northbound Left Turns | LOS F | 302 feet | LOS E | 201 feet |
| | Northbound Right Turns | LOS C | 225 feet | LOS D | 172 feet |
| | **Overall Intersection** | **LOS E** | | **LOS C** | |

# 4. PROJECTION OF BACKGROUND TRAFFIC VOLUMES

In order to account for the traffic growth which will occur within the study area because of typical growth, background traffic volumes were established for the intersections within the study area. Specifically, in order to account for typical growth within the study area, consideration was given to the historical traffic volumes near the project site. The Tennessee Department of Transportation (TDOT) conducts an annual count program throughout the state. This count program includes the annual collection of average daily traffic (ADT) counts at numerous fixed locations. As shown in Table 4, the daily traffic volumes within the study area have increased 2.65% per year since 2006. Based on this information, for the purposes of this study, the existing traffic volumes at the intersections within the study area were increased by 8% to represent initial background traffic volumes in the Year 2018, as shown in Figure 5A.

**TABLE 4. HISTORICAL TRAFFIC VOLUMES IN THE STUDY AREA**

| Year | Station 164 S. Royal Oaks Blvd ADT | Annual Growth | |
|---|---|---|---|
| 2006 | 18,274 | | |
| 2007 | 17,787 | -2.66% | |
| 2008 | 20,374 | 14.54% | |
| 2009 | 19,666 | -3.48% | |
| 2010 | 19,324 | -1.74% | |
| 2011 | 19,090 | -1.21% | |
| 2012 | 19,435 | 1.81% | |
| 2013 | 20,343 | 4.67% | |
| 2014 | 22,118 | 8.73% | **Overall Growth** |
| 2015 | 22,638 | 2.35% | **2.65%** |

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning

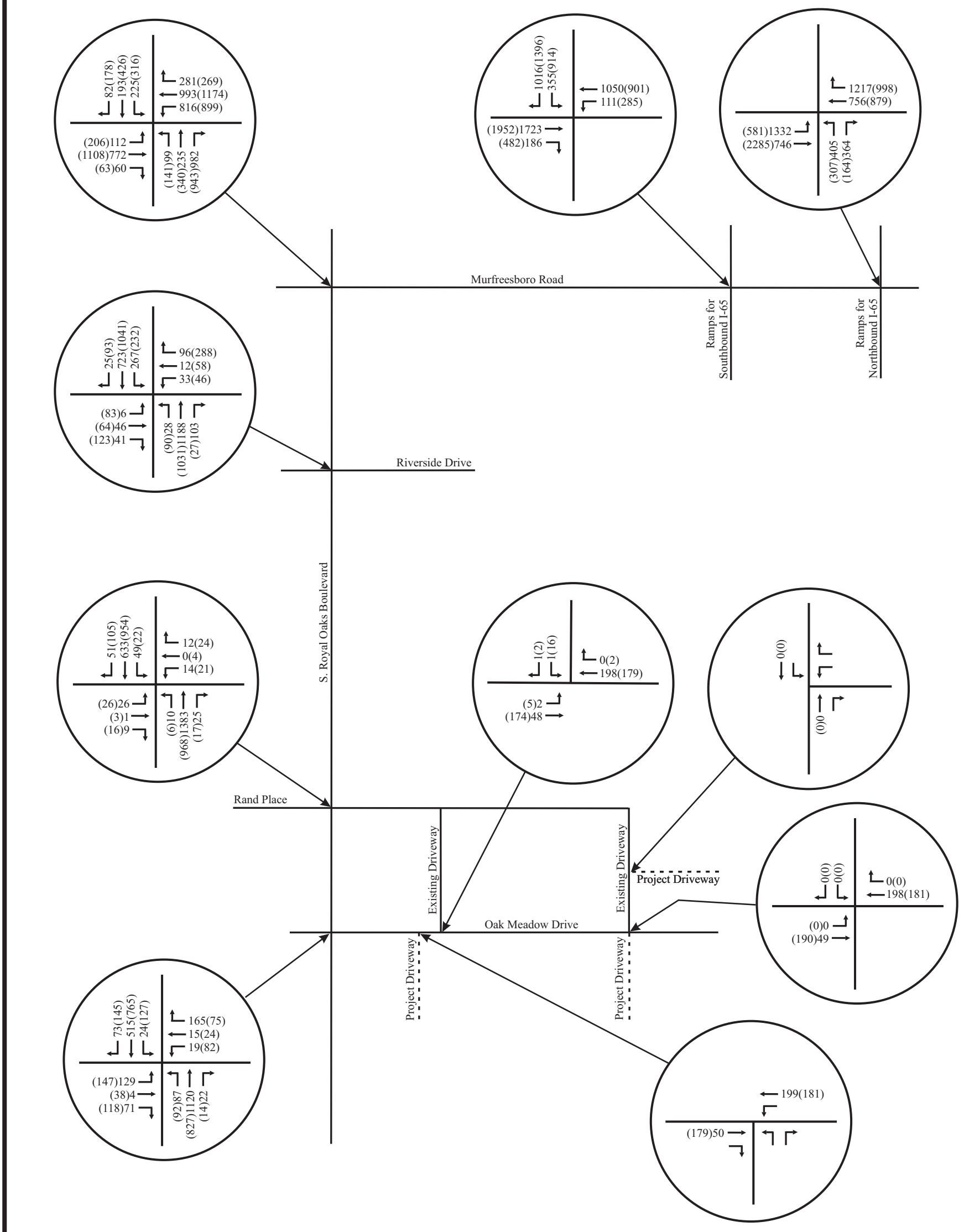



**Figure 5A.**
**Initial Background Peak Hour Traffic Volumes within the Study Area**

It is important to note that a day care center is under construction on the north side of S. Royal Oaks Boulevard at Mack Hatcher Parkway, southwest of the proposed project. It is likely that a significant portion of the traffic that will be generated by the day care center will be pass-by traffic that is already traveling on the S. Royal Oaks Boulevard corridor. The 8% growth rate applied to the existing traffic volumes will account for the additional traffic that will be generated by the day care center.

Also, it is important to note that an assisted living facility with 208 beds is under construction on the north side of Oak Meadow Drive, opposite the southern project site for the proposed project. For the purposes of this study, trip generation calculations were conducted in order to identify how much traffic is expected to be generated by the assisted living facility. Trip generation data for daily and peak hour trips were identified from Trip Generation, Ninth Edition, which was published by the Institute of Transportation Engineers (ITE) in 2012. Table 5 presents the daily and peak hour trip generations, and these calculations are included in Appendix D.

**TABLE 5. TRIP GENERATION (SOMERBY ASSISTED LIVING FACILITY)**

| LAND USE | SIZE | DAILY TRAFFIC | GENERATED TRAFFIC | | | |
|---|---|---|---|---|---|---|
| | | | AM PEAK HOUR | | PM PEAK HOUR | |
| | | | ENTER | EXIT | ENTER | EXIT |
| Assisted Living Facility (LUC 254) | 208 beds | 570 | 34 | 13 | 30 | 47 |

Figures 5B and 5C include the directional distribution and assignment of peak hour traffic volumes that are expected to be generated by the assisted living facility.

The peak hour traffic volumes shown in Figures 5B and 5C were added to the traffic volumes shown in Figure 5A in order to establish the final background traffic volumes shown in Figure 5D. Using the background peak hour traffic volumes, capacity analyses were conducted for the intersections within the study area. For these analyses, it was assumed that all existing laneage and traffic control will be maintained and no improvements will be provided. The results of the capacity analyses for the background peak hour traffic volumes are shown in Table 5, and Appendix C includes the capacity analyses worksheets. These analyses indicate that the background conditions are consistent with the existing conditions within the study area.

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning

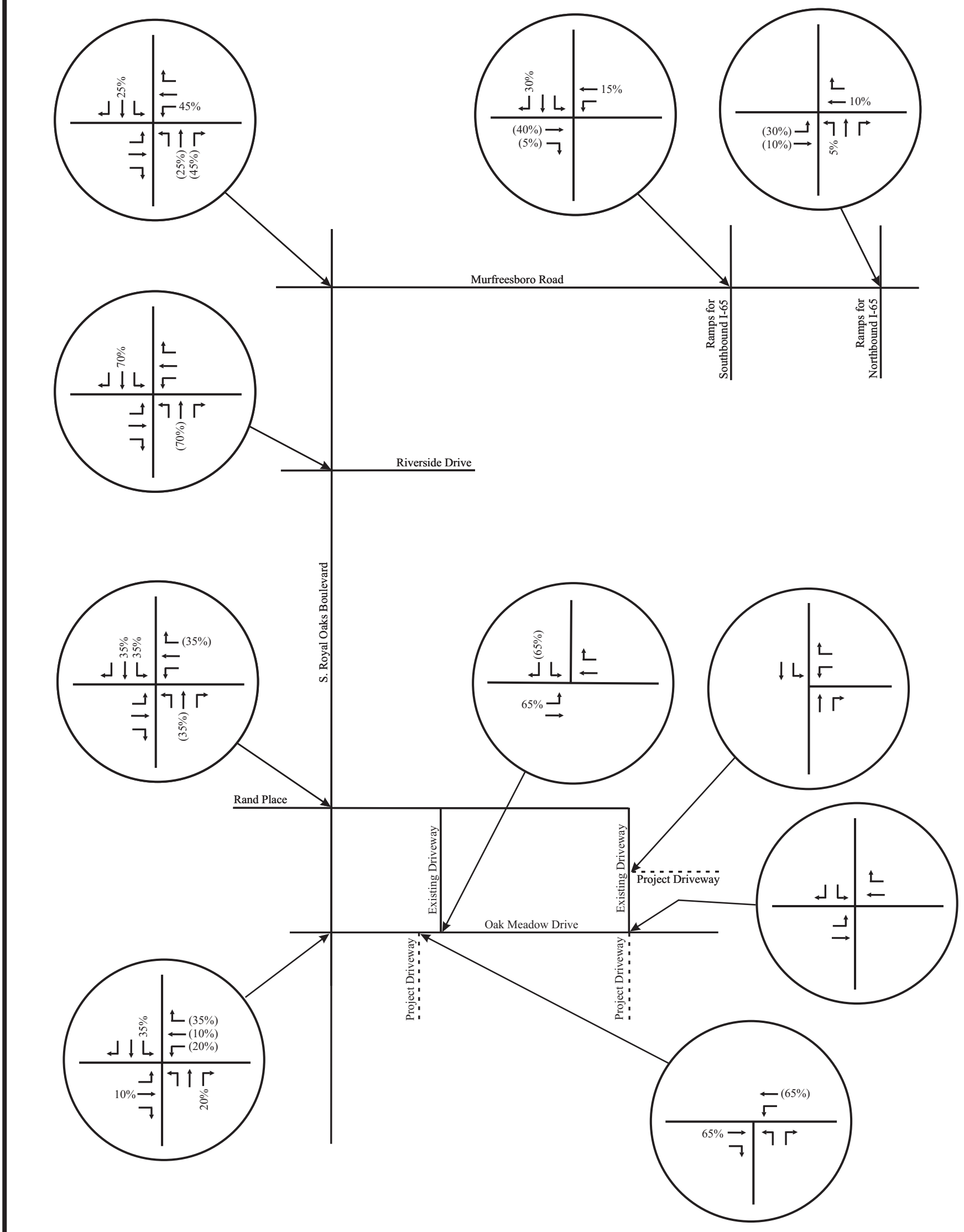
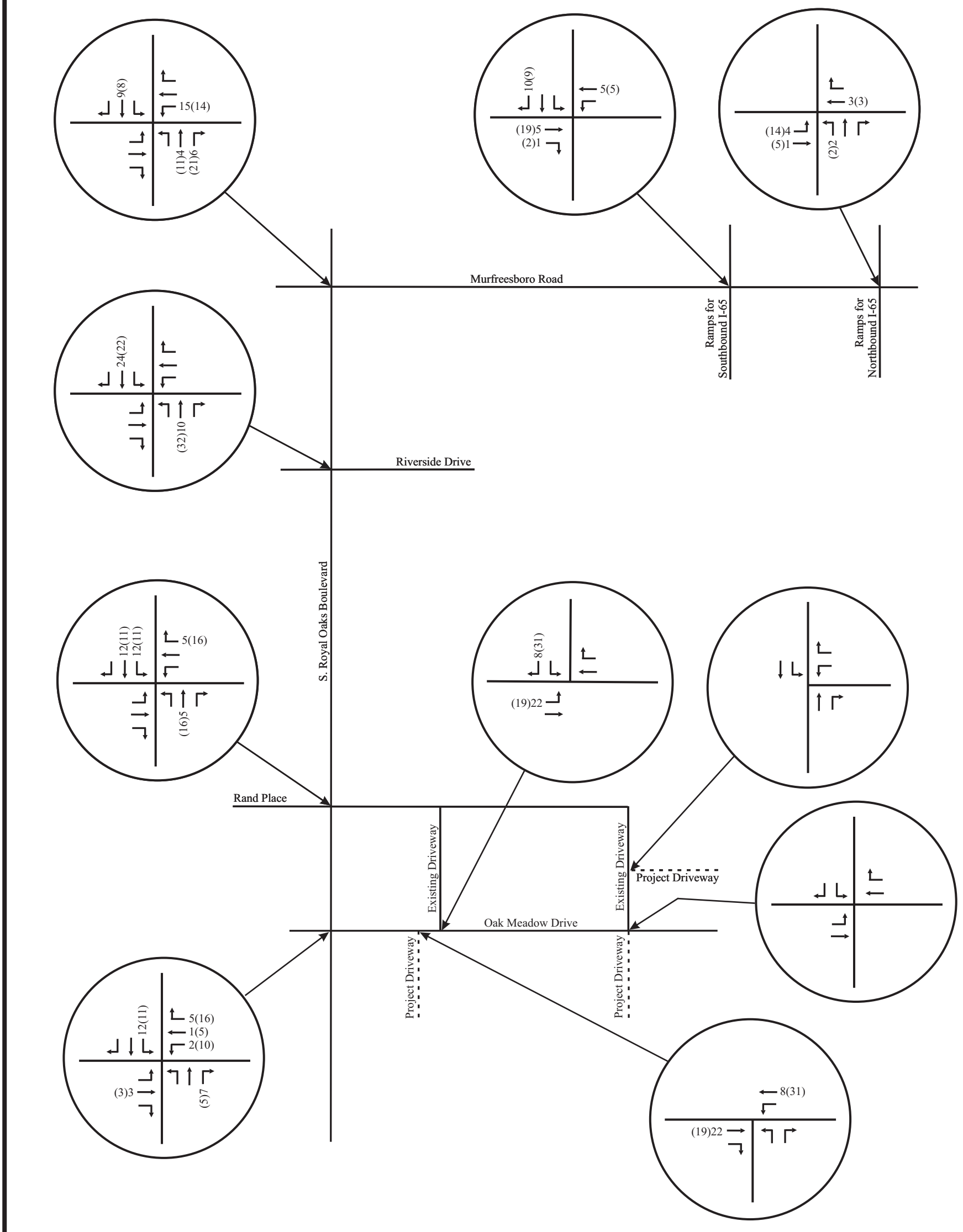



**Figure 5B.**
**Directional Distribution of Peak Hour Traffic Generated by the Somerby Assisted Living Facility**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning

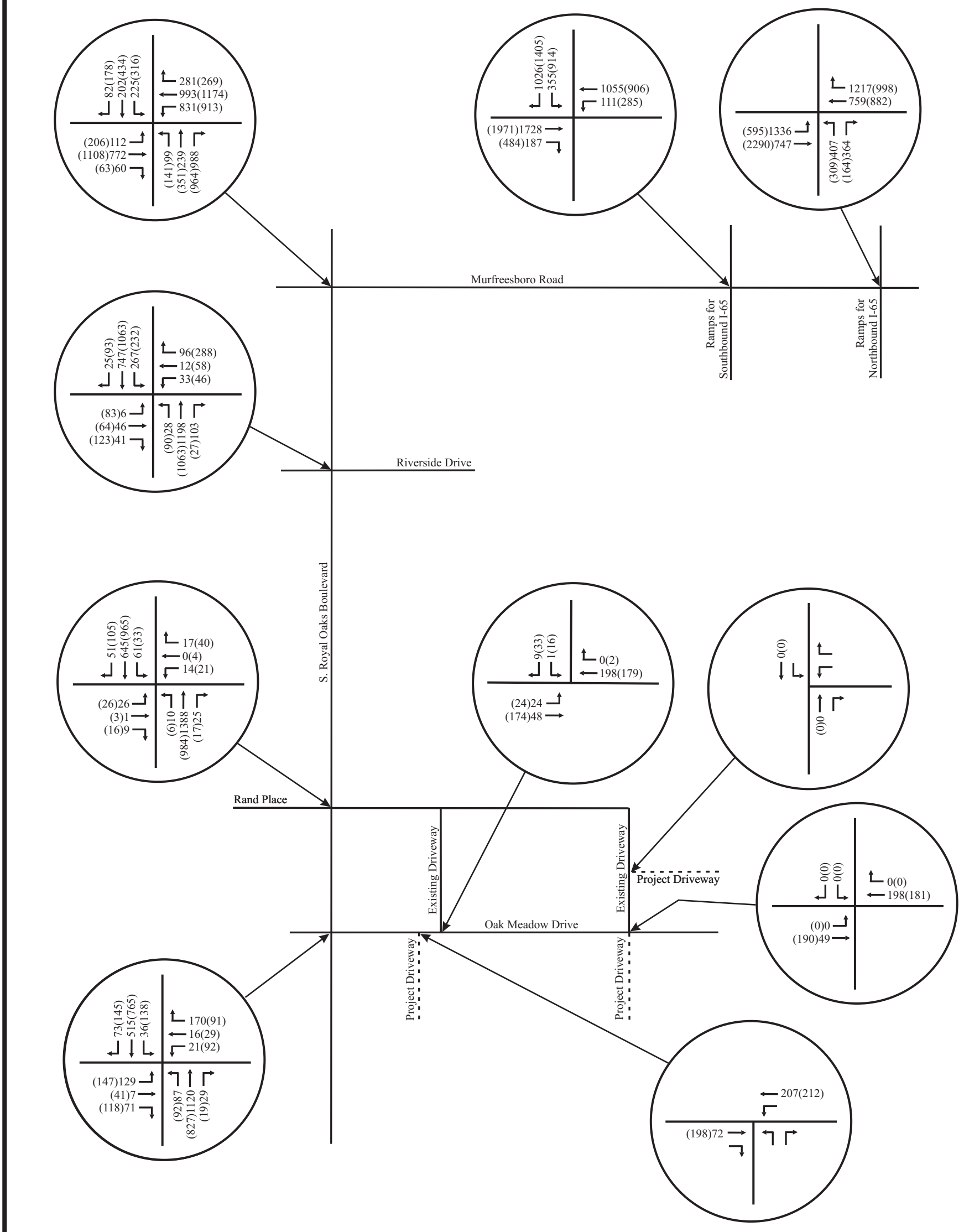



**No Scale**

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

**Figure 5C.**
**Peak Hour Traffic Generated by the Somerby Assisted Living Facility**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning




**No Scale**

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

**Figure 5D.**
**Final Background Peak Hour Traffic Volumes within the Study Area**

**TABLE 5. BACKGROUND PEAK HOUR LEVELS OF SERVICE**

| INTERSECTION | TURNING MOVEMENT | AM PEAK HOUR | | PM PEAK HOUR | |
|---|---|---|---|---|---|
| | | LEVEL OF SERVICE | 95TH %-ILE QUEUE | LEVEL OF SERVICE | 95TH %-ILE QUEUE |
| **Oak Meadow Drive and the Eastern Access for Home Depot** | Eastbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Southbound Left and Right Turns | LOS A | 1 veh | LOS A | 1 veh |
| **Oak Meadow Drive and the Western Access for Home Depot** | Eastbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Southbound Left and Right Turns | LOS A | 1 veh | LOS B | 1 veh |
| **S. Royal Oaks Boulevard and Oak Meadow Drive** (signalized) | Northbound Left Turns | LOS A | 35 feet | LOS C | 56 feet |
| | Northbound Thrus | LOS B | 351 feet | LOS B | 308 feet |
| | Northbound Right Turns | LOS A | 0 feet | LOS A | 0 feet |
| | Southbound Left Turns | LOS A | 18 feet | LOS B | 78 feet |
| | Southbound Thrus/Right Turns | LOS B | 147 feet | LOS C | 423 feet |
| | Eastbound Left Turns | LOS D | 127 feet | LOS D | 142 feet |
| | Eastbound Thrus/Right Turns | LOS B | 15 feet | LOS D | 80 feet |
| | Westbound Left Turns | LOS C | 30 feet | LOS D | 92 feet |
| | Westbound Thrus | LOS D | 27 feet | LOS D | 41 feet |
| | Westbound Right Turns | LOS B | 110 feet | LOS A | 37 feet |
| | **Overall Intersection** | **LOS B** | | **LOS C** | |
| **S. Royal Oaks Boulevard and Rand Place / Home Depot Access** | Northbound Left Turns | LOS A | 1 veh | LOS B | 1 veh |
| | Southbound Left Turns | LOS B | 1 veh | LOS B | 1 veh |
| | Eastbound Left Turns | LOS D | 1 veh | LOS D | 1 veh |
| | Eastbound Thrus/Right Turns | LOS B | 1 veh | LOS C | 1 veh |

| | | | | | |
|---|---|---|---|---|---|
| | Westbound Left Turns | LOS E | 1 veh | LOS D | 1 veh |
| | Westbound Thrus/Right Turns | LOS C | 1 veh | LOS B | 1 veh |
| **S. Royal Oaks Boulevard and Riverside Drive / Center Point Place** (signalized) | Northbound Left Turns | LOS A | 12 feet | LOS B | 59 feet |
| | Northbound Thrus | LOS B | 374 feet | LOS C | 538 feet |
| | Northbound Right Turns | LOS A | 31 feet | LOS A | 0 feet |
| | Southbound Left Turns | LOS E | 192 feet | LOS D | 112 feet |
| | Southbound Thrus/Right Turns | LOS A | 228 feet | LOS A | 351 feet |
| | Eastbound Left Turns | LOS D | 18 feet | LOS F | 217 feet |
| | Eastbound Thrus/Right Turns | LOS D | 114 feet | LOS C | 170 feet |
| | Westbound Left Turns | LOS E | 60 feet | LOS D | 74 veh |
| | Westbound Thrus/Right Turns | LOS B | 24 feet | LOS D | 289 veh |
| | **Overall Intersection** | **LOS B** | | **LOS C** | |
| **Murfreesboro Road and Royal Oaks Boulevard** (signalized) | Eastbound Left Turns | LOS E | 93 feet | LOS E | 155 feet |
| | Eastbound Thrus / Right Turns | LOS D | 338 feet | LOS D | 369 feet |
| | Westbound Left Turns | LOS E | 435 feet | LOS F | 521 feet |
| | Westbound Thrus | LOS D | 554 feet | LOS D | 521 feet |
| | Westbound Right Turns | LOS A | 109 feet | LOS B | 130 feet |
| | Northbound Left Turns | LOS D | 78 feet | LOS E | 109 feet |
| | Northbound Thrus | LOS D | 153 feet | LOS E | 236 feet |
| | Northbound Right Turns | LOS D | 655 feet | LOS D | 692 feet |
| | Southbound Left Turns | LOS E | 159 feet | LOS F | 272 feet |

| | | | | | |
|---|---|---|---|---|---|
| | Southbound Thrus / Right Turns | LOS D | 159 feet | LOS E | 465 feet |
| | **Overall Intersection** | **LOS D** | | **LOS E** | |
| **Murfreesboro Road and Ramps for Southbound I-65** (signalized) | Eastbound Thrus | LOS C | 388 feet | LOS E | 672 feet |
| | Eastbound Right Turns | LOS A | 50 feet | LOS C | 295 feet |
| | Westbound Left Turns | LOS E | 163 feet | LOS F | 520 feet |
| | Westbound Thrus | LOS B | 294 feet | LOS C | 407 feet |
| | Southbound Left Turns | LOS D | 178 feet | LOS D | 515 feet |
| | Southbound Right Turns | LOS F | 738 feet | LOS F | 1235 feet |
| | **Overall Intersection** | **LOS D** | | **LOS F** | |
| **Murfreesboro Road and Ramps for Northbound I-65** (signalized) | Eastbound Left Turns | LOS F | 1028 feet | LOS E | 340 feet |
| | Eastbound Thrus | LOS A | 76 feet | LOS C | 518 feet |
| | Westbound Thrus | LOS D | 372 feet | LOS C | 467 feet |
| | Westbound Right Turns | LOS C | 573 feet | LOS B | 311 feet |
| | Northbound Left Turns | LOS F | 337 feet | LOS E | 218 feet |
| | Northbound Right Turns | LOS D | 341 feet | LOS D | 190 feet |
| | **Overall Intersection** | **LOS F** | | **LOS C** | |

# 5. IMPACTS OF PROPOSED DEVELOPMENT

## 5.1 TRIP GENERATION

Trip generation calculations were conducted in order to identify how much traffic will be generated by the proposed project. Trip generation data for daily and peak hour trips were identified from Trip Generation, Ninth Edition, which was published by the Institute of Transportation Engineers (ITE) in 2012. Table 6A presents the daily and peak hour trip generations for proposed townhomes, and these calculations are included in Appendix D.

**TABLE 6A. TRIP GENERATION FOR THE PROPOSED PROJECT**

| LAND USE | SIZE | DAILY TRAFFIC | GENERATED TRAFFIC | | | |
|---|---|---|---|---|---|---|
| | | | AM PEAK HOUR | | PM PEAK HOUR | |
| | | | ENTER | EXIT | ENTER | EXIT |
| Multi-Family (LUC 220) **South Site** | 98 units | 652 | 10 | 40 | 39 | 21 |
| Multi-Family (LUC 220) **North Site** | 204 units | 1,356 | 21 | 83 | 82 | 44 |
| **TOTAL** | **302 units** | **2,008** | **31** | **123** | **121** | **65** |
| Future Commercial Development | 15,000 sq.ft. | 664 | 49 | 53 | 18 | 23 |

Also, trip generation calculations were conducted in order to identify how much traffic might be generated by office and retail land uses that could be developed on the project sites instead of multi-family residential. For purposes of these analyses, two land use scenarios were considered:

1. **40,000 sq.ft.** office space on the southern project site and **100,000 sq.ft** of office space on the northern project site

2. **30,000 sq.ft.** retail space on the southern project site and **60,000 sq.ft** of retail space on the northern project site

Table 6B presents the daily and peak hour trip generations for these alternative land uses.

## TABLE 6B. TRIP GENERATION FOR ALTERNATIVE LAND USES

| LAND USE | SIZE | DAILY TRAFFIC | GENERATED TRAFFIC | | | |
|---|---|---|---|---|---|---|
| | | | AM PEAK HOUR | | PM PEAK HOUR | |
| | | | ENTER | EXIT | ENTER | EXIT |
| Office (LUC 710) | 140,000 sq.ft. | 1,696 | 220 | 30 | 40 | 195 |
| Retail (LUC 820) | 90,000 sq.ft. | 6,342 | 91 | 56 | 268 | 290 |

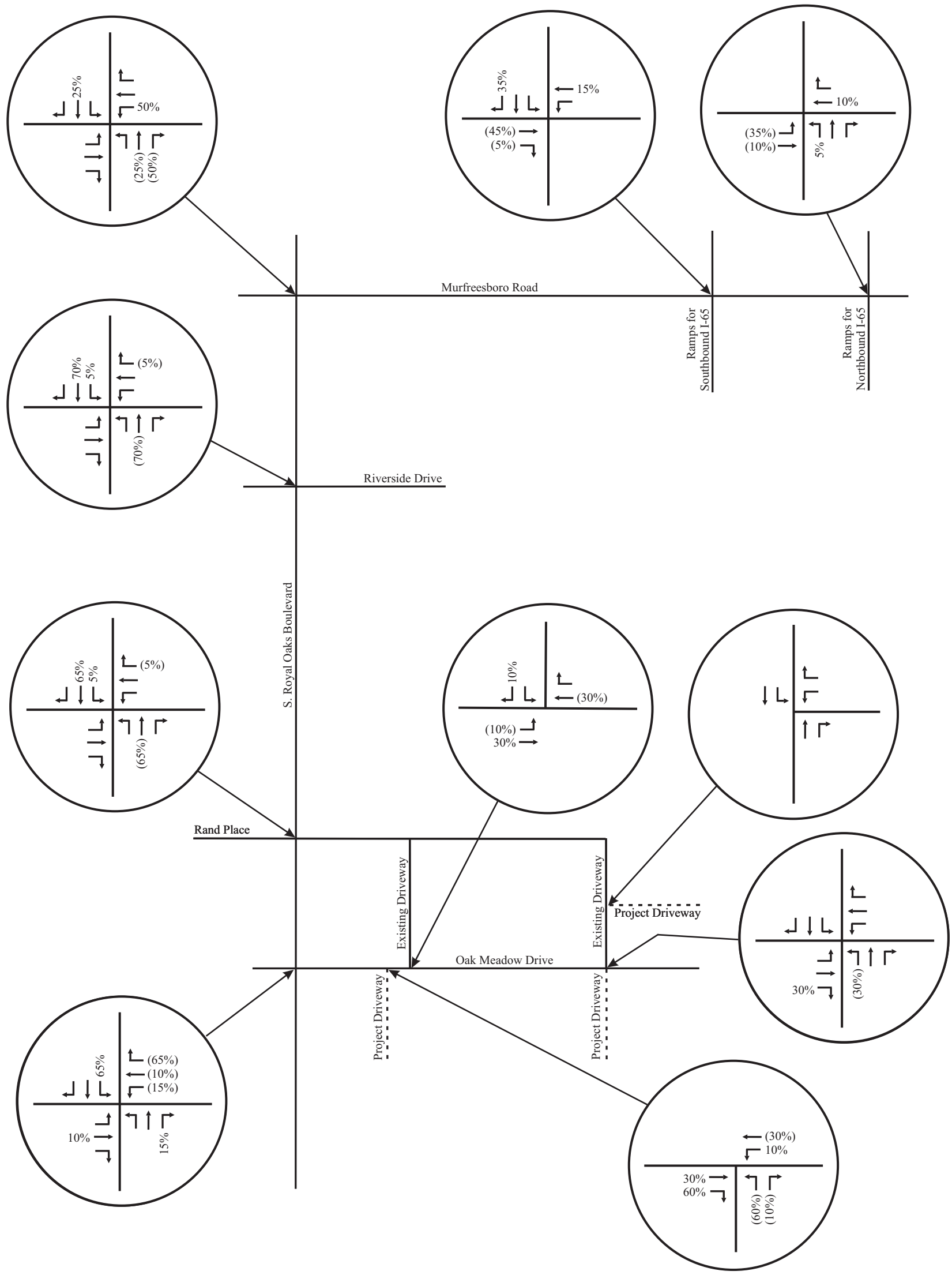
## 5.2 TRIP DISTRIBUTION AND TRAFFIC ASSIGNMENT

For the purposes of this study, it was estimated that the trips generated by the proposed project and the future commercial development will access the project site according to the directional distribution shown in Figures 6A, 6B, and 6C. It is important to note that these directional distributions were prepared with input and approval from the City of Franklin Engineering Department and their third-party private consultant, Neel-Schaffer, Inc. The development of these distributions was based on the following factors:

- existing land use characteristics,
- the directions of approach of the existing traffic,
- the access proposed for the project, and
- the locations of population centers in the area.

The peak hour trip generations and directional distributions were used to add the site-generated trips to the roadway system. Figures 7A, 7B, 7C, and 7D include the peak hour traffic volumes that are expected to be generated by the proposed project and the future commercial development.

F i s c h b a c h
Transportation Group, LLC
Traffic Engineering and Planning

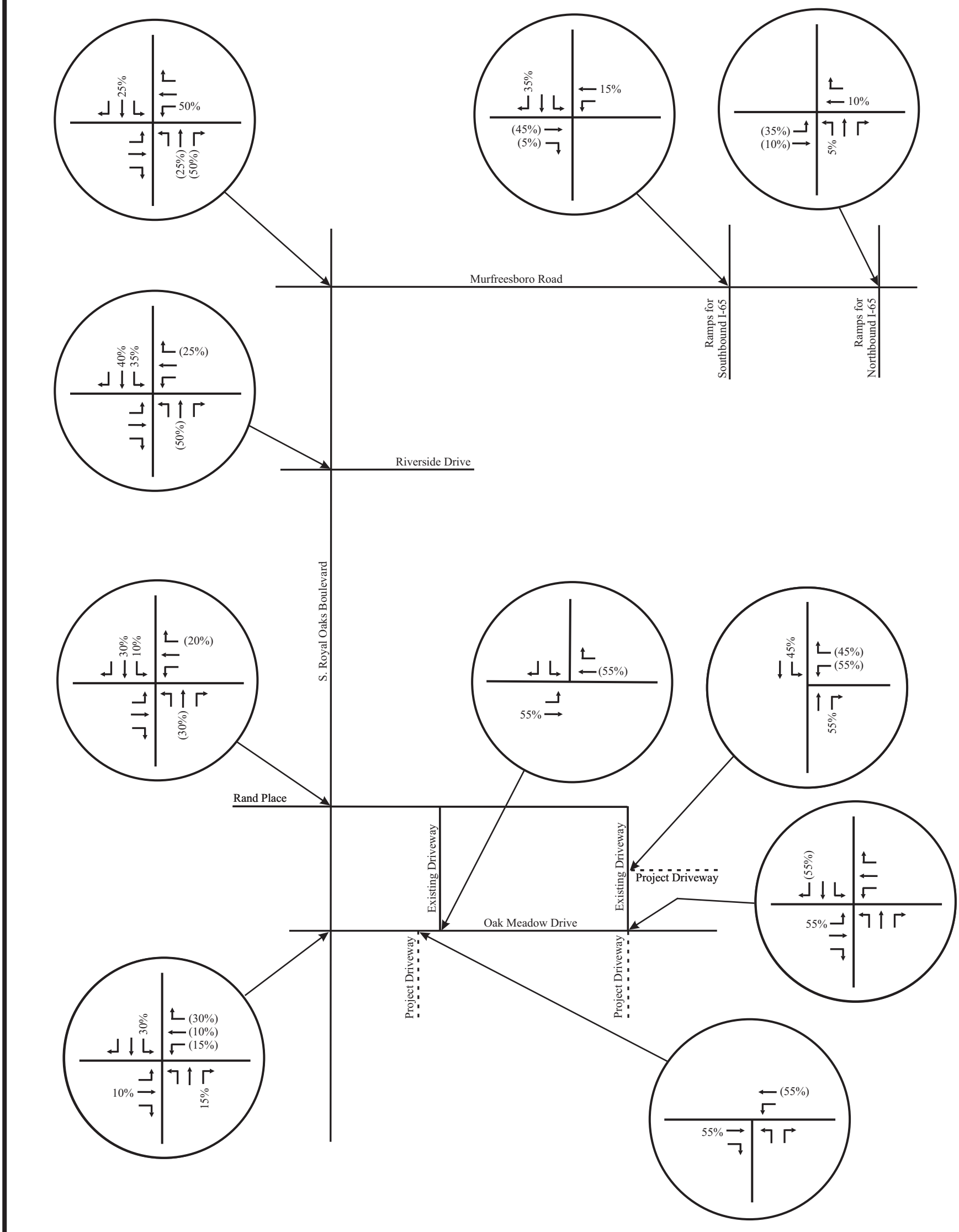



**No Scale**

XX - Entering Volumes
(XX) - Exiting Volumes

**Figure 6A.**
**Directional Distribution of Peak Hour Traffic Volumes Generated by the Proposed Apartments (Southern Site)**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning

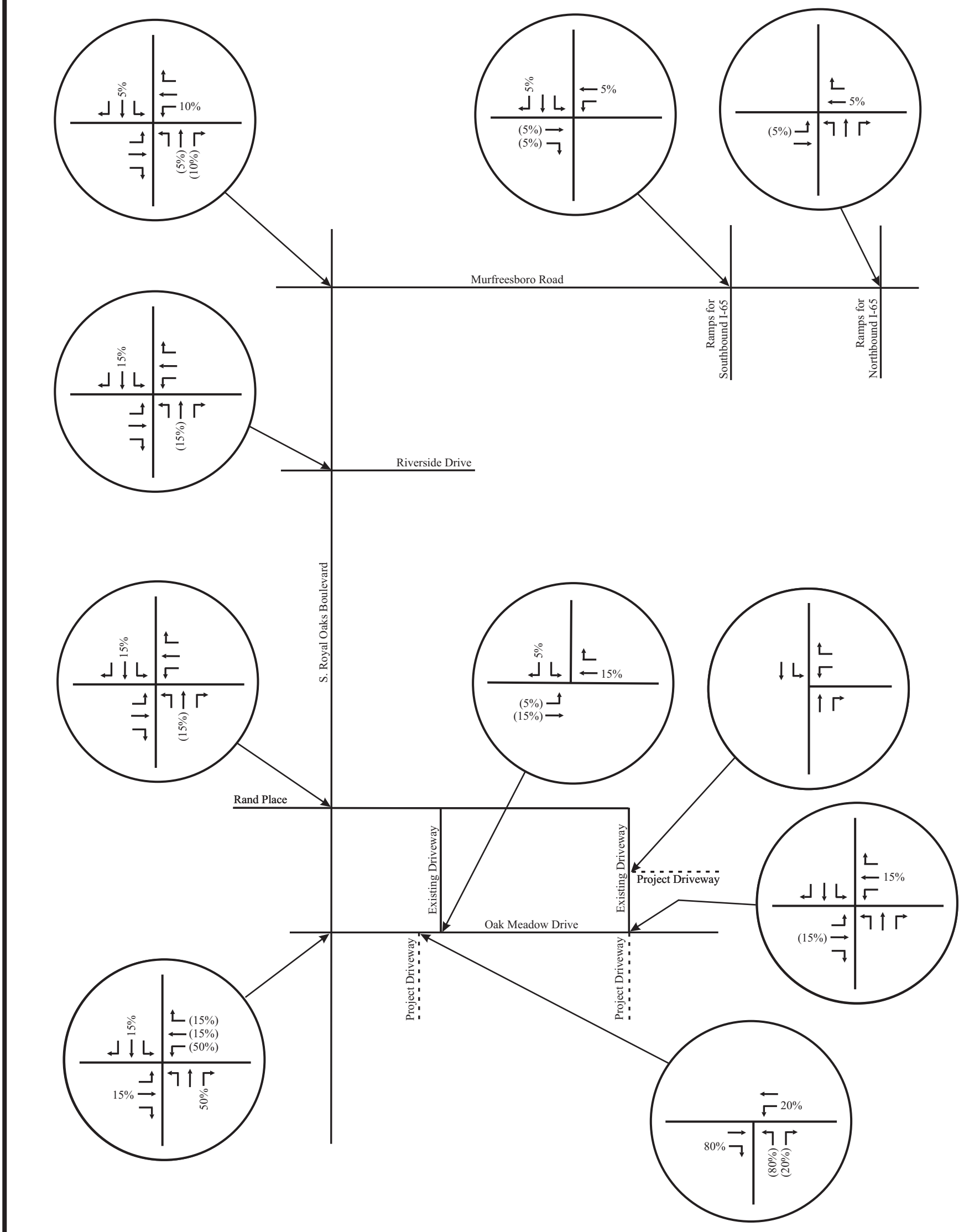



**No Scale**

XX - Entering Volumes
(XX) - Exiting Volumes

**Figure 6B.**
**Directional Distribution of Peak Hour Traffic Volumes Generated by the Proposed Apartments (Northern Site)**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning

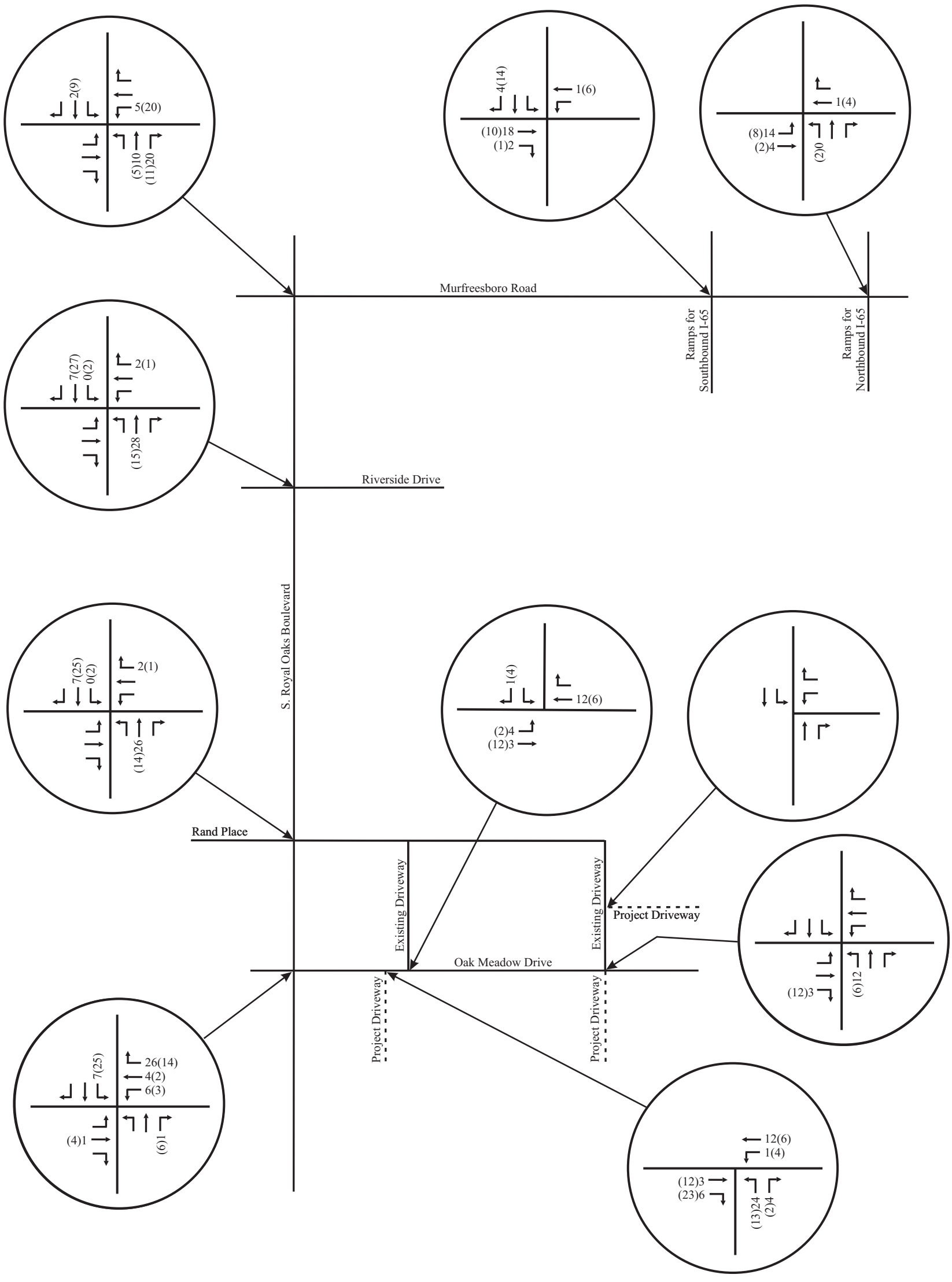



**No Scale**

XX - Entering Volumes
(XX) - Exiting Volumes

**Figure 6C.**
**Directional Distribution of Peak Hour Traffic Volumes Generated by the Future Retail Center**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning




**No Scale**

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

**Figure 7A.**
**Peak Hour Traffic Volumes Generated by the Proposed Apartments (Southern Site)**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning

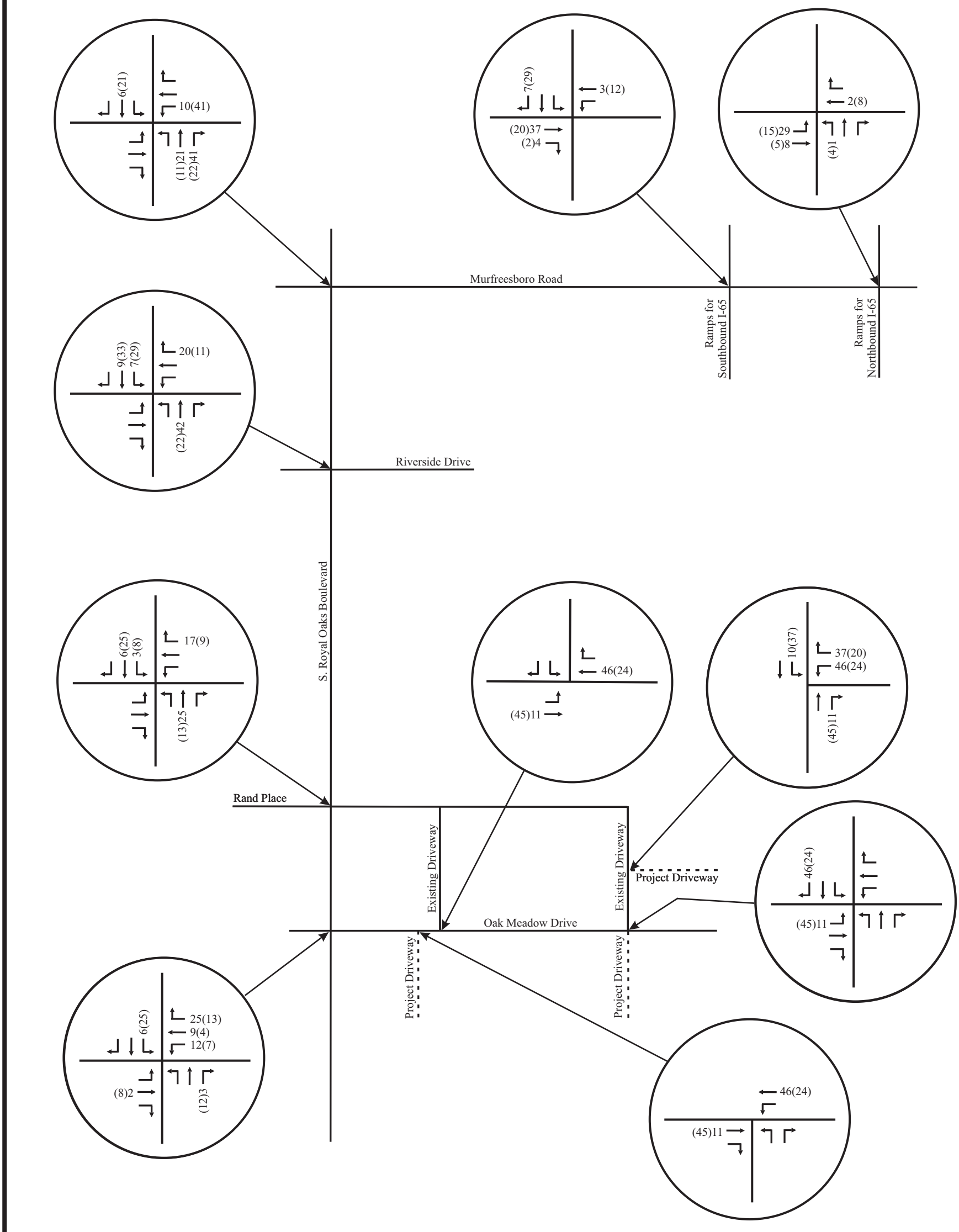
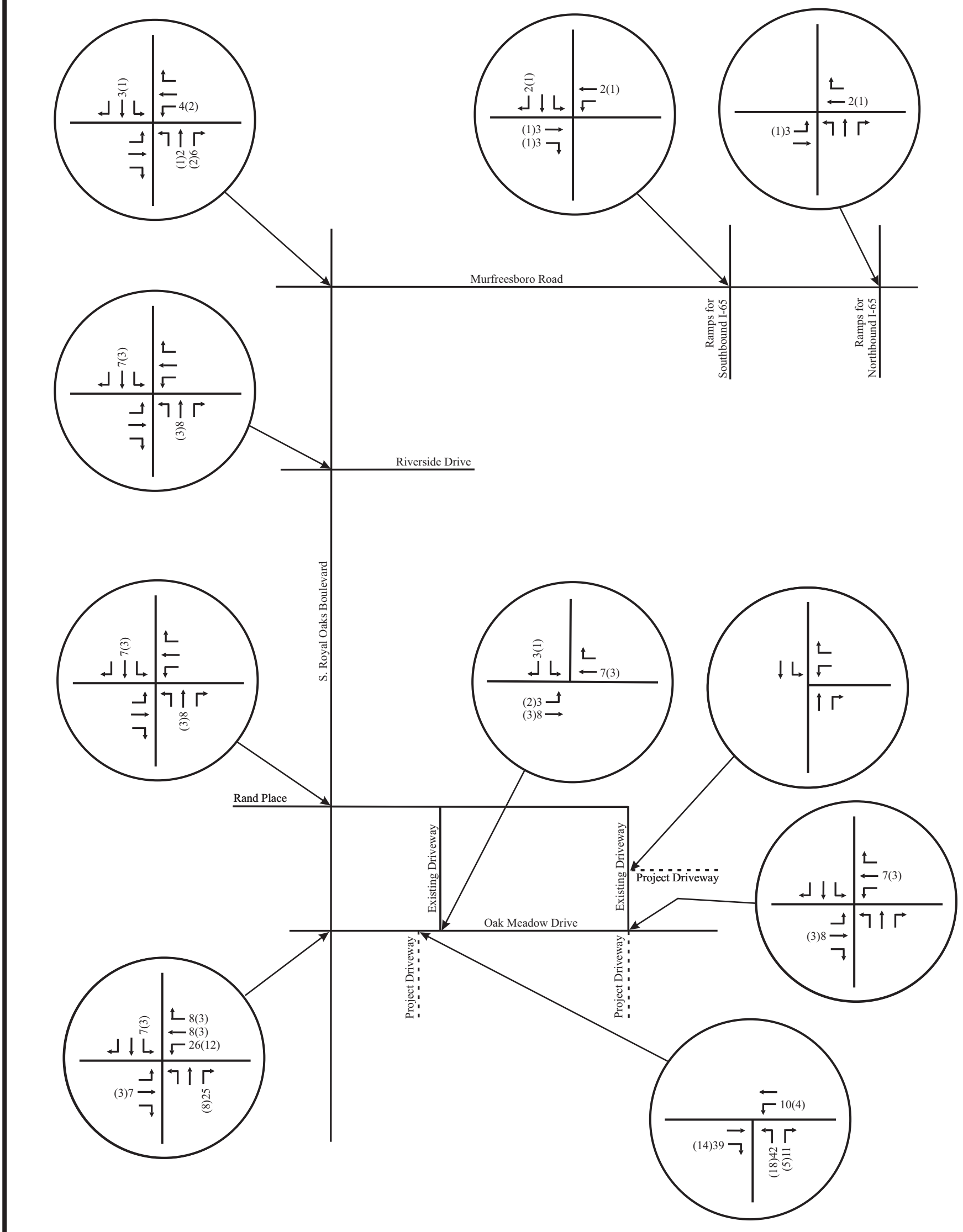



**Figure 7B.**
**Peak Hour Traffic Volumes Generated by the Proposed Apartments (Northern Site)**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning



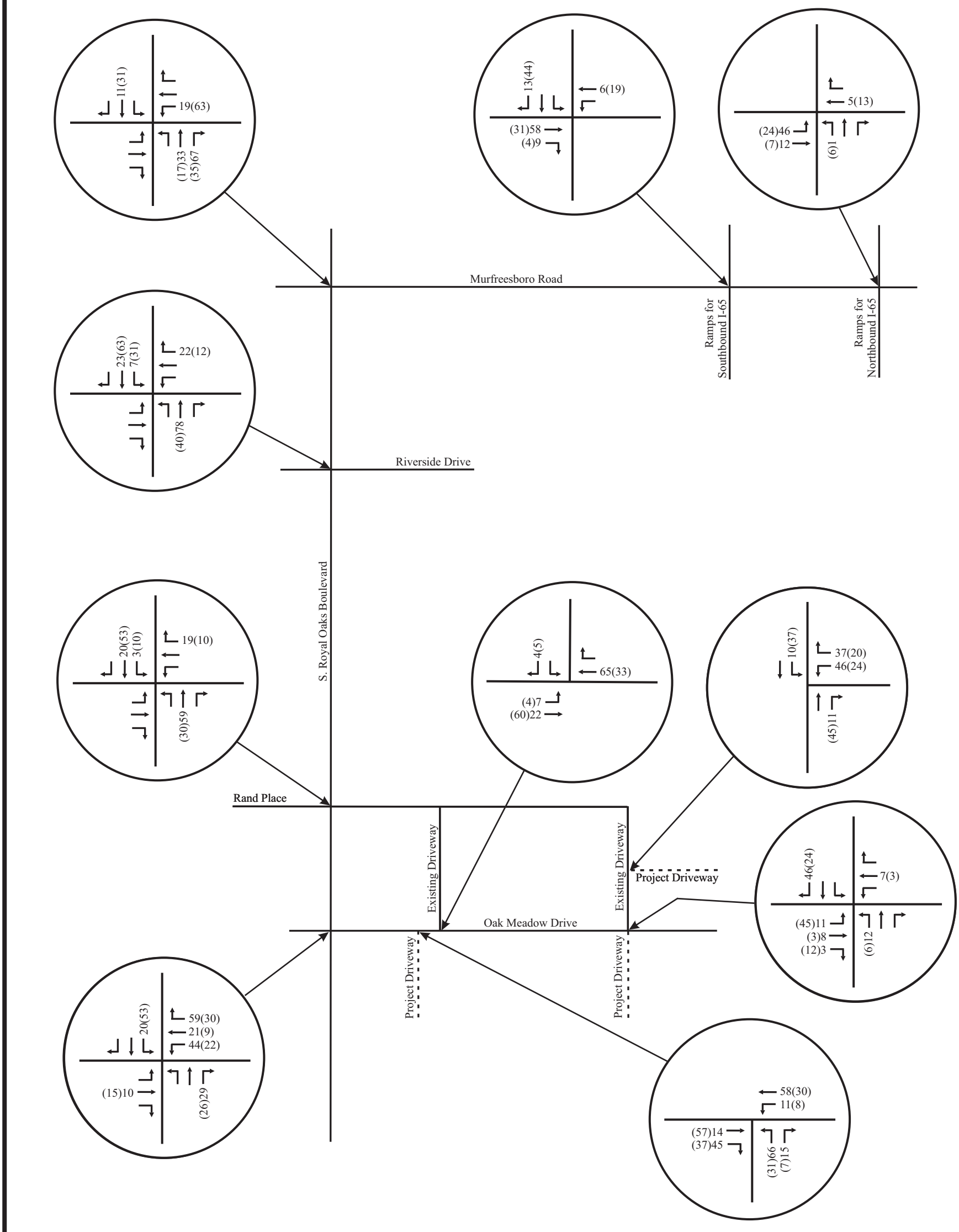

N

**No Scale**

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

**Figure 7C.**
**Peak Hour Traffic Volumes Generated by the Future Retail Center**

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning




**No Scale**

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

**Figure 7D.**
**Total Peak Hour Traffic Volumes Generated by the Proposed Apartments (Total Both Sites) and Future Retail**

## 5.3 CAPACITY ANALYSES

In order to identify the projected peak hour traffic volumes at the completion of the proposed project, the trips generated by the project were added to the background peak hour traffic volumes. The resulting peak hour volumes are shown in Figure 8.

Using the total projected peak hour traffic volumes, capacity analyses were conducted in order to determine the impact of the project on the roadway system. Specifically, these capacity analyses were used to evaluate the need for roadway and traffic control improvements within the study area. For these analyses, the following assumptions were made:

- All existing laneage and traffic control will be maintained and no improvements will be provided.

- Each of the project accesses on Oak Meadow Drive will be constructed to include one entering lane and one exiting lane.

- The access on S. Royal Oaks Boulevard for the future commercial project will be constructed to include one entering lane and two exiting lanes, striped as a separate left turn lane and a shared through/right turn lane.

The results of the capacity analyses for the total projected peak hour traffic volumes are shown in Table 7, and Appendix C includes the capacity analyses worksheets. These analyses indicate that the total projected conditions with full build-out of the project are consistent with the existing and background conditions within the study area.

Also, additional analyses were conducted in order to identify how well the intersection of S. Royal Oaks Boulevard and Riverside Drive / Center Point Place would operate if the traffic signal were modified to include protected signal phases for eastbound and westbound motorists. The results of these analyses are shown in Table 7, and Appendix C includes the capacity analyses worksheets. As shown, the additional signal phases would marginally reduce the level of service at this intersection during the PM peak hour.

Fischbach
Transportation Group, LLC
Traffic Engineering and Planning

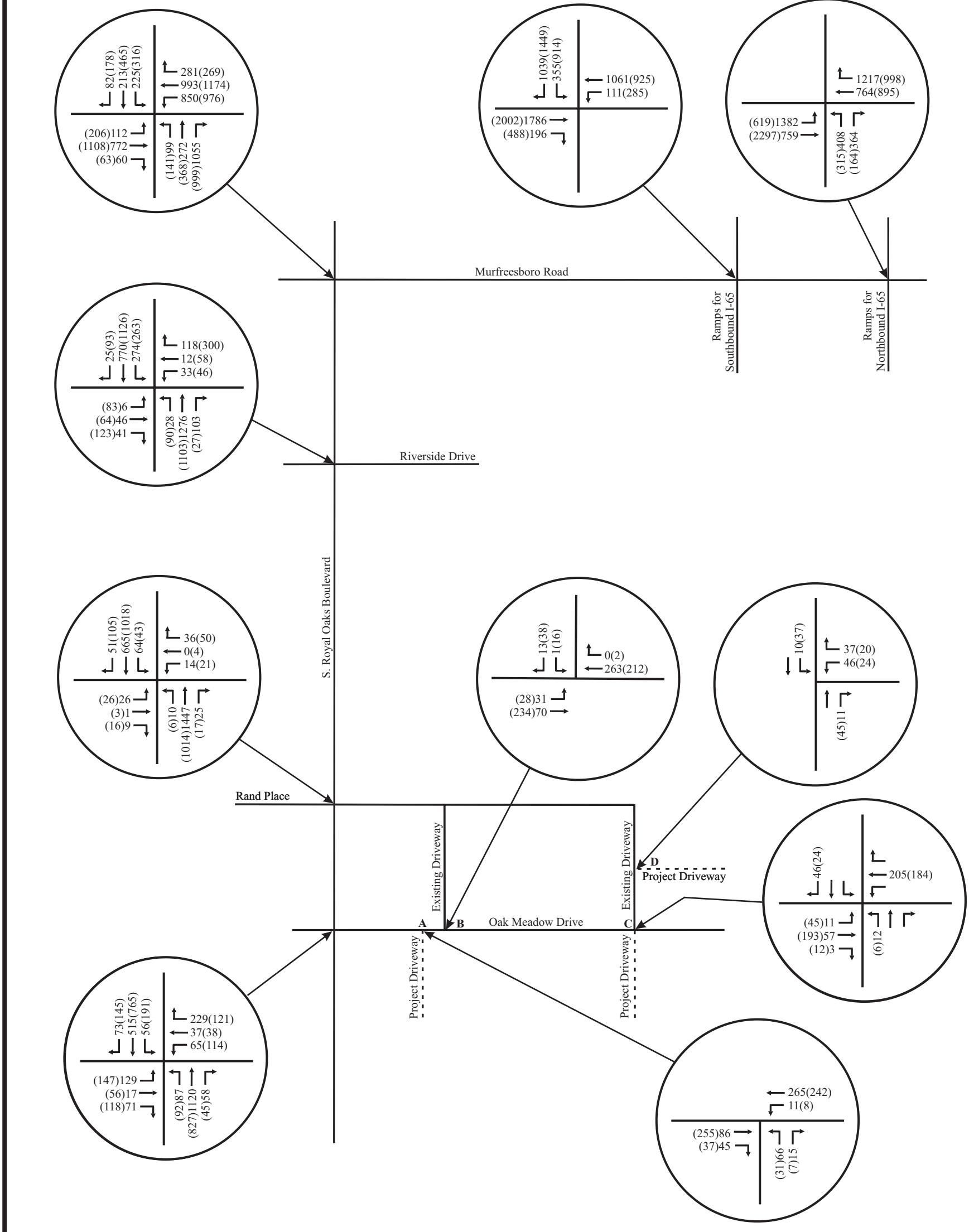



**Figure 8.**
**Total Projected Peak Hour Traffic Volumes at the Completion of the Proposed Apartments and Future Retail**

## TABLE 7. PROJECTED PEAK HOUR LEVELS OF SERVICE

| INTERSECTION | TURNING MOVEMENT | AM PEAK HOUR | | PM PEAK HOUR | |
|---|---|---|---|---|---|
| | | LEVEL OF SERVICE | 95TH %-ILE QUEUE | LEVEL OF SERVICE | 95TH %-ILE QUEUE |
| **A - Oak Meadow Drive and the Western Access for the Apartments / Retail** | Westbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Northbound Left and Right Turns | LOS B | 1 veh | LOS B | 1 veh |
| **B - Oak Meadow Drive and the Western Access for Home Depot** | Eastbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Southbound Left and Right Turns | LOS B | 1 veh | LOS B | 1 veh |
| **C - Oak Meadow Drive and the Eastern Access for Home Depot / Apartments** | Eastbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Westbound Left Turns | LOS A | 1 veh | LOS A | 1 veh |
| | Northbound Left/Thru/Right Turns | LOS B | 1 veh | LOS B | 1 veh |
| | Southbound Left/Thru/Right Turns | LOS A | 1 veh | LOS A | 1 veh |
| **D - Eastern Access for Home Depot / Access for Northern Apartments** | Southbound Left Turns / Thrus | LOS A | 1 veh | LOS A | 1 veh |
| | Westbound Left and Right Turns | LOS A | 1 veh | LOS A | 1 veh |
| **S. Royal Oaks Boulevard and Oak Meadow Drive** (signalized) | Northbound Left Turns | LOS A | 37 feet | LOS C | 70 feet |
| | Northbound Thrus | LOS B | 362 feet | LOS C | 328 feet |
| | Northbound Right Turns | LOS A | 0 feet | LOS A | 0 feet |
| | Southbound Left Turns | LOS A | 26 feet | LOS C | 116 feet |
| | Southbound Thrus/Right Turns | LOS B | 152 feet | LOS C | 447 feet |
| | Eastbound Left Turns | LOS D | 124 feet | LOS C | 135 feet |
| | Eastbound Thrus/Right Turns | LOS B | 22 feet | LOS D | 108 feet |
| | Westbound Left Turns | LOS C | 69 feet | LOS D | 105 feet |
| | Westbound | LOS D | 48 feet | LOS D | 49 feet |

| | | | | | |
|---|---|---|---|---|---|
| | Thrus | | | | |
| | Westbound Right Turns | LOS C | 161 feet | LOS A | 40 feet |
| | **Overall Intersection** | **LOS B** | | **LOS C** | |
| **S. Royal Oaks Boulevard and Rand Place / Home Depot Access** | Northbound Left Turns | LOS A | 1 veh | LOS B | 1 veh |
| | Southbound Left Turns | LOS B | 1 veh | LOS B | 1 veh |
| | Eastbound Left Turns | LOS D | 1 veh | LOS E | 1 veh |
| | Eastbound Thrus/Right Turns | LOS B | 1 veh | LOS C | 1 veh |
| | Westbound Left Turns | LOS E | 1 veh | LOS D | 1 veh |
| | Westbound Thrus/Right Turns | LOS C | 1 veh | LOS B | 1 veh |
| **S. Royal Oaks Boulevard and Riverside Drive / Center Point Place** (signalized) | Northbound Left Turns | LOS A | 12 feet | LOS C | 59 feet |
| | Northbound Thrus | LOS B | 414 feet | LOS C | 567 feet |
| | Northbound Right Turns | LOS A | 31 feet | LOS A | 0 feet |
| | Southbound Left Turns | LOS F | 181 feet | LOS D | 133 feet |
| | Southbound Thrus/Right Turns | LOS A | 343 feet | LOS B | 599 feet |
| | Eastbound Left Turns | LOS E | 18 feet | LOS F | 217 feet |
| | Eastbound Thrus/Right Turns | LOS D | 114 feet | LOS C | 176 feet |
| | Westbound Left Turns | LOS E | 60 feet | LOS D | 74 veh |
| | Westbound Thrus/Right Turns | LOS B | 21 feet | LOS D | 300 veh |
| | **Overall Intersection** | **LOS C** | | **LOS C** | |
| **S. Royal Oaks Boulevard and Riverside Drive / Center Point Place** (signalized and with protected left turn signal | Northbound Left Turns | LOS A | 19 feet | LOS C | 70 feet |
| | Northbound Thrus | LOS B | 571 feet | LOS D | 636 feet |
| | Northbound | LOS A | 31 feet | LOS A | 0 feet |

| | | | | | |
|---|---|---|---|---|---|
| phases for eastbound and westbound motorists) | Right Turns | | | | |
| | Southbound Left Turns | LOS F | 405 feet | LOS F | 334 feet |
| | Southbound Thrus/Right Turns | LOS B | 262 feet | LOS C | 671 feet |
| | Eastbound Left Turns | LOS D | 14 feet | LOS D | 110 feet |
| | Eastbound Thrus/Right Turns | LOS E | 105 feet | LOS D | 181 feet |
| | Westbound Left Turns | LOS D | 52 feet | LOS D | 65 veh |
| | Westbound Thrus/Right Turns | LOS B | 21 feet | LOS D | 340 veh |
| | **Overall Intersection** | **LOS C** | | **LOS D** | |
| **Murfreesboro Road and Royal Oaks Boulevard** (signalized) | Eastbound Left Turns | LOS E | 93 feet | LOS E | 155 feet |
| | Eastbound Thrus / Right Turns | LOS D | 338 feet | LOS D | 368 feet |
| | Westbound Left Turns | LOS E | 446 feet | LOS F | 567 feet |
| | Westbound Thrus | LOS D | 544 feet | LOS D | 517 feet |
| | Westbound Right Turns | LOS A | 122 feet | LOS B | 125 feet |
| | Northbound Left Turns | LOS D | 76 feet | LOS E | 105 feet |
| | Northbound Thrus | LOS D | 174 feet | LOS E | 249 feet |
| | Northbound Right Turns | LOS D | 696 feet | LOS D | 716 feet |
| | Southbound Left Turns | LOS E | 159 feet | LOS F | 272 feet |
| | Southbound Thrus / Right Turns | LOS D | 167 feet | LOS F | 505 feet |
| | **Overall Intersection** | **LOS D** | | **LOS F** | |
| **Murfreesboro Road and Ramps for Southbound I-65** (signalized) | Eastbound Thrus | LOS C | 406 feet | LOS E | 692 feet |
| | Eastbound Right Turns | LOS A | 47 feet | LOS C | 295 feet |
| | Westbound | LOS E | 164 feet | LOS F | 521 feet |

| | | | | | |
|---|---|---|---|---|---|
| | Left Turns | | | | |
| | Westbound Thrus | LOS B | 297 feet | LOS C | 430 feet |
| | Southbound Left Turns | LOS D | 178 feet | LOS D | 515 feet |
| | Southbound Right Turns | LOS F | 754 feet | LOS F | 1297 feet |
| | **Overall Intersection** | **LOS D** | | **LOS F** | |
| **Murfreesboro Road and Ramps for Northbound I-65** (signalized) | Eastbound Left Turns | LOS F | 1078 feet | LOS E | 344 feet |
| | Eastbound Thrus | LOS A | 75 feet | LOS C | 499 feet |
| | Westbound Thrus | LOS D | 375 feet | LOS C | 485 feet |
| | Westbound Right Turns | LOS C | 573 feet | LOS B | 327 feet |
| | Northbound Left Turns | LOS F | 338 feet | LOS E | 222 feet |
| | Northbound Right Turns | LOS E | 351 feet | LOS D | 190 feet |
| | **Overall Intersection** | **LOS F** | | **LOS D** | |

## 5.4 CAPACITY ANALYSIS COMPARISON

The results of the capacity analyses for the existing, background, and total projected peak hour traffic volumes are included in Tables 8 and 9 for comparison purposes. Also, the levels of service that worsen from background conditions to total projected conditions with the proposed project are highlighted in red. Finally, additional analyses were conducted in order to identify how well the intersections within the study area would operate if a third northbound through lane were provided on S. Royal Oaks between Oak Meadow Drive and Murfreesboro Road. Specifically, for these analyses, the northbound right turn lanes at Oak Meadow Drive, Rand Place, and Riverside Drive were converted to shared through/right turn lanes. Also, the analyses included the modification of the existing traffic signal at the intersection of S. Royal Oaks Boulevard and Riverside Drive / Center Point Place to include protected signal phases for eastbound and westbound motorists. The results of these additional analyses are shown in Tables 8 and 9. These comparisons and analyses that reveal poor levels of service are described below:

**S. Royal Oaks Boulevard and Oak Meadow Drive**
This intersection operates at LOS B during the AM peak hour and LOS C during the PM peak hour under existing, background, and total projected conditions.

**S. Royal Oaks Boulevard and Riverside Drive / Center Point Place**
This intersection operates at LOS B during the AM peak hour and LOS C during the PM peak hour under existing and background conditions. With the proposed project, this intersection will operate at LOS C during both peak hours. Also, if the existing traffic signal were modified to include protected signal phases for eastbound and westbound motorists, this intersection would operate at LOS C during the AM peak hour and LOS D during the PM peak hour.

**Murfreesboro Road and Royal Oaks Boulevard**
This intersection operates poorly during the PM peak hour under existing, background, and total projected conditions. Specifically, the traffic volumes for the eastbound throughs, westbound throughs, westbound left turns, and northbound right turns are all approximately equal during both peak hours. Although some of these turning movements can operate during the same signal phases, the total time needed to serve all of the turning movements is significantly high. These conditions will persist unless the Murfreesboro Road corridor is widened to include three travel lanes in each direction.

**Murfreesboro Road and the Ramps for Southbound I-65**
This intersection operates poorly during the PM peak hour under existing, background, and total projected conditions. Specifically, the traffic volumes for the eastbound throughs, westbound throughs, and southbound right turns are all significantly high during both peak hours, and the traffic volume for the southbound left turns are significantly high during the PM peak hour. Although some of these turning movements can operate during the same signal phases, the total time needed to serve all of the turning movements is significantly high. These conditions will persist unless the Murfreesboro Road corridor is widened to include three travel lanes in each direction.

**Murfreesboro Road and the Ramps for Northbound I-65**

This intersection operates poorly during the AM peak hour under existing, background, and total projected conditions. Specifically, the traffic volumes for the eastbound left turns and westbound right turns are significantly high during the AM peak hour, and the traffic volumes for the eastbound throughs and westbound right turns are significantly high during the PM peak hour. These turning movements cannot operate during the same signal phases, and the total time needed to serve all of the turning movements is significantly high. These conditions will persist unless the Murfreesboro Road corridor is widened to include three travel lanes in each direction.

## TABLE 8. COMPARISON OF AM PEAK HOUR LEVELS OF SERVICE

| INTERSECTION | TURNING MOVEMENT | LEVELS OF SERVICE | | | |
|---|---|---|---|---|---|
| | | EXISTING CONDITIONS | BACKGROUND CONDITIONS | TOTAL PROJECTED CONDITIONS | WITH THIRD NORTHBOUND TRAVEL LANE |
| S. Royal Oaks Boulevard and Oak Meadow Drive | Overall Intersection | LOS B (13.9 sec/veh) | LOS B (15.4 sec/veh) | LOS B (17.6 sec/veh) | LOS B (16.0 sec/veh) |
| S. Royal Oaks Boulevard and Riverside Drive / Center Point Place | Overall Intersection | LOS B (14.0 sec/veh) | **LOS B** (17.3 sec/veh) | **LOS C** (20.5 sec/veh) | LOS C (30.8 sec/veh) |
| Murfreesboro Road and Royal Oaks Boulevard | Overall Intersection | LOS D (42.0 sec/veh) | LOS D (44.9 sec/veh) | LOS D (46.1 sec/veh) | LOS D (44.4 sec/veh) |
| Murfreesboro Road and Ramps for Southbound I-65 | Overall Intersection | LOS C (31.7 sec/veh) | LOS D (39.6 sec/veh) | LOS D (41.2 sec/veh) | LOS D (41.6 sec/veh) |
| Murfreesboro Road and Ramps for Northbound I-65 | Overall Intersection | LOS E (64.7 sec/veh) | LOS F (81.2 sec/veh) | LOS F (87.9 sec/veh) | LOS F (87.9 sec/veh) |

## TABLE 9. COMPARISON OF PM PEAK HOUR LEVELS OF SERVICE

| INTERSECTION | TURNING MOVEMENT | LEVELS OF SERVICE | | | |
|---|---|---|---|---|---|
| | | EXISTING CONDITIONS | BACKGROUND CONDITIONS | TOTAL PROJECTED CONDITIONS | WITH THIRD NORTHBOUND TRAVEL LANE |
| S. Royal Oaks Boulevard and Oak Meadow Drive | Overall Intersection | LOS C (21.9 sec/veh) | LOS C (25.3 sec/veh) | LOS C (28.1 sec/veh) | LOS C (26.9 sec/veh) |
| S. Royal Oaks Boulevard and Riverside Drive / Center Point Place | Overall Intersection | LOS C (27.4 sec/veh) | LOS C (29.0 sec/veh) | **LOS C** (31.3 sec/veh) | **LOS D** (36.8 sec/veh) |
| Murfreesboro Road and Royal Oaks Boulevard | Overall Intersection | LOS E (61.2 sec/veh) | **LOS E** (72.3 sec/veh) | **LOS F** (80.6 sec/veh) | LOS E (78.8 sec/veh) |
| Murfreesboro Road and Ramps for Southbound I-65 | Overall Intersection | LOS E (78.4 sec/veh) | LOS F (97.4 sec/veh) | LOS F (103.7 sec/veh) | LOS F (103.9 sec/veh) |
| Murfreesboro Road and Ramps for Northbound I-65 | Overall Intersection | LOS C (29.5 sec/veh) | **LOS C** (34.2 sec/veh) | **LOS D** (35.1 sec/veh) | LOS D (35.1 sec/veh) |

# 6. CONCLUSIONS AND RECOMMENDATIONS

The analyses presented in this study indicate the following information for the intersections that provide direct access to the project sites:

**Oak Meadow Drive and the Western Project Access**
At this intersection, the new project access should be constructed to include one entering lane and one exiting lane, and a stop sign should be installed on the northbound approach of the new access. The capacity analyses indicate that all of the vehicle queues and vehicle delays at this intersection will be very low.

The existing center turn lane on Oak Meadow Drive should be restriped to provide a dedicated westbound left turn lane with 50 feet of storage for motorists turning onto the project access.

In order to identify the sight distances that will be available at the project access, sight triangles should be provided in conjunction with construction documents for the proposed project. These sight triangles should be developed based on guidelines that are included in A Policy on Geometric Design of Highways and Streets, which is published by the American Association of State Highway and Transportation Officials (AASHTO) and commonly known as The Green Book. Specifically, The Green Book indicates that for a speed of 40 mph, the minimum stopping sight distance is 305 feet. This is the distance that a motorist on Oak Meadow Drive needs to come to a stop if a vehicle turning from the project access creates a conflict. Also, based on The Green Book, the minimum intersection sight distance is 445 feet. This is the distance that a motorist exiting the project access needs to safely complete turns onto Oak Meadow Drive.

**Oak Meadow Drive and the Western Home Depot Access**
The capacity analyses indicate that all of the vehicle queues and vehicle delays at this intersection will remain very low. However, double yellow pavement markings should be provided on the Home Depot access in order to delineate travel lanes. Also, the existing center turn lane on Oak Meadow Drive should be restriped to provide a dedicated eastbound left turn lane with 50 feet of storage for motorists turning onto the Home Depot access.

**Oak Meadow Drive and the Eastern Project Access / Home Depot Access**
At this intersection, the new project access should be constructed to include one entering lane and one exiting lane, and a stop sign should be installed on the northbound approach of the new access. The capacity analyses indicate that all of the vehicle queues and vehicle delays at this intersection will be very low.

At the completion of the proposed project, the existing double yellow pavement markings on the Home Depot access should be reapplied in order to delineate travel lanes. The existing center turn lane on Oak Meadow Drive should be restriped to provide a dedicated eastbound and westbound left turn lanes for motorists turning onto the Home Depot access and the project access. Each of these turn lanes should include at least 50 feet of storage.

In order to identify the sight distances that will be available at the project access, sight triangles should be provided in conjunction with construction documents for the proposed project. These sight triangles should be developed based on guidelines that are included in A Policy on Geometric Design of Highways and Streets, which is published by the American Association of State Highway and Transportation Officials (AASHTO) and commonly known as The Green Book. Specifically, The Green Book indicates that for a speed of 40 mph, the minimum stopping sight distance is 305 feet. This is the distance that a motorist on Oak Meadow Drive needs to come to a stop if a vehicle turning from the project access creates a conflict. Also, based on The Green Book, the minimum intersection sight distance is 445 feet. This is the distance that a motorist exiting the project access needs to safely complete turns onto Oak Meadow Drive.

Also, sight distance should be maximized for northbound/westbound motorists on Oak Meadow Drive by removing foliage and vegetation from the south side of Oak Meadow Drive.

**Eastern Home Depot Access and the Project Access for the Northern Apartments**

At this intersection, the new project access should be constructed to include one entering lane and one exiting lane, and a stop sign should be installed on the westbound approach of the new access. The capacity analyses indicate that all of the vehicle queues and vehicle delays at this intersection will be very low. At the completion of the proposed project, the existing double yellow pavement markings on the Home Depot access should be reapplied in order to delineate travel lanes.

**S. Royal Oaks Boulevard and Oak Meadow Drive**

The capacity analyses indicate that all of the turning movements at this intersection will operate at acceptable levels of service. Also, the existing lengths of the turn lanes are adequate to accommodate the total projected traffic volumes with the completion of the proposed project. Finally, it is important to note that the westbound approach of Oak Meadow Drive already includes separate left, through, and right turn lanes at the intersection with S. Royal Oaks Boulevard, and the existing traffic signal already includes a right turn overlap signal phase for westbound motorists. Therefore, there are no additional dedicated turn lanes or traffic control modifications that can be provided at this location. Field observations and traffic counts confirm that the northbound and southbound through volumes are significant, particularly the northbound through movement during the AM peak hour. However, the proposed project will have a minimal impact on these conditions.

**S. Royal Oaks Boulevard and Rand Place / Access for Home Depot**

The capacity analyses indicate that all of the critical turning movements at this unsignalized intersection will operate at acceptable levels of service. Also, the existing lengths of the turn lanes are adequate to accommodate the total projected traffic volumes with the completion of the proposed project. Field observations and traffic counts confirm that the northbound and southbound through volumes are significant, particularly the northbound through movement during the AM peak hour. In addition, the field observations and traffic counts confirm that the eastbound and westbound left turn volumes are relatively low, presumably because left turns are challenging when the northbound and southbound through volumes are high. Finally, the

eastbound and westbound motorists have access to the existing traffic signal at Oak Meadow Drive. It is important to note that proposed project will have a minimal impact on these conditions. Also, it is important to note that this intersection is not an appropriate location for a traffic signal installation because of its proximity to the existing traffic signal at Oak Meadow Drive.

At the completion of the proposed project, the existing pavement markings on the Home Depot access should be reapplied in order to delineate travel lanes. At that time, consideration should be given to restriping the westbound travel lanes in order to provide a shared left turn / through lane and a separate right turn lane. This modification would reduce delays for the westbound right turns, which occur approximately twice as frequently as the westbound left turns.

**S. Royal Oaks Boulevard and Riverside Drive / Center Point Place**

The capacity analyses indicate that several turning movements at this intersection will operate at LOS C or better during both peak hours under existing, background, and total projected conditions. If the existing traffic signal were modified to include protected signal phases for eastbound and westbound motorists, this intersection would operate at LOS C during the AM peak hour and LOS D during the PM peak hour. However, this modification would reduce the potential for vehicle conflicts for eastbound and westbound motorists.

Also, it is important to note that the analyses indicate that providing a third northbound through lane on S. Royal Oaks Boulevard would not significantly reduce delays at this intersection.

**Access for the Future Retail Site**

Currently, the future retail parcel is not included in the site plan for the proposed apartments. Since building sizes, land uses, parking provisions, and driveways have not be established for this future development, no recommendations are made for the number and location of driveways or the laneage and traffic control that will be needed at the intersections that will provide access to the future retail development.

**APPENDIX A**
**TRAFFIC IMPACT STUDY SCOPE PROVIDED BY**
**THE CITY OF FRANKLIN AND NEEL-SCHAFFER, INC.**

Exhibit B

City of Franklin
Engineering Department

# APPLICATION FORM
# REQUEST FOR APPROVED TRANSPORTATION IMPACT ANALYSIS REPORT

**APPROVED**
**By Carl Baughman at 4:26 pm, Jan 28, 2016**

| | | | |
|---|---|---|---|
| Applicant Name: | Crunk Engineering . | Applicant Name: | Epoch Residential . |
| Address: | 1894 Gen. George Patton. | Address: | 359 Carolina Avenue . |
| | Franklin, TN 37067 . | | Winter Park, FL 32789 . |
| Phone #: | (615) 873-1795 . | Phone #: | (321) 316-6005 . |
| e-mail address: | adam@crunkeng.com . | e-mail address: | mccarley@epochresidential.com . |

## PROCESS OVERVIEW

A Transportation Impact Analysis shall be prepared by the Applicant's Consultant or the City's Traffic Consultant using the standard format specified by the Institute of Transportation Engineers in accordance with the following:

(i) The applicant shall submit a completed *Request for Transportation Impact Analysis Application Form* to the Engineering Department.

(ii) Scope of Services
   a. Following initial review of the application form, the Engineering Department shall prepare and submit a Scope of Services and schedule to the Applicant. If necessary a meeting will be scheduled to review and discuss the Scope of Services in detail.
   b. Following approval the applicant will pay the City 90% of the estimated cost of the traffic impact study. At the completion of the study the City shall reimburse the applicant all remaining fees.

(iii) Transportation impact analyses shall be prepared utilizing traffic data that are consistent with:
   a. The land use and density data as referenced in the most current edition of Trip Generation, published by the Institute of Transportation Engineers;
   b. Current city and state traffic counts for surrounding streets;
   c. Any additional traffic counts performed as a part of preparing the study.

## Attachment A

City of Franklin Review Process for Transportation Impact Analysis

**Step 1 – Preliminary discussion with Consultant/Developer on project description including site plan.**
**Step 2 – Scoping of Transportation Impact Analysis between the City of Franklin and Consultant/Developer.**
**Step 3 – Consultant, Traffic Engineer and Director of Engineering execute a MOU (Fees may apply per COF Ordinance 2015-64.**
**Step 4 – Consultant/Developer pays review fee and submits Transportation Impact Analysis.**
**Step 5 – City of Franklin prepares initial comments on the transportation impact analysis, if necessary.**

**Step 6 – Consultant submits corrections/revisions to the transportation impact analysis, if necessary.**
**Step 7 – City of Franklin prepares initial comments on proposed mitigation measures, if necessary**
**Step 8 – Consultant submits corrections/revisions on proposed mitigation measures, if necessary and electronic copy of the transportation impact analysis.**
**Step 9 – City of Franklin issues an assessment letter**

# Attachment B

Transportation Impact Analysis – Memorandum of Understanding (MOU)

This MOU acknowledges that the transportation impact analysis for the following project will be prepared in accordance with the latest version of City of Franklin Zoning Ordinance.

Project Name: Epoch Franklin .
Project Address: Oak Meadow Drive, east of S. Royal Oaks Boulevard .
Project Description: 352 apartments (240 units on north side, 112 apts on the south side) .

Attach a site map and a trip generation table with a description of the proposed land uses, ITE rates, estimated daily, morning, midday and afternoon peak hour volumes (ins/outs/totals), proposed trip credits, etc.

Project Buildout Year: 2018 Ambient or CMP Growth Rate: : 4 % Per Yr.

Study Intersections:

| | |
|---|---|
| 1. Oak Meadow Drive and Private Road for Home Depot / western project access | 9. Oak Meadow Drive and the eastern project accesses |
| 2. S. Royal Oaks Blvd and Oak Meadow Dr | 10. |
| 3. S. Royal Oaks Blvd and Center Point Pl / Riverside Dr | 11. |
| 4. Highway 96E and Royal Oaks Blvd (for data collection and signal timing purposes only) | 12. |
| 5. Highway 96E and Ramps for SB I-65(for data collection and signal timing purposes only) | 13. |
| 6. Highway 96E and Ramps for NB I-65(for data collection and signal timing purposes only) | 14. |

Trip Credits: (Exact amount of credit subject to approval by City of Franklin)

| | Yes | No |
|---|---|---|
| Transit Usage | | X |
| Existing Active Land Use | | X |
| Previous Land Use | | X |
| Internal Trip | | X |
| Pass-By Trip | | X |

Exhibit B

| | | | |
|---|---|---|---|
| Consultant: | FTG, LLC | Developer: | Epoch Residential |
| Address: | PO Box 682736 | Address: | 359 Carolina Avenue |
| | Franklin, TN 37068 | | Winter Park, FL 32789 |
| Phone #: | (615) 771-8022 | Phone #: | (321) 316-6005 |
| e-mail address: | Gillian@FTGtraffic.com | e-mail address: | mccarley@epochresidential.com |

Approved By: _____ _____

City of Franklin Traffic Engineer Director of Engineering

**Reason for Request:** (Planned Unit Development, Site Plan, Rezoning)

site plan

**Description of Proposed Project** (Address, Map/Parcel Number, etc.) (Attach a conceptual development plans showing all access points and adjacent streets.):

079 08800 00009079

079 10105 00109079

**Existing Land Use** (be specific):

undeveloped

**Proposed Land Use** (be specific):

240 apartments on 13.06 acres (north) and 112 apartments on 18.87 acres (south)

**Potential Development Yield** (number of residential units; building square footage, projected number of employees, hours of operations):

352 apartments

**As applicant, I agree to pay to the City of Franklin 90% of the entire cost of the Transportation Impact Analysis.**

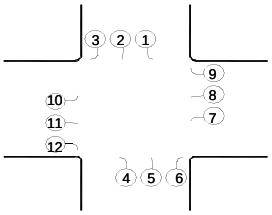
Property Owner Signature: _____

Property Owner Title: _____

Date: _____

The information above shall be submitted to the Engineering Department (109 3rd Ave South; Franklin, TN 37064) to review and provide estimated cost along with a proposed scope of services. All questions should be directed to Carl Baughman, Traffic Engineer III (615-791-3218).

**APPENDIX B**
**EXISTING TRAFFIC COUNTS**

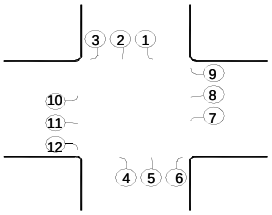



**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** Oak Meadow Dr and Eastern Home Depot Access
**DATE:** 23-Feb-16 Tue
**RECORDER:** FTG
**NOTES:** unsignalized

| LOCATION | S/B Home Depot Access | | | N/B | | | W/B Oak Meadow Dr | | | E/B Oak Meadow Dr | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TIME | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | |
| 6:30-6:45 | | | | | | | | 24 | | | 7 | | 209 | 31 |
| 6:45-7:00 | | | | | | | | **54** | | | **13** | | **228** | **67** |
| 7:00-7:15 | | | | | | | | **50** | | | **13** | | 209 | 63 |
| 7:15-7:30 | | | | | | | | **36** | | | **12** | | 189 | 48 |
| 7:30-7:45 | | | | | | | | **43** | | | **7** | | 179 | 50 |
| 7:45-8:00 | | | | | | | | 41 | | | 7 | | | 48 |
| 8:00-8:15 | | | | | | | | 33 | | | 10 | | | 43 |
| 8:15-8:30 | | | | | | | | 29 | | | 9 | | | 38 |
| | | | | | | | | | | | | | | |
| 4:30-4:45 | | | | | | | | **46** | | | **33** | | **344** | 79 |
| 4:45-5:00 | | | | | | | | **33** | | | **49** | | 336 | 82 |
| 5:00-5:15 | | | | | | | | **41** | | | **48** | | 346 | 89 |
| 5:15-5:30 | | | | | | | | **48** | | | **46** | | 329 | **94** |
| 5:30-5:45 | | | | | | | | 33 | | | 38 | | 309 | 71 |
| 5:45-6:00 | | | | | | | | 34 | | | 58 | | | 92 |
| 6:00-6:15 | | | | | | | | 25 | | | 47 | | | 72 |
| 6:15-6:30 | | | | | | | | 32 | | | 42 | | | 74 |
| **TOTAL** | | | | | | | | **602** | | | **439** | | | |
| **AM PK HR** | | | | | | | | 183 | | | 45 | | **6:45-7:45** | |
| **PM PK HR** | | | | | | | | 168 | | | 176 | | **4:30-5:30** | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | | | | | | | | 0.85 | | | 0.87 | | **0.85** |
| **PM PK PHF** | | | | | | | | 0.88 | | | 0.90 | | **0.91** |

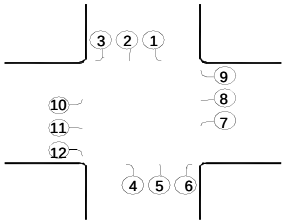



**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** Oak Meadow Dr and Western Home Depot Access
**DATE:** 23-Feb-16 Tue
**RECORDER:** FTG
**NOTES:** unsignalized

| LOCATION | S/B Home Depot Access | | | N/B | | | W/B Oak Meadow Dr | | | E/B Oak Meadow Dr | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TIME** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | | |
| 6:30-6:45 | | | 1 | | | | | 24 | | | 7 | | 213 | 32 |
| 6:45-7:00 | | | | | | | | **54** | | | **13** | | **231** | **67** |
| 7:00-7:15 | | | | | | | | **50** | | **1** | **13** | | 213 | 64 |
| 7:15-7:30 | | | **1** | | | | | **36** | | **1** | **12** | | 192 | 50 |
| 7:30-7:45 | **1** | | | | | | | **43** | | | **6** | | 180 | 50 |
| 7:45-8:00 | | | | | | | | 41 | | 1 | 7 | | | 49 |
| 8:00-8:15 | 1 | | | | | | | 33 | | | 9 | | | 43 |
| 8:15-8:30 | | | | | | | | 29 | | | 9 | | | 38 |
| | | | | | | | | | | | | | | |
| 4:30-4:45 | **3** | | | | | | | **46** | | **1** | **30** | | **351** | 80 |
| 4:45-5:00 | **4** | | | | | | | **33** | | **1** | **45** | | 343 | 83 |
| 5:00-5:15 | **3** | | **1** | | | | | **40** | **1** | **2** | **45** | | 354 | 92 |
| 5:15-5:30 | **5** | | **1** | | | | | **47** | **1** | **1** | **41** | | 335 | **96** |
| 5:30-5:45 | 3 | | | | | | | 33 | | 1 | 35 | | 314 | 72 |
| 5:45-6:00 | 6 | | | | | | | 34 | | 2 | 52 | | | 94 |
| 6:00-6:15 | 7 | | | | | | | 25 | | 1 | 40 | | | 73 |
| 6:15-6:30 | 5 | | | | | | | 32 | | 1 | 37 | | | 75 |
| **TOTAL** | **38** | | **4** | | | | | **600** | **2** | **13** | **401** | | | |
| **AM PK HR** | 1 | | 1 | | | | | 183 | | 2 | 44 | | **6:45-7:45** | |
| **PM PK HR** | 15 | | 2 | | | | | 166 | 2 | 5 | 161 | | **4:30-5:30** | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | 0.25 | | 0.25 | | | | | 0.85 | | 0.50 | 0.85 | | **0.86** |
| **PM PK PHF** | 0.75 | | 0.50 | | | | | 0.88 | 0.50 | 0.63 | 0.89 | | **0.91** |

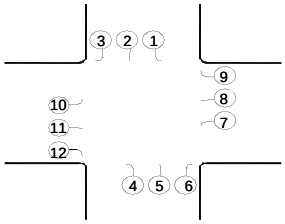



**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** S. Royal Oaks Blvd and Oak Meadow Dr
**DATE:** 4-Feb-16 Thu
**RECORDER:** Burns
**NOTES:** signalized

| LOCATION | S/B S. Royal Oaks Blvd | | | N/B S. Royal Oaks Blvd | | | W/B Oak Meadow Dr | | | E/B Oak Meadow Dr | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TIME | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| 6:30-6:45 | 1 | 96 | 15 | 17 | 231 | 2 | 2 | 2 | 21 | 28 | 4 | 9 | 1,978 |
| 6:45-7:00 | **4** | **88** | **17** | **17** | **270** | **7** | **1** | **4** | **49** | **31** | **2** | **12** | **2,078** |
| 7:00-7:15 | **6** | **115** | **15** | **14** | **300** | **6** | **5** | **2** | **43** | **26** | **2** | **16** | 2,071 |
| 7:15-7:30 | **9** | **117** | **15** | **23** | **242** | **4** | **4** | | **33** | **34** | | **17** | 1,995 |
| 7:30-7:45 | **3** | **157** | **21** | **27** | **225** | **3** | **7** | **8** | **28** | **28** | | **21** | 1,972 |
| 7:45-8:00 | 5 | 172 | 15 | 17 | 199 | 2 | 8 | 4 | 29 | 30 | 1 | 13 | |
| 8:00-8:15 | 3 | 123 | 22 | 22 | 214 | 4 | 8 | 8 | 17 | 29 | 2 | 22 | |
| 8:15-8:30 | 6 | 142 | 19 | 18 | 213 | 3 | 7 | 3 | 19 | 24 | | 21 | |
| | | | | | | | | | | | | | |
| 4:30-4:45 | **25** | **187** | **40** | **17** | **169** | | **20** | **9** | **17** | **44** | **6** | **26** | **2,272** |
| 4:45-5:00 | **29** | **179** | **29** | **18** | **200** | **6** | **17** | **2** | **14** | **25** | **11** | **31** | 2,225 |
| 5:00-5:15 | **32** | **170** | **33** | **28** | **222** | **5** | **19** | **5** | **17** | **35** | **10** | **29** | 2,170 |
| 5:15-5:30 | **32** | **172** | **32** | **22** | **175** | **2** | **21** | **6** | **21** | **32** | **8** | **23** | 2,016 |
| 5:30-5:45 | 27 | 150 | 29 | 16 | 188 | 4 | 14 | 3 | 16 | 33 | 5 | 28 | 1,932 |
| 5:45-6:00 | 33 | 158 | 33 | 8 | 162 | 11 | 12 | 7 | 15 | 35 | 10 | 22 | |
| 6:00-6:15 | 34 | 164 | 16 | 20 | 138 | 3 | 10 | 9 | 6 | 22 | 4 | 25 | |
| 6:15-6:30 | 33 | 175 | 18 | 9 | 148 | 1 | 17 | 6 | 9 | 23 | 4 | 19 | |
| **TOTAL** | **282** | **2,365** | **369** | **293** | **3,296** | **63** | **172** | **78** | **354** | **479** | **69** | **334** | |
| **AM PK HR** | 22 | 477 | 68 | 81 | 1,037 | 20 | 17 | 14 | 153 | 119 | 4 | 66 | **6:45-7:45** |
| **PM PK HR** | 118 | 708 | 134 | 85 | 766 | 13 | 77 | 22 | 69 | 136 | 35 | 109 | **4:30-5:30** |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | 0.61 | 0.76 | 0.81 | 0.75 | 0.86 | 0.71 | 0.61 | 0.44 | 0.78 | 0.88 | 0.50 | 0.79 | **0.94** |
| **PM PK PHF** | 0.92 | 0.95 | 0.84 | 0.76 | 0.86 | 0.54 | 0.92 | 0.61 | 0.82 | 0.77 | 0.80 | 0.88 | **0.94** |

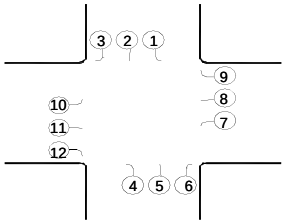



**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** S. Royal Oaks Blvd and Rand Place / Home Depot
**DATE:** 23-Feb-16 Tue
**RECORDER:** Burns
**NOTES:** unsignalized

| LOCATION | S/B S. Royal Oaks Blvd | | | N/B S. Royal Oaks Blvd | | | W/B Home Depot Access | | | E/B Rand Place | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TIME** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | |
| 6:30-6:45 | 13 | 93 | 10 | 3 | 279 | 11 | 2 | 1 | 2 | 6 | 1 | | 1,934 |
| 6:45-7:00 | **10** | **132** | **8** | **2** | **358** | **6** | **2** | | **1** | **5** | | **1** | **2,048** |
| 7:00-7:15 | **15** | **119** | **12** | | **364** | **5** | **1** | | **1** | **8** | **1** | **1** | 2,029 |
| 7:15-7:30 | **9** | **153** | **9** | **4** | **264** | **5** | **2** | | **7** | **4** | | **4** | 1,968 |
| 7:30-7:45 | **11** | **182** | **18** | **3** | **295** | **7** | **8** | | **2** | **7** | | **2** | 1,986 |
| 7:45-8:00 | 6 | 188 | 6 | 4 | 279 | 9 | 3 | | 5 | 2 | | 4 | |
| 8:00-8:15 | 13 | 172 | 14 | 4 | 240 | 6 | 2 | 1 | 3 | 5 | | 6 | |
| 8:15-8:30 | 11 | 123 | 11 | 7 | 307 | 7 | 2 | | 4 | 7 | | | |
| | | | | | | | | | | | | | |
| 4:30-4:45 | **5** | **207** | **19** | **1** | **218** | **5** | **11** | | **6** | **8** | **1** | **4** | **2,005** |
| 4:45-5:00 | **5** | **211** | **27** | **1** | **209** | **3** | **3** | | **8** | **6** | **1** | **6** | 1,987 |
| 5:00-5:15 | **5** | **228** | **26** | **2** | **235** | **4** | **4** | **3** | **3** | **5** | | **2** | 1,967 |
| 5:15-5:30 | **5** | **237** | **25** | **2** | **234** | **4** | **1** | **1** | **5** | **5** | **1** | **3** | 1,888 |
| 5:30-5:45 | 2 | 262 | 17 | 4 | 156 | 1 | 5 | 1 | 3 | 12 | | 4 | 1,720 |
| 5:45-6:00 | 3 | 211 | 23 | 4 | 196 | 2 | 3 | 1 | 4 | 7 | | 6 | |
| 6:00-6:15 | 3 | 213 | 18 | 2 | 168 | 3 | 5 | 1 | 4 | 12 | 2 | 7 | |
| 6:15-6:30 | 1 | 204 | 17 | 2 | 115 | 3 | 2 | | | 8 | | 3 | |
| **TOTAL** | **117** | **2,935** | **260** | **45** | **3,917** | **81** | **56** | **9** | **58** | **107** | **7** | **53** | |
| **AM PK HR** | 45 | 586 | 47 | 9 | 1,281 | 23 | 13 | | 11 | 24 | 1 | 8 | **6:45-7:45** |
| **PM PK HR** | 20 | 883 | 97 | 6 | 896 | 16 | 19 | 4 | 22 | 24 | 3 | 15 | **4:30-5:30** |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | 0.75 | 0.80 | 0.65 | 0.56 | 0.88 | 0.82 | 0.41 | | 0.39 | 0.75 | 0.25 | 0.50 | **0.97** |
| **PM PK PHF** | 1.00 | 0.93 | 0.90 | 0.75 | 0.95 | 0.80 | 0.43 | 0.33 | 0.69 | 0.75 | 0.75 | 0.63 | **0.96** |

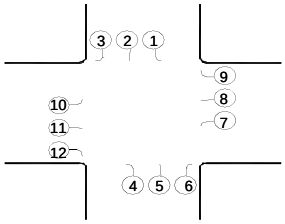



**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** S. Royal Oaks Blvd and Center Point Pl and Riverside Dr
**DATE:** 4-Feb-16 Thu
**RECORDER:** Burns
**NOTES:** signalized

| LOCATION | S/B S. Royal Oaks Blvd | | | N/B S. Royal Oaks Blvd | | | W/B Riverside Dr | | | E/B Cener Point Pl | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TIME** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | |
| 6:30-6:45 | 50 | 105 | 4 | 3 | 226 | 24 | 6 | 2 | 13 | 0 | 3 | 6 | 2,202 |
| 6:45-7:00 | 45 | 113 | 5 | 2 | 335 | 22 | 5 | 0 | 23 | 2 | 9 | 3 | 2,321 |
| 7:00-7:15 | **63** | **130** | **4** | **3** | **306** | **22** | **4** | **4** | **26** | **0** | **7** | **10** | **2,378** |
| 7:15-7:30 | **59** | **161** | **8** | **7** | **297** | **30** | **10** | **4** | **20** | **0** | **14** | **7** | 2,372 |
| 7:30-7:45 | **63** | **158** | **4** | **8** | **253** | **16** | **12** | **2** | **21** | **3** | **12** | **9** | 2,375 |
| 7:45-8:00 | **62** | **220** | **7** | **8** | **244** | **27** | **5** | **1** | **22** | **3** | **10** | **12** | |
| 8:00-8:15 | 74 | 161 | 8 | 7 | 232 | 19 | 11 | 3 | 33 | 4 | 14 | 7 | |
| 8:15-8:30 | 70 | 194 | 6 | 7 | 231 | 25 | 13 | 5 | 31 | 10 | 10 | 18 | |
| | | | | | | | | | | | | | |
| 4:30-4:45 | **56** | **255** | **24** | **19** | **240** | **6** | **11** | **15** | **59** | **21** | **14** | **38** | **2,942** |
| 4:45-5:00 | **48** | **243** | **16** | **30** | **228** | **4** | **13** | **14** | **67** | **15** | **15** | **29** | 2,865 |
| 5:00-5:15 | **47** | **233** | **28** | **12** | **247** | **7** | **11** | **20** | **71** | **28** | **13** | **30** | 2,829 |
| 5:15-5:30 | **64** | **233** | **18** | **22** | **240** | **8** | **8** | **5** | **70** | **13** | **17** | **17** | 2,730 |
| 5:30-5:45 | 60 | 223 | 25 | 14 | 221 | 9 | 8 | 8 | 47 | 15 | 29 | 22 | 2,571 |
| 5:45-6:00 | 55 | 206 | 23 | 20 | 228 | 13 | 6 | 7 | 52 | 25 | 22 | 29 | |
| 6:00-6:15 | 61 | 200 | 19 | 19 | 199 | 6 | 7 | 10 | 63 | 25 | 14 | 25 | |
| 6:15-6:30 | 37 | 184 | 21 | 17 | 166 | 6 | 11 | 10 | 33 | 25 | 17 | 29 | |
| **TOTAL** | **914** | **3,019** | **220** | **198** | **3,893** | **244** | **141** | **110** | **651** | **189** | **220** | **291** | |
| **AM PK HR** | 247 | 669 | 23 | 26 | 1,100 | 95 | 31 | 11 | 89 | 6 | 43 | 38 | **7:00-8:00** |
| **PM PK HR** | 215 | 964 | 86 | 83 | 955 | 25 | 43 | 54 | 267 | 77 | 59 | 114 | **4:30-5:30** |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | 0.98 | 0.76 | 0.72 | 0.81 | 0.90 | 0.79 | 0.65 | 0.69 | 0.86 | 0.50 | 0.77 | 0.79 | **0.96** |
| **PM PK PHF** | 0.84 | 0.95 | 0.77 | 0.69 | 0.97 | 0.78 | 0.83 | 0.68 | 0.94 | 0.69 | 0.87 | 0.75 | **0.97** |

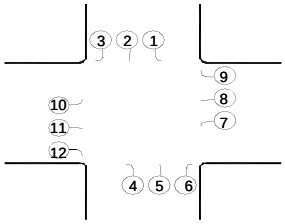



**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** Murfreesboro Road and Royal Oaks Blvd
**DATE:** 11-Feb-16 Thu
**RECORDER:** Burns
**NOTES:** signalized

| LOCATION | S/B N. Royal Oaks Blvd | | | N/B S. Royal Oaks Blvd | | | W/B Murfreesboro Road | | | E/B Murfreesboro Road | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TIME** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | |
| 6:30-6:45 | 21 | 26 | 8 | 14 | 38 | 211 | 99 | 137 | 37 | 4 | 118 | 7 | 3,669 |
| 6:45-7:00 | 29 | 17 | 4 | 24 | 80 | 244 | 123 | 193 | 43 | 15 | 168 | 8 | 4,005 |
| 7:00-7:15 | 48 | 27 | 5 | 28 | 119 | 253 | 107 | 159 | 37 | 20 | 166 | 13 | 4,252 |
| 7:15-7:30 | 51 | 25 | 14 | 22 | 53 | 236 | 160 | 204 | 57 | 21 | 163 | 13 | 4,384 |
| 7:30-7:45 | **53** | **39** | **18** | **25** | **70** | **213** | **162** | **210** | **58** | **29** | **165** | **14** | **4,492** |
| 7:45-8:00 | **50** | **43** | **20** | **26** | **56** | **267** | **210** | **234** | **72** | **25** | **181** | **11** | |
| 8:00-8:15 | **53** | **36** | **19** | **14** | **48** | **205** | **193** | **249** | **61** | **23** | **202** | **11** | |
| 8:15-8:30 | **52** | **61** | **19** | **27** | **44** | **224** | **191** | **226** | **69** | **27** | **167** | **20** | |
| | | | | | | | | | | | | | |
| 4:30-4:45 | **71** | **94** | **37** | **28** | **90** | **220** | **195** | **284** | **54** | **45** | **238** | **15** | **5,614** |
| 4:45-5:00 | **67** | **103** | **47** | **32** | **78** | **213** | **198** | **252** | **61** | **50** | **275** | **17** | 5,552 |
| 5:00-5:15 | **78** | **90** | **39** | **38** | **74** | **235** | **222** | **272** | **60** | **41** | **267** | **12** | 5,358 |
| 5:15-5:30 | **77** | **107** | **42** | **33** | **73** | **205** | **217** | **279** | **74** | **55** | **246** | **14** | 5,160 |
| 5:30-5:45 | 81 | 101 | 41 | 22 | 74 | 187 | 199 | 271 | 60 | 42 | 211 | 20 | 4,965 |
| 5:45-6:00 | 68 | 78 | 47 | 25 | 72 | 157 | 175 | 208 | 119 | 33 | 197 | 20 | |
| 6:00-6:15 | 80 | 89 | 44 | 32 | 65 | 169 | 169 | 234 | 60 | 42 | 229 | 17 | |
| 6:15-6:30 | 72 | 87 | 38 | 19 | 54 | 175 | 183 | 260 | 58 | 49 | 219 | 13 | |
| **TOTAL** | **951** | **1,023** | **442** | **409** | **1,088** | **3,414** | **2,803** | **3,672** | **980** | **521** | **3,212** | **225** | |
| **AM PK HR** | 208 | 179 | 76 | 92 | 218 | 909 | 756 | 919 | 260 | 104 | 715 | 56 | **7:30-8:30** |
| **PM PK HR** | 293 | 394 | 165 | 131 | 315 | 873 | 832 | 1,087 | 249 | 191 | 1,026 | 58 | **4:30-5:30** |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | 0.98 | 0.73 | 0.95 | 0.85 | 0.78 | 0.85 | 0.90 | 0.92 | 0.90 | 0.90 | 0.88 | 0.70 | **0.94** |
| **PM PK PHF** | 0.94 | 0.92 | 0.88 | 0.86 | 0.88 | 0.93 | 0.94 | 0.96 | 0.84 | 0.87 | 0.93 | 0.85 | **0.98** |

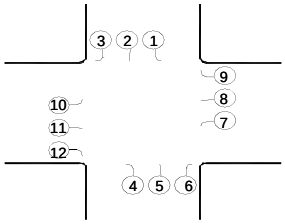



**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** Murfreesboro Road and the Ramps for Southbound I-65
**DATE:** 11-Feb-16 Thu
**RECORDER:** Burns
**NOTES:** signalized

| LOCATION | S/B Ramps | | | N/B | | | W/B Murfreesboro Road | | | E/B Murfreesboro Road | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TIME | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| 6:30-6:45 | 63 | | 148 | | | | 11 | | | | 369 | 34 | 2,929 |
| 6:45-7:00 | 69 | | 181 | | | | 31 | | | | 406 | 47 | 3,112 |
| 7:00-7:15 | 66 | | 139 | | | | 30 | | | | 471 | 49 | 3,159 |
| 7:15-7:30 | **73** | | **196** | | | | **37** | | | | **452** | **57** | **3,168** |
| 7:30-7:45 | **61** | | **237** | | | | **32** | | | | **432** | **46** | 3,140 |
| 7:45-8:00 | **91** | | **245** | | | | **18** | | | | **385** | **42** | |
| 8:00-8:15 | **86** | | **219** | | | | **29** | | | | **385** | **45** | |
| 8:15-8:30 | 91 | | 240 | | | | 24 | | | | 393 | 39 | |
| | | | | | | | | | | | | | |
| 4:30-4:45 | **205** | | **299** | | | | **71** | | | | **480** | **114** | **4,656** |
| 4:45-5:00 | **222** | | **322** | | | | **48** | | | | **388** | **95** | 4,524 |
| 5:00-5:15 | **197** | | **298** | | | | **76** | | | | **470** | **119** | 4,499 |
| 5:15-5:30 | **222** | | **374** | | | | **69** | | | | **469** | **118** | 4,376 |
| 5:30-5:45 | 175 | | 319 | | | | 56 | | | | 385 | 102 | 4,089 |
| 5:45-6:00 | 181 | | 349 | | | | 44 | | | | 383 | 93 | |
| 6:00-6:15 | 196 | | 290 | | | | 43 | | | | 408 | 100 | |
| 6:15-6:30 | 178 | | 256 | | | | 40 | | | | 414 | 77 | |
| **TOTAL** | **2,176** | | **4,112** | | | | **659** | | | | **6,690** | **1,177** | |
| **AM PK HR** | 311 | | 897 | | | | 116 | | | | 1,654 | 190 | **7:15-8:15** |
| **PM PK HR** | 846 | | 1,293 | | | | 264 | | | | 1,807 | 446 | **4:30-5:30** |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | 0.85 | | 0.92 | | | | 0.91 | | | | 0.96 | 1.03 | **0.97** |
| **PM PK PHF** | 0.95 | | 0.86 | | | | 0.87 | | | | 0.94 | 0.94 | **0.93** |




**INTERSECTION TRAFFIC VOLUME COUNTS**

**LOCATION:** Murfreesboro Road and the Ramps for Northbound I-65
**DATE:** 11-Feb-16 Thu
**RECORDER:** Burns
**NOTES:** signalized

| LOCATION | S/B Ramps | | | N/B | | | W/B Murfreesboro Road | | | E/B Murfreesboro Road | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TIME | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| 6:30-6:45 | | | | 74 | | 78 | | 144 | 286 | 278 | | | 3,695 |
| 6:45-7:00 | | | | **109** | | **94** | | **150** | **306** | **319** | | | **3,772** |
| 7:00-7:15 | | | | **65** | | **66** | | **183** | **306** | **331** | | | 3,689 |
| 7:15-7:30 | | | | **94** | | **92** | | **154** | **267** | **299** | | | 3,592 |
| 7:30-7:45 | | | | **107** | | **85** | | **213** | **248** | **284** | | | 3,508 |
| 7:45-8:00 | | | | 72 | | 101 | | 243 | 236 | 243 | | | |
| 8:00-8:15 | | | | 108 | | 82 | | 182 | 223 | 259 | | | |
| 8:15-8:30 | | | | 91 | | 67 | | 234 | 223 | 207 | | | |
| | | | | | | | | | | | | | |
| 4:30-4:45 | | | | **80** | | **40** | | **229** | **138** | **215** | | | **2,712** |
| 4:45-5:00 | | | | **75** | | **39** | | **231** | **134** | **187** | | | 2,597 |
| 5:00-5:15 | | | | **63** | | **39** | | **251** | **123** | **208** | | | 2,490 |
| 5:15-5:30 | | | | **66** | | **34** | | **213** | **143** | **204** | | | 2,376 |
| 5:30-5:45 | | | | 49 | | 40 | | 200 | 105 | 193 | | | 2,230 |
| 5:45-6:00 | | | | 79 | | 46 | | 161 | 101 | 172 | | | |
| 6:00-6:15 | | | | 71 | | 44 | | 183 | 106 | 166 | | | |
| 6:15-6:30 | | | | 52 | | 44 | | 176 | 89 | 153 | | | |
| **TOTAL** | | | | **1,255** | | **991** | | **1,503** | **3,034** | **3,718** | | | |
| **AM PK HR** | | | | 375 | | 337 | | 700 | 1,127 | 1,233 | | | **6:45-7:45** |
| **PM PK HR** | | | | 284 | | 152 | | 814 | 924 | 538 | | | **4:30-5:30** |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM PK PHF** | | | | 0.86 | | 0.90 | | 0.82 | 0.92 | 0.93 | #DIV/0! | | **0.96** |
| **PM PK PHF** | | | | 0.89 | | 0.95 | | 0.95 | 0.92 | 0.94 | #DIV/0! | | **0.97** |

**APPENDIX C**
**CAPACITY ANALYSES**

## EXISTING CONDITIONS

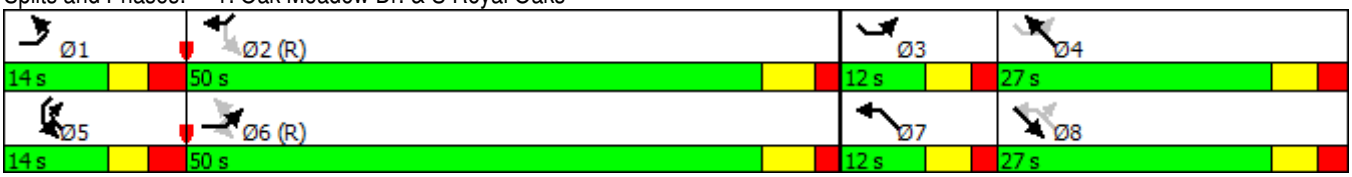
| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 81 | 1037 | 20 | 119 | 4 | 66 | 17 | 14 | 153 | 22 | 477 | 68 |
| Future Volume (vph) | 81 | 1037 | 20 | 119 | 4 | 66 | 17 | 14 | 153 | 22 | 477 | 68 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 3 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | | 0.850 | | 0.861 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.950 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 3319 | 1531 | 1711 | 1550 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.308 | 0.950 | | 0.742 | | | 0.583 | | | 0.208 | | |
| Satd. Flow (perm) | 497 | 3319 | 1531 | 1336 | 1550 | 0 | 1086 | 1925 | 1583 | 387 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 154 | | 90 | | | | 101 | | 154 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 552 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 12.5 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 121 | 1103 | 32 | 151 | 7 | 90 | 23 | 24 | 166 | 29 | 636 | 99 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 121 | 1103 | 32 | 151 | 97 | 0 | 23 | 24 | 166 | 29 | 735 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 30 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | 42 | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | 45 | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | Perm | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | 6 | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | 20.0 | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 13.0 | 26.0 | 26.0 | 12.5 | 20.0 | | 12.5 | 20.0 | 13.0 | 13.0 | 26.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 14.0 | 50.0 | 50.0 | 12.0 | 27.0 | | 12.0 | 27.0 | 14.0 | 14.0 | 50.0 | |
| Total Split (%) | 13.6% | 48.5% | 48.5% | 11.7% | 26.2% | | 11.7% | 26.2% | 13.6% | 13.6% | 48.5% | |
| Maximum Green (s) | 8.0 | 44.0 | 44.0 | 6.5 | 21.0 | | 6.5 | 21.0 | 8.0 | 8.0 | 44.0 | |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | -1.5 | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | 4.5 | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | 5.0 | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | C-Min | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 77.4 | 66.6 | 66.6 | 14.7 | 10.8 | | 14.7 | 10.8 | 21.2 | 76.9 | 66.4 | |
| Actuated g/C Ratio | 0.75 | 0.65 | 0.65 | 0.14 | 0.10 | | 0.14 | 0.10 | 0.21 | 0.75 | 0.64 | |
| v/c Ratio | 0.26 | 0.51 | 0.03 | 0.67 | 0.40 | | 0.11 | 0.12 | 0.41 | 0.07 | 0.40 | |
| Control Delay | 5.3 | 12.0 | 0.1 | 54.1 | 15.7 | | 34.1 | 42.2 | 16.9 | 4.5 | 8.6 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 5.3 | 12.0 | 0.1 | 54.1 | 15.7 | | 34.1 | 42.2 | 16.9 | 4.5 | 8.6 | |
| LOS | A | B | A | D | B | | C | D | B | A | A | |
| Approach Delay | | 11.1 | | | 39.0 | | | 21.6 | | 8.4 | | |
| Approach LOS | | B | | | D | | | C | | A | | |
| 90th %ile Green (s) | 8.0 | 54.3 | 54.3 | 6.5 | 11.7 | | 6.5 | 11.7 | 7.0 | 7.0 | 53.3 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Min | Min | Coord | |
| 70th %ile Green (s) | 7.3 | 57.4 | 57.4 | 6.5 | 8.6 | | 6.5 | 8.6 | 7.0 | 7.0 | 57.1 | |
| 70th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Min | Min | Coord | |
| 50th %ile Green (s) | 7.0 | 71.0 | 71.0 | 7.5 | 7.0 | | 0.0 | 0.0 | 7.0 | 7.0 | 71.0 | |
| 50th %ile Term Code | Min | Coord | Coord | Hold | Min | | Skip | Skip | Min | Min | Coord | |
| 30th %ile Green (s) | 7.0 | 71.0 | 71.0 | 7.5 | 7.0 | | 0.0 | 0.0 | 7.0 | 7.0 | 71.0 | |
| 30th %ile Term Code | Min | Coord | Coord | Hold | Min | | Skip | Skip | Min | Min | Coord | |
| 10th %ile Green (s) | 7.0 | 72.0 | 72.0 | 6.5 | 0.0 | | 0.0 | 0.0 | 7.0 | 7.0 | 72.0 | |
| 10th %ile Term Code | Min | Coord | Coord | Max | Skip | | Skip | Skip | Min | Min | Coord | |
| Stops (vph) | 21 | 538 | 0 | 110 | 17 | | 15 | 14 | 53 | 7 | 205 | |
| Fuel Used(gal) | 1 | 10 | 0 | 2 | 1 | | 0 | 0 | 2 | 0 | 9 | |
| CO Emissions (g/hr) | 39 | 697 | 6 | 172 | 50 | | 26 | 24 | 140 | 24 | 628 | |
| NOx Emissions (g/hr) | 8 | 136 | 1 | 33 | 10 | | 5 | 5 | 27 | 5 | 122 | |
| VOC Emissions (g/hr) | 9 | 162 | 1 | 40 | 12 | | 6 | 6 | 32 | 5 | 146 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 1 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 10 | 145 | 0 | 100 | 4 | | 14 | 15 | 35 | 2 | 71 | |
| Queue Length 95th (ft) | 32 | 308 | 0 | 120 | 13 | | 27 | 25 | 88 | 12 | 130 | |
| Internal Link Dist (ft) | | 472 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | 150 | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 482 | 2147 | 1044 | 224 | 423 | | 214 | 439 | 420 | 433 | 1850 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.25 | 0.51 | 0.03 | 0.67 | 0.23 | | 0.11 | 0.05 | 0.40 | 0.07 | 0.40 | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 103 | |

| | |
|---|---|
| Actuated Cycle Length: 103 | |
| Offset: 0 (0%), Referenced to phase 2:SWL and 6:EBL, Start of Green | |
| Natural Cycle: 75 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.67 | |
| Intersection Signal Delay: 13.9 | Intersection LOS: B |
| Intersection Capacity Utilization 59.1% | ICU Level of Service B |
| Analysis Period (min) 15 | |

Splits and Phases: 1: Oak Meadow Dr. & S Royal Oaks



| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 26 | 1100 | 95 | 247 | 669 | 23 | 6 | 43 | 38 | 31 | 11 | 89 |
| Future Volume (vph) | 26 | 1100 | 95 | 247 | 669 | 23 | 6 | 43 | 38 | 31 | 11 | 89 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 12 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | | 1% | | | -2% | | | -1% | | | 2% | |
| Storage Length (ft) | 80 | | 135 | 220 | | 0 | 100 | | 0 | 120 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | 0.993 | | | 0.934 | | | 0.871 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1676 | 3438 | 1607 | 1787 | 3428 | 0 | 1754 | 1624 | 0 | 1787 | 1523 | 0 |
| Flt Permitted | 0.377 | | | 0.182 | | | 0.489 | | | 0.520 | | |
| Satd. Flow (perm) | 665 | 3438 | 1607 | 342 | 3428 | 0 | 903 | 1624 | 0 | 978 | 1523 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 82 | | 5 | | | 30 | | | 103 | |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1624 | | | 792 | | | 957 | | | 515 | |
| Travel Time (s) | | 36.9 | | | 18.0 | | | 21.8 | | | 11.7 | |
| Peak Hour Factor | 0.63 | 0.92 | 0.87 | 0.80 | 0.99 | 0.67 | 0.58 | 0.68 | 0.77 | 0.67 | 0.63 | 0.86 |
| Heavy Vehicles (%) | 0% | 1% | 0% | 2% | 2% | 4% | 0% | 11% | 0% | 0% | 10% | 3% |
| Adj. Flow (vph) | 41 | 1196 | 109 | 309 | 676 | 34 | 10 | 63 | 49 | 46 | 17 | 103 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 41 | 1196 | 109 | 309 | 710 | 0 | 10 | 112 | 0 | 46 | 120 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 0.99 | 1.03 | 0.99 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 1 | 0 | 1 | 1 | | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | 0 | 42 | 226 | | 42 | 42 | | 42 | 42 | |
| Trailing Detector (ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | 50 | 45 | 6 | | 45 | 45 | | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | D.Pm | NA | | D.Pm | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | | 4 | | | 8 | |
| Permitted Phases | 6 | | 6 | 2 | | | 8 | | | 4 | | |
| Detector Phase | 1 | 6 | | 5 | 2 | | 8 | 4 | | 4 | 8 | |
| Switch Phase | | | | | | | | | | | | |

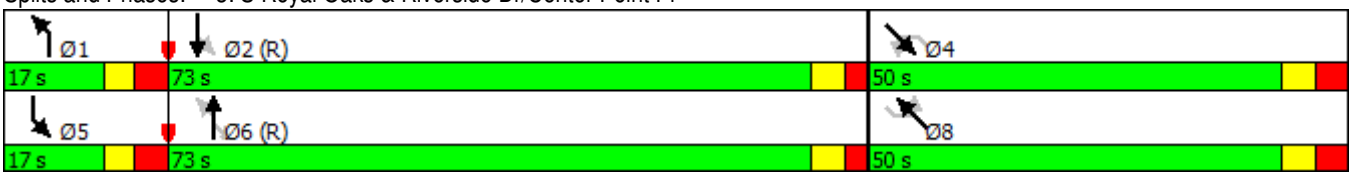
| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | |
| Minimum Split (s) | 17.0 | 73.0 | 73.0 | 17.0 | 73.0 | | 50.0 | 50.0 | | 50.0 | 50.0 | |
| Total Split (s) | 17.0 | 73.0 | 73.0 | 17.0 | 73.0 | | 50.0 | 50.0 | | 50.0 | 50.0 | |
| Total Split (%) | 12.1% | 52.1% | 52.1% | 12.1% | 52.1% | | 35.7% | 35.7% | | 35.7% | 35.7% | |
| Maximum Green (s) | 10.5 | 67.0 | 67.0 | 10.5 | 67.0 | | 43.0 | 43.0 | | 43.0 | 43.0 | |
| Yellow Time (s) | 3.0 | 3.5 | 3.5 | 3.0 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | 2.5 | 3.5 | 2.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | -3.0 | -1.0 | -3.0 | | -2.5 | -2.5 | | -2.5 | -2.5 | |
| Total Lost Time (s) | 5.5 | 3.0 | 3.0 | 5.5 | 3.0 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Recall Mode | None | C-Min | C-Min | None | C-Min | | None | None | | None | None | |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | | 8.0 | 8.0 | | 8.0 | 8.0 | |
| Flash Dont Walk (s) | | 16.0 | 16.0 | | 20.0 | | 35.0 | 32.0 | | 32.0 | 35.0 | |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 105.1 | 99.9 | 99.9 | 112.9 | 106.2 | | 15.6 | 15.6 | | 15.6 | 15.6 | |
| Actuated g/C Ratio | 0.75 | 0.71 | 0.71 | 0.81 | 0.76 | | 0.11 | 0.11 | | 0.11 | 0.11 | |
| v/c Ratio | 0.07 | 0.49 | 0.09 | 0.78 | 0.27 | | 0.10 | 0.54 | | 0.43 | 0.46 | |
| Control Delay | 3.6 | 10.1 | 2.5 | 37.9 | 2.9 | | 49.5 | 43.9 | | 68.5 | 19.4 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 3.6 | 10.1 | 2.5 | 37.9 | 2.9 | | 49.5 | 43.9 | | 68.5 | 19.4 | |
| LOS | A | B | A | D | A | | D | D | | E | B | |
| Approach Delay | | 9.2 | | | 13.5 | | | 44.3 | | | 33.0 | |
| Approach LOS | | A | | | B | | | D | | | C | |
| 90th %ile Green (s) | 7.6 | 90.9 | 90.9 | 10.5 | 93.8 | | 19.1 | 19.1 | | 19.1 | 19.1 | |
| 90th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 70th %ile Green (s) | 7.0 | 94.5 | 94.5 | 10.5 | 98.0 | | 15.5 | 15.5 | | 15.5 | 15.5 | |
| 70th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 50th %ile Green (s) | 6.6 | 96.9 | 96.9 | 10.5 | 100.8 | | 13.1 | 13.1 | | 13.1 | 13.1 | |
| 50th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 30th %ile Green (s) | 6.3 | 99.4 | 99.4 | 10.5 | 103.6 | | 10.6 | 10.6 | | 10.6 | 10.6 | |
| 30th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 10th %ile Green (s) | 0.0 | 102.9 | 102.9 | 10.5 | 119.9 | | 7.1 | 7.1 | | 7.1 | 7.1 | |
| 10th %ile Term Code | Skip | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| Stops (vph) | 6 | 463 | 9 | 181 | 127 | | 7 | 63 | | 28 | 22 | |
| Fuel Used(gal) | 0 | 19 | 1 | 4 | 5 | | 0 | 2 | | 1 | 1 | |
| CO Emissions (g/hr) | 27 | 1310 | 91 | 310 | 376 | | 10 | 117 | | 50 | 64 | |
| NOx Emissions (g/hr) | 5 | 255 | 18 | 60 | 73 | | 2 | 23 | | 10 | 12 | |
| VOC Emissions (g/hr) | 6 | 304 | 21 | 72 | 87 | | 2 | 27 | | 12 | 15 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 6 | 228 | 7 | 124 | 63 | | 9 | 77 | | 40 | 14 | |
| Queue Length 95th (ft) | 11 | 320 | 26 | m161 | m85 | | 18 | 99 | | 58 | 24 | |
| Internal Link Dist (ft) | | 1544 | | | 712 | | | 877 | | | 435 | |
| Turn Bay Length (ft) | 80 | | 135 | 220 | | | 100 | | | 120 | | |
| Base Capacity (vph) | 600 | 2453 | 1170 | 394 | 2601 | | 293 | 548 | | 317 | 564 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |

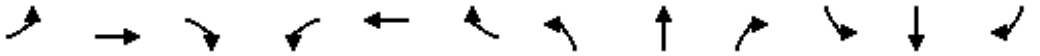
| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.07 | 0.49 | 0.09 | 0.78 | 0.27 | | 0.03 | 0.20 | | 0.15 | 0.21 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 139 (99%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.78 | | | |
| Intersection Signal Delay: 14.0 | | Intersection LOS: B | |
| Intersection Capacity Utilization 64.1% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |

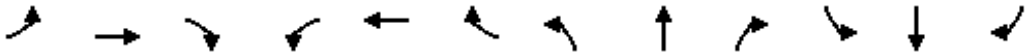
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: S Royal Oaks & Riverside Dr/Center Point Pl





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 104 | 715 | 56 | 756 | 919 | 260 | 92 | 218 | 909 | 208 | 179 | 76 |
| Future Volume (vph) | 104 | 715 | 56 | 756 | 919 | 260 | 92 | 218 | 909 | 208 | 179 | 76 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.988 | | | | 0.850 | | | 0.850 | | 0.958 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3232 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3232 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 10 | | | | 201 | | | | | 36 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 700 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 11.9 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.80 | 0.90 | 0.80 | 0.93 | 0.91 | 0.88 | 0.82 | 0.80 | 0.93 | 0.92 | 0.74 | 0.81 |
| Heavy Vehicles (%) | 3% | 6% | 2% | 3% | 6% | 3% | 4% | 2% | 2% | 2% | 4% | 2% |
| Adj. Flow (vph) | 130 | 794 | 70 | 813 | 1010 | 295 | 112 | 273 | 977 | 226 | 242 | 94 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 130 | 864 | 0 | 813 | 1010 | 295 | 112 | 273 | 977 | 226 | 336 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

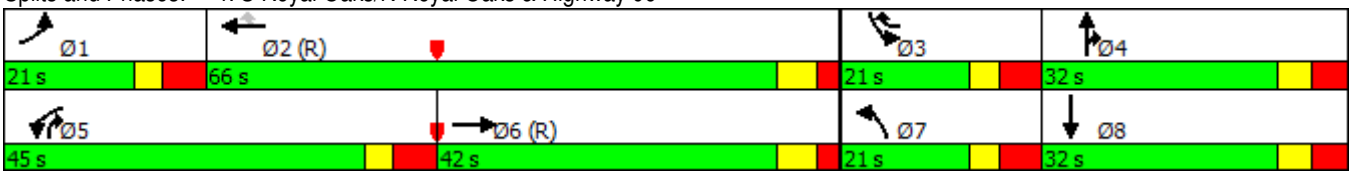


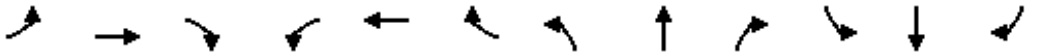
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (%) | 15.0% | 30.0% | | 32.1% | 47.1% | 15.0% | 15.0% | 22.9% | | 15.0% | 22.9% | |
| Maximum Green (s) | 13.5 | 35.5 | | 37.5 | 59.5 | 13.5 | 13.5 | 24.5 | | 13.5 | 24.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 13.2 | 38.9 | | 39.8 | 65.4 | 84.3 | 12.0 | 27.5 | 71.8 | 14.9 | 30.3 | |
| Actuated g/C Ratio | 0.09 | 0.28 | | 0.28 | 0.47 | 0.60 | 0.09 | 0.20 | 0.51 | 0.11 | 0.22 | |
| v/c Ratio | 0.40 | 0.66 | | 0.87 | 0.63 | 0.28 | 0.39 | 0.38 | 0.67 | 0.64 | 0.46 | |
| Control Delay | 77.5 | 38.6 | | 49.2 | 40.8 | 6.0 | 55.8 | 51.9 | 34.8 | 68.9 | 45.0 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 77.5 | 38.6 | | 49.2 | 40.8 | 6.0 | 55.8 | 51.9 | 34.8 | 68.9 | 45.0 | |
| LOS | E | D | | D | D | A | E | D | C | E | D | |
| Approach Delay | | 43.7 | | | 39.2 | | | 40.0 | | | 54.6 | |
| Approach LOS | | D | | | D | | | D | | | D | |
| 90th %ile Green (s) | 13.5 | 35.5 | | 37.5 | 59.5 | 13.5 | 12.9 | 24.5 | | 13.5 | 25.1 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 70th %ile Green (s) | 12.0 | 35.5 | | 37.5 | 61.0 | 13.5 | 11.2 | 24.5 | | 13.5 | 26.8 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 50th %ile Green (s) | 10.8 | 35.5 | | 37.5 | 62.2 | 13.5 | 10.0 | 24.5 | | 13.5 | 28.0 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 30th %ile Green (s) | 9.6 | 35.9 | | 37.5 | 63.8 | 13.1 | 8.9 | 24.5 | | 13.1 | 28.7 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | Gap | Gap | Max | | Gap | Hold | |
| 10th %ile Green (s) | 7.8 | 39.4 | | 36.4 | 68.0 | 10.7 | 7.2 | 24.5 | | 10.7 | 28.0 | |
| 10th %ile Term Code | Gap | Coord | | Gap | Coord | Gap | Gap | Max | | Gap | Hold | |
| Stops (vph) | 104 | 667 | | 657 | 884 | 60 | 85 | 201 | 635 | 196 | 196 | |
| Fuel Used(gal) | 3 | 16 | | 20 | 24 | 3 | 2 | 5 | 16 | 6 | 5 | |
| CO Emissions (g/hr) | 221 | 1137 | | 1407 | 1661 | 210 | 146 | 333 | 1088 | 389 | 373 | |
| NOx Emissions (g/hr) | 43 | 221 | | 274 | 323 | 41 | 28 | 65 | 212 | 76 | 73 | |
| VOC Emissions (g/hr) | 51 | 264 | | 326 | 385 | 49 | 34 | 77 | 252 | 90 | 86 | |
| Dilemma Vehicles (#) | 0 | 26 | | 0 | 34 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 63 | 260 | | 352 | 503 | 50 | 50 | 128 | 322 | 103 | 125 | |
| Queue Length 95th (ft) | 88 | 310 | | m412 | m539 | m80 | 73 | 146 | 567 | 148 | 141 | |
| Internal Link Dist (ft) | | 620 | | | 611 | | | 712 | | | 884 | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 388 | 1308 | | 938 | 1591 | 1061 | 370 | 714 | 1473 | 367 | 728 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.34 | 0.66 | | 0.87 | 0.63 | 0.28 | 0.30 | 0.38 | 0.66 | 0.62 | 0.46 | |

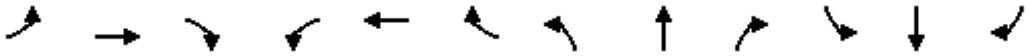
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 116 (83%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.87 | | | |
| Intersection Signal Delay: 42.0 | | Intersection LOS: D | |
| Intersection Capacity Utilization 66.7% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 4: S Royal Oaks/N Royal Oaks & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 1595 | 172 | 103 | 972 | 0 | 0 | 0 | 0 | 329 | 0 | 941 |
| Future Volume (vph) | 0 | 1595 | 172 | 103 | 972 | 0 | 0 | 0 | 0 | 329 | 0 | 941 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 181 | | | | | | | | | 147 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.91 | 0.90 | 0.86 | 0.87 | 1.00 | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 |
| Heavy Vehicles (%) | 2% | 3% | 7% | 1% | 3% | 2% | 2% | 2% | 2% | 6% | 2% | 3% |
| Adj. Flow (vph) | 0 | 1753 | 191 | 120 | 1117 | 0 | 0 | 0 | 0 | 387 | 0 | 1001 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 1753 | 191 | 120 | 1117 | 0 | 0 | 0 | 0 | 387 | 0 | 1001 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



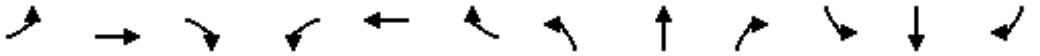
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (%) | | 44.3% | 44.3% | 16.4% | 60.7% | | | | | 39.3% | | 39.3% |
| Maximum Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 60.9 | 60.9 | 15.1 | 81.0 | | | | | 49.5 | | 49.5 |
| Actuated g/C Ratio | | 0.44 | 0.44 | 0.11 | 0.58 | | | | | 0.35 | | 0.35 |
| v/c Ratio | | 0.64 | 0.25 | 0.62 | 0.57 | | | | | 0.33 | | 0.97 |
| Control Delay | | 23.9 | 4.3 | 69.3 | 18.2 | | | | | 34.2 | | 59.3 |
| Queue Delay | | 0.1 | 0.0 | 0.0 | 0.3 | | | | | 1.2 | | 0.0 |
| Total Delay | | 24.0 | 4.3 | 69.3 | 18.5 | | | | | 35.3 | | 59.3 |
| LOS | | C | A | E | B | | | | | D | | E |
| Approach Delay | | 22.0 | | | 23.5 | | | | | | | |
| Approach LOS | | C | | | C | | | | | | | |
| 90th %ile Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| 90th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 70th %ile Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| 70th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 50th %ile Green (s) | | 58.2 | 58.2 | 14.8 | 79.0 | | | | | 47.5 | | 47.5 |
| 50th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| 30th %ile Green (s) | | 60.5 | 60.5 | 12.5 | 79.0 | | | | | 47.5 | | 47.5 |
| 30th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| 10th %ile Green (s) | | 63.7 | 63.7 | 9.3 | 79.0 | | | | | 47.5 | | 47.5 |
| 10th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| Stops (vph) | | 879 | 29 | 103 | 466 | | | | | 235 | | 753 |
| Fuel Used(gal) | | 29 | 2 | 3 | 12 | | | | | 6 | | 21 |
| CO Emissions (g/hr) | | 2048 | 128 | 199 | 828 | | | | | 397 | | 1494 |
| NOx Emissions (g/hr) | | 398 | 25 | 39 | 161 | | | | | 77 | | 291 |
| VOC Emissions (g/hr) | | 475 | 30 | 46 | 192 | | | | | 92 | | 346 |
| Dilemma Vehicles (#) | | 41 | 0 | 0 | 24 | | | | | 0 | | 0 |
| Queue Length 50th (ft) | | 231 | 16 | 116 | 273 | | | | | 132 | | 451 |
| Queue Length 95th (ft) | | 330 | 51 | m156 | m273 | | | | | 164 | | #617 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2759 | 758 | 229 | 1960 | | | | | 1162 | | 1033 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 305 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 150 | 0 | 0 | 0 | | | | | 537 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.67 | 0.25 | 0.52 | 0.67 | | | | | 0.62 | | 0.97 |

Intersection Summary

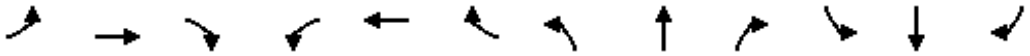
| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 106 (76%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.97 | | | |
| Intersection Signal Delay: 31.7 | | Intersection LOS: C | |
| Intersection Capacity Utilization 100.3% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Ent ramp to I-65/Exit ramp from I-65 & Highway 96



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1233 | 691 | 0 | 0 | 700 | 1127 | 375 | 0 | 337 | 0 | 0 | 0 |
| Future Volume (vph) | 1233 | 691 | 0 | 0 | 700 | 1127 | 375 | 0 | 337 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 23 | | | 289 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 311 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 5.3 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.88 | 0.86 | 0.95 | 1.00 | 0.95 | 0.98 | 0.95 | 0.25 | 0.92 | 1.00 | 1.00 | 0.95 |
| Heavy Vehicles (%) | 2% | 5% | 2% | 2% | 2% | 1% | 2% | 0% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 1401 | 803 | 0 | 0 | 737 | 1150 | 395 | 0 | 366 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 1401 | 803 | 0 | 0 | 737 | 1150 | 395 | 0 | 366 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (%) | 40.0% | 82.9% | | | 42.9% | | 17.1% | | 17.1% | | | |
| Maximum Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 50.0 | 110.0 | | | 53.5 | 79.5 | 16.5 | | 16.5 | | | |
| Actuated g/C Ratio | 0.36 | 0.79 | | | 0.38 | 0.57 | 0.12 | | 0.12 | | | |
| v/c Ratio | 1.19 | 0.31 | | | 0.55 | 0.72 | 1.02 | | 0.82 | | | |
| Control Delay | 144.4 | 2.7 | | | 35.6 | 24.7 | 109.7 | | 29.7 | | | |
| Queue Delay | 0.3 | 0.1 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 144.7 | 2.8 | | | 35.6 | 24.7 | 109.7 | | 29.7 | | | |
| LOS | F | A | | | D | C | F | | C | | | |
| Approach Delay | | 93.0 | | | 28.9 | | | | | | | |
| Approach LOS | | F | | | C | | | | | | | |
| 90th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 90th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 70th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 70th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 50th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 50th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 30th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 30th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 10th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 10th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| Stops (vph) | 894 | 79 | | | 533 | 785 | 332 | | 80 | | | |
| Fuel Used(gal) | 50 | 4 | | | 12 | 16 | 12 | | 4 | | | |
| CO Emissions (g/hr) | 3473 | 263 | | | 824 | 1101 | 827 | | 301 | | | |
| NOx Emissions (g/hr) | 676 | 51 | | | 160 | 214 | 161 | | 59 | | | |
| VOC Emissions (g/hr) | 805 | 61 | | | 191 | 255 | 192 | | 70 | | | |
| Dilemma Vehicles (#) | 0 | 18 | | | 25 | 0 | 0 | | 0 | | | |
| Queue Length 50th (ft) | ~756 | 47 | | | 273 | 409 | ~195 | | 66 | | | |
| Queue Length 95th (ft) | #913 | 71 | | | 337 | 502 | #302 | | #225 | | | |
| Internal Link Dist (ft) | | 476 | | | 231 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1179 | 2598 | | | 1352 | 1607 | 389 | | 446 | | | |
| Starvation Cap Reductn | 67 | 590 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 1.26 | 0.40 | | | 0.55 | 0.72 | 1.02 | | 0.82 | | | |

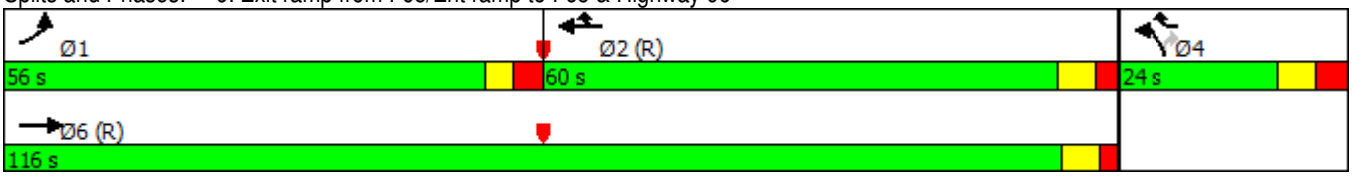
Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 122 (87%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.19 | | | |
| Intersection Signal Delay: 64.7 | | Intersection LOS: E | |
| Intersection Capacity Utilization 100.3% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 85 | 766 | 13 | 136 | 35 | 109 | 77 | 22 | 69 | 118 | 708 | 134 |
| Future Volume (vph) | 85 | 766 | 13 | 136 | 35 | 109 | 77 | 22 | 69 | 118 | 708 | 134 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 3 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | | 0.850 | | 0.893 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.950 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 3319 | 1531 | 1711 | 1608 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.128 | 0.950 | | 0.732 | | | 0.317 | | | 0.294 | | |
| Satd. Flow (perm) | 207 | 3319 | 1531 | 1318 | 1608 | 0 | 590 | 1925 | 1583 | 548 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 132 | | 101 | | | | 77 | | 132 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 552 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 12.5 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 127 | 815 | 21 | 172 | 60 | 149 | 103 | 38 | 75 | 157 | 944 | 194 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 127 | 815 | 21 | 172 | 209 | 0 | 103 | 38 | 75 | 157 | 1138 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 30 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | 42 | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | 45 | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | Perm | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | 6 | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | 20.0 | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 18.0 | 57.0 | 57.0 | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 18.0 | 57.0 | 57.0 | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |
| Total Split (%) | 15.0% | 47.5% | 47.5% | 11.7% | 29.2% | | 11.7% | 29.2% | 11.7% | 11.7% | 44.2% | |
| Maximum Green (s) | 12.0 | 51.0 | 51.0 | 8.5 | 29.0 | | 8.5 | 29.0 | 8.0 | 8.0 | 47.0 | |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | -1.5 | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | 4.5 | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | 5.0 | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | C-Min | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 80.5 | 67.8 | 67.8 | 29.4 | 17.1 | | 28.2 | 16.3 | 30.6 | 76.9 | 65.9 | |
| Actuated g/C Ratio | 0.67 | 0.56 | 0.56 | 0.24 | 0.14 | | 0.24 | 0.14 | 0.26 | 0.64 | 0.55 | |
| v/c Ratio | 0.47 | 0.43 | 0.02 | 0.46 | 0.66 | | 0.42 | 0.15 | 0.16 | 0.35 | 0.72 | |
| Control Delay | 13.5 | 17.0 | 0.1 | 39.6 | 34.2 | | 38.6 | 43.7 | 7.1 | 9.9 | 22.3 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 13.5 | 17.0 | 0.1 | 39.6 | 34.2 | | 38.6 | 43.7 | 7.1 | 9.9 | 22.3 | |
| LOS | B | B | A | D | C | | D | D | A | A | C | |
| Approach Delay | | 16.2 | | | 36.6 | | | 28.6 | | 20.8 | | |
| Approach LOS | | B | | | D | | | C | | C | | |
| 90th %ile Green (s) | 12.0 | 57.5 | 57.5 | 8.5 | 22.5 | | 8.5 | 22.5 | 8.0 | 8.0 | 53.5 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 70th %ile Green (s) | 11.6 | 62.2 | 62.2 | 8.5 | 17.8 | | 8.5 | 17.8 | 8.0 | 8.0 | 58.6 | |
| 70th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 50th %ile Green (s) | 9.2 | 65.9 | 65.9 | 8.5 | 14.5 | | 8.5 | 14.5 | 7.6 | 7.6 | 64.3 | |
| 50th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Gap | Gap | Coord | |
| 30th %ile Green (s) | 7.0 | 70.2 | 70.2 | 25.3 | 11.2 | | 8.1 | 0.0 | 7.0 | 7.0 | 70.2 | |
| 30th %ile Term Code | Min | Coord | Coord | Hold | Gap | | Gap | Skip | Min | Min | Coord | |
| 10th %ile Green (s) | 7.0 | 75.5 | 75.5 | 20.0 | 7.0 | | 7.0 | 0.0 | 7.0 | 7.0 | 75.5 | |
| 10th %ile Term Code | Min | Coord | Coord | Hold | Min | | Min | Skip | Min | Min | Coord | |
| Stops (vph) | 29 | 432 | 0 | 111 | 70 | | 58 | 19 | 10 | 44 | 562 | |
| Fuel Used(gal) | 1 | 8 | 0 | 2 | 2 | | 2 | 1 | 1 | 2 | 18 | |
| CO Emissions (g/hr) | 53 | 583 | 4 | 165 | 151 | | 116 | 36 | 44 | 138 | 1229 | |
| NOx Emissions (g/hr) | 10 | 113 | 1 | 32 | 29 | | 23 | 7 | 9 | 27 | 239 | |
| VOC Emissions (g/hr) | 12 | 135 | 1 | 38 | 35 | | 27 | 8 | 10 | 32 | 285 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 1 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 31 | 180 | 0 | 109 | 79 | | 63 | 26 | 0 | 38 | 318 | |
| Queue Length 95th (ft) | 47 | 268 | 0 | 137 | 63 | | 82 | 35 | 33 | 64 | 356 | |
| Internal Link Dist (ft) | | 472 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | 150 | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 302 | 1874 | 921 | 377 | 496 | | 248 | 505 | 467 | 460 | 1590 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.42 | 0.43 | 0.02 | 0.46 | 0.42 | | 0.42 | 0.08 | 0.16 | 0.34 | 0.72 | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 120 | |

| | |
|---|---|
| Actuated Cycle Length: 120 | |
| Offset: 117 (98%), Referenced to phase 2:SWL and 6:EBL, Start of Green | |
| Natural Cycle: 120 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.72 | |
| Intersection Signal Delay: 21.9 | Intersection LOS: C |
| Intersection Capacity Utilization 56.5% | ICU Level of Service B |
| Analysis Period (min) 15 | |

Splits and Phases: 1: Oak Meadow Dr. & S Royal Oaks

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 83 | 955 | 25 | 215 | 964 | 86 | 77 | 59 | 114 | 43 | 54 | 267 |
| Future Volume (vph) | 83 | 955 | 25 | 215 | 964 | 86 | 77 | 59 | 114 | 43 | 54 | 267 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 12 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | | 1% | | | -2% | | | -1% | | | 2% | |
| Storage Length (ft) | 80 | | 135 | 220 | | 0 | 100 | | 0 | 120 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | 0.986 | | | 0.906 | | | 0.877 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1676 | 3438 | 1575 | 1805 | 3444 | 0 | 1736 | 1672 | 0 | 1752 | 1595 | 0 |
| Flt Permitted | 0.192 | | | 0.198 | | | 0.147 | | | 0.385 | | |
| Satd. Flow (perm) | 339 | 3438 | 1575 | 376 | 3444 | 0 | 269 | 1672 | 0 | 710 | 1595 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 124 | | 12 | | | 57 | | | 159 | |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1624 | | | 792 | | | 957 | | | 515 | |
| Travel Time (s) | | 36.9 | | | 18.0 | | | 21.8 | | | 11.7 | |
| Peak Hour Factor | 0.79 | 0.95 | 0.64 | 0.75 | 0.90 | 0.76 | 0.86 | 0.71 | 0.82 | 0.75 | 0.88 | 0.94 |
| Heavy Vehicles (%) | 0% | 1% | 2% | 1% | 1% | 0% | 1% | 0% | 0% | 2% | 0% | 0% |
| Adj. Flow (vph) | 105 | 1005 | 39 | 287 | 1071 | 113 | 90 | 83 | 139 | 57 | 61 | 284 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 105 | 1005 | 39 | 287 | 1184 | 0 | 90 | 222 | 0 | 57 | 345 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 0.99 | 1.03 | 0.99 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 1 | 0 | 1 | 1 | | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | 0 | 42 | 226 | | 42 | 42 | | 42 | 42 | |
| Trailing Detector (ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | 50 | 45 | 6 | | 45 | 45 | | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | D.Pm | NA | | D.Pm | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | | 4 | | | 8 | |
| Permitted Phases | 6 | | 6 | 2 | | | 8 | | | 4 | | |
| Detector Phase | 1 | 6 | | 5 | 2 | | 8 | 4 | | 4 | 8 | |
| Switch Phase | | | | | | | | | | | | |

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | |
| Minimum Split (s) | 15.0 | 70.0 | 70.0 | 30.0 | 85.0 | | 50.0 | 50.0 | | 50.0 | 50.0 | |
| Total Split (s) | 14.0 | 72.0 | 72.0 | 29.0 | 87.0 | | 49.0 | 49.0 | | 49.0 | 49.0 | |
| Total Split (%) | 9.3% | 48.0% | 48.0% | 19.3% | 58.0% | | 32.7% | 32.7% | | 32.7% | 32.7% | |
| Maximum Green (s) | 7.5 | 66.0 | 66.0 | 22.5 | 81.0 | | 42.0 | 42.0 | | 42.0 | 42.0 | |
| Yellow Time (s) | 3.0 | 3.5 | 3.5 | 3.0 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | 2.5 | 3.5 | 2.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | -3.0 | -1.0 | -3.0 | | -2.5 | -2.5 | | -2.5 | -2.5 | |
| Total Lost Time (s) | 5.5 | 3.0 | 3.0 | 5.5 | 3.0 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Recall Mode | None | C-Min | C-Min | None | C-Min | | None | None | | None | None | |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | | 8.0 | 8.0 | | 8.0 | 8.0 | |
| Flash Dont Walk (s) | | 16.0 | 16.0 | | 20.0 | | 35.0 | 32.0 | | 32.0 | 35.0 | |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 94.1 | 88.3 | 88.3 | 107.0 | 96.6 | | 32.0 | 32.0 | | 32.0 | 32.0 | |
| Actuated g/C Ratio | 0.63 | 0.59 | 0.59 | 0.71 | 0.64 | | 0.21 | 0.21 | | 0.21 | 0.21 | |
| v/c Ratio | 0.37 | 0.50 | 0.04 | 0.67 | 0.53 | | 1.58 | 0.55 | | 0.38 | 0.74 | |
| Control Delay | 13.2 | 21.7 | 0.1 | 26.3 | 3.4 | | 363.3 | 32.8 | | 54.2 | 37.7 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 13.2 | 21.7 | 0.1 | 26.3 | 3.7 | | 363.3 | 32.8 | | 54.2 | 37.7 | |
| LOS | B | C | A | C | A | | F | C | | D | D | |
| Approach Delay | | 20.2 | | | 8.1 | | | 128.1 | | | 40.0 | |
| Approach LOS | | C | | | A | | | F | | | D | |
| 90th %ile Green (s) | 7.5 | 66.0 | 66.0 | 22.5 | 81.0 | | 42.0 | 42.0 | | 42.0 | 42.0 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Coord | | Max | Hold | | Hold | Max | |
| 70th %ile Green (s) | 7.5 | 73.1 | 73.1 | 20.4 | 86.0 | | 37.0 | 37.0 | | 37.0 | 37.0 | |
| 70th %ile Term Code | Max | Coord | Coord | Gap | Coord | | Gap | Hold | | Hold | Gap | |
| 50th %ile Green (s) | 7.5 | 84.8 | 84.8 | 15.1 | 92.4 | | 30.6 | 30.6 | | 30.6 | 30.6 | |
| 50th %ile Term Code | Max | Coord | Coord | Gap | Coord | | Gap | Hold | | Hold | Gap | |
| 30th %ile Green (s) | 7.5 | 94.9 | 94.9 | 11.6 | 99.0 | | 24.0 | 24.0 | | 24.0 | 24.0 | |
| 30th %ile Term Code | Max | Coord | Coord | Gap | Coord | | Gap | Hold | | Hold | Gap | |
| 10th %ile Green (s) | 6.6 | 107.5 | 107.5 | 8.9 | 109.8 | | 14.1 | 14.1 | | 14.1 | 14.1 | |
| 10th %ile Term Code | Gap | Coord | Coord | Gap | Coord | | Gap | Hold | | Hold | Gap | |
| Stops (vph) | 34 | 560 | 0 | 149 | 255 | | 56 | 115 | | 35 | 165 | |
| Fuel Used(gal) | 1 | 19 | 0 | 3 | 9 | | 7 | 3 | | 1 | 5 | |
| CO Emissions (g/hr) | 102 | 1356 | 22 | 231 | 603 | | 460 | 215 | | 59 | 326 | |
| NOx Emissions (g/hr) | 20 | 264 | 4 | 45 | 117 | | 89 | 42 | | 11 | 63 | |
| VOC Emissions (g/hr) | 24 | 314 | 5 | 54 | 140 | | 107 | 50 | | 14 | 76 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 29 | 292 | 0 | 101 | 33 | | ~122 | 118 | | 48 | 174 | |
| Queue Length 95th (ft) | 55 | 464 | 0 | m91 | m161 | | #214 | 141 | | 70 | 255 | |
| Internal Link Dist (ft) | | 1544 | | | 712 | | | 877 | | | 435 | |
| Turn Bay Length (ft) | 80 | | 135 | 220 | | | 100 | | | 120 | | |
| Base Capacity (vph) | 288 | 2022 | 977 | 494 | 2222 | | 79 | 536 | | 210 | 585 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 423 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.36 | 0.50 | 0.04 | 0.58 | 0.66 | | 1.14 | 0.41 | | 0.27 | 0.59 | |

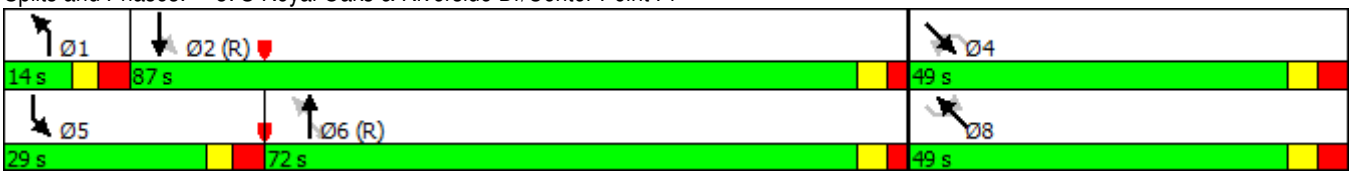
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 123 (82%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.58 | | | |
| Intersection Signal Delay: 27.4 | | Intersection LOS: C | |
| Intersection Capacity Utilization 78.9% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

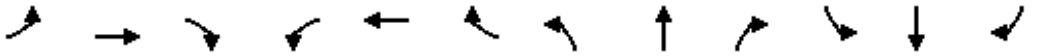
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

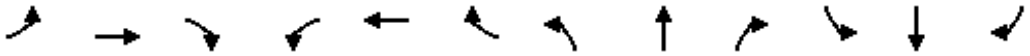
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: S Royal Oaks & Riverside Dr/Center Point Pl





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 191 | 1026 | 58 | 832 | 1087 | 249 | 131 | 315 | 873 | 293 | 394 | 165 |
| Future Volume (vph) | 191 | 1026 | 58 | 832 | 1087 | 249 | 131 | 315 | 873 | 293 | 394 | 165 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.991 | | | | 0.850 | | | 0.850 | | 0.950 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3315 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3315 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 7 | | | | 106 | | | | | 51 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 700 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 11.9 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.92 | 0.93 | 0.81 | 0.87 | 0.91 | 0.89 | 0.74 | 0.83 | 0.89 | 0.83 | 0.95 | 0.80 |
| Heavy Vehicles (%) | 1% | 1% | 0% | 1% | 2% | 1% | 0% | 0% | 1% | 0% | 0% | 0% |
| Adj. Flow (vph) | 208 | 1103 | 72 | 956 | 1195 | 280 | 177 | 380 | 981 | 353 | 415 | 206 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 208 | 1175 | 0 | 956 | 1195 | 280 | 177 | 380 | 981 | 353 | 621 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

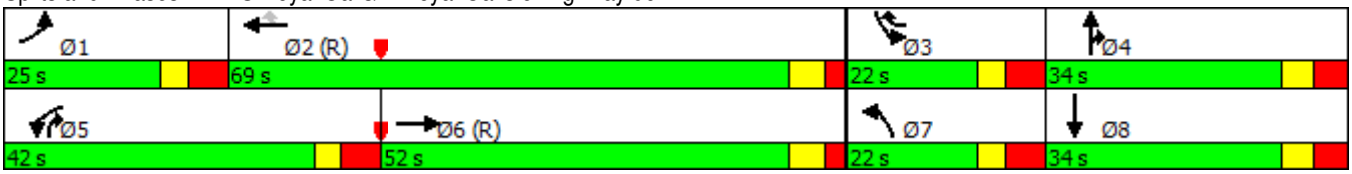


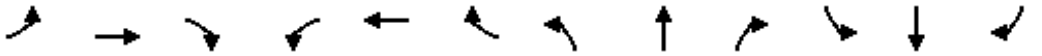
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (%) | 16.7% | 34.7% | | 28.0% | 46.0% | 14.7% | 14.7% | 22.7% | | 14.7% | 22.7% | |
| Maximum Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 16.7 | 48.0 | | 37.0 | 68.3 | 88.8 | 14.5 | 29.5 | 71.0 | 16.5 | 31.5 | |
| Actuated g/C Ratio | 0.11 | 0.32 | | 0.25 | 0.46 | 0.59 | 0.10 | 0.20 | 0.47 | 0.11 | 0.21 | |
| v/c Ratio | 0.54 | 0.74 | | 1.16 | 0.74 | 0.27 | 0.53 | 0.52 | 0.72 | 0.95 | 0.84 | |
| Control Delay | 68.8 | 41.9 | | 119.7 | 46.5 | 14.5 | 65.6 | 61.5 | 39.5 | 100.9 | 63.9 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.5 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 68.8 | 41.9 | | 119.7 | 46.9 | 14.5 | 65.7 | 61.5 | 39.5 | 100.9 | 63.9 | |
| LOS | E | D | | F | D | B | E | E | D | F | E | |
| Approach Delay | | 45.9 | | | 71.8 | | | 47.9 | | | 77.3 | |
| Approach LOS | | D | | | E | | | D | | | E | |
| 90th %ile Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | Max | Max | Max | | Max | Max | |
| 70th %ile Green (s) | 15.9 | 45.5 | | 34.5 | 64.1 | 14.5 | 14.4 | 26.5 | | 14.5 | 26.6 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 50th %ile Green (s) | 14.4 | 45.5 | | 34.5 | 65.6 | 14.5 | 12.9 | 26.5 | | 14.5 | 28.1 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 30th %ile Green (s) | 12.8 | 45.5 | | 34.5 | 67.2 | 14.5 | 11.5 | 26.5 | | 14.5 | 29.5 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 10th %ile Green (s) | 10.5 | 45.5 | | 34.5 | 69.5 | 14.5 | 9.4 | 26.5 | | 14.5 | 31.6 | |
| 10th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| Stops (vph) | 177 | 770 | | 714 | 982 | 166 | 124 | 280 | 638 | 266 | 474 | |
| Fuel Used(gal) | 5 | 22 | | 34 | 29 | 4 | 3 | 7 | 16 | 10 | 14 | |
| CO Emissions (g/hr) | 372 | 1535 | | 2378 | 2008 | 306 | 227 | 520 | 1114 | 677 | 985 | |
| NOx Emissions (g/hr) | 72 | 299 | | 463 | 391 | 60 | 44 | 101 | 217 | 132 | 192 | |
| VOC Emissions (g/hr) | 86 | 356 | | 551 | 465 | 71 | 53 | 120 | 258 | 157 | 228 | |
| Dilemma Vehicles (#) | 0 | 41 | | 0 | 37 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 100 | 266 | | ~580 | 551 | 113 | 85 | 202 | 283 | 179 | 287 | |
| Queue Length 95th (ft) | m144 | 336 | | m#499 | m492 | m120 | m103 | m218 | m617 | #242 | #398 | |
| Internal Link Dist (ft) | | 620 | | | 611 | | | 712 | | | 884 | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 462 | 1580 | | 826 | 1610 | 1021 | 383 | 730 | 1369 | 372 | 735 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 1 | | 0 | 114 | 0 | 9 | 0 | 0 | 0 | 1 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.45 | 0.74 | | 1.16 | 0.80 | 0.27 | 0.47 | 0.52 | 0.72 | 0.95 | 0.85 | |

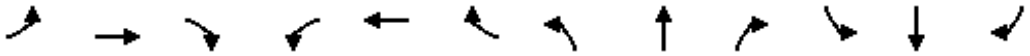
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 133 (89%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.16 | | | |
| Intersection Signal Delay: 61.2 | | Intersection LOS: E | |
| Intersection Capacity Utilization 81.9% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |
| ~ Volume exceeds capacity, queue is theoretically infinite. | | | |
| Queue shown is maximum after two cycles. | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | |
| Queue shown is maximum after two cycles. | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 4: S Royal Oaks/N Royal Oaks & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 1807 | 446 | 264 | 834 | 0 | 0 | 0 | 0 | 846 | 0 | 1293 |
| Future Volume (vph) | 0 | 1807 | 446 | 264 | 834 | 0 | 0 | 0 | 0 | 846 | 0 | 1293 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 405 | | | | | | | | | 177 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.93 | 0.78 | 0.71 | 0.86 | 1.00 | 1.00 | 1.00 | 1.00 | 0.87 | 1.00 | 0.88 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 1% | 1% | 2% | 2% | 2% | 2% | 1% | 2% | 1% |
| Adj. Flow (vph) | 0 | 1943 | 572 | 372 | 970 | 0 | 0 | 0 | 0 | 972 | 0 | 1469 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 1943 | 572 | 372 | 970 | 0 | 0 | 0 | 0 | 972 | 0 | 1469 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (%) | | 36.7% | 36.7% | 20.0% | 56.7% | | | | | 43.3% | | 43.3% |
| Maximum Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 51.0 | 51.0 | 25.0 | 81.0 | | | | | 59.5 | | 59.5 |
| Actuated g/C Ratio | | 0.34 | 0.34 | 0.17 | 0.54 | | | | | 0.40 | | 0.40 |
| v/c Ratio | | 0.89 | 0.71 | 1.25 | 0.52 | | | | | 0.71 | | 1.24 |
| Control Delay | | 63.2 | 26.8 | 190.8 | 21.8 | | | | | 41.5 | | 151.8 |
| Queue Delay | | 0.0 | 0.0 | 0.0 | 0.3 | | | | | 0.2 | | 0.0 |
| Total Delay | | 63.2 | 26.8 | 190.8 | 22.1 | | | | | 41.8 | | 151.8 |
| LOS | | E | C | F | C | | | | | D | | F |
| Approach Delay | | 54.9 | | | 68.9 | | | | | | | |
| Approach LOS | | D | | | E | | | | | | | |
| 90th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 90th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 70th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 70th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 50th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 50th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 30th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 30th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 10th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 10th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| Stops (vph) | | 1693 | 363 | 205 | 393 | | | | | 695 | | 956 |
| Fuel Used(gal) | | 54 | 10 | 13 | 11 | | | | | 16 | | 53 |
| CO Emissions (g/hr) | | 3809 | 671 | 927 | 748 | | | | | 1134 | | 3733 |
| NOx Emissions (g/hr) | | 741 | 131 | 180 | 146 | | | | | 221 | | 726 |
| VOC Emissions (g/hr) | | 883 | 156 | 215 | 173 | | | | | 263 | | 865 |
| Dilemma Vehicles (#) | | 108 | 0 | 0 | 34 | | | | | 0 | | 0 |
| Queue Length 50th (ft) | | 565 | 221 | ~464 | 239 | | | | | 409 | | ~953 |
| Queue Length 95th (ft) | | m609 | 265 | #465 | 337 | | | | | 465 | | #1065 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2178 | 805 | 297 | 1865 | | | | | 1368 | | 1180 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 353 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 57 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.89 | 0.71 | 1.25 | 0.64 | | | | | 0.74 | | 1.24 |

Intersection Summary

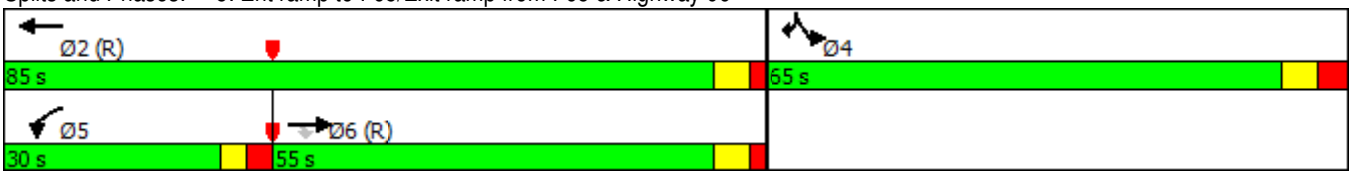
| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 104 (69%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.25 | | | |
| Intersection Signal Delay: 78.4 | | Intersection LOS: E | |
| Intersection Capacity Utilization 79.1% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

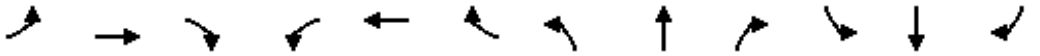
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

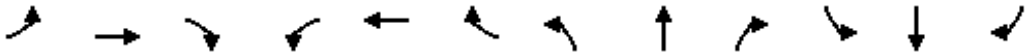
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Ent ramp to I-65/Exit ramp from I-65 & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 538 | 2115 | 0 | 0 | 814 | 924 | 284 | 0 | 152 | 0 | 0 | 0 |
| Future Volume (vph) | 538 | 2115 | 0 | 0 | 814 | 924 | 284 | 0 | 152 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 301 | | | 69 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 1845 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 31.4 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.97 | 0.98 | 1.00 | 0.25 | 0.91 | 0.93 | 0.92 | 1.00 | 0.87 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 3% | 3% | 2% | 0% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 2% |
| Adj. Flow (vph) | 555 | 2158 | 0 | 0 | 895 | 994 | 309 | 0 | 175 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 555 | 2158 | 0 | 0 | 895 | 994 | 309 | 0 | 175 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |

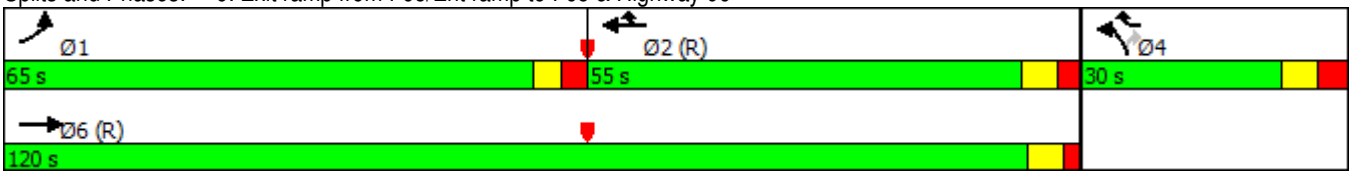


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (%) | 43.3% | 80.0% | | | 36.7% | | 20.0% | | 20.0% | | | |
| Maximum Green (s) | 59.0 | 114.0 | | | 48.5 | | 22.5 | | 22.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 33.1 | 115.2 | | | 75.6 | 106.4 | 21.3 | | 21.3 | | | |
| Actuated g/C Ratio | 0.22 | 0.77 | | | 0.50 | 0.71 | 0.14 | | 0.14 | | | |
| v/c Ratio | 0.77 | 0.83 | | | 0.50 | 0.48 | 0.66 | | 0.61 | | | |
| Control Delay | 78.2 | 19.8 | | | 27.0 | 7.5 | 68.0 | | 45.7 | | | |
| Queue Delay | 0.0 | 1.5 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 78.2 | 21.3 | | | 27.0 | 7.5 | 68.0 | | 45.7 | | | |
| LOS | E | C | | | C | A | E | | D | | | |
| Approach Delay | | 33.0 | | | 16.8 | | | | | | | |
| Approach LOS | | C | | | B | | | | | | | |
| 90th %ile Green (s) | 40.9 | 114.0 | | | 66.6 | | 22.5 | | 22.5 | | | |
| 90th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 70th %ile Green (s) | 36.1 | 114.0 | | | 71.4 | | 22.5 | | 22.5 | | | |
| 70th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 50th %ile Green (s) | 33.3 | 114.0 | | | 74.2 | | 22.5 | | 22.5 | | | |
| 50th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 30th %ile Green (s) | 29.6 | 114.7 | | | 78.6 | | 21.8 | | 21.8 | | | |
| 30th %ile Term Code | Gap | Coord | | | Coord | | Gap | | Gap | | | |
| 10th %ile Green (s) | 25.4 | 119.3 | | | 87.4 | | 17.2 | | 17.2 | | | |
| 10th %ile Term Code | Gap | Coord | | | Coord | | Gap | | Gap | | | |
| Stops (vph) | 537 | 1521 | | | 532 | 278 | 266 | | 86 | | | |
| Fuel Used(gal) | 16 | 31 | | | 20 | 16 | 7 | | 3 | | | |
| CO Emissions (g/hr) | 1110 | 2200 | | | 1390 | 1099 | 462 | | 184 | | | |
| NOx Emissions (g/hr) | 216 | 428 | | | 270 | 214 | 90 | | 36 | | | |
| VOC Emissions (g/hr) | 257 | 510 | | | 322 | 255 | 107 | | 43 | | | |
| Dilemma Vehicles (#) | 0 | 77 | | | 27 | 0 | 0 | | 0 | | | |
| Queue Length 50th (ft) | 297 | 362 | | | 305 | 150 | 148 | | 97 | | | |
| Queue Length 95th (ft) | m341 | 370 | | | 406 | 234 | 201 | | 172 | | | |
| Internal Link Dist (ft) | | 476 | | | 1765 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1286 | 2588 | | | 1784 | 2085 | 495 | | 298 | | | |
| Starvation Cap Reductn | 0 | 244 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 0.43 | 0.92 | | | 0.50 | 0.48 | 0.62 | | 0.59 | | | |

Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 138 (92%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.83 | | | |
| Intersection Signal Delay: 29.5 | | Intersection LOS: C | |
| Intersection Capacity Utilization 79.1% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 6: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



# HCS 2010 Two-Way Stop Control Summary Report

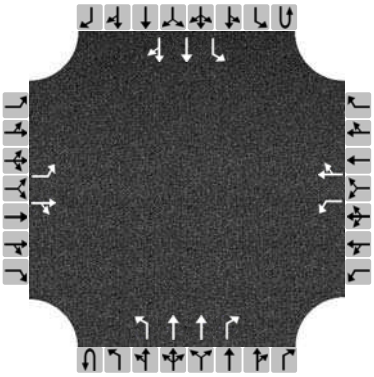
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Existing) |

## Site Information

| | |
|---|---|
| Intersection | S. Royal Oaks and Rand |
| Jurisdiction | Franklin, TN |
| East/West Street | Rand Pl / Home Depot |
| North/South Street | S. Royal Oaks Blvd |
| Peak Hour Factor | 0.97 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 1 | 1 | 0 | | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 2 | 0 |
| Configuration | | L | | TR | | L | | TR | | L | T | R | | L | T | TR |
| Volume (veh/h) | | 24 | 1 | 8 | | 13 | 0 | 11 | | 9 | 1281 | 23 | | 45 | 586 | 47 |
| Percent Heavy Vehicles | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left + Thru | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 25 | | 9 | | 13 | | 11 | | 9 | | | | 46 | | |
| Capacity | | 203 | | 461 | | 130 | | 410 | | 944 | | | | 519 | | |
| v/c Ratio | | 0.12 | | 0.02 | | 0.10 | | 0.03 | | 0.01 | | | | 0.09 | | |
| 95% Queue Length | | 0.4 | | 0.1 | | 0.3 | | 0.1 | | 0.0 | | | | 0.3 | | |
| Control Delay (s/veh) | | 25.2 | | 13.0 | | 35.8 | | 14.0 | | 8.8 | | | | 12.6 | | |
| Level of Service (LOS) | | D | | B | | E | | B | | A | | | | B | | |
| Approach Delay (s/veh) | 21.9 | | | | 25.8 | | | | 0.1 | | | | 0.8 | | | |
| Approach LOS | C | | | | D | | | | A | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

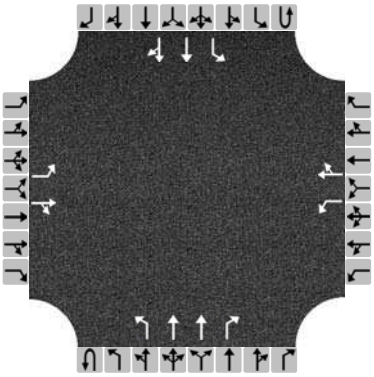
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Existing) |

## Site Information

| | |
|---|---|
| Intersection | S. Royal Oaks and Rand |
| Jurisdiction | Franklin, TN |
| East/West Street | Rand Pl / Home Depot |
| North/South Street | S. Royal Oaks Blvd |
| Peak Hour Factor | 0.96 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 1 | 1 | 0 | | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 2 | 0 |
| Configuration | | L | | TR | | L | | TR | | L | T | R | | L | T | TR |
| Volume (veh/h) | | 24 | 3 | 15 | | 19 | 4 | 22 | | 6 | 896 | 16 | | 20 | 883 | 97 |
| Percent Heavy Vehicles | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left + Thru | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 25 | | 19 | | 20 | | 27 | | 6 | | | | 21 | | |
| Capacity | | 183 | | 391 | | 199 | | 411 | | 688 | | | | 731 | | |
| v/c Ratio | | 0.14 | | 0.05 | | 0.10 | | 0.07 | | 0.01 | | | | 0.03 | | |
| 95% Queue Length | | 0.5 | | 0.2 | | 0.3 | | 0.2 | | 0.0 | | | | 0.1 | | |
| Control Delay (s/veh) | | 27.7 | | 14.7 | | 25.1 | | 14.4 | | 10.3 | | | | 10.1 | | |
| Level of Service (LOS) | | D | | B | | D | | B | | B | | | | B | | |
| Approach Delay (s/veh) | 22.1 | | | | 18.9 | | | | 0.1 | | | | 0.2 | | | |
| Approach LOS | C | | | | C | | | | A | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

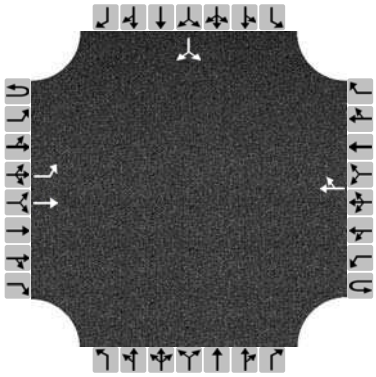
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Existing) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and dwy |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Western Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 2 | 44 | | | | 183 | 0 | | | | | | 1 | | 1 |
| Percent Heavy Vehicles | | 0 | | | | | | | | | | | | 0 | | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 2 | | | | | | | | | | | | | 2 | |
| Capacity | | 1351 | | | | | | | | | | | | | 761 | |
| v/c Ratio | | 0.00 | | | | | | | | | | | | | 0.00 | |
| 95% Queue Length | | 0.0 | | | | | | | | | | | | | 0.0 | |
| Control Delay (s/veh) | | 7.7 | | | | | | | | | | | | | 9.7 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | A | |
| Approach Delay (s/veh) | 0.3 | | | | | | | | | | | | 9.7 | | | |
| Approach LOS | A | | | | | | | | | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

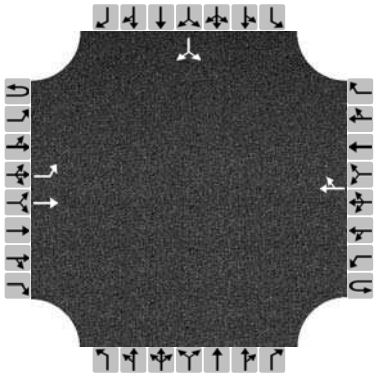
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Existing) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and dwy |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Western Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 5 | 161 | | | | 166 | 2 | | | | | | 15 | | 2 |
| Percent Heavy Vehicles | | 0 | | | | | | | | | | | | 0 | | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 6 | | | | | | | | | | | | | 21 | |
| Capacity | | 1373 | | | | | | | | | | | | | 660 | |
| v/c Ratio | | 0.00 | | | | | | | | | | | | | 0.03 | |
| 95% Queue Length | | 0.0 | | | | | | | | | | | | | 0.1 | |
| Control Delay (s/veh) | | 7.6 | | | | | | | | | | | | | 10.6 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | B | |
| Approach Delay (s/veh) | 0.2 | | | | | | | | | | | | 10.6 | | | |
| Approach LOS | A | | | | | | | | | | | | B | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

## BACKGROUND CONDITIONS

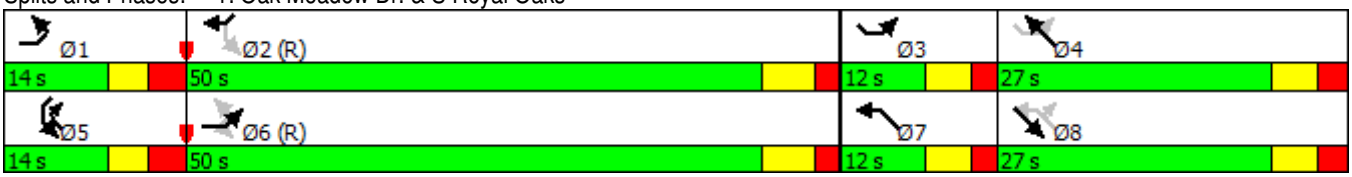
| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 87 | 1120 | 29 | 129 | 7 | 71 | 21 | 16 | 170 | 36 | 515 | 73 |
| Future Volume (vph) | 87 | 1120 | 29 | 129 | 7 | 71 | 21 | 16 | 170 | 36 | 515 | 73 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 3 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | | 0.850 | | 0.867 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.950 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 3319 | 1531 | 1711 | 1561 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.278 | 0.950 | | 0.739 | | | 0.540 | | | 0.177 | | |
| Satd. Flow (perm) | 449 | 3319 | 1531 | 1331 | 1561 | 0 | 1006 | 1925 | 1583 | 330 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 154 | | 97 | | | | 90 | | 154 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 552 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 12.5 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 130 | 1191 | 46 | 163 | 12 | 97 | 28 | 28 | 185 | 48 | 687 | 106 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 130 | 1191 | 46 | 163 | 109 | 0 | 28 | 28 | 185 | 48 | 793 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 30 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | 42 | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | 45 | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | Perm | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | 6 | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | 20.0 | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 13.0 | 26.0 | 26.0 | 12.5 | 20.0 | | 12.5 | 20.0 | 13.0 | 13.0 | 26.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 14.0 | 50.0 | 50.0 | 12.0 | 27.0 | | 12.0 | 27.0 | 14.0 | 14.0 | 50.0 | |
| Total Split (%) | 13.6% | 48.5% | 48.5% | 11.7% | 26.2% | | 11.7% | 26.2% | 13.6% | 13.6% | 48.5% | |
| Maximum Green (s) | 8.0 | 44.0 | 44.0 | 6.5 | 21.0 | | 6.5 | 21.0 | 8.0 | 8.0 | 44.0 | |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | -1.5 | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | 4.5 | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | 5.0 | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | C-Min | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 74.6 | 63.7 | 63.7 | 17.0 | 11.1 | | 17.0 | 11.1 | 24.1 | 73.9 | 63.4 | |
| Actuated g/C Ratio | 0.72 | 0.62 | 0.62 | 0.17 | 0.11 | | 0.17 | 0.11 | 0.23 | 0.72 | 0.62 | |
| v/c Ratio | 0.30 | 0.58 | 0.05 | 0.64 | 0.43 | | 0.12 | 0.14 | 0.42 | 0.13 | 0.45 | |
| Control Delay | 6.5 | 14.4 | 0.1 | 48.7 | 16.3 | | 32.2 | 42.1 | 19.9 | 5.6 | 10.3 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 6.5 | 14.4 | 0.1 | 48.7 | 16.3 | | 32.2 | 42.1 | 19.9 | 5.6 | 10.3 | |
| LOS | A | B | A | D | B | | C | D | B | A | B | |
| Approach Delay | | 13.2 | | | 35.7 | | | 23.9 | | 10.0 | | |
| Approach LOS | | B | | | D | | | C | | A | | |
| 90th %ile Green (s) | 8.0 | 53.7 | 53.7 | 6.5 | 12.3 | | 6.5 | 12.3 | 7.0 | 7.0 | 52.7 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Min | Min | Coord | |
| 70th %ile Green (s) | 7.6 | 57.0 | 57.0 | 6.5 | 9.0 | | 6.5 | 9.0 | 7.0 | 7.0 | 56.4 | |
| 70th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Min | Min | Coord | |
| 50th %ile Green (s) | 7.0 | 58.5 | 58.5 | 6.5 | 7.5 | | 6.5 | 7.5 | 7.0 | 7.0 | 58.5 | |
| 50th %ile Term Code | Min | Coord | Coord | Max | Hold | | Max | Gap | Min | Min | Coord | |
| 30th %ile Green (s) | 7.0 | 71.0 | 71.0 | 7.5 | 7.0 | | 0.0 | 0.0 | 7.0 | 7.0 | 71.0 | |
| 30th %ile Term Code | Min | Coord | Coord | Hold | Min | | Skip | Skip | Min | Min | Coord | |
| 10th %ile Green (s) | 7.0 | 71.0 | 71.0 | 7.5 | 7.0 | | 0.0 | 0.0 | 7.0 | 7.0 | 71.0 | |
| 10th %ile Term Code | Min | Coord | Coord | Hold | Min | | Skip | Skip | Min | Min | Coord | |
| Stops (vph) | 25 | 656 | 0 | 116 | 19 | | 17 | 15 | 74 | 11 | 250 | |
| Fuel Used(gal) | 1 | 12 | 0 | 3 | 1 | | 0 | 0 | 2 | 1 | 10 | |
| CO Emissions (g/hr) | 44 | 821 | 9 | 176 | 57 | | 30 | 27 | 173 | 39 | 703 | |
| NOx Emissions (g/hr) | 9 | 160 | 2 | 34 | 11 | | 6 | 5 | 34 | 8 | 137 | |
| VOC Emissions (g/hr) | 10 | 190 | 2 | 41 | 13 | | 7 | 6 | 40 | 9 | 163 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 1 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 23 | 246 | 0 | 93 | 7 | | 15 | 17 | 52 | 8 | 125 | |
| Queue Length 95th (ft) | 35 | 351 | 0 | 127 | 15 | | 30 | 27 | 110 | 18 | 147 | |
| Internal Link Dist (ft) | | 472 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | 150 | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 438 | 2054 | 1006 | 254 | 431 | | 232 | 439 | 453 | 386 | 1775 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.30 | 0.58 | 0.05 | 0.64 | 0.25 | | 0.12 | 0.06 | 0.41 | 0.12 | 0.45 | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 103 | |

| | |
|---|---|
| Actuated Cycle Length: 103 | |
| Offset: 0 (0%), Referenced to phase 2:SWL and 6:EBL, Start of Green | |
| Natural Cycle: 80 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.64 | |
| Intersection Signal Delay: 15.4 | Intersection LOS: B |
| Intersection Capacity Utilization 62.0% | ICU Level of Service B |
| Analysis Period (min) 15 | |

Splits and Phases: 1: Oak Meadow Dr. & S Royal Oaks



| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 28 | 1198 | 103 | 267 | 747 | 25 | 6 | 46 | 41 | 33 | 12 | 96 |
| Future Volume (vph) | 28 | 1198 | 103 | 267 | 747 | 25 | 6 | 46 | 41 | 33 | 12 | 96 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 12 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | | 1% | | | -2% | | | -1% | | | 2% | |
| Storage Length (ft) | 80 | | 135 | 220 | | 0 | 100 | | 0 | 120 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | 0.993 | | | 0.934 | | | 0.872 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1676 | 3438 | 1607 | 1787 | 3428 | 0 | 1754 | 1624 | 0 | 1787 | 1524 | 0 |
| Flt Permitted | 0.341 | | | 0.156 | | | 0.460 | | | 0.497 | | |
| Satd. Flow (perm) | 602 | 3438 | 1607 | 293 | 3428 | 0 | 849 | 1624 | 0 | 935 | 1524 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 82 | | 5 | | | 30 | | | 112 | |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1624 | | | 792 | | | 957 | | | 515 | |
| Travel Time (s) | | 36.9 | | | 18.0 | | | 21.8 | | | 11.7 | |
| Peak Hour Factor | 0.63 | 0.92 | 0.87 | 0.80 | 0.99 | 0.67 | 0.58 | 0.68 | 0.77 | 0.67 | 0.63 | 0.86 |
| Heavy Vehicles (%) | 0% | 1% | 0% | 2% | 2% | 4% | 0% | 11% | 0% | 0% | 10% | 3% |
| Adj. Flow (vph) | 44 | 1302 | 118 | 334 | 755 | 37 | 10 | 68 | 53 | 49 | 19 | 112 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 44 | 1302 | 118 | 334 | 792 | 0 | 10 | 121 | 0 | 49 | 131 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 0.99 | 1.03 | 0.99 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 1 | 0 | 1 | 1 | | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | 0 | 42 | 226 | | 42 | 42 | | 42 | 42 | |
| Trailing Detector (ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | 50 | 45 | 6 | | 45 | 45 | | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | D.Pm | NA | | D.Pm | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | | 4 | | | 8 | |
| Permitted Phases | 6 | | 6 | 2 | | | 8 | | | 4 | | |
| Detector Phase | 1 | 6 | | 5 | 2 | | 8 | 4 | | 4 | 8 | |
| Switch Phase | | | | | | | | | | | | |

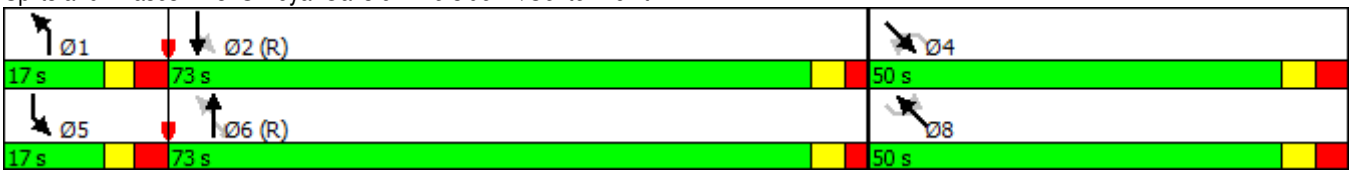
| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | |
| Minimum Split (s) | 17.0 | 73.0 | 73.0 | 17.0 | 73.0 | | 50.0 | 50.0 | | 50.0 | 50.0 | |
| Total Split (s) | 17.0 | 73.0 | 73.0 | 17.0 | 73.0 | | 50.0 | 50.0 | | 50.0 | 50.0 | |
| Total Split (%) | 12.1% | 52.1% | 52.1% | 12.1% | 52.1% | | 35.7% | 35.7% | | 35.7% | 35.7% | |
| Maximum Green (s) | 10.5 | 67.0 | 67.0 | 10.5 | 67.0 | | 43.0 | 43.0 | | 43.0 | 43.0 | |
| Yellow Time (s) | 3.0 | 3.5 | 3.5 | 3.0 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | 2.5 | 3.5 | 2.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | -3.0 | -1.0 | -3.0 | | -2.5 | -2.5 | | -2.5 | -2.5 | |
| Total Lost Time (s) | 5.5 | 3.0 | 3.0 | 5.5 | 3.0 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Recall Mode | None | C-Min | C-Min | None | C-Min | | None | None | | None | None | |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | | 8.0 | 8.0 | | 8.0 | 8.0 | |
| Flash Dont Walk (s) | | 16.0 | 16.0 | | 20.0 | | 35.0 | 32.0 | | 32.0 | 35.0 | |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 104.4 | 99.1 | 99.1 | 112.1 | 105.4 | | 16.4 | 16.4 | | 16.4 | 16.4 | |
| Actuated g/C Ratio | 0.75 | 0.71 | 0.71 | 0.80 | 0.75 | | 0.12 | 0.12 | | 0.12 | 0.12 | |
| v/c Ratio | 0.09 | 0.53 | 0.10 | 0.94 | 0.31 | | 0.10 | 0.56 | | 0.45 | 0.47 | |
| Control Delay | 3.9 | 11.1 | 2.9 | 57.5 | 4.9 | | 52.5 | 47.4 | | 69.1 | 18.8 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 3.9 | 11.1 | 2.9 | 57.5 | 4.9 | | 52.5 | 47.4 | | 69.1 | 18.8 | |
| LOS | A | B | A | E | A | | D | D | | E | B | |
| Approach Delay | | 10.2 | | | 20.5 | | | 47.8 | | | 32.5 | |
| Approach LOS | | B | | | C | | | D | | | C | |
| 90th %ile Green (s) | 7.7 | 89.8 | 89.8 | 10.5 | 92.6 | | 20.2 | 20.2 | | 20.2 | 20.2 | |
| 90th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 70th %ile Green (s) | 7.1 | 93.6 | 93.6 | 10.5 | 97.0 | | 16.4 | 16.4 | | 16.4 | 16.4 | |
| 70th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 50th %ile Green (s) | 6.7 | 96.1 | 96.1 | 10.5 | 99.9 | | 13.9 | 13.9 | | 13.9 | 13.9 | |
| 50th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 30th %ile Green (s) | 6.3 | 98.7 | 98.7 | 10.5 | 102.9 | | 11.3 | 11.3 | | 11.3 | 11.3 | |
| 30th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 10th %ile Green (s) | 0.0 | 102.4 | 102.4 | 10.5 | 119.4 | | 7.6 | 7.6 | | 7.6 | 7.6 | |
| 10th %ile Term Code | Skip | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| Stops (vph) | 7 | 543 | 11 | 209 | 252 | | 7 | 68 | | 30 | 24 | |
| Fuel Used(gal) | 0 | 21 | 1 | 6 | 7 | | 0 | 2 | | 1 | 1 | |
| CO Emissions (g/hr) | 29 | 1459 | 100 | 414 | 485 | | 10 | 130 | | 53 | 69 | |
| NOx Emissions (g/hr) | 6 | 284 | 19 | 81 | 94 | | 2 | 25 | | 10 | 13 | |
| VOC Emissions (g/hr) | 7 | 338 | 23 | 96 | 112 | | 2 | 30 | | 12 | 16 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 6 | 267 | 9 | 156 | 75 | | 9 | 83 | | 42 | 16 | |
| Queue Length 95th (ft) | 12 | 374 | 31 | m#192 | m228 | | 18 | 114 | | 60 | 24 | |
| Internal Link Dist (ft) | | 1544 | | | 712 | | | 877 | | | 435 | |
| Turn Bay Length (ft) | 80 | | 135 | 220 | | | 100 | | | 120 | | |
| Base Capacity (vph) | 553 | 2434 | 1161 | 357 | 2581 | | 275 | 548 | | 303 | 570 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |

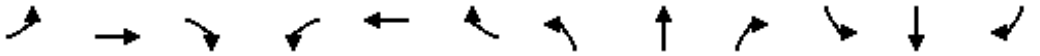
| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.08 | 0.53 | 0.10 | 0.94 | 0.31 | | 0.04 | 0.22 | | 0.16 | 0.23 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 139 (99%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.94 | | | |
| Intersection Signal Delay: 17.3 | | Intersection LOS: B | |
| Intersection Capacity Utilization 68.1% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |

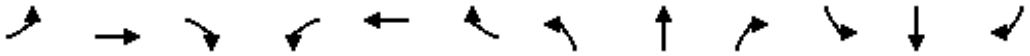
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: S Royal Oaks & Riverside Dr/Center Point Pl





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 112 | 772 | 60 | 831 | 993 | 281 | 99 | 239 | 988 | 225 | 202 | 82 |
| Future Volume (vph) | 112 | 772 | 60 | 831 | 993 | 281 | 99 | 239 | 988 | 225 | 202 | 82 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.988 | | | | 0.850 | | | 0.850 | | 0.959 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3235 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3235 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 10 | | | | 173 | | | | | 34 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 700 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 11.9 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.80 | 0.90 | 0.80 | 0.93 | 0.91 | 0.88 | 0.82 | 0.80 | 0.93 | 0.92 | 0.74 | 0.81 |
| Heavy Vehicles (%) | 3% | 6% | 2% | 3% | 6% | 3% | 4% | 2% | 2% | 2% | 4% | 2% |
| Adj. Flow (vph) | 140 | 858 | 75 | 894 | 1091 | 319 | 121 | 299 | 1062 | 245 | 273 | 101 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 140 | 933 | 0 | 894 | 1091 | 319 | 121 | 299 | 1062 | 245 | 374 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

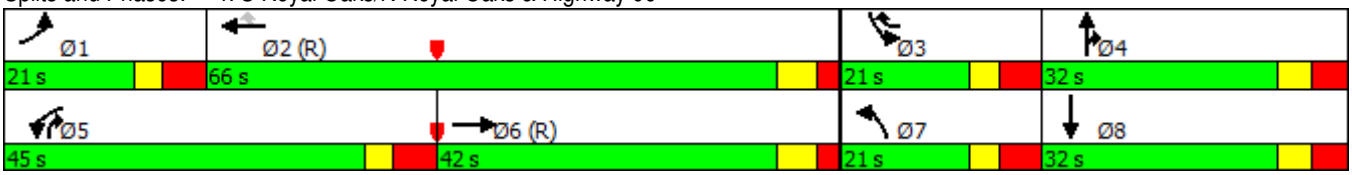


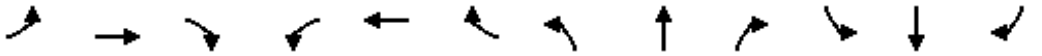
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (%) | 15.0% | 30.0% | | 32.1% | 47.1% | 15.0% | 15.0% | 22.9% | | 15.0% | 22.9% | |
| Maximum Green (s) | 13.5 | 35.5 | | 37.5 | 59.5 | 13.5 | 13.5 | 24.5 | | 13.5 | 24.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 13.5 | 38.4 | | 40.0 | 64.9 | 84.0 | 12.4 | 27.5 | 72.0 | 15.1 | 30.2 | |
| Actuated g/C Ratio | 0.10 | 0.27 | | 0.29 | 0.46 | 0.60 | 0.09 | 0.20 | 0.51 | 0.11 | 0.22 | |
| v/c Ratio | 0.43 | 0.72 | | 0.95 | 0.69 | 0.31 | 0.41 | 0.42 | 0.72 | 0.69 | 0.52 | |
| Control Delay | 76.9 | 41.3 | | 57.0 | 40.9 | 7.8 | 54.7 | 49.3 | 39.6 | 70.7 | 47.1 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 76.9 | 41.3 | | 57.0 | 40.9 | 7.8 | 54.7 | 49.3 | 39.6 | 70.7 | 47.1 | |
| LOS | E | D | | E | D | A | D | D | D | E | D | |
| Approach Delay | | 45.9 | | | 42.6 | | | 42.8 | | | 56.4 | |
| Approach LOS | | D | | | D | | | D | | | E | |
| 90th %ile Green (s) | 13.5 | 35.5 | | 37.5 | 59.5 | 13.5 | 13.3 | 24.5 | | 13.5 | 24.7 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 70th %ile Green (s) | 12.4 | 35.5 | | 37.5 | 60.6 | 13.5 | 11.6 | 24.5 | | 13.5 | 26.4 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 50th %ile Green (s) | 11.2 | 35.5 | | 37.5 | 61.8 | 13.5 | 10.4 | 24.5 | | 13.5 | 27.6 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 30th %ile Green (s) | 9.9 | 35.5 | | 37.5 | 63.1 | 13.5 | 9.2 | 24.5 | | 13.5 | 28.8 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 10th %ile Green (s) | 8.1 | 37.6 | | 37.5 | 67.0 | 11.4 | 7.5 | 24.5 | | 11.4 | 28.4 | |
| 10th %ile Term Code | Gap | Coord | | Max | Coord | Gap | Gap | Max | | Gap | Hold | |
| Stops (vph) | 110 | 737 | | 736 | 955 | 86 | 92 | 218 | 750 | 214 | 225 | |
| Fuel Used(gal) | 3 | 18 | | 24 | 26 | 4 | 2 | 5 | 18 | 6 | 6 | |
| CO Emissions (g/hr) | 235 | 1271 | | 1650 | 1796 | 249 | 155 | 355 | 1273 | 427 | 427 | |
| NOx Emissions (g/hr) | 46 | 247 | | 321 | 349 | 48 | 30 | 69 | 248 | 83 | 83 | |
| VOC Emissions (g/hr) | 55 | 295 | | 382 | 416 | 58 | 36 | 82 | 295 | 99 | 99 | |
| Dilemma Vehicles (#) | 0 | 28 | | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 69 | 284 | | 409 | 535 | 65 | 55 | 140 | 395 | 112 | 144 | |
| Queue Length 95th (ft) | 93 | 338 | | m435 | m554 | m109 | 78 | 153 | 655 | 159 | 159 | |
| Internal Link Dist (ft) | | 620 | | | 611 | | | 712 | | | 884 | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 388 | 1293 | | 938 | 1578 | 1045 | 370 | 714 | 1473 | 367 | 724 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.36 | 0.72 | | 0.95 | 0.69 | 0.31 | 0.33 | 0.42 | 0.72 | 0.67 | 0.52 | |

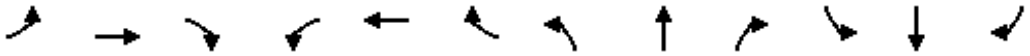
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 116 (83%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.95 | | | |
| Intersection Signal Delay: 44.9 | | Intersection LOS: D | |
| Intersection Capacity Utilization 70.5% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 4: S Royal Oaks/N Royal Oaks & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 1728 | 187 | 111 | 1055 | 0 | 0 | 0 | 0 | 355 | 0 | 1026 |
| Future Volume (vph) | 0 | 1728 | 187 | 111 | 1055 | 0 | 0 | 0 | 0 | 355 | 0 | 1026 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 182 | | | | | | | | | 117 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.91 | 0.90 | 0.86 | 0.87 | 1.00 | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 |
| Heavy Vehicles (%) | 2% | 3% | 7% | 1% | 3% | 2% | 2% | 2% | 2% | 6% | 2% | 3% |
| Adj. Flow (vph) | 0 | 1899 | 208 | 129 | 1213 | 0 | 0 | 0 | 0 | 418 | 0 | 1091 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 1899 | 208 | 129 | 1213 | 0 | 0 | 0 | 0 | 418 | 0 | 1091 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (%) | | 44.3% | 44.3% | 16.4% | 60.7% | | | | | 39.3% | | 39.3% |
| Maximum Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 60.5 | 60.5 | 15.5 | 81.0 | | | | | 49.5 | | 49.5 |
| Actuated g/C Ratio | | 0.43 | 0.43 | 0.11 | 0.58 | | | | | 0.35 | | 0.35 |
| v/c Ratio | | 0.69 | 0.28 | 0.65 | 0.62 | | | | | 0.36 | | 1.08 |
| Control Delay | | 25.9 | 4.8 | 71.1 | 19.1 | | | | | 34.6 | | 89.4 |
| Queue Delay | | 0.5 | 0.0 | 0.0 | 0.3 | | | | | 2.1 | | 0.0 |
| Total Delay | | 26.3 | 4.8 | 71.1 | 19.4 | | | | | 36.7 | | 89.4 |
| LOS | | C | A | E | B | | | | | D | | F |
| Approach Delay | | 24.2 | | | 24.3 | | | | | | | |
| Approach LOS | | C | | | C | | | | | | | |
| 90th %ile Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| 90th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 70th %ile Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| 70th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 50th %ile Green (s) | | 57.6 | 57.6 | 15.4 | 79.0 | | | | | 47.5 | | 47.5 |
| 50th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| 30th %ile Green (s) | | 59.8 | 59.8 | 13.2 | 79.0 | | | | | 47.5 | | 47.5 |
| 30th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| 10th %ile Green (s) | | 63.2 | 63.2 | 9.8 | 79.0 | | | | | 47.5 | | 47.5 |
| 10th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| Stops (vph) | | 1020 | 34 | 111 | 500 | | | | | 256 | | 827 |
| Fuel Used(gal) | | 33 | 2 | 3 | 13 | | | | | 6 | | 30 |
| CO Emissions (g/hr) | | 2313 | 142 | 218 | 908 | | | | | 431 | | 2069 |
| NOx Emissions (g/hr) | | 450 | 28 | 42 | 177 | | | | | 84 | | 403 |
| VOC Emissions (g/hr) | | 536 | 33 | 50 | 211 | | | | | 100 | | 480 |
| Dilemma Vehicles (#) | | 50 | 0 | 0 | 33 | | | | | 0 | | 0 |
| Queue Length 50th (ft) | | 295 | 20 | 125 | 282 | | | | | 144 | | ~586 |
| Queue Length 95th (ft) | | 388 | m50 | m163 | m294 | | | | | 178 | | #738 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2743 | 755 | 229 | 1960 | | | | | 1162 | | 1014 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 217 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 376 | 0 | 0 | 0 | | | | | 581 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.80 | 0.28 | 0.56 | 0.70 | | | | | 0.72 | | 1.08 |

Intersection Summary

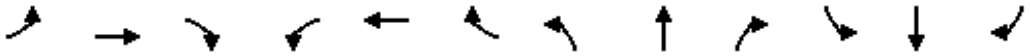
| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 106 (76%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.08 | | | |
| Intersection Signal Delay: 39.6 | | Intersection LOS: D | |
| Intersection Capacity Utilization 107.3% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

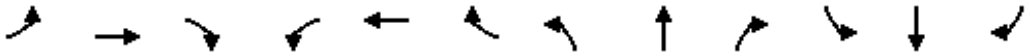
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Ent ramp to I-65/Exit ramp from I-65 & Highway 96



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1336 | 747 | 0 | 0 | 759 | 1217 | 407 | 0 | 364 | 0 | 0 | 0 |
| Future Volume (vph) | 1336 | 747 | 0 | 0 | 759 | 1217 | 407 | 0 | 364 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 23 | | | 258 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 311 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 5.3 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.88 | 0.86 | 0.95 | 1.00 | 0.95 | 0.98 | 0.95 | 0.25 | 0.92 | 1.00 | 1.00 | 0.95 |
| Heavy Vehicles (%) | 2% | 5% | 2% | 2% | 2% | 1% | 2% | 0% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 1518 | 869 | 0 | 0 | 799 | 1242 | 428 | 0 | 396 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 1518 | 869 | 0 | 0 | 799 | 1242 | 428 | 0 | 396 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (%) | 40.0% | 82.9% | | | 42.9% | | 17.1% | | 17.1% | | | |
| Maximum Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 50.0 | 110.0 | | | 53.5 | 79.5 | 16.5 | | 16.5 | | | |
| Actuated g/C Ratio | 0.36 | 0.79 | | | 0.38 | 0.57 | 0.12 | | 0.12 | | | |
| v/c Ratio | 1.29 | 0.33 | | | 0.59 | 0.77 | 1.10 | | 0.95 | | | |
| Control Delay | 186.0 | 3.2 | | | 36.7 | 27.0 | 131.0 | | 53.3 | | | |
| Queue Delay | 0.7 | 0.1 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 186.7 | 3.3 | | | 36.7 | 27.0 | 131.0 | | 53.3 | | | |
| LOS | F | A | | | D | C | F | | D | | | |
| Approach Delay | | 119.9 | | | 30.8 | | | | | | | |
| Approach LOS | | F | | | C | | | | | | | |
| 90th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 90th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 70th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 70th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 50th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 50th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 30th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 30th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 10th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 10th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| Stops (vph) | 979 | 101 | | | 591 | 899 | 348 | | 115 | | | |
| Fuel Used(gal) | 65 | 4 | | | 13 | 18 | 15 | | 7 | | | |
| CO Emissions (g/hr) | 4561 | 300 | | | 914 | 1264 | 1018 | | 455 | | | |
| NOx Emissions (g/hr) | 887 | 58 | | | 178 | 246 | 198 | | 89 | | | |
| VOC Emissions (g/hr) | 1057 | 70 | | | 212 | 293 | 236 | | 105 | | | |
| Dilemma Vehicles (#) | 0 | 17 | | | 27 | 0 | 0 | | 0 | | | |
| Queue Length 50th (ft) | ~899 | 68 | | | 303 | 468 | ~227 | | 135 | | | |
| Queue Length 95th (ft) | #1028 | 76 | | | 372 | 573 | #337 | | #341 | | | |
| Internal Link Dist (ft) | | 476 | | | 231 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1179 | 2598 | | | 1352 | 1607 | 389 | | 419 | | | |
| Starvation Cap Reductn | 163 | 612 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 1.49 | 0.44 | | | 0.59 | 0.77 | 1.10 | | 0.95 | | | |

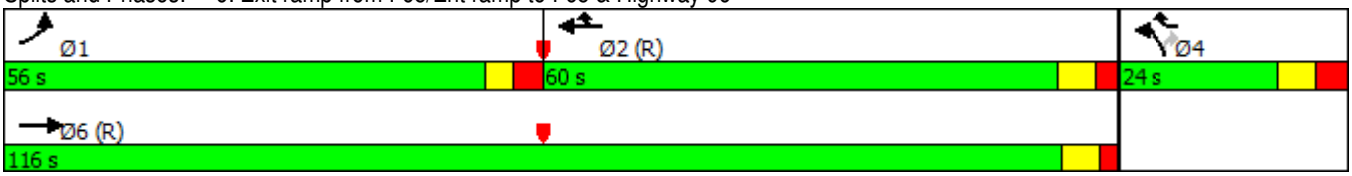
Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 122 (87%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.29 | | | |
| Intersection Signal Delay: 81.2 | | Intersection LOS: F | |
| Intersection Capacity Utilization 107.3% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 92 | 827 | 19 | 147 | 41 | 118 | 92 | 29 | 91 | 138 | 765 | 145 |
| Future Volume (vph) | 92 | 827 | 19 | 147 | 41 | 118 | 92 | 29 | 91 | 138 | 765 | 145 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 3 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | | 0.850 | | 0.896 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.950 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 3319 | 1531 | 1711 | 1613 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.097 | 0.950 | | 0.724 | | | 0.278 | | | 0.265 | | |
| Satd. Flow (perm) | 157 | 3319 | 1531 | 1304 | 1613 | 0 | 518 | 1925 | 1583 | 494 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 132 | | 93 | | | | 99 | | 132 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 552 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 12.5 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 137 | 880 | 30 | 186 | 71 | 162 | 123 | 50 | 99 | 184 | 1020 | 210 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 137 | 880 | 30 | 186 | 233 | 0 | 123 | 50 | 99 | 184 | 1230 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 30 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | 42 | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | 45 | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | Perm | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | 6 | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | 20.0 | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 18.0 | 57.0 | 57.0 | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 18.0 | 57.0 | 57.0 | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |
| Total Split (%) | 15.0% | 47.5% | 47.5% | 11.7% | 29.2% | | 11.7% | 29.2% | 11.7% | 11.7% | 44.2% | |
| Maximum Green (s) | 12.0 | 51.0 | 51.0 | 8.5 | 29.0 | | 8.5 | 29.0 | 8.0 | 8.0 | 47.0 | |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | -1.5 | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | 4.5 | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | 5.0 | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | C-Min | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 78.4 | 65.3 | 65.3 | 31.2 | 19.4 | | 30.6 | 19.1 | 33.0 | 74.3 | 63.1 | |
| Actuated g/C Ratio | 0.65 | 0.54 | 0.54 | 0.26 | 0.16 | | 0.26 | 0.16 | 0.28 | 0.62 | 0.53 | |
| v/c Ratio | 0.56 | 0.49 | 0.03 | 0.48 | 0.69 | | 0.51 | 0.16 | 0.20 | 0.45 | 0.80 | |
| Control Delay | 22.4 | 19.3 | 0.1 | 38.4 | 38.0 | | 39.3 | 41.7 | 6.4 | 12.4 | 27.4 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 22.4 | 19.3 | 0.1 | 38.4 | 38.0 | | 39.3 | 41.7 | 6.4 | 12.4 | 27.4 | |
| LOS | C | B | A | D | D | | D | D | A | B | C | |
| Approach Delay | | 19.1 | | | 38.2 | | | 27.8 | | 25.5 | | |
| Approach LOS | | B | | | D | | | C | | C | | |
| 90th %ile Green (s) | 12.0 | 54.9 | 54.9 | 8.5 | 25.1 | | 8.5 | 25.1 | 8.0 | 8.0 | 50.9 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 70th %ile Green (s) | 12.0 | 59.7 | 59.7 | 8.5 | 20.3 | | 8.5 | 20.3 | 8.0 | 8.0 | 55.7 | |
| 70th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 50th %ile Green (s) | 10.3 | 63.1 | 63.1 | 8.5 | 16.9 | | 8.5 | 16.9 | 8.0 | 8.0 | 60.8 | |
| 50th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 30th %ile Green (s) | 7.7 | 67.2 | 67.2 | 8.5 | 13.5 | | 8.5 | 13.5 | 7.3 | 7.3 | 66.8 | |
| 30th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Gap | Gap | Coord | |
| 10th %ile Green (s) | 7.0 | 73.9 | 73.9 | 21.6 | 8.6 | | 7.0 | 0.0 | 7.0 | 7.0 | 73.9 | |
| 10th %ile Term Code | Min | Coord | Coord | Hold | Gap | | Min | Skip | Min | Min | Coord | |
| Stops (vph) | 40 | 507 | 0 | 118 | 89 | | 69 | 23 | 12 | 56 | 640 | |
| Fuel Used(gal) | 1 | 10 | 0 | 3 | 3 | | 2 | 1 | 1 | 2 | 20 | |
| CO Emissions (g/hr) | 72 | 671 | 6 | 175 | 178 | | 139 | 46 | 56 | 168 | 1408 | |
| NOx Emissions (g/hr) | 14 | 131 | 1 | 34 | 35 | | 27 | 9 | 11 | 33 | 274 | |
| VOC Emissions (g/hr) | 17 | 156 | 1 | 41 | 41 | | 32 | 11 | 13 | 39 | 326 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 1 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 36 | 211 | 0 | 116 | 103 | | 74 | 34 | 0 | 49 | 395 | |
| Queue Length 95th (ft) | 56 | 308 | 0 | 142 | 80 | | 92 | 41 | 37 | 78 | 423 | |
| Internal Link Dist (ft) | | 472 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | 150 | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 270 | 1804 | 892 | 385 | 492 | | 248 | 505 | 512 | 418 | 1528 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.51 | 0.49 | 0.03 | 0.48 | 0.47 | | 0.50 | 0.10 | 0.19 | 0.44 | 0.80 | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 120 | |

| | |
|---|---|
| Actuated Cycle Length: 120 | |
| Offset: 117 (98%), Referenced to phase 2:SWL and 6:EBL, Start of Green | |
| Natural Cycle: 120 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.80 | |
| Intersection Signal Delay: 25.3 | Intersection LOS: C |
| Intersection Capacity Utilization 60.2% | ICU Level of Service B |
| Analysis Period (min) 15 | |

Splits and Phases: 1: Oak Meadow Dr. & S Royal Oaks

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 90 | 1063 | 27 | 232 | 1063 | 93 | 83 | 64 | 123 | 46 | 58 | 288 |
| Future Volume (vph) | 90 | 1063 | 27 | 232 | 1063 | 93 | 83 | 64 | 123 | 46 | 58 | 288 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 12 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | | 1% | | | -2% | | | -1% | | | 2% | |
| Storage Length (ft) | 80 | | 135 | 220 | | 0 | 100 | | 0 | 120 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | 0.986 | | | 0.906 | | | 0.877 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1676 | 3438 | 1575 | 1805 | 3444 | 0 | 1736 | 1672 | 0 | 1752 | 1595 | 0 |
| Flt Permitted | 0.156 | | | 0.144 | | | 0.168 | | | 0.392 | | |
| Satd. Flow (perm) | 275 | 3438 | 1575 | 274 | 3444 | 0 | 307 | 1672 | 0 | 723 | 1595 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 124 | | 12 | | | 57 | | | 158 | |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1624 | | | 792 | | | 957 | | | 515 | |
| Travel Time (s) | | 36.9 | | | 18.0 | | | 21.8 | | | 11.7 | |
| Peak Hour Factor | 0.79 | 0.95 | 0.64 | 0.75 | 0.90 | 0.76 | 0.86 | 0.71 | 0.82 | 0.75 | 0.88 | 0.94 |
| Heavy Vehicles (%) | 0% | 1% | 2% | 1% | 1% | 0% | 1% | 0% | 0% | 2% | 0% | 0% |
| Adj. Flow (vph) | 114 | 1119 | 42 | 309 | 1181 | 122 | 97 | 90 | 150 | 61 | 66 | 306 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 114 | 1119 | 42 | 309 | 1303 | 0 | 97 | 240 | 0 | 61 | 372 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 0.99 | 1.03 | 0.99 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 1 | 0 | 1 | 1 | | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | 0 | 42 | 226 | | 42 | 42 | | 42 | 42 | |
| Trailing Detector (ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | 50 | 45 | 6 | | 45 | 45 | | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | D.Pm | NA | | D.Pm | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | | 4 | | | 8 | |
| Permitted Phases | 6 | | 6 | 2 | | | 8 | | | 4 | | |
| Detector Phase | 1 | 6 | | 5 | 2 | | 8 | 4 | | 4 | 8 | |
| Switch Phase | | | | | | | | | | | | |

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | |
| Minimum Split (s) | 15.0 | 70.0 | 70.0 | 30.0 | 85.0 | | 50.0 | 50.0 | | 50.0 | 50.0 | |
| Total Split (s) | 14.0 | 72.0 | 72.0 | 29.0 | 87.0 | | 49.0 | 49.0 | | 49.0 | 49.0 | |
| Total Split (%) | 9.3% | 48.0% | 48.0% | 19.3% | 58.0% | | 32.7% | 32.7% | | 32.7% | 32.7% | |
| Maximum Green (s) | 7.5 | 66.0 | 66.0 | 22.5 | 81.0 | | 42.0 | 42.0 | | 42.0 | 42.0 | |
| Yellow Time (s) | 3.0 | 3.5 | 3.5 | 3.0 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | 2.5 | 3.5 | 2.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | -3.0 | -1.0 | -3.0 | | -2.5 | -2.5 | | -2.5 | -2.5 | |
| Total Lost Time (s) | 5.5 | 3.0 | 3.0 | 5.5 | 3.0 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Recall Mode | None | C-Min | C-Min | None | C-Min | | None | None | | None | None | |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | | 8.0 | 8.0 | | 8.0 | 8.0 | |
| Flash Dont Walk (s) | | 16.0 | 16.0 | | 20.0 | | 35.0 | 32.0 | | 32.0 | 35.0 | |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 86.2 | 80.3 | 80.3 | 103.3 | 92.2 | | 36.4 | 36.4 | | 36.4 | 36.4 | |
| Actuated g/C Ratio | 0.57 | 0.54 | 0.54 | 0.69 | 0.61 | | 0.24 | 0.24 | | 0.24 | 0.24 | |
| v/c Ratio | 0.49 | 0.61 | 0.05 | 0.78 | 0.61 | | 1.31 | 0.53 | | 0.35 | 0.73 | |
| Control Delay | 18.9 | 28.2 | 0.1 | 40.9 | 7.1 | | 246.3 | 34.1 | | 49.9 | 37.3 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 18.9 | 28.2 | 0.1 | 40.9 | 8.2 | | 246.3 | 34.1 | | 49.9 | 37.3 | |
| LOS | B | C | A | D | A | | F | C | | D | D | |
| Approach Delay | | 26.4 | | | 14.5 | | | 95.2 | | | 39.1 | |
| Approach LOS | | C | | | B | | | F | | | D | |
| 90th %ile Green (s) | 7.5 | 66.0 | 66.0 | 22.5 | 81.0 | | 42.0 | 42.0 | | 42.0 | 42.0 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Coord | | Max | Hold | | Hold | Max | |
| 70th %ile Green (s) | 7.5 | 66.0 | 66.0 | 22.5 | 81.0 | | 42.0 | 42.0 | | 42.0 | 42.0 | |
| 70th %ile Term Code | Max | Coord | Coord | Max | Coord | | Max | Hold | | Hold | Max | |
| 50th %ile Green (s) | 7.5 | 70.5 | 70.5 | 22.5 | 85.5 | | 37.5 | 37.5 | | 37.5 | 37.5 | |
| 50th %ile Term Code | Max | Coord | Coord | Max | Coord | | Gap | Hold | | Hold | Gap | |
| 30th %ile Green (s) | 7.5 | 82.8 | 82.8 | 17.8 | 93.1 | | 29.9 | 29.9 | | 29.9 | 29.9 | |
| 30th %ile Term Code | Max | Coord | Coord | Gap | Coord | | Gap | Hold | | Hold | Gap | |
| 10th %ile Green (s) | 6.8 | 101.4 | 101.4 | 10.8 | 105.4 | | 18.3 | 18.3 | | 18.3 | 18.3 | |
| 10th %ile Term Code | Gap | Coord | Coord | Gap | Coord | | Gap | Hold | | Hold | Gap | |
| Stops (vph) | 41 | 735 | 0 | 224 | 525 | | 67 | 124 | | 37 | 188 | |
| Fuel Used(gal) | 2 | 24 | 0 | 5 | 12 | | 5 | 3 | | 1 | 5 | |
| CO Emissions (g/hr) | 120 | 1651 | 24 | 322 | 819 | | 360 | 236 | | 60 | 353 | |
| NOx Emissions (g/hr) | 23 | 321 | 5 | 63 | 159 | | 70 | 46 | | 12 | 69 | |
| VOC Emissions (g/hr) | 28 | 383 | 6 | 75 | 190 | | 83 | 55 | | 14 | 82 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 37 | 427 | 0 | 146 | 64 | | ~113 | 157 | | 48 | 193 | |
| Queue Length 95th (ft) | 59 | 538 | 0 | m112 | m351 | | #217 | 170 | | 74 | 289 | |
| Internal Link Dist (ft) | | 1544 | | | 712 | | | 877 | | | 435 | |
| Turn Bay Length (ft) | 80 | | 135 | 220 | | | 100 | | | 120 | | |
| Base Capacity (vph) | 237 | 1841 | 900 | 429 | 2121 | | 91 | 536 | | 214 | 584 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 527 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.48 | 0.61 | 0.05 | 0.72 | 0.82 | | 1.07 | 0.45 | | 0.29 | 0.64 | |

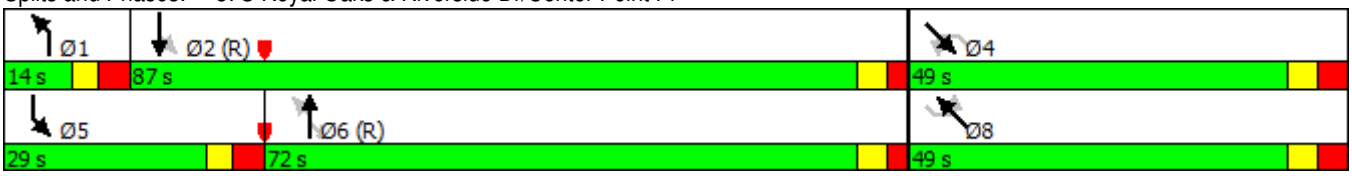
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 123 (82%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.31 | | | |
| Intersection Signal Delay: 29.0 | | Intersection LOS: C | |
| Intersection Capacity Utilization 84.3% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

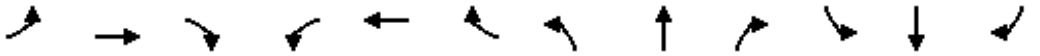
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

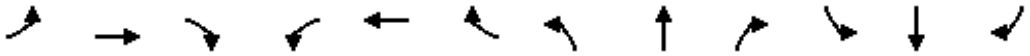
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: S Royal Oaks & Riverside Dr/Center Point Pl





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 206 | 1108 | 63 | 913 | 1174 | 269 | 141 | 351 | 964 | 316 | 434 | 178 |
| Future Volume (vph) | 206 | 1108 | 63 | 913 | 1174 | 269 | 141 | 351 | 964 | 316 | 434 | 178 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.991 | | | | 0.850 | | | 0.850 | | 0.951 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3319 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3319 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 7 | | | | 87 | | | | | 49 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 700 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 11.9 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.92 | 0.93 | 0.81 | 0.87 | 0.91 | 0.89 | 0.74 | 0.83 | 0.89 | 0.83 | 0.95 | 0.80 |
| Heavy Vehicles (%) | 1% | 1% | 0% | 1% | 2% | 1% | 0% | 0% | 1% | 0% | 0% | 0% |
| Adj. Flow (vph) | 224 | 1191 | 78 | 1049 | 1290 | 302 | 191 | 423 | 1083 | 381 | 457 | 223 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 224 | 1269 | 0 | 1049 | 1290 | 302 | 191 | 423 | 1083 | 381 | 680 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

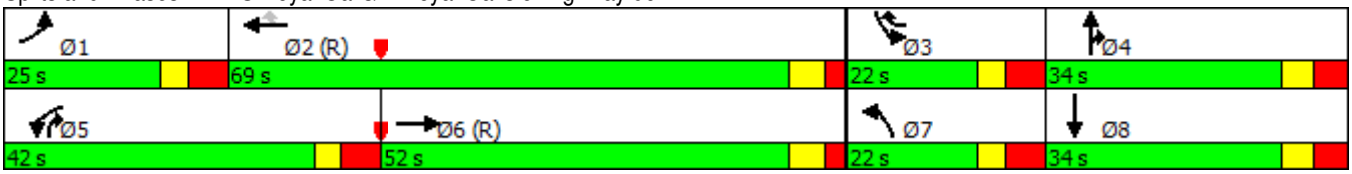


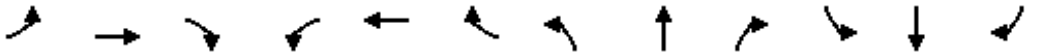
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (%) | 16.7% | 34.7% | | 28.0% | 46.0% | 14.7% | 14.7% | 22.7% | | 14.7% | 22.7% | |
| Maximum Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 17.3 | 48.0 | | 37.0 | 67.7 | 88.2 | 14.9 | 29.5 | 71.0 | 16.5 | 31.1 | |
| Actuated g/C Ratio | 0.12 | 0.32 | | 0.25 | 0.45 | 0.59 | 0.10 | 0.20 | 0.47 | 0.11 | 0.21 | |
| v/c Ratio | 0.56 | 0.80 | | 1.27 | 0.81 | 0.30 | 0.55 | 0.58 | 0.79 | 1.02 | 0.94 | |
| Control Delay | 68.7 | 44.7 | | 163.5 | 48.8 | 16.5 | 60.9 | 58.9 | 49.2 | 117.0 | 74.6 | |
| Queue Delay | 0.0 | 0.2 | | 0.2 | 0.6 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.3 | |
| Total Delay | 68.7 | 44.9 | | 163.7 | 49.4 | 16.5 | 61.1 | 58.9 | 49.2 | 117.0 | 74.9 | |
| LOS | E | D | | F | D | B | E | E | D | F | E | |
| Approach Delay | | 48.5 | | | 91.1 | | | 53.0 | | | 90.0 | |
| Approach LOS | | D | | | F | | | D | | | F | |
| 90th %ile Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | Max | Max | Max | | Max | Max | |
| 70th %ile Green (s) | 16.7 | 45.5 | | 34.5 | 63.3 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | Max | Max | Max | | Max | Max | |
| 50th %ile Green (s) | 15.1 | 45.5 | | 34.5 | 64.9 | 14.5 | 13.5 | 26.5 | | 14.5 | 27.5 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 30th %ile Green (s) | 13.4 | 45.5 | | 34.5 | 66.6 | 14.5 | 12.0 | 26.5 | | 14.5 | 29.0 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 10th %ile Green (s) | 11.1 | 45.5 | | 34.5 | 68.9 | 14.5 | 9.8 | 26.5 | | 14.5 | 31.2 | |
| 10th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| Stops (vph) | 191 | 937 | | 743 | 1069 | 205 | 134 | 321 | 787 | 280 | 514 | |
| Fuel Used(gal) | 6 | 25 | | 45 | 32 | 5 | 3 | 8 | 20 | 11 | 17 | |
| CO Emissions (g/hr) | 401 | 1777 | | 3150 | 2214 | 356 | 235 | 570 | 1395 | 800 | 1171 | |
| NOx Emissions (g/hr) | 78 | 346 | | 613 | 431 | 69 | 46 | 111 | 271 | 156 | 228 | |
| VOC Emissions (g/hr) | 93 | 412 | | 730 | 513 | 83 | 54 | 132 | 323 | 185 | 271 | |
| Dilemma Vehicles (#) | 0 | 44 | | 0 | 44 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 107 | 315 | | ~680 | 582 | 137 | 94 | 220 | 490 | ~203 | 327 | |
| Queue Length 95th (ft) | 155 | 369 | | m#521 | m521 | m130 | m109 | m236 | m692 | #272 | #465 | |
| Internal Link Dist (ft) | | 620 | | | 611 | | | 712 | | | 884 | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 462 | 1580 | | 826 | 1598 | 1007 | 383 | 730 | 1369 | 372 | 727 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 34 | | 29 | 84 | 0 | 10 | 0 | 0 | 0 | 2 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.48 | 0.82 | | 1.32 | 0.85 | 0.30 | 0.51 | 0.58 | 0.79 | 1.02 | 0.94 | |

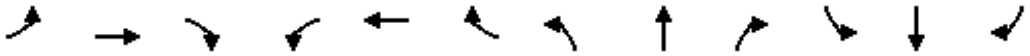
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 133 (89%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.27 | | | |
| Intersection Signal Delay: 72.3 | | Intersection LOS: E | |
| Intersection Capacity Utilization 87.4% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |
| ~ Volume exceeds capacity, queue is theoretically infinite. | | | |
| Queue shown is maximum after two cycles. | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | |
| Queue shown is maximum after two cycles. | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 4: S Royal Oaks/N Royal Oaks & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 1971 | 484 | 285 | 906 | 0 | 0 | 0 | 0 | 914 | 0 | 1405 |
| Future Volume (vph) | 0 | 1971 | 484 | 285 | 906 | 0 | 0 | 0 | 0 | 914 | 0 | 1405 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 403 | | | | | | | | | 143 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.93 | 0.78 | 0.71 | 0.86 | 1.00 | 1.00 | 1.00 | 1.00 | 0.87 | 1.00 | 0.88 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 1% | 1% | 2% | 2% | 2% | 2% | 1% | 2% | 1% |
| Adj. Flow (vph) | 0 | 2119 | 621 | 401 | 1053 | 0 | 0 | 0 | 0 | 1051 | 0 | 1597 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 2119 | 621 | 401 | 1053 | 0 | 0 | 0 | 0 | 1051 | 0 | 1597 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (%) | | 36.7% | 36.7% | 20.0% | 56.7% | | | | | 43.3% | | 43.3% |
| Maximum Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 51.0 | 51.0 | 25.0 | 81.0 | | | | | 59.5 | | 59.5 |
| Actuated g/C Ratio | | 0.34 | 0.34 | 0.17 | 0.54 | | | | | 0.40 | | 0.40 |
| v/c Ratio | | 0.97 | 0.77 | 1.35 | 0.56 | | | | | 0.77 | | 1.38 |
| Control Delay | | 69.9 | 30.6 | 226.6 | 25.0 | | | | | 43.9 | | 207.9 |
| Queue Delay | | 0.8 | 0.0 | 0.0 | 0.7 | | | | | 1.7 | | 0.0 |
| Total Delay | | 70.7 | 30.6 | 226.6 | 25.7 | | | | | 45.6 | | 207.9 |
| LOS | | E | C | F | C | | | | | D | | F |
| Approach Delay | | 61.6 | | | 81.1 | | | | | | | |
| Approach LOS | | E | | | F | | | | | | | |
| 90th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 90th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 70th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 70th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 50th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 50th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 30th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 30th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 10th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 10th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| Stops (vph) | | 1855 | 462 | 222 | 472 | | | | | 776 | | 985 |
| Fuel Used(gal) | | 62 | 11 | 16 | 13 | | | | | 18 | | 74 |
| CO Emissions (g/hr) | | 4349 | 802 | 1147 | 886 | | | | | 1262 | | 5163 |
| NOx Emissions (g/hr) | | 846 | 156 | 223 | 172 | | | | | 246 | | 1005 |
| VOC Emissions (g/hr) | | 1008 | 186 | 266 | 205 | | | | | 292 | | 1197 |
| Dilemma Vehicles (#) | | 105 | 0 | 0 | 45 | | | | | 0 | | 0 |
| Queue Length 50th (ft) | | 619 | 296 | ~524 | 272 | | | | | 457 | | ~1127 |
| Queue Length 95th (ft) | | m#672 | m295 | #520 | 407 | | | | | 515 | | #1235 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2178 | 804 | 297 | 1865 | | | | | 1368 | | 1160 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 446 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 14 | 0 | 0 | 0 | | | | | 166 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.98 | 0.77 | 1.35 | 0.74 | | | | | 0.87 | | 1.38 |

Intersection Summary

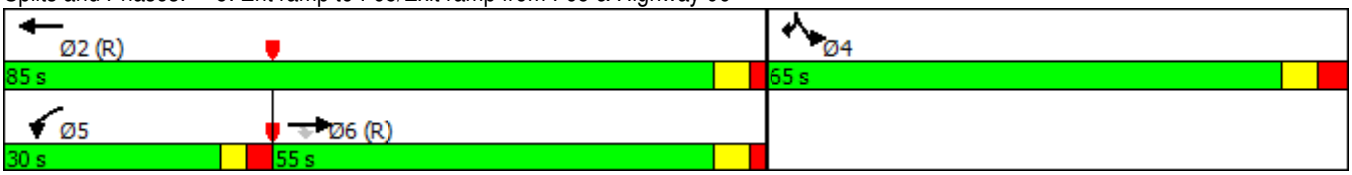
| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 104 (69%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.38 | | | |
| Intersection Signal Delay: 97.4 | | Intersection LOS: F | |
| Intersection Capacity Utilization 84.7% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

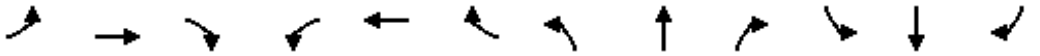
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

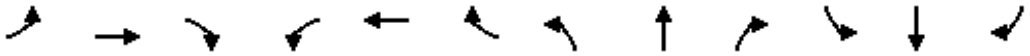
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Ent ramp to I-65/Exit ramp from I-65 & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 595 | 2290 | 0 | 0 | 882 | 998 | 309 | 0 | 164 | 0 | 0 | 0 |
| Future Volume (vph) | 595 | 2290 | 0 | 0 | 882 | 998 | 309 | 0 | 164 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 246 | | | 69 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 1845 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 31.4 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.97 | 0.98 | 1.00 | 0.25 | 0.91 | 0.93 | 0.92 | 1.00 | 0.87 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 3% | 3% | 2% | 0% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 2% |
| Adj. Flow (vph) | 613 | 2337 | 0 | 0 | 969 | 1073 | 336 | 0 | 189 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 613 | 2337 | 0 | 0 | 969 | 1073 | 336 | 0 | 189 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |

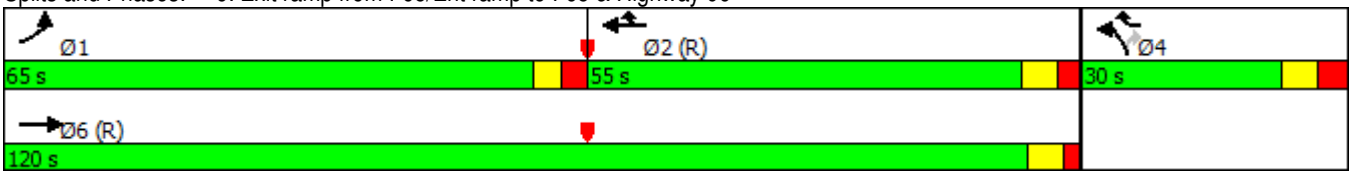


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (%) | 43.3% | 80.0% | | | 36.7% | | 20.0% | | 20.0% | | | |
| Maximum Green (s) | 59.0 | 114.0 | | | 48.5 | | 22.5 | | 22.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 35.9 | 114.7 | | | 72.3 | 103.6 | 21.8 | | 21.8 | | | |
| Actuated g/C Ratio | 0.24 | 0.76 | | | 0.48 | 0.69 | 0.15 | | 0.15 | | | |
| v/c Ratio | 0.78 | 0.91 | | | 0.57 | 0.54 | 0.70 | | 0.65 | | | |
| Control Delay | 79.7 | 23.8 | | | 30.4 | 10.0 | 69.4 | | 49.0 | | | |
| Queue Delay | 0.0 | 4.8 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 79.7 | 28.6 | | | 30.4 | 10.0 | 69.4 | | 49.0 | | | |
| LOS | E | C | | | C | B | E | | D | | | |
| Approach Delay | | 39.2 | | | 19.7 | | | | | | | |
| Approach LOS | | D | | | B | | | | | | | |
| 90th %ile Green (s) | 43.9 | 114.0 | | | 63.6 | | 22.5 | | 22.5 | | | |
| 90th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 70th %ile Green (s) | 39.0 | 114.0 | | | 68.5 | | 22.5 | | 22.5 | | | |
| 70th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 50th %ile Green (s) | 36.0 | 114.0 | | | 71.5 | | 22.5 | | 22.5 | | | |
| 50th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 30th %ile Green (s) | 33.0 | 114.0 | | | 74.5 | | 22.5 | | 22.5 | | | |
| 30th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 10th %ile Green (s) | 27.8 | 117.5 | | | 83.2 | | 19.0 | | 19.0 | | | |
| 10th %ile Term Code | Gap | Coord | | | Coord | | Gap | | Gap | | | |
| Stops (vph) | 588 | 1844 | | | 621 | 375 | 290 | | 100 | | | |
| Fuel Used(gal) | 18 | 38 | | | 23 | 18 | 7 | | 3 | | | |
| CO Emissions (g/hr) | 1236 | 2645 | | | 1580 | 1273 | 509 | | 208 | | | |
| NOx Emissions (g/hr) | 240 | 515 | | | 307 | 248 | 99 | | 40 | | | |
| VOC Emissions (g/hr) | 286 | 613 | | | 366 | 295 | 118 | | 48 | | | |
| Dilemma Vehicles (#) | 0 | 83 | | | 29 | 0 | 0 | | 0 | | | |
| Queue Length 50th (ft) | 329 | 582 | | | 353 | 205 | 162 | | 112 | | | |
| Queue Length 95th (ft) | m340 | m518 | | | 467 | 311 | 218 | | 190 | | | |
| Internal Link Dist (ft) | | 476 | | | 1765 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1286 | 2577 | | | 1704 | 2012 | 495 | | 298 | | | |
| Starvation Cap Reductn | 0 | 197 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 0.48 | 0.98 | | | 0.57 | 0.53 | 0.68 | | 0.63 | | | |

Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 138 (92%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.91 | | | |
| Intersection Signal Delay: 34.2 | | Intersection LOS: C | |
| Intersection Capacity Utilization 84.7% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 6: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



# HCS 2010 Two-Way Stop Control Summary Report

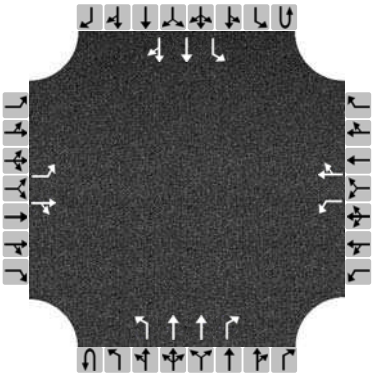
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Background) |

## Site Information

| | |
|---|---|
| Intersection | S. Royal Oaks and Rand |
| Jurisdiction | Franklin, TN |
| East/West Street | Rand Pl / Home Depot |
| North/South Street | S. Royal Oaks Blvd |
| Peak Hour Factor | 0.97 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 1 | 1 | 0 | | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 2 | 0 |
| Configuration | | L | | TR | | L | | TR | | L | T | R | | L | T | TR |
| Volume (veh/h) | | 26 | 1 | 9 | | 14 | 0 | 17 | | 10 | 1388 | 25 | | 61 | 645 | 51 |
| Percent Heavy Vehicles | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left + Thru | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 27 | | 10 | | 14 | | 18 | | 10 | | | | 63 | | |
| Capacity | | 165 | | 416 | | 108 | | 377 | | 893 | | | | 470 | | |
| v/c Ratio | | 0.16 | | 0.02 | | 0.13 | | 0.05 | | 0.01 | | | | 0.13 | | |
| 95% Queue Length | | 0.6 | | 0.1 | | 0.4 | | 0.1 | | 0.0 | | | | 0.5 | | |
| Control Delay (s/veh) | | 31.0 | | 13.9 | | 43.1 | | 15.0 | | 9.1 | | | | 13.8 | | |
| Level of Service (LOS) | | D | | B | | E | | C | | A | | | | B | | |
| Approach Delay (s/veh) | 26.4 | | | | 27.3 | | | | 0.1 | | | | 1.1 | | | |
| Approach LOS | D | | | | D | | | | A | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

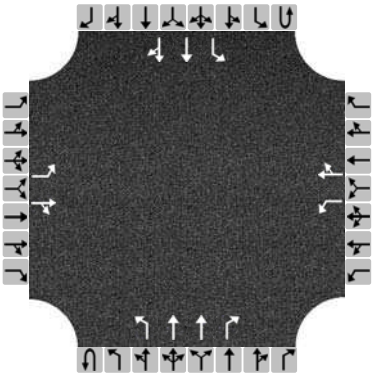
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Background) |

## Site Information

| | |
|---|---|
| Intersection | S. Royal Oaks and Rand |
| Jurisdiction | Franklin, TN |
| East/West Street | Rand Pl / Home Depot |
| North/South Street | S. Royal Oaks Blvd |
| Peak Hour Factor | 0.96 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 1 | 1 | 0 | | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 2 | 0 |
| Configuration | | L | | TR | | L | | TR | | L | T | R | | L | T | TR |
| Volume (veh/h) | | 26 | 3 | 16 | | 21 | 4 | 40 | | 6 | 984 | 17 | | 33 | 965 | 105 |
| Percent Heavy Vehicles | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left + Thru | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 27 | | 20 | | 22 | | 46 | | 6 | | | | 34 | | |
| Capacity | | 150 | | 355 | | 170 | | 419 | | 635 | | | | 675 | | |
| v/c Ratio | | 0.18 | | 0.06 | | 0.13 | | 0.11 | | 0.01 | | | | 0.05 | | |
| 95% Queue Length | | 0.6 | | 0.2 | | 0.4 | | 0.4 | | 0.0 | | | | 0.2 | | |
| Control Delay (s/veh) | | 34.1 | | 15.7 | | 29.2 | | 14.7 | | 10.7 | | | | 10.6 | | |
| Level of Service (LOS) | | D | | C | | D | | B | | B | | | | B | | |
| Approach Delay (s/veh) | 26.3 | | | | 19.4 | | | | 0.1 | | | | 0.3 | | | |
| Approach LOS | D | | | | C | | | | A | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

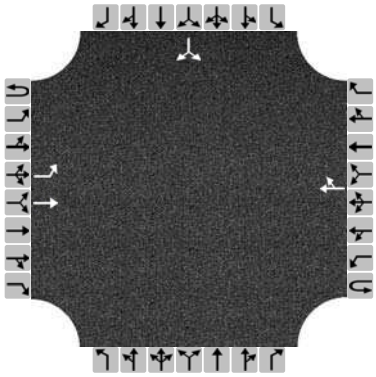
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | Mar 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Background) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and dwy |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Western Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 24 | 48 | | | | 198 | 0 | | | | | | 1 | | 9 |
| Percent Heavy Vehicles | | 0 | | | | | | | | | | | | 0 | | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

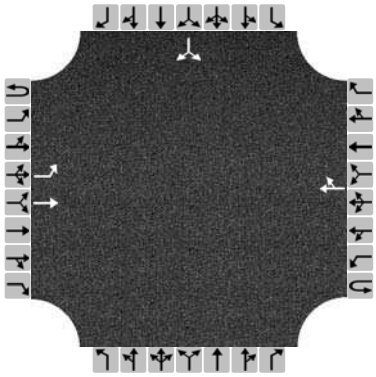
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 30 | | | | | | | | | | | | | 12 | |
| Capacity | | 1330 | | | | | | | | | | | | | 782 | |
| v/c Ratio | | 0.02 | | | | | | | | | | | | | 0.02 | |
| 95% Queue Length | | 0.1 | | | | | | | | | | | | | 0.0 | |
| Control Delay (s/veh) | | 7.8 | | | | | | | | | | | | | 9.7 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | A | |
| Approach Delay (s/veh) | 2.6 | | | | | | | | | | | | 9.7 | | | |
| Approach LOS | A | | | | | | | | | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | FTG | Intersection | Oak Meadow Dr and dwy |
| Agency/Co. | FTG | Jurisdiction | Franklin, TN |
| Date Performed | Mar 2016 | East/West Street | Oak Meadow Drive |
| Analysis Year | 2016 | North/South Street | Western Home Depot dwy |
| Time Analyzed | PM Peak Hour | Peak Hour Factor | 0.80 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | 10728 (Background) | | |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 24 | 174 | | | | 179 | 2 | | | | | | 16 | | 33 |
| Percent Heavy Vehicles | | 0 | | | | | | | | | | | | 0 | | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 30 | | | | | | | | | | | | | 61 | |
| Capacity | | 1355 | | | | | | | | | | | | | 726 | |
| v/c Ratio | | 0.02 | | | | | | | | | | | | | 0.08 | |
| 95% Queue Length | | 0.1 | | | | | | | | | | | | | 0.3 | |
| Control Delay (s/veh) | | 7.7 | | | | | | | | | | | | | 10.4 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | B | |
| Approach Delay (s/veh) | 0.9 | | | | | | | | | | | | 10.4 | | | |
| Approach LOS | A | | | | | | | | | | | | B | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

## TOTAL PROJECTED CONDITIONS

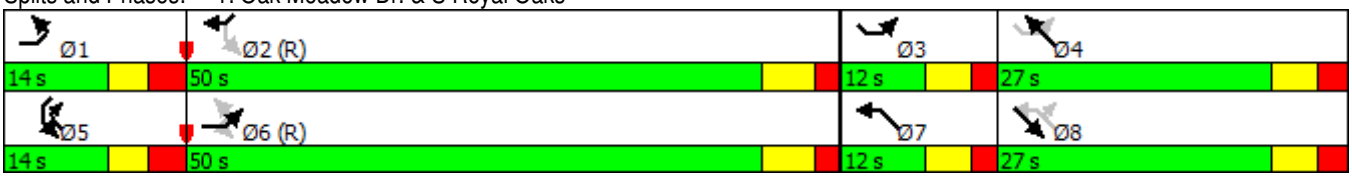
| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 87 | 1120 | 58 | 129 | 17 | 71 | 65 | 37 | 229 | 56 | 515 | 73 |
| Future Volume (vph) | 87 | 1120 | 58 | 129 | 17 | 71 | 65 | 37 | 229 | 56 | 515 | 73 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 3 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | | 0.850 | | 0.885 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.950 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 3319 | 1531 | 1711 | 1594 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.271 | 0.950 | | 0.715 | | | 0.495 | | | 0.170 | | |
| Satd. Flow (perm) | 437 | 3319 | 1531 | 1287 | 1594 | 0 | 922 | 1925 | 1583 | 317 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 154 | | 97 | | | | 90 | | 154 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 552 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 12.5 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 130 | 1191 | 92 | 163 | 29 | 97 | 87 | 64 | 249 | 75 | 687 | 106 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 130 | 1191 | 92 | 163 | 126 | 0 | 87 | 64 | 249 | 75 | 793 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 30 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | 42 | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | 45 | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | Perm | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | 6 | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | 20.0 | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 13.0 | 26.0 | 26.0 | 12.5 | 20.0 | | 12.5 | 20.0 | 13.0 | 13.0 | 26.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 14.0 | 50.0 | 50.0 | 12.0 | 27.0 | | 12.0 | 27.0 | 14.0 | 14.0 | 50.0 | |
| Total Split (%) | 13.6% | 48.5% | 48.5% | 11.7% | 26.2% | | 11.7% | 26.2% | 13.6% | 13.6% | 48.5% | |
| Maximum Green (s) | 8.0 | 44.0 | 44.0 | 6.5 | 21.0 | | 6.5 | 21.0 | 8.0 | 8.0 | 44.0 | |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | -1.5 | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | 4.5 | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | 5.0 | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | C-Min | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 71.0 | 60.1 | 60.1 | 20.0 | 12.3 | | 20.0 | 12.3 | 25.3 | 70.3 | 59.8 | |
| Actuated g/C Ratio | 0.69 | 0.58 | 0.58 | 0.19 | 0.12 | | 0.19 | 0.12 | 0.25 | 0.68 | 0.58 | |
| v/c Ratio | 0.32 | 0.61 | 0.10 | 0.57 | 0.46 | | 0.34 | 0.28 | 0.55 | 0.21 | 0.47 | |
| Control Delay | 7.7 | 16.8 | 0.5 | 41.9 | 18.6 | | 34.8 | 43.6 | 25.6 | 7.0 | 11.8 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 7.7 | 16.8 | 0.5 | 41.9 | 18.6 | | 34.8 | 43.6 | 25.6 | 7.0 | 11.8 | |
| LOS | A | B | A | D | B | | C | D | C | A | B | |
| Approach Delay | | 14.9 | | | 31.7 | | | 30.5 | | 11.4 | | |
| Approach LOS | | B | | | C | | | C | | B | | |
| 90th %ile Green (s) | 8.0 | 52.3 | 52.3 | 6.5 | 13.7 | | 6.5 | 13.7 | 7.0 | 7.0 | 51.3 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Min | Min | Coord | |
| 70th %ile Green (s) | 7.8 | 55.3 | 55.3 | 6.5 | 10.7 | | 6.5 | 10.7 | 7.0 | 7.0 | 54.5 | |
| 70th %ile Term Code | Gap | Coord | Coord | Max | Hold | | Max | Gap | Min | Min | Coord | |
| 50th %ile Green (s) | 7.0 | 56.6 | 56.6 | 6.5 | 9.4 | | 6.5 | 9.4 | 7.0 | 7.0 | 56.6 | |
| 50th %ile Term Code | Min | Coord | Coord | Max | Hold | | Max | Gap | Min | Min | Coord | |
| 30th %ile Green (s) | 7.0 | 57.9 | 57.9 | 6.5 | 8.1 | | 6.5 | 8.1 | 7.0 | 7.0 | 57.9 | |
| 30th %ile Term Code | Min | Coord | Coord | Max | Hold | | Max | Gap | Min | Min | Coord | |
| 10th %ile Green (s) | 7.0 | 71.0 | 71.0 | 7.5 | 7.0 | | 0.0 | 0.0 | 7.0 | 7.0 | 71.0 | |
| 10th %ile Term Code | Min | Coord | Coord | Hold | Min | | Skip | Skip | Min | Min | Coord | |
| Stops (vph) | 27 | 714 | 1 | 112 | 27 | | 51 | 33 | 126 | 18 | 271 | |
| Fuel Used(gal) | 1 | 13 | 0 | 2 | 1 | | 1 | 1 | 4 | 1 | 10 | |
| CO Emissions (g/hr) | 46 | 880 | 18 | 162 | 68 | | 96 | 62 | 270 | 62 | 724 | |
| NOx Emissions (g/hr) | 9 | 171 | 4 | 32 | 13 | | 19 | 12 | 52 | 12 | 141 | |
| VOC Emissions (g/hr) | 11 | 204 | 4 | 38 | 16 | | 22 | 14 | 63 | 14 | 168 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 2 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 25 | 258 | 0 | 91 | 17 | | 46 | 39 | 90 | 14 | 131 | |
| Queue Length 95th (ft) | 37 | 362 | 0 | 124 | 22 | | 69 | 48 | 161 | 26 | 152 | |
| Internal Link Dist (ft) | | 472 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | 150 | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 415 | 1937 | 957 | 287 | 438 | | 253 | 439 | 470 | 367 | 1681 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.31 | 0.61 | 0.10 | 0.57 | 0.29 | | 0.34 | 0.15 | 0.53 | 0.20 | 0.47 | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 103 | |

| | |
|---|---|
| Actuated Cycle Length: 103 | |
| Offset: 0 (0%), Referenced to phase 2:SWL and 6:EBL, Start of Green | |
| Natural Cycle: 80 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.61 | |
| Intersection Signal Delay: 17.6 | Intersection LOS: B |
| Intersection Capacity Utilization 62.0% | ICU Level of Service B |
| Analysis Period (min) 15 | |

Splits and Phases: 1: Oak Meadow Dr. & S Royal Oaks



| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 28 | 1276 | 103 | 274 | 770 | 25 | 6 | 46 | 41 | 33 | 12 | 118 |
| Future Volume (vph) | 28 | 1276 | 103 | 274 | 770 | 25 | 6 | 46 | 41 | 33 | 12 | 118 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 12 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | | 1% | | | -2% | | | -1% | | | 2% | |
| Storage Length (ft) | 80 | | 135 | 220 | | 0 | 100 | | 0 | 120 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | 0.993 | | | 0.934 | | | 0.868 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1676 | 3438 | 1607 | 1787 | 3428 | 0 | 1754 | 1624 | 0 | 1787 | 1520 | 0 |
| Flt Permitted | 0.332 | | | 0.138 | | | 0.368 | | | 0.497 | | |
| Satd. Flow (perm) | 586 | 3438 | 1607 | 260 | 3428 | 0 | 679 | 1624 | 0 | 935 | 1520 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 82 | | 5 | | | 30 | | | 137 | |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1624 | | | 792 | | | 957 | | | 515 | |
| Travel Time (s) | | 36.9 | | | 18.0 | | | 21.8 | | | 11.7 | |
| Peak Hour Factor | 0.63 | 0.92 | 0.87 | 0.80 | 0.99 | 0.67 | 0.58 | 0.68 | 0.77 | 0.67 | 0.63 | 0.86 |
| Heavy Vehicles (%) | 0% | 1% | 0% | 2% | 2% | 4% | 0% | 11% | 0% | 0% | 10% | 3% |
| Adj. Flow (vph) | 44 | 1387 | 118 | 343 | 778 | 37 | 10 | 68 | 53 | 49 | 19 | 137 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 44 | 1387 | 118 | 343 | 815 | 0 | 10 | 121 | 0 | 49 | 156 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 0.99 | 1.03 | 0.99 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 1 | 0 | 1 | 1 | | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | 0 | 42 | 226 | | 42 | 42 | | 42 | 42 | |
| Trailing Detector (ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | 50 | 45 | 6 | | 45 | 45 | | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | D.Pm | NA | | D.Pm | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | | 4 | | | 8 | |
| Permitted Phases | 6 | | 6 | 2 | | | 8 | | | 4 | | |
| Detector Phase | 1 | 6 | | 5 | 2 | | 8 | 4 | | 4 | 8 | |
| Switch Phase | | | | | | | | | | | | |

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | |
| Minimum Split (s) | 17.0 | 73.0 | 73.0 | 17.0 | 73.0 | | 50.0 | 50.0 | | 50.0 | 50.0 | |
| Total Split (s) | 17.0 | 73.0 | 73.0 | 17.0 | 73.0 | | 50.0 | 50.0 | | 50.0 | 50.0 | |
| Total Split (%) | 12.1% | 52.1% | 52.1% | 12.1% | 52.1% | | 35.7% | 35.7% | | 35.7% | 35.7% | |
| Maximum Green (s) | 10.5 | 67.0 | 67.0 | 10.5 | 67.0 | | 43.0 | 43.0 | | 43.0 | 43.0 | |
| Yellow Time (s) | 3.0 | 3.5 | 3.5 | 3.0 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | 2.5 | 3.5 | 2.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | -3.0 | -1.0 | -3.0 | | -2.5 | -2.5 | | -2.5 | -2.5 | |
| Total Lost Time (s) | 5.5 | 3.0 | 3.0 | 5.5 | 3.0 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Recall Mode | None | C-Min | C-Min | None | C-Min | | None | None | | None | None | |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | | 8.0 | 8.0 | | 8.0 | 8.0 | |
| Flash Dont Walk (s) | | 16.0 | 16.0 | | 20.0 | | 35.0 | 32.0 | | 32.0 | 35.0 | |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 104.4 | 99.1 | 99.1 | 112.1 | 105.4 | | 16.4 | 16.4 | | 16.4 | 16.4 | |
| Actuated g/C Ratio | 0.75 | 0.71 | 0.71 | 0.80 | 0.75 | | 0.12 | 0.12 | | 0.12 | 0.12 | |
| v/c Ratio | 0.09 | 0.57 | 0.10 | 1.03 | 0.32 | | 0.13 | 0.56 | | 0.45 | 0.52 | |
| Control Delay | 3.9 | 11.7 | 2.9 | 80.0 | 6.7 | | 55.7 | 49.1 | | 69.1 | 18.2 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 3.9 | 11.7 | 2.9 | 80.0 | 6.7 | | 55.7 | 49.1 | | 69.1 | 18.2 | |
| LOS | A | B | A | F | A | | E | D | | E | B | |
| Approach Delay | | 10.8 | | | 28.4 | | | 49.6 | | | 30.4 | |
| Approach LOS | | B | | | C | | | D | | | C | |
| 90th %ile Green (s) | 7.7 | 89.8 | 89.8 | 10.5 | 92.6 | | 20.2 | 20.2 | | 20.2 | 20.2 | |
| 90th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 70th %ile Green (s) | 7.1 | 93.6 | 93.6 | 10.5 | 97.0 | | 16.4 | 16.4 | | 16.4 | 16.4 | |
| 70th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 50th %ile Green (s) | 6.7 | 96.1 | 96.1 | 10.5 | 99.9 | | 13.9 | 13.9 | | 13.9 | 13.9 | |
| 50th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 30th %ile Green (s) | 6.3 | 98.7 | 98.7 | 10.5 | 102.9 | | 11.3 | 11.3 | | 11.3 | 11.3 | |
| 30th %ile Term Code | Gap | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| 10th %ile Green (s) | 0.0 | 102.4 | 102.4 | 10.5 | 119.4 | | 7.6 | 7.6 | | 7.6 | 7.6 | |
| 10th %ile Term Code | Skip | Coord | Coord | Max | Coord | | Hold | Gap | | Gap | Hold | |
| Stops (vph) | 7 | 603 | 11 | 227 | 286 | | 7 | 68 | | 30 | 26 | |
| Fuel Used(gal) | 0 | 23 | 1 | 7 | 8 | | 0 | 2 | | 1 | 1 | |
| CO Emissions (g/hr) | 29 | 1574 | 100 | 518 | 529 | | 11 | 132 | | 53 | 80 | |
| NOx Emissions (g/hr) | 6 | 306 | 19 | 101 | 103 | | 2 | 26 | | 10 | 16 | |
| VOC Emissions (g/hr) | 7 | 365 | 23 | 120 | 123 | | 2 | 31 | | 12 | 19 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 6 | 296 | 9 | ~180 | 83 | | 9 | 82 | | 42 | 16 | |
| Queue Length 95th (ft) | 12 | 414 | 31 | m#181 | m343 | | 18 | 114 | | 60 | 21 | |
| Internal Link Dist (ft) | | 1544 | | | 712 | | | 877 | | | 435 | |
| Turn Bay Length (ft) | 80 | | 135 | 220 | | | 100 | | | 120 | | |
| Base Capacity (vph) | 542 | 2434 | 1161 | 333 | 2581 | | 220 | 548 | | 303 | 586 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.08 | 0.57 | 0.10 | 1.03 | 0.32 | | 0.05 | 0.22 | | 0.16 | 0.27 | |

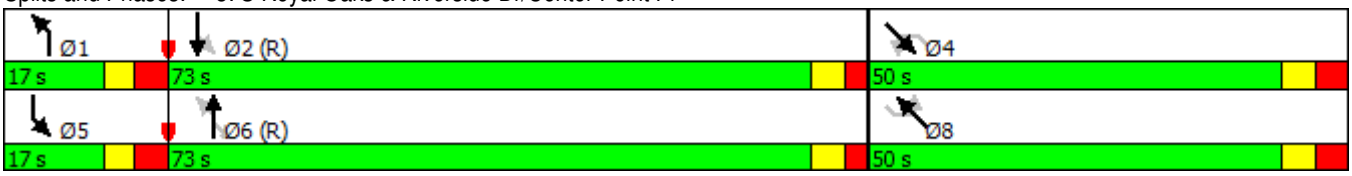
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 139 (99%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.03 | | | |
| Intersection Signal Delay: 20.5 | | Intersection LOS: C | |
| Intersection Capacity Utilization 70.6% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |

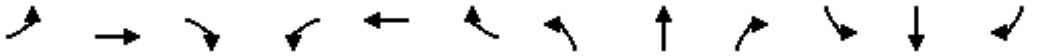
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

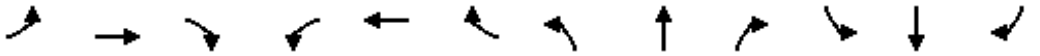
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: S Royal Oaks & Riverside Dr/Center Point Pl





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 112 | 772 | 60 | 850 | 993 | 281 | 99 | 272 | 1055 | 225 | 213 | 82 |
| Future Volume (vph) | 112 | 772 | 60 | 850 | 993 | 281 | 99 | 272 | 1055 | 225 | 213 | 82 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.988 | | | | 0.850 | | | 0.850 | | 0.961 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3241 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3241 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 10 | | | | 149 | | | | | 31 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 700 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 11.9 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.80 | 0.90 | 0.80 | 0.93 | 0.91 | 0.88 | 0.82 | 0.80 | 0.93 | 0.92 | 0.74 | 0.81 |
| Heavy Vehicles (%) | 3% | 6% | 2% | 3% | 6% | 3% | 4% | 2% | 2% | 2% | 4% | 2% |
| Adj. Flow (vph) | 140 | 858 | 75 | 914 | 1091 | 319 | 121 | 340 | 1134 | 245 | 288 | 101 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 140 | 933 | 0 | 914 | 1091 | 319 | 121 | 340 | 1134 | 245 | 389 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

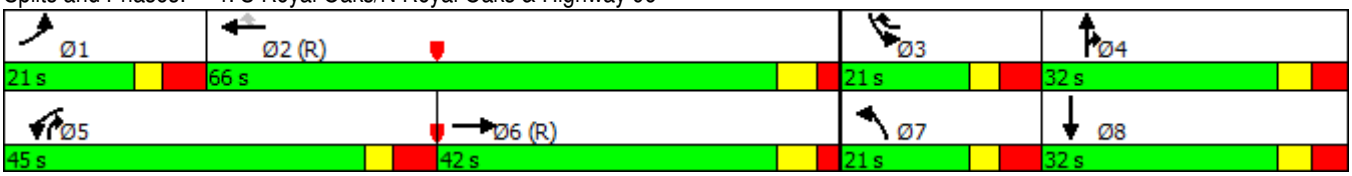


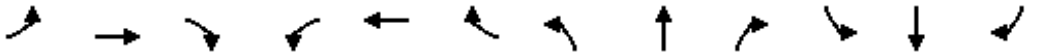
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (%) | 15.0% | 30.0% | | 32.1% | 47.1% | 15.0% | 15.0% | 22.9% | | 15.0% | 22.9% | |
| Maximum Green (s) | 13.5 | 35.5 | | 37.5 | 59.5 | 13.5 | 13.5 | 24.5 | | 13.5 | 24.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 13.5 | 38.4 | | 40.0 | 64.9 | 84.0 | 12.4 | 27.5 | 72.0 | 15.1 | 30.2 | |
| Actuated g/C Ratio | 0.10 | 0.27 | | 0.29 | 0.46 | 0.60 | 0.09 | 0.20 | 0.51 | 0.11 | 0.22 | |
| v/c Ratio | 0.43 | 0.72 | | 0.97 | 0.69 | 0.31 | 0.41 | 0.48 | 0.77 | 0.69 | 0.54 | |
| Control Delay | 76.9 | 41.3 | | 61.0 | 40.4 | 8.7 | 54.2 | 48.5 | 43.0 | 70.7 | 48.2 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 76.9 | 41.3 | | 61.0 | 40.4 | 8.7 | 54.2 | 48.5 | 43.0 | 70.7 | 48.2 | |
| LOS | E | D | | E | D | A | D | D | D | E | D | |
| Approach Delay | | 45.9 | | | 44.1 | | | 45.0 | | | 56.9 | |
| Approach LOS | | D | | | D | | | D | | | E | |
| 90th %ile Green (s) | 13.5 | 35.5 | | 37.5 | 59.5 | 13.5 | 13.3 | 24.5 | | 13.5 | 24.7 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 70th %ile Green (s) | 12.4 | 35.5 | | 37.5 | 60.6 | 13.5 | 11.6 | 24.5 | | 13.5 | 26.4 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 50th %ile Green (s) | 11.2 | 35.5 | | 37.5 | 61.8 | 13.5 | 10.4 | 24.5 | | 13.5 | 27.6 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 30th %ile Green (s) | 9.9 | 35.5 | | 37.5 | 63.1 | 13.5 | 9.2 | 24.5 | | 13.5 | 28.8 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 10th %ile Green (s) | 8.1 | 37.6 | | 37.5 | 67.0 | 11.4 | 7.5 | 24.5 | | 11.4 | 28.4 | |
| 10th %ile Term Code | Gap | Coord | | Max | Coord | Gap | Gap | Max | | Gap | Hold | |
| Stops (vph) | 110 | 736 | | 759 | 947 | 98 | 92 | 248 | 849 | 214 | 238 | |
| Fuel Used(gal) | 3 | 18 | | 25 | 25 | 4 | 2 | 6 | 20 | 6 | 6 | |
| CO Emissions (g/hr) | 235 | 1270 | | 1740 | 1782 | 261 | 155 | 401 | 1428 | 427 | 449 | |
| NOx Emissions (g/hr) | 46 | 247 | | 338 | 347 | 51 | 30 | 78 | 278 | 83 | 87 | |
| VOC Emissions (g/hr) | 55 | 294 | | 403 | 413 | 60 | 36 | 93 | 331 | 99 | 104 | |
| Dilemma Vehicles (#) | 0 | 28 | | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 69 | 284 | | 419 | 535 | 78 | 54 | 156 | 475 | 112 | 153 | |
| Queue Length 95th (ft) | 93 | 338 | | m#446 | m544 | m122 | 76 | 174 | 696 | 159 | 167 | |
| Internal Link Dist (ft) | | 620 | | | 611 | | | 712 | | | 884 | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 388 | 1293 | | 938 | 1578 | 1035 | 370 | 714 | 1473 | 367 | 723 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.36 | 0.72 | | 0.97 | 0.69 | 0.31 | 0.33 | 0.48 | 0.77 | 0.67 | 0.54 | |

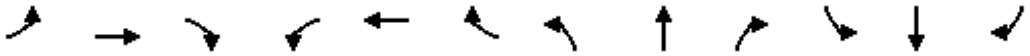
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 116 (83%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.97 | | | |
| Intersection Signal Delay: 46.1 | | Intersection LOS: D | |
| Intersection Capacity Utilization 71.7% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | |
| Queue shown is maximum after two cycles. | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 4: S Royal Oaks/N Royal Oaks & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 1786 | 196 | 111 | 1061 | 0 | 0 | 0 | 0 | 355 | 0 | 1039 |
| Future Volume (vph) | 0 | 1786 | 196 | 111 | 1061 | 0 | 0 | 0 | 0 | 355 | 0 | 1039 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 184 | | | | | | | | | 115 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.91 | 0.90 | 0.86 | 0.87 | 1.00 | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 |
| Heavy Vehicles (%) | 2% | 3% | 7% | 1% | 3% | 2% | 2% | 2% | 2% | 6% | 2% | 3% |
| Adj. Flow (vph) | 0 | 1963 | 218 | 129 | 1220 | 0 | 0 | 0 | 0 | 418 | 0 | 1105 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 1963 | 218 | 129 | 1220 | 0 | 0 | 0 | 0 | 418 | 0 | 1105 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (%) | | 44.3% | 44.3% | 16.4% | 60.7% | | | | | 39.3% | | 39.3% |
| Maximum Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 60.5 | 60.5 | 15.5 | 81.0 | | | | | 49.5 | | 49.5 |
| Actuated g/C Ratio | | 0.43 | 0.43 | 0.11 | 0.58 | | | | | 0.35 | | 0.35 |
| v/c Ratio | | 0.72 | 0.29 | 0.65 | 0.62 | | | | | 0.36 | | 1.09 |
| Control Delay | | 26.6 | 4.9 | 71.8 | 19.3 | | | | | 34.6 | | 94.9 |
| Queue Delay | | 0.8 | 0.0 | 0.0 | 0.3 | | | | | 2.1 | | 0.0 |
| Total Delay | | 27.3 | 4.9 | 71.8 | 19.5 | | | | | 36.7 | | 94.9 |
| LOS | | C | A | E | B | | | | | D | | F |
| Approach Delay | | 25.1 | | | 24.5 | | | | | | | |
| Approach LOS | | C | | | C | | | | | | | |
| 90th %ile Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| 90th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 70th %ile Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| 70th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 50th %ile Green (s) | | 57.6 | 57.6 | 15.4 | 79.0 | | | | | 47.5 | | 47.5 |
| 50th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| 30th %ile Green (s) | | 59.8 | 59.8 | 13.2 | 79.0 | | | | | 47.5 | | 47.5 |
| 30th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| 10th %ile Green (s) | | 63.2 | 63.2 | 9.8 | 79.0 | | | | | 47.5 | | 47.5 |
| 10th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| Stops (vph) | | 1114 | 37 | 111 | 497 | | | | | 256 | | 836 |
| Fuel Used(gal) | | 35 | 2 | 3 | 13 | | | | | 6 | | 31 |
| CO Emissions (g/hr) | | 2450 | 150 | 219 | 912 | | | | | 431 | | 2177 |
| NOx Emissions (g/hr) | | 477 | 29 | 43 | 177 | | | | | 84 | | 423 |
| VOC Emissions (g/hr) | | 568 | 35 | 51 | 211 | | | | | 100 | | 504 |
| Dilemma Vehicles (#) | | 50 | 0 | 0 | 34 | | | | | 0 | | 0 |
| Queue Length 50th (ft) | | 324 | 26 | 124 | 283 | | | | | 144 | | ~602 |
| Queue Length 95th (ft) | | 406 | m47 | m164 | m297 | | | | | 178 | | #754 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2743 | 756 | 229 | 1960 | | | | | 1162 | | 1012 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 215 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 420 | 0 | 0 | 0 | | | | | 581 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.85 | 0.29 | 0.56 | 0.70 | | | | | 0.72 | | 1.09 |

Intersection Summary

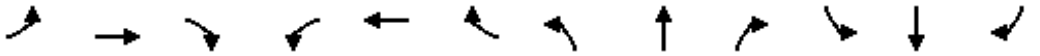
| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 106 (76%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.09 | | | |
| Intersection Signal Delay: 41.2 | | Intersection LOS: D | |
| Intersection Capacity Utilization 108.6% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

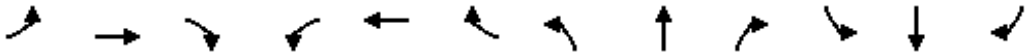
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Ent ramp to I-65/Exit ramp from I-65 & Highway 96



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1382 | 759 | 0 | 0 | 764 | 1217 | 408 | 0 | 364 | 0 | 0 | 0 |
| Future Volume (vph) | 1382 | 759 | 0 | 0 | 764 | 1217 | 408 | 0 | 364 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 23 | | | 252 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 311 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 5.3 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.88 | 0.86 | 0.95 | 1.00 | 0.95 | 0.98 | 0.95 | 0.25 | 0.92 | 1.00 | 1.00 | 0.95 |
| Heavy Vehicles (%) | 2% | 5% | 2% | 2% | 2% | 1% | 2% | 0% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 1570 | 883 | 0 | 0 | 804 | 1242 | 429 | 0 | 396 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 1570 | 883 | 0 | 0 | 804 | 1242 | 429 | 0 | 396 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (%) | 40.0% | 82.9% | | | 42.9% | | 17.1% | | 17.1% | | | |
| Maximum Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 50.0 | 110.0 | | | 53.5 | 79.5 | 16.5 | | 16.5 | | | |
| Actuated g/C Ratio | 0.36 | 0.79 | | | 0.38 | 0.57 | 0.12 | | 0.12 | | | |
| v/c Ratio | 1.33 | 0.34 | | | 0.59 | 0.77 | 1.10 | | 0.96 | | | |
| Control Delay | 204.9 | 3.4 | | | 36.8 | 27.0 | 131.8 | | 56.6 | | | |
| Queue Delay | 0.7 | 0.1 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 205.5 | 3.5 | | | 36.8 | 27.0 | 131.8 | | 56.6 | | | |
| LOS | F | A | | | D | C | F | | E | | | |
| Approach Delay | | 132.8 | | | 30.8 | | | | | | | |
| Approach LOS | | F | | | C | | | | | | | |
| 90th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 90th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 70th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 70th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 50th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 50th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 30th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 30th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 10th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 10th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| Stops (vph) | 1007 | 107 | | | 597 | 899 | 350 | | 119 | | | |
| Fuel Used(gal) | 73 | 4 | | | 13 | 18 | 15 | | 7 | | | |
| CO Emissions (g/hr) | 5085 | 310 | | | 923 | 1264 | 1025 | | 474 | | | |
| NOx Emissions (g/hr) | 989 | 60 | | | 180 | 246 | 200 | | 92 | | | |
| VOC Emissions (g/hr) | 1179 | 72 | | | 214 | 293 | 238 | | 110 | | | |
| Dilemma Vehicles (#) | 0 | 18 | | | 27 | 0 | 0 | | 0 | | | |
| Queue Length 50th (ft) | ~952 | 67 | | | 306 | 468 | ~228 | | 142 | | | |
| Queue Length 95th (ft) | #1078 | 75 | | | 375 | 573 | #338 | | #351 | | | |
| Internal Link Dist (ft) | | 476 | | | 231 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1179 | 2598 | | | 1352 | 1607 | 389 | | 414 | | | |
| Starvation Cap Reductn | 163 | 623 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 1.55 | 0.45 | | | 0.59 | 0.77 | 1.10 | | 0.96 | | | |

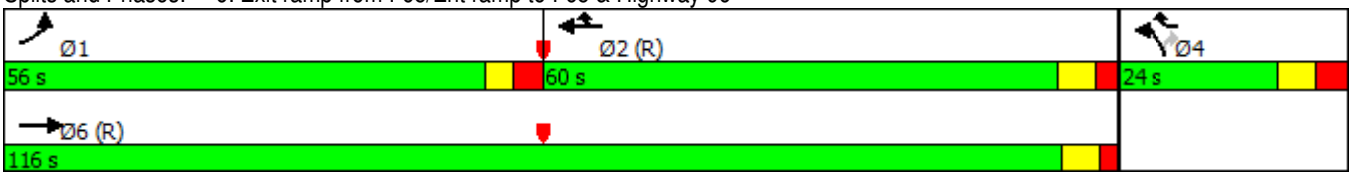
Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 122 (87%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.33 | | | |
| Intersection Signal Delay: 87.9 | | Intersection LOS: F | |
| Intersection Capacity Utilization 108.6% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 92 | 827 | 45 | 147 | 56 | 118 | 114 | 38 | 121 | 191 | 765 | 145 |
| Future Volume (vph) | 92 | 827 | 45 | 147 | 56 | 118 | 114 | 38 | 121 | 191 | 765 | 145 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 3 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | | 0.850 | | 0.906 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.950 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 3319 | 1531 | 1711 | 1631 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.083 | 0.950 | | 0.704 | | | 0.285 | | | 0.252 | | |
| Satd. Flow (perm) | 134 | 3319 | 1531 | 1268 | 1631 | 0 | 531 | 1925 | 1583 | 469 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 132 | | 68 | | | | 132 | | 132 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 552 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 12.5 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 137 | 880 | 71 | 186 | 97 | 162 | 152 | 66 | 132 | 255 | 1020 | 210 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 137 | 880 | 71 | 186 | 259 | 0 | 152 | 66 | 132 | 255 | 1230 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 30 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | 42 | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | -3 | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | 45 | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | Perm | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | 6 | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | 20.0 | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 18.0 | 57.0 | 57.0 | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 18.0 | 57.0 | 57.0 | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |
| Total Split (%) | 15.0% | 47.5% | 47.5% | 11.7% | 29.2% | | 11.7% | 29.2% | 11.7% | 11.7% | 44.2% | |
| Maximum Green (s) | 12.0 | 51.0 | 51.0 | 8.5 | 29.0 | | 8.5 | 29.0 | 8.0 | 8.0 | 47.0 | |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | -1.5 | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | 4.5 | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | 5.0 | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | C-Min | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 74.5 | 61.4 | 61.4 | 34.8 | 22.9 | | 34.2 | 21.9 | 36.8 | 70.9 | 59.5 | |
| Actuated g/C Ratio | 0.62 | 0.51 | 0.51 | 0.29 | 0.19 | | 0.28 | 0.18 | 0.31 | 0.59 | 0.50 | |
| v/c Ratio | 0.61 | 0.52 | 0.08 | 0.44 | 0.71 | | 0.58 | 0.19 | 0.23 | 0.65 | 0.85 | |
| Control Delay | 29.2 | 22.0 | 0.2 | 34.6 | 43.2 | | 39.1 | 39.7 | 5.3 | 20.8 | 31.8 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 29.2 | 22.0 | 0.2 | 34.6 | 43.2 | | 39.1 | 39.7 | 5.3 | 20.8 | 31.8 | |
| LOS | C | C | A | C | D | | D | D | A | C | C | |
| Approach Delay | | 21.5 | | | 39.6 | | | 26.5 | | 29.9 | | |
| Approach LOS | | C | | | D | | | C | | C | | |
| 90th %ile Green (s) | 12.0 | 51.3 | 51.3 | 8.5 | 28.7 | | 8.5 | 28.7 | 8.0 | 8.0 | 47.3 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 70th %ile Green (s) | 12.0 | 56.1 | 56.1 | 8.5 | 23.9 | | 8.5 | 23.9 | 8.0 | 8.0 | 52.1 | |
| 70th %ile Term Code | Max | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 50th %ile Green (s) | 10.3 | 59.6 | 59.6 | 8.5 | 20.4 | | 8.5 | 20.4 | 8.0 | 8.0 | 57.3 | |
| 50th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 30th %ile Green (s) | 7.7 | 63.0 | 63.0 | 8.5 | 17.0 | | 8.5 | 17.0 | 8.0 | 8.0 | 63.3 | |
| 30th %ile Term Code | Gap | Coord | Coord | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 10th %ile Green (s) | 7.0 | 69.4 | 69.4 | 25.5 | 11.9 | | 7.6 | 0.0 | 7.6 | 7.6 | 70.0 | |
| 10th %ile Term Code | Min | Coord | Coord | Hold | Gap | | Gap | Skip | Gap | Gap | Coord | |
| Stops (vph) | 47 | 542 | 0 | 112 | 120 | | 84 | 31 | 14 | 89 | 658 | |
| Fuel Used(gal) | 1 | 10 | 0 | 2 | 3 | | 2 | 1 | 1 | 4 | 21 | |
| CO Emissions (g/hr) | 84 | 717 | 14 | 165 | 215 | | 171 | 59 | 71 | 260 | 1472 | |
| NOx Emissions (g/hr) | 16 | 139 | 3 | 32 | 42 | | 33 | 12 | 14 | 51 | 286 | |
| VOC Emissions (g/hr) | 19 | 166 | 3 | 38 | 50 | | 40 | 14 | 17 | 60 | 341 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 2 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 42 | 226 | 0 | 111 | 140 | | 88 | 43 | 0 | 78 | 422 | |
| Queue Length 95th (ft) | 70 | 328 | 0 | 135 | 108 | | 105 | 49 | 40 | 116 | 447 | |
| Internal Link Dist (ft) | | 472 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | 150 | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 254 | 1697 | 847 | 421 | 478 | | 265 | 505 | 578 | 391 | 1448 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.54 | 0.52 | 0.08 | 0.44 | 0.54 | | 0.57 | 0.13 | 0.23 | 0.65 | 0.85 | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 120 | |

| | |
|---|---|
| Actuated Cycle Length: 120 | |
| Offset: 117 (98%), Referenced to phase 2:SWL and 6:EBL, Start of Green | |
| Natural Cycle: 120 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.85 | |
| Intersection Signal Delay: 28.1 | Intersection LOS: C |
| Intersection Capacity Utilization 64.4% | ICU Level of Service C |
| Analysis Period (min) 15 | |

Splits and Phases: 1: Oak Meadow Dr. & S Royal Oaks

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 90 | 1103 | 27 | 263 | 1126 | 93 | 83 | 64 | 123 | 46 | 58 | 300 |
| Future Volume (vph) | 90 | 1103 | 27 | 263 | 1126 | 93 | 83 | 64 | 123 | 46 | 58 | 300 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 12 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | | 1% | | | -2% | | | -1% | | | 2% | |
| Storage Length (ft) | 80 | | 135 | 220 | | 0 | 100 | | 0 | 120 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | 0.850 | | 0.987 | | | 0.906 | | | 0.876 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1676 | 3438 | 1575 | 1805 | 3447 | 0 | 1736 | 1672 | 0 | 1752 | 1593 | 0 |
| Flt Permitted | 0.138 | | | 0.121 | | | 0.168 | | | 0.405 | | |
| Satd. Flow (perm) | 243 | 3438 | 1575 | 230 | 3447 | 0 | 307 | 1672 | 0 | 747 | 1593 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 124 | | 11 | | | 57 | | | 165 | |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1624 | | | 792 | | | 957 | | | 515 | |
| Travel Time (s) | | 36.9 | | | 18.0 | | | 21.8 | | | 11.7 | |
| Peak Hour Factor | 0.79 | 0.95 | 0.64 | 0.75 | 0.90 | 0.76 | 0.86 | 0.71 | 0.82 | 0.75 | 0.88 | 0.94 |
| Heavy Vehicles (%) | 0% | 1% | 2% | 1% | 1% | 0% | 1% | 0% | 0% | 2% | 0% | 0% |
| Adj. Flow (vph) | 114 | 1161 | 42 | 351 | 1251 | 122 | 97 | 90 | 150 | 61 | 66 | 319 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 114 | 1161 | 42 | 351 | 1373 | 0 | 97 | 240 | 0 | 61 | 385 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 0.99 | 1.03 | 0.99 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 1 | 0 | 1 | 1 | | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | 0 | 42 | 226 | | 42 | 42 | | 42 | 42 | |
| Trailing Detector (ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 220 | 0 | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | 50 | 45 | 6 | | 45 | 45 | | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | D.Pm | NA | | D.Pm | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | | 4 | | | 8 | |
| Permitted Phases | 6 | | 6 | 2 | | | 8 | | | 4 | | |
| Detector Phase | 1 | 6 | | 5 | 2 | | 8 | 4 | | 4 | 8 | |
| Switch Phase | | | | | | | | | | | | |

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | 10.0 | 5.0 | 10.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | |
| Minimum Split (s) | 15.0 | 70.0 | 70.0 | 30.0 | 85.0 | | 50.0 | 50.0 | | 50.0 | 50.0 | |
| Total Split (s) | 14.0 | 72.0 | 72.0 | 29.0 | 87.0 | | 49.0 | 49.0 | | 49.0 | 49.0 | |
| Total Split (%) | 9.3% | 48.0% | 48.0% | 19.3% | 58.0% | | 32.7% | 32.7% | | 32.7% | 32.7% | |
| Maximum Green (s) | 7.5 | 66.0 | 66.0 | 22.5 | 81.0 | | 42.0 | 42.0 | | 42.0 | 42.0 | |
| Yellow Time (s) | 3.0 | 3.5 | 3.5 | 3.0 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | 2.5 | 3.5 | 2.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | -3.0 | -1.0 | -3.0 | | -2.5 | -2.5 | | -2.5 | -2.5 | |
| Total Lost Time (s) | 5.5 | 3.0 | 3.0 | 5.5 | 3.0 | | 4.5 | 4.5 | | 4.5 | 4.5 | |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| Recall Mode | None | C-Min | C-Min | None | C-Min | | None | None | | None | None | |
| Walk Time (s) | | 7.0 | 7.0 | | 7.0 | | 8.0 | 8.0 | | 8.0 | 8.0 | |
| Flash Dont Walk (s) | | 16.0 | 16.0 | | 20.0 | | 35.0 | 32.0 | | 32.0 | 35.0 | |
| Pedestrian Calls (#/hr) | | 0 | 0 | | 0 | | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 82.2 | 76.3 | 76.3 | 102.1 | 90.7 | | 37.9 | 37.9 | | 37.9 | 37.9 | |
| Actuated g/C Ratio | 0.55 | 0.51 | 0.51 | 0.68 | 0.60 | | 0.25 | 0.25 | | 0.25 | 0.25 | |
| v/c Ratio | 0.54 | 0.66 | 0.05 | 0.89 | 0.66 | | 1.26 | 0.52 | | 0.32 | 0.73 | |
| Control Delay | 22.5 | 31.3 | 0.1 | 50.6 | 9.5 | | 225.4 | 33.3 | | 48.0 | 36.4 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 22.5 | 31.3 | 0.1 | 50.6 | 11.9 | | 225.4 | 33.3 | | 48.0 | 36.4 | |
| LOS | C | C | A | D | B | | F | C | | D | D | |
| Approach Delay | | 29.5 | | | 19.8 | | | 88.6 | | | 38.0 | |
| Approach LOS | | C | | | B | | | F | | | D | |
| 90th %ile Green (s) | 7.5 | 66.0 | 66.0 | 22.5 | 81.0 | | 42.0 | 42.0 | | 42.0 | 42.0 | |
| 90th %ile Term Code | Max | Coord | Coord | Max | Coord | | Max | Hold | | Hold | Max | |
| 70th %ile Green (s) | 7.5 | 66.0 | 66.0 | 22.5 | 81.0 | | 42.0 | 42.0 | | 42.0 | 42.0 | |
| 70th %ile Term Code | Max | Coord | Coord | Max | Coord | | Max | Hold | | Hold | Max | |
| 50th %ile Green (s) | 7.5 | 67.5 | 67.5 | 22.5 | 82.5 | | 40.5 | 40.5 | | 40.5 | 40.5 | |
| 50th %ile Term Code | Max | Coord | Coord | Max | Coord | | Gap | Hold | | Hold | Gap | |
| 30th %ile Green (s) | 7.5 | 75.6 | 75.6 | 22.5 | 90.6 | | 32.4 | 32.4 | | 32.4 | 32.4 | |
| 30th %ile Term Code | Max | Coord | Coord | Max | Coord | | Gap | Hold | | Hold | Gap | |
| 10th %ile Green (s) | 6.9 | 91.3 | 91.3 | 19.2 | 103.6 | | 20.0 | 20.0 | | 20.0 | 20.0 | |
| 10th %ile Term Code | Gap | Coord | Coord | Gap | Coord | | Gap | Hold | | Hold | Gap | |
| Stops (vph) | 43 | 813 | 0 | 282 | 618 | | 68 | 125 | | 35 | 193 | |
| Fuel Used(gal) | 2 | 25 | 0 | 6 | 13 | | 5 | 3 | | 1 | 5 | |
| CO Emissions (g/hr) | 125 | 1781 | 24 | 412 | 929 | | 336 | 234 | | 58 | 360 | |
| NOx Emissions (g/hr) | 24 | 347 | 5 | 80 | 181 | | 65 | 46 | | 11 | 70 | |
| VOC Emissions (g/hr) | 29 | 413 | 6 | 95 | 215 | | 78 | 54 | | 13 | 84 | |
| Dilemma Vehicles (#) | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 40 | 471 | 0 | 205 | 162 | | ~107 | 158 | | 47 | 194 | |
| Queue Length 95th (ft) | 59 | 567 | 0 | m133 | m599 | | #217 | 176 | | 74 | 300 | |
| Internal Link Dist (ft) | | 1544 | | | 712 | | | 877 | | | 435 | |
| Turn Bay Length (ft) | 80 | | 135 | 220 | | | 100 | | | 120 | | |
| Base Capacity (vph) | 214 | 1748 | 861 | 403 | 2089 | | 91 | 536 | | 221 | 588 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 562 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 | |

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.53 | 0.66 | 0.05 | 0.87 | 0.90 | | 1.07 | 0.45 | | 0.28 | 0.65 | |

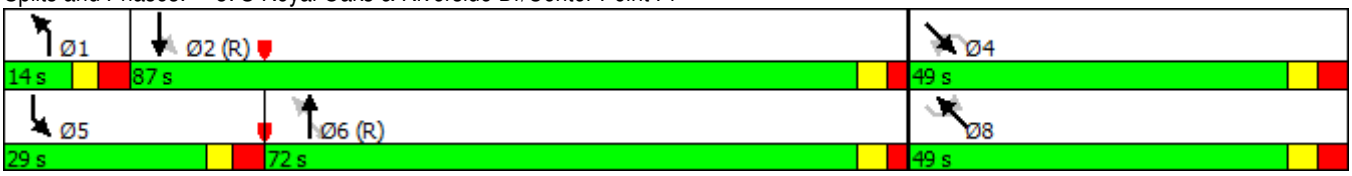
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 123 (82%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.26 | | | |
| Intersection Signal Delay: 31.3 | | Intersection LOS: C | |
| Intersection Capacity Utilization 87.9% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

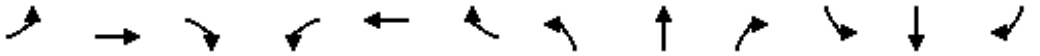
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

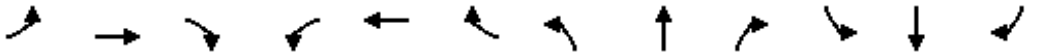
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: S Royal Oaks & Riverside Dr/Center Point Pl





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 206 | 1108 | 63 | 976 | 1174 | 269 | 141 | 368 | 999 | 316 | 465 | 178 |
| Future Volume (vph) | 206 | 1108 | 63 | 976 | 1174 | 269 | 141 | 368 | 999 | 316 | 465 | 178 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.991 | | | | 0.850 | | | 0.850 | | 0.953 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3326 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3326 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 7 | | | | 87 | | | | | 44 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 700 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 11.9 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.92 | 0.93 | 0.81 | 0.87 | 0.91 | 0.89 | 0.74 | 0.83 | 0.89 | 0.83 | 0.95 | 0.80 |
| Heavy Vehicles (%) | 1% | 1% | 0% | 1% | 2% | 1% | 0% | 0% | 1% | 0% | 0% | 0% |
| Adj. Flow (vph) | 224 | 1191 | 78 | 1122 | 1290 | 302 | 191 | 443 | 1122 | 381 | 489 | 223 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 224 | 1269 | 0 | 1122 | 1290 | 302 | 191 | 443 | 1122 | 381 | 712 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

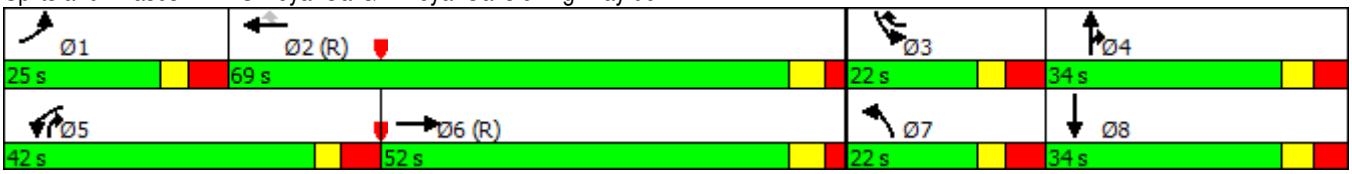


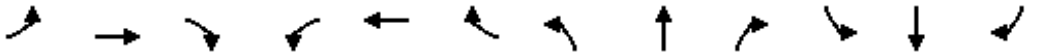
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (%) | 16.7% | 34.7% | | 28.0% | 46.0% | 14.7% | 14.7% | 22.7% | | 14.7% | 22.7% | |
| Maximum Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 17.3 | 48.0 | | 37.0 | 67.7 | 88.2 | 14.9 | 29.5 | 71.0 | 16.5 | 31.1 | |
| Actuated g/C Ratio | 0.12 | 0.32 | | 0.25 | 0.45 | 0.59 | 0.10 | 0.20 | 0.47 | 0.11 | 0.21 | |
| v/c Ratio | 0.56 | 0.80 | | 1.36 | 0.81 | 0.30 | 0.55 | 0.61 | 0.82 | 1.02 | 0.98 | |
| Control Delay | 68.7 | 44.7 | | 200.8 | 49.2 | 16.6 | 58.5 | 59.9 | 52.2 | 117.0 | 84.1 | |
| Queue Delay | 0.0 | 0.3 | | 0.3 | 0.6 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.5 | |
| Total Delay | 68.7 | 45.0 | | 201.1 | 49.8 | 16.6 | 58.6 | 59.9 | 52.3 | 117.0 | 84.6 | |
| LOS | E | D | | F | D | B | E | E | D | F | F | |
| Approach Delay | | 48.6 | | | 108.6 | | | 54.9 | | | 95.9 | |
| Approach LOS | | D | | | F | | | D | | | F | |
| 90th %ile Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | Max | Max | Max | | Max | Max | |
| 70th %ile Green (s) | 16.7 | 45.5 | | 34.5 | 63.3 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | Max | Max | Max | | Max | Max | |
| 50th %ile Green (s) | 15.1 | 45.5 | | 34.5 | 64.9 | 14.5 | 13.5 | 26.5 | | 14.5 | 27.5 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 30th %ile Green (s) | 13.4 | 45.5 | | 34.5 | 66.6 | 14.5 | 12.0 | 26.5 | | 14.5 | 29.0 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 10th %ile Green (s) | 11.1 | 45.5 | | 34.5 | 68.9 | 14.5 | 9.8 | 26.5 | | 14.5 | 31.2 | |
| 10th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| Stops (vph) | 191 | 938 | | 759 | 1064 | 208 | 133 | 346 | 815 | 280 | 539 | |
| Fuel Used(gal) | 6 | 25 | | 55 | 32 | 5 | 3 | 9 | 21 | 11 | 19 | |
| CO Emissions (g/hr) | 401 | 1778 | | 3861 | 2216 | 359 | 230 | 606 | 1488 | 800 | 1315 | |
| NOx Emissions (g/hr) | 78 | 346 | | 751 | 431 | 70 | 45 | 118 | 289 | 156 | 256 | |
| VOC Emissions (g/hr) | 93 | 412 | | 895 | 514 | 83 | 53 | 140 | 345 | 185 | 305 | |
| Dilemma Vehicles (#) | 0 | 44 | | 0 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 107 | 316 | | ~759 | 580 | 139 | 94 | 228 | 581 | ~203 | ~352 | |
| Queue Length 95th (ft) | 155 | 368 | | m#567 | m517 | m125 | m105 | m249 | m716 | #272 | #505 | |
| Internal Link Dist (ft) | | 620 | | | 611 | | | 712 | | | 884 | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 462 | 1580 | | 826 | 1598 | 1007 | 383 | 730 | 1369 | 372 | 725 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 48 | | 46 | 84 | 0 | 10 | 0 | 0 | 0 | 2 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.48 | 0.83 | | 1.44 | 0.85 | 0.30 | 0.51 | 0.61 | 0.83 | 1.02 | 0.98 | |

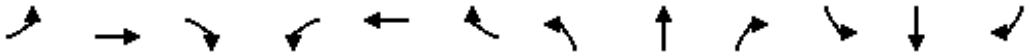
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 133 (89%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.36 | | | |
| Intersection Signal Delay: 80.6 | | Intersection LOS: F | |
| Intersection Capacity Utilization 90.0% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |
| ~ Volume exceeds capacity, queue is theoretically infinite. | | | |
| Queue shown is maximum after two cycles. | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | |
| Queue shown is maximum after two cycles. | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 4: S Royal Oaks/N Royal Oaks & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 2002 | 488 | 285 | 925 | 0 | 0 | 0 | 0 | 914 | 0 | 1449 |
| Future Volume (vph) | 0 | 2002 | 488 | 285 | 925 | 0 | 0 | 0 | 0 | 914 | 0 | 1449 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 400 | | | | | | | | | 135 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.93 | 0.78 | 0.71 | 0.86 | 1.00 | 1.00 | 1.00 | 1.00 | 0.87 | 1.00 | 0.88 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 1% | 1% | 2% | 2% | 2% | 2% | 1% | 2% | 1% |
| Adj. Flow (vph) | 0 | 2153 | 626 | 401 | 1076 | 0 | 0 | 0 | 0 | 1051 | 0 | 1647 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 2153 | 626 | 401 | 1076 | 0 | 0 | 0 | 0 | 1051 | 0 | 1647 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (%) | | 36.7% | 36.7% | 20.0% | 56.7% | | | | | 43.3% | | 43.3% |
| Maximum Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 51.0 | 51.0 | 25.0 | 81.0 | | | | | 59.5 | | 59.5 |
| Actuated g/C Ratio | | 0.34 | 0.34 | 0.17 | 0.54 | | | | | 0.40 | | 0.40 |
| v/c Ratio | | 0.99 | 0.78 | 1.35 | 0.58 | | | | | 0.77 | | 1.43 |
| Control Delay | | 71.6 | 30.4 | 226.4 | 26.5 | | | | | 43.9 | | 229.0 |
| Queue Delay | | 1.3 | 0.0 | 0.0 | 0.9 | | | | | 1.8 | | 0.0 |
| Total Delay | | 72.9 | 30.4 | 226.4 | 27.4 | | | | | 45.7 | | 229.0 |
| LOS | | E | C | F | C | | | | | D | | F |
| Approach Delay | | 63.3 | | | 81.4 | | | | | | | |
| Approach LOS | | E | | | F | | | | | | | |
| 90th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 90th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 70th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 70th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 50th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 50th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 30th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 30th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 10th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 10th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| Stops (vph) | | 1873 | 465 | 222 | 498 | | | | | 776 | | 998 |
| Fuel Used(gal) | | 64 | 12 | 16 | 13 | | | | | 18 | | 82 |
| CO Emissions (g/hr) | | 4459 | 807 | 1146 | 935 | | | | | 1262 | | 5755 |
| NOx Emissions (g/hr) | | 868 | 157 | 223 | 182 | | | | | 246 | | 1120 |
| VOC Emissions (g/hr) | | 1033 | 187 | 266 | 217 | | | | | 292 | | 1334 |
| Dilemma Vehicles (#) | | 105 | 0 | 0 | 51 | | | | | 0 | | 0 |
| Queue Length 50th (ft) | | 634 | 325 | ~525 | 287 | | | | | 457 | | ~1192 |
| Queue Length 95th (ft) | | m#692 | m295 | #521 | 430 | | | | | 515 | | #1297 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2178 | 802 | 297 | 1865 | | | | | 1368 | | 1155 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 464 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 14 | 0 | 0 | 0 | | | | | 172 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.99 | 0.78 | 1.35 | 0.77 | | | | | 0.88 | | 1.43 |

Intersection Summary

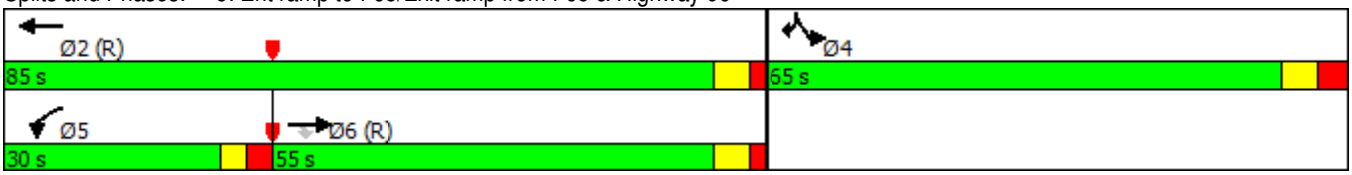
| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 104 (69%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.43 | | | |
| Intersection Signal Delay: 103.7 | | Intersection LOS: F | |
| Intersection Capacity Utilization 84.9% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

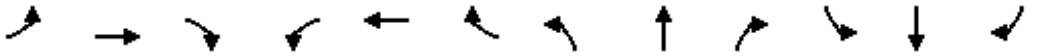
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

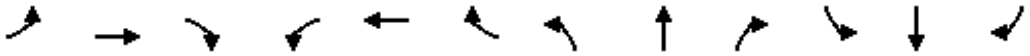
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Ent ramp to I-65/Exit ramp from I-65 & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 619 | 2297 | 0 | 0 | 895 | 998 | 315 | 0 | 164 | 0 | 0 | 0 |
| Future Volume (vph) | 619 | 2297 | 0 | 0 | 895 | 998 | 315 | 0 | 164 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 226 | | | 69 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 1845 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 31.4 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.97 | 0.98 | 1.00 | 0.25 | 0.91 | 0.93 | 0.92 | 1.00 | 0.87 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 3% | 3% | 2% | 0% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 2% |
| Adj. Flow (vph) | 638 | 2344 | 0 | 0 | 984 | 1073 | 342 | 0 | 189 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 638 | 2344 | 0 | 0 | 984 | 1073 | 342 | 0 | 189 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |

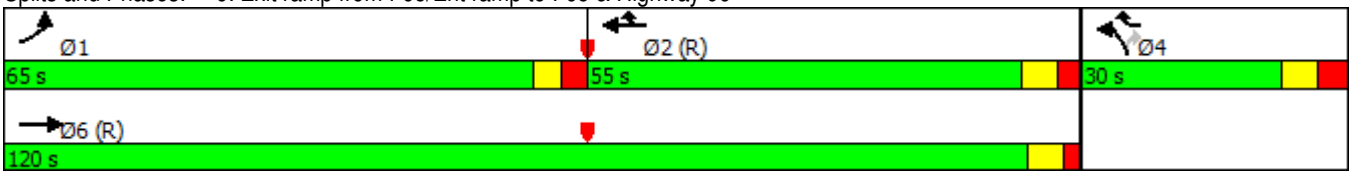


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (%) | 43.3% | 80.0% | | | 36.7% | | 20.0% | | 20.0% | | | |
| Maximum Green (s) | 59.0 | 114.0 | | | 48.5 | | 22.5 | | 22.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 37.2 | 114.6 | | | 70.9 | 102.3 | 21.9 | | 21.9 | | | |
| Actuated g/C Ratio | 0.25 | 0.76 | | | 0.47 | 0.68 | 0.15 | | 0.15 | | | |
| v/c Ratio | 0.79 | 0.91 | | | 0.59 | 0.54 | 0.71 | | 0.65 | | | |
| Control Delay | 79.7 | 23.9 | | | 31.8 | 10.9 | 69.9 | | 48.9 | | | |
| Queue Delay | 0.0 | 5.4 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 79.7 | 29.3 | | | 31.8 | 10.9 | 69.9 | | 48.9 | | | |
| LOS | E | C | | | C | B | E | | D | | | |
| Approach Delay | | 40.1 | | | 20.9 | | | | | | | |
| Approach LOS | | D | | | C | | | | | | | |
| 90th %ile Green (s) | 45.2 | 114.0 | | | 62.3 | | 22.5 | | 22.5 | | | |
| 90th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 70th %ile Green (s) | 40.9 | 114.0 | | | 66.6 | | 22.5 | | 22.5 | | | |
| 70th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 50th %ile Green (s) | 37.2 | 114.0 | | | 70.3 | | 22.5 | | 22.5 | | | |
| 50th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 30th %ile Green (s) | 34.1 | 114.0 | | | 73.4 | | 22.5 | | 22.5 | | | |
| 30th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 10th %ile Green (s) | 28.8 | 117.2 | | | 81.9 | | 19.3 | | 19.3 | | | |
| 10th %ile Term Code | Gap | Coord | | | Coord | | Gap | | Gap | | | |
| Stops (vph) | 610 | 1847 | | | 646 | 395 | 295 | | 100 | | | |
| Fuel Used(gal) | 18 | 38 | | | 23 | 19 | 7 | | 3 | | | |
| CO Emissions (g/hr) | 1284 | 2656 | | | 1632 | 1299 | 521 | | 208 | | | |
| NOx Emissions (g/hr) | 250 | 517 | | | 317 | 253 | 101 | | 40 | | | |
| VOC Emissions (g/hr) | 298 | 615 | | | 378 | 301 | 121 | | 48 | | | |
| Dilemma Vehicles (#) | 0 | 83 | | | 30 | 0 | 0 | | 0 | | | |
| Queue Length 50th (ft) | 342 | 589 | | | 366 | 218 | 165 | | 112 | | | |
| Queue Length 95th (ft) | m344 | m499 | | | 485 | 327 | 222 | | 190 | | | |
| Internal Link Dist (ft) | | 476 | | | 1765 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1286 | 2575 | | | 1672 | 1982 | 495 | | 298 | | | |
| Starvation Cap Reductn | 0 | 199 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 0.50 | 0.99 | | | 0.59 | 0.54 | 0.69 | | 0.63 | | | |

Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 138 (92%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.91 | | | |
| Intersection Signal Delay: 35.1 | | Intersection LOS: D | |
| Intersection Capacity Utilization 84.9% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 6: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



# HCS 2010 Two-Way Stop Control Summary Report

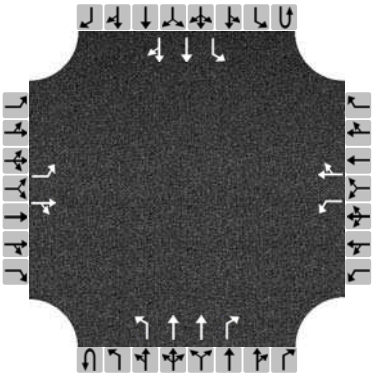
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | May 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | S. Royal Oaks and Rand |
| Jurisdiction | Franklin, TN |
| East/West Street | Rand Pl / Home Depot |
| North/South Street | S. Royal Oaks Blvd |
| Peak Hour Factor | 0.97 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 1 | 1 | 0 | | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 2 | 0 |
| Configuration | | L | | TR | | L | | TR | | L | T | R | | L | T | TR |
| Volume (veh/h) | | 26 | 1 | 9 | | 14 | 0 | 36 | | 10 | 1447 | 25 | | 64 | 665 | 51 |
| Percent Heavy Vehicles | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left + Thru | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 27 | | 10 | | 14 | | 37 | | 10 | | | | 66 | | |
| Capacity | | 148 | | 392 | | 99 | | 361 | | 877 | | | | 446 | | |
| v/c Ratio | | 0.18 | | 0.03 | | 0.14 | | 0.10 | | 0.01 | | | | 0.15 | | |
| 95% Queue Length | | 0.6 | | 0.1 | | 0.5 | | 0.3 | | 0.0 | | | | 0.5 | | |
| Control Delay (s/veh) | | 34.6 | | 14.4 | | 47.0 | | 16.1 | | 9.2 | | | | 14.5 | | |
| Level of Service (LOS) | | D | | B | | E | | C | | A | | | | B | | |
| Approach Delay (s/veh) | 29.2 | | | | 24.6 | | | | 0.1 | | | | 1.2 | | | |
| Approach LOS | D | | | | C | | | | A | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

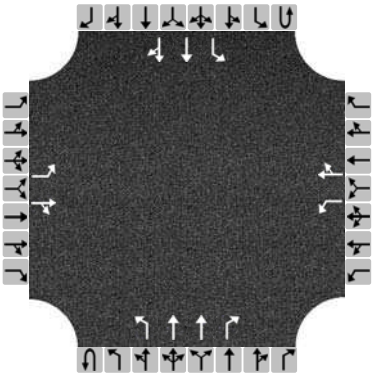
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | May 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | S. Royal Oaks and Rand |
| Jurisdiction | Franklin, TN |
| East/West Street | Rand Pl / Home Depot |
| North/South Street | S. Royal Oaks Blvd |
| Peak Hour Factor | 0.96 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 1 | 1 | 0 | | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 2 | 0 |
| Configuration | | L | | TR | | L | | TR | | L | T | R | | L | T | TR |
| Volume (veh/h) | | 26 | 3 | 16 | | 21 | 4 | 50 | | 6 | 1014 | 17 | | 43 | 1018 | 105 |
| Percent Heavy Vehicles | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left + Thru | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 27 | | 20 | | 22 | | 56 | | 6 | | | | 45 | | |
| Capacity | | 132 | | 333 | | 158 | | 417 | | 605 | | | | 657 | | |
| v/c Ratio | | 0.20 | | 0.06 | | 0.14 | | 0.13 | | 0.01 | | | | 0.07 | | |
| 95% Queue Length | | 0.7 | | 0.2 | | 0.5 | | 0.5 | | 0.0 | | | | 0.2 | | |
| Control Delay (s/veh) | | 39.0 | | 16.5 | | 31.4 | | 15.0 | | 11.0 | | | | 10.9 | | |
| Level of Service (LOS) | | E | | C | | D | | B | | B | | | | B | | |
| Approach Delay (s/veh) | 29.4 | | | | 19.6 | | | | 0.1 | | | | 0.4 | | | |
| Approach LOS | D | | | | C | | | | A | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

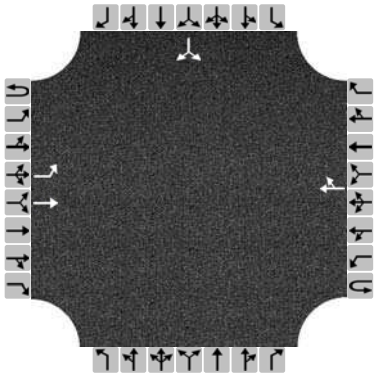
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | May 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and dwy |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Western Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 31 | 70 | | | | 263 | 0 | | | | | | 1 | | 13 |
| Percent Heavy Vehicles | | 0 | | | | | | | | | | | | 0 | | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 39 | | | | | | | | | | | | | 17 | |
| Capacity | | 1242 | | | | | | | | | | | | | 708 | |
| v/c Ratio | | 0.03 | | | | | | | | | | | | | 0.02 | |
| 95% Queue Length | | 0.1 | | | | | | | | | | | | | 0.1 | |
| Control Delay (s/veh) | | 8.0 | | | | | | | | | | | | | 10.2 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | B | |
| Approach Delay (s/veh) | 2.5 | | | | | | | | | | | | 10.2 | | | |
| Approach LOS | A | | | | | | | | | | | | B | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

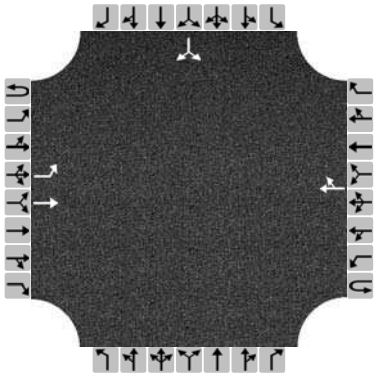
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | May 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and dwy |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Western Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 28 | 234 | | | | 212 | 2 | | | | | | 16 | | 38 |
| Percent Heavy Vehicles | | 0 | | | | | | | | | | | | 0 | | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 35 | | | | | | | | | | | | | 68 | |
| Capacity | | 1309 | | | | | | | | | | | | | 681 | |
| v/c Ratio | | 0.03 | | | | | | | | | | | | | 0.10 | |
| 95% Queue Length | | 0.1 | | | | | | | | | | | | | 0.3 | |
| Control Delay (s/veh) | | 7.8 | | | | | | | | | | | | | 10.9 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | B | |
| Approach Delay (s/veh) | 0.8 | | | | | | | | | | | | 10.9 | | | |
| Approach LOS | A | | | | | | | | | | | | B | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

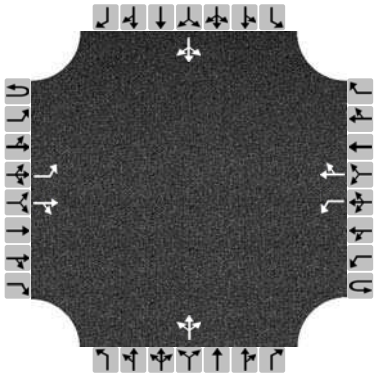
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | May 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and east dw |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Eastern Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | | 0 | 1 | 0 | | 0 | 1 | 0 |
| Configuration | | L | | TR | | L | | TR | | | LTR | | | | LTR | |
| Volume (veh/h) | | 11 | 57 | 3 | | 0 | 205 | 0 | | 12 | 0 | 0 | | 0 | 0 | 46 |
| Percent Heavy Vehicles | | 0 | | | | 0 | | | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 14 | | | | | | | | | 15 | | | | 58 | |
| Capacity | | 1321 | | | | 1537 | | | | | 571 | | | | 788 | |
| v/c Ratio | | 0.01 | | | | | | | | | 0.03 | | | | 0.07 | |
| 95% Queue Length | | 0.0 | | | | | | | | | 0.1 | | | | 0.2 | |
| Control Delay (s/veh) | | 7.8 | | | | 7.3 | | | | | 11.5 | | | | 9.9 | |
| Level of Service (LOS) | | A | | | | A | | | | | B | | | | A | |
| Approach Delay (s/veh) | 1.2 | | | | | | | | 11.5 | | | | 9.9 | | | |
| Approach LOS | A | | | | | | | | B | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

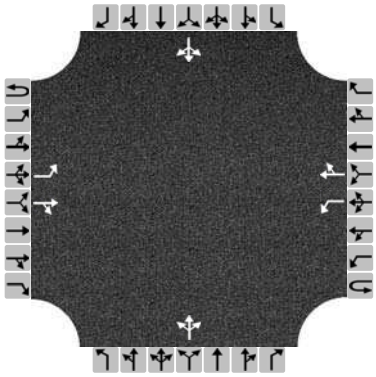
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | May 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and east dw |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Eastern Home Depot dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | | 0 | 1 | 0 | | 0 | 1 | 0 |
| Configuration | | L | | TR | | L | | TR | | | LTR | | | | LTR | |
| Volume (veh/h) | | 45 | 193 | 12 | | 0 | 184 | 0 | | 6 | 0 | 0 | | 0 | 0 | 24 |
| Percent Heavy Vehicles | | 0 | | | | 0 | | | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | 56 | | | | | | | | | 8 | | | | 30 | |
| Capacity | | 1350 | | | | 1321 | | | | | 475 | | | | 814 | |
| v/c Ratio | | 0.04 | | | | | | | | | 0.02 | | | | 0.04 | |
| 95% Queue Length | | 0.1 | | | | | | | | | 0.1 | | | | 0.1 | |
| Control Delay (s/veh) | | 7.8 | | | | 7.7 | | | | | 12.7 | | | | 9.6 | |
| Level of Service (LOS) | | A | | | | A | | | | | B | | | | A | |
| Approach Delay (s/veh) | 1.4 | | | | | | | | 12.7 | | | | 9.6 | | | |
| Approach LOS | A | | | | | | | | B | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

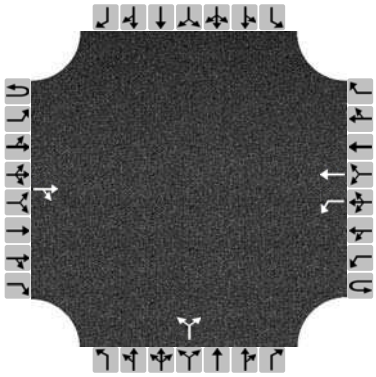
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | May 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and west dw |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Western project dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Configuration | | | | TR | | L | T | | | | LR | | | | | |
| Volume (veh/h) | | | 86 | 45 | | 11 | 265 | | | 66 | | 15 | | | | |
| Percent Heavy Vehicles | | | | | | 0 | | | | 0 | | 0 | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | | | | | 14 | | | | | 101 | | | | | |
| Capacity | | | | | | 1427 | | | | | 596 | | | | | |
| v/c Ratio | | | | | | 0.01 | | | | | 0.17 | | | | | |
| 95% Queue Length | | | | | | 0.0 | | | | | 0.6 | | | | | |
| Control Delay (s/veh) | | | | | | 7.5 | | | | | 12.3 | | | | | |
| Level of Service (LOS) | | | | | | A | | | | | B | | | | | |
| Approach Delay (s/veh) | | | | | 0.3 | | | | 12.3 | | | | | | | |
| Approach LOS | | | | | A | | | | B | | | | | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

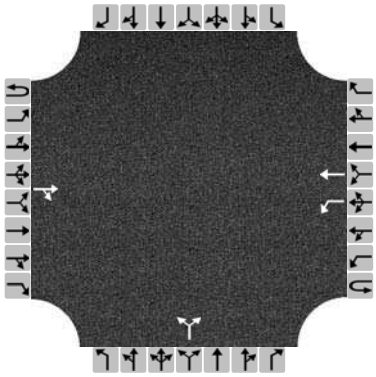
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | May 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | East-West |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | Oak Meadow Dr and west dw |
| Jurisdiction | Franklin, TN |
| East/West Street | Oak Meadow Drive |
| North/South Street | Western project dwy |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |
| Configuration | | | | TR | | L | T | | | | LR | | | | | |
| Volume (veh/h) | | | 255 | 37 | | 8 | 242 | | | 31 | | 7 | | | | |
| Percent Heavy Vehicles | | | | | | 0 | | | | 0 | | 0 | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Left Only | | | | | | | | | | | | | | | |
| Median Storage | 1 | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | | | | | 10 | | | | | 48 | | | | | |
| Capacity | | | | | | 1205 | | | | | 513 | | | | | |
| v/c Ratio | | | | | | 0.01 | | | | | 0.09 | | | | | |
| 95% Queue Length | | | | | | 0.0 | | | | | 0.3 | | | | | |
| Control Delay (s/veh) | | | | | | 8.0 | | | | | 12.7 | | | | | |
| Level of Service (LOS) | | | | | | A | | | | | B | | | | | |
| Approach Delay (s/veh) | | | | | 0.3 | | | | 12.7 | | | | | | | |
| Approach LOS | | | | | A | | | | B | | | | | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

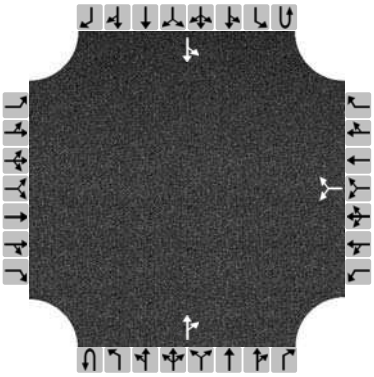
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | May 2016 |
| Analysis Year | 2016 |
| Time Analyzed | AM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | Home Depot and Apt Dwy |
| Jurisdiction | Franklin, TN |
| East/West Street | Project Driveway |
| North/South Street | Home Depot Access |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| Configuration | | | | | | | LR | | | | | TR | | LT | | |
| Volume (veh/h) | | | | | | 46 | | 37 | | | 0 | 11 | | 10 | 0 | |
| Percent Heavy Vehicles | | | | | | 0 | | 0 | | | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Undivided | | | | | | | | | | | | | | | |
| Median Storage | | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | | | | | | 104 | | | | | | | 12 | | |
| Capacity | | | | | | | 1023 | | | | | | | 1618 | | |
| v/c Ratio | | | | | | | 0.10 | | | | | | | 0.01 | | |
| 95% Queue Length | | | | | | | 0.3 | | | | | | | 0.0 | | |
| Control Delay (s/veh) | | | | | | | 8.9 | | | | | | | 7.2 | | |
| Level of Service (LOS) | | | | | | | A | | | | | | | A | | |
| Approach Delay (s/veh) | | | | | 8.9 | | | | | | | | 7.2 | | | |
| Approach LOS | | | | | A | | | | | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

# HCS 2010 Two-Way Stop Control Summary Report

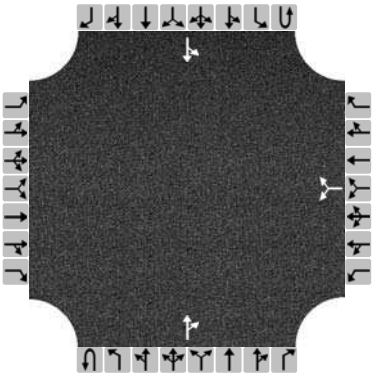
## General Information

| | |
|---|---|
| Analyst | FTG |
| Agency/Co. | FTG |
| Date Performed | May 2016 |
| Analysis Year | 2016 |
| Time Analyzed | PM Peak Hour |
| Intersection Orientation | North-South |
| Project Description | 10728 (Total) |

## Site Information

| | |
|---|---|
| Intersection | Home Depot and Apt Dwy |
| Jurisdiction | Franklin, TN |
| East/West Street | Project Driveway |
| North/South Street | Home Depot Access |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| Configuration | | | | | | | LR | | | | | TR | | LT | | |
| Volume (veh/h) | | | | | | 24 | | 20 | | | 0 | 45 | | 37 | 0 | |
| Percent Heavy Vehicles | | | | | | 0 | | 0 | | | | | | 0 | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Right Turn Channelized | No | | | | No | | | | No | | | | No | | | |
| Median Type | Undivided | | | | | | | | | | | | | | | |
| Median Storage | | | | | | | | | | | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate (veh/h) | | | | | | | 55 | | | | | | | 46 | | |
| Capacity | | | | | | | 935 | | | | | | | 1562 | | |
| v/c Ratio | | | | | | | 0.06 | | | | | | | 0.03 | | |
| 95% Queue Length | | | | | | | 0.2 | | | | | | | 0.1 | | |
| Control Delay (s/veh) | | | | | | | 9.1 | | | | | | | 7.4 | | |
| Level of Service (LOS) | | | | | | | A | | | | | | | A | | |
| Approach Delay (s/veh) | | | | | 9.1 | | | | | | | | 7.4 | | | |
| Approach LOS | | | | | A | | | | | | | | A | | | |

Copyright © 2016 University of Florida. All Rights Reserved.

**TOTAL PROJECTED CONDITIONS**
**With a third northbound through lane**

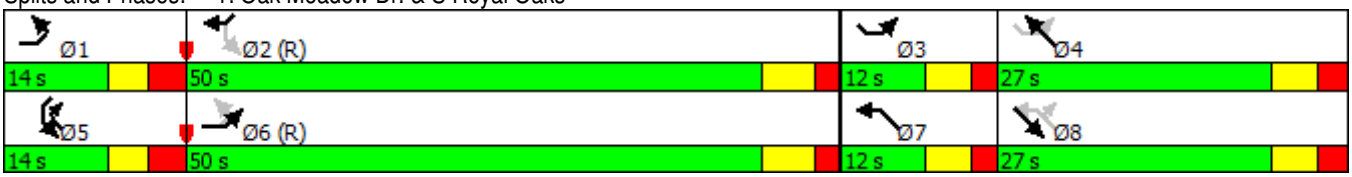
| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 87 | 1120 | 58 | 129 | 17 | 71 | 65 | 37 | 229 | 56 | 515 | 73 |
| Future Volume (vph) | 87 | 1120 | 58 | 129 | 17 | 71 | 65 | 37 | 229 | 56 | 515 | 73 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 2 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.94 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | 0.989 | | | 0.885 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.956 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 4801 | 0 | 1711 | 1594 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.271 | 0.956 | | 0.715 | | | 0.495 | | | 0.177 | | |
| Satd. Flow (perm) | 437 | 4801 | 0 | 1287 | 1594 | 0 | 922 | 1925 | 1583 | 330 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 154 | | | 97 | | | | 90 | | 154 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 552 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 12.5 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 130 | 1191 | 92 | 163 | 29 | 97 | 87 | 64 | 249 | 75 | 687 | 106 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 130 | 1283 | 0 | 163 | 126 | 0 | 87 | 64 | 249 | 75 | 793 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 41 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 13.0 | 26.0 | | 12.5 | 20.0 | | 12.5 | 20.0 | 13.0 | 13.0 | 26.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 14.0 | 50.0 | | 12.0 | 27.0 | | 12.0 | 27.0 | 14.0 | 14.0 | 50.0 | |
| Total Split (%) | 13.6% | 48.5% | | 11.7% | 26.2% | | 11.7% | 26.2% | 13.6% | 13.6% | 48.5% | |
| Maximum Green (s) | 8.0 | 44.0 | | 6.5 | 21.0 | | 6.5 | 21.0 | 8.0 | 8.0 | 44.0 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 71.0 | 60.1 | | 20.0 | 12.3 | | 20.0 | 12.3 | 25.3 | 70.3 | 59.8 | |
| Actuated g/C Ratio | 0.69 | 0.58 | | 0.19 | 0.12 | | 0.19 | 0.12 | 0.25 | 0.68 | 0.58 | |
| v/c Ratio | 0.32 | 0.45 | | 0.57 | 0.46 | | 0.34 | 0.28 | 0.55 | 0.21 | 0.47 | |
| Control Delay | 7.7 | 11.8 | | 41.9 | 18.6 | | 34.8 | 43.6 | 25.6 | 6.9 | 11.8 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 7.7 | 11.8 | | 41.9 | 18.6 | | 34.8 | 43.6 | 25.6 | 6.9 | 11.8 | |
| LOS | A | B | | D | B | | C | D | C | A | B | |
| Approach Delay | | 11.4 | | | 31.7 | | | 30.5 | | 11.4 | | |
| Approach LOS | | B | | | C | | | C | | B | | |
| 90th %ile Green (s) | 8.0 | 52.3 | | 6.5 | 13.7 | | 6.5 | 13.7 | 7.0 | 7.0 | 51.3 | |
| 90th %ile Term Code | Max | Coord | | Max | Gap | | Max | Hold | Min | Min | Coord | |
| 70th %ile Green (s) | 7.8 | 55.3 | | 6.5 | 10.7 | | 6.5 | 10.7 | 7.0 | 7.0 | 54.5 | |
| 70th %ile Term Code | Gap | Coord | | Max | Hold | | Max | Gap | Min | Min | Coord | |
| 50th %ile Green (s) | 7.0 | 56.6 | | 6.5 | 9.4 | | 6.5 | 9.4 | 7.0 | 7.0 | 56.6 | |
| 50th %ile Term Code | Min | Coord | | Max | Hold | | Max | Gap | Min | Min | Coord | |
| 30th %ile Green (s) | 7.0 | 57.9 | | 6.5 | 8.1 | | 6.5 | 8.1 | 7.0 | 7.0 | 57.9 | |
| 30th %ile Term Code | Min | Coord | | Max | Hold | | Max | Gap | Min | Min | Coord | |
| 10th %ile Green (s) | 7.0 | 71.0 | | 7.5 | 7.0 | | 0.0 | 0.0 | 7.0 | 7.0 | 71.0 | |
| 10th %ile Term Code | Min | Coord | | Hold | Min | | Skip | Skip | Min | Min | Coord | |
| Stops (vph) | 27 | 567 | | 112 | 27 | | 51 | 33 | 126 | 18 | 271 | |
| Fuel Used(gal) | 1 | 11 | | 2 | 1 | | 1 | 1 | 4 | 1 | 10 | |
| CO Emissions (g/hr) | 46 | 771 | | 162 | 68 | | 96 | 62 | 270 | 62 | 724 | |
| NOx Emissions (g/hr) | 9 | 150 | | 32 | 13 | | 19 | 12 | 52 | 12 | 141 | |
| VOC Emissions (g/hr) | 11 | 179 | | 38 | 16 | | 22 | 14 | 63 | 14 | 168 | |
| Dilemma Vehicles (#) | 0 | 0 | | 0 | 0 | | 0 | 2 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 25 | 144 | | 91 | 17 | | 46 | 39 | 90 | 14 | 131 | |
| Queue Length 95th (ft) | 37 | 198 | | 124 | 22 | | 69 | 48 | 161 | 26 | 152 | |
| Internal Link Dist (ft) | | 472 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 415 | 2866 | | 287 | 438 | | 253 | 439 | 470 | 374 | 1681 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.31 | 0.45 | | 0.57 | 0.29 | | 0.34 | 0.15 | 0.53 | 0.20 | 0.47 | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 103 | |

| | |
|---|---|
| Actuated Cycle Length: 103 | |
| Offset: 0 (0%), Referenced to phase 2:SWL and 6:EBL, Start of Green | |
| Natural Cycle: 75 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.57 | |
| Intersection Signal Delay: 16.0 | Intersection LOS: B |
| Intersection Capacity Utilization 52.6% | ICU Level of Service A |
| Analysis Period (min) 15 | |

Splits and Phases: 1: Oak Meadow Dr. & S Royal Oaks



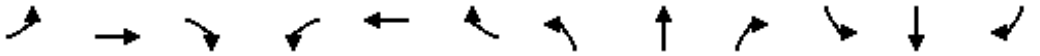
| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 28 | 1276 | 103 | 274 | 770 | 25 | 6 | 46 | 41 | 33 | 12 | 118 |
| Future Volume (vph) | 28 | 1276 | 103 | 274 | 770 | 25 | 6 | 46 | 41 | 33 | 12 | 118 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 12 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | | 1% | | | -2% | | | -1% | | | 2% | |
| Storage Length (ft) | 80 | | 135 | 220 | | 0 | 100 | | 0 | 120 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.91 | 0.91 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.988 | | | 0.993 | | | 0.934 | | | 0.868 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1676 | 4884 | 0 | 1787 | 3428 | 0 | 1754 | 1624 | 0 | 1787 | 1520 | 0 |
| Flt Permitted | 0.315 | | | 0.119 | | | 0.552 | | | 0.463 | | |
| Satd. Flow (perm) | 556 | 4884 | 0 | 224 | 3428 | 0 | 1019 | 1624 | 0 | 871 | 1520 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 12 | | | 4 | | | 27 | | | 137 | |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1624 | | | 792 | | | 957 | | | 515 | |
| Travel Time (s) | | 36.9 | | | 18.0 | | | 21.8 | | | 11.7 | |
| Peak Hour Factor | 0.63 | 0.92 | 0.87 | 0.80 | 0.99 | 0.67 | 0.58 | 0.68 | 0.77 | 0.67 | 0.63 | 0.86 |
| Heavy Vehicles (%) | 0% | 1% | 0% | 2% | 2% | 4% | 0% | 11% | 0% | 0% | 10% | 3% |
| Adj. Flow (vph) | 44 | 1387 | 118 | 343 | 778 | 37 | 10 | 68 | 53 | 49 | 19 | 137 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 44 | 1505 | 0 | 343 | 815 | 0 | 10 | 121 | 0 | 49 | 156 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 0.99 | 1.03 | 0.99 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | 1 | 1 | | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | | 42 | 226 | | 42 | 42 | | 42 | 42 | |
| Trailing Detector (ft) | -3 | 220 | | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 220 | | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | | 45 | 45 | | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | pm+pt | NA | | pm+pt | NA | | pm+pt | NA | | pm+pt | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | 6 | | | 2 | | | 4 | | | 8 | | |
| Detector Phase | 1 | 6 | | 5 | 2 | | 7 | 4 | | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | | 5.0 | 10.0 | | 6.0 | 7.0 | | 6.0 | 7.0 | |
| Minimum Split (s) | 17.0 | 73.0 | | 17.0 | 73.0 | | 10.0 | 50.0 | | 10.0 | 50.0 | |
| Total Split (s) | 17.0 | 73.0 | | 17.0 | 73.0 | | 10.0 | 50.0 | | 10.0 | 50.0 | |
| Total Split (%) | 11.3% | 48.7% | | 11.3% | 48.7% | | 6.7% | 33.3% | | 6.7% | 33.3% | |
| Maximum Green (s) | 10.5 | 67.0 | | 10.5 | 67.0 | | 6.0 | 43.0 | | 6.0 | 43.0 | |
| Yellow Time (s) | 3.0 | 3.5 | | 3.0 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | | 3.5 | 2.5 | | 0.5 | 3.5 | | 0.5 | 3.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | | -1.0 | -3.0 | | -2.5 | -2.5 | | -2.5 | -2.5 | |
| Total Lost Time (s) | 5.5 | 3.0 | | 5.5 | 3.0 | | 1.5 | 4.5 | | 1.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.0 | 3.5 | | 3.0 | 3.5 | |
| Recall Mode | None | C-Min | | None | C-Min | | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 8.0 | | | 8.0 | |
| Flash Dont Walk (s) | | 16.0 | | | 20.0 | | | 32.0 | | | 35.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 103.4 | 97.8 | | 110.4 | 103.7 | | 27.4 | 17.2 | | 30.7 | 23.3 | |
| Actuated g/C Ratio | 0.69 | 0.65 | | 0.74 | 0.69 | | 0.18 | 0.11 | | 0.20 | 0.16 | |
| v/c Ratio | 0.10 | 0.47 | | 1.21 | 0.34 | | 0.04 | 0.58 | | 0.20 | 0.44 | |
| Control Delay | 7.4 | 14.7 | | 144.4 | 11.7 | | 42.7 | 58.7 | | 46.7 | 15.6 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 7.4 | 14.7 | | 144.4 | 11.7 | | 42.7 | 58.7 | | 46.7 | 15.6 | |
| LOS | A | B | | F | B | | D | E | | D | B | |
| Approach Delay | | 14.5 | | | 51.0 | | | 57.5 | | | 23.0 | |
| Approach LOS | | B | | | D | | | E | | | C | |
| 90th %ile Green (s) | 8.6 | 83.8 | | 10.5 | 85.7 | | 7.3 | 21.2 | | 11.0 | 24.9 | |
| 90th %ile Term Code | Gap | Coord | | Max | Coord | | Gap | Gap | | Gap | Hold | |
| 70th %ile Green (s) | 7.6 | 89.2 | | 10.5 | 92.1 | | 6.6 | 17.3 | | 9.5 | 20.2 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | | Gap | Gap | | Gap | Hold | |
| 50th %ile Green (s) | 7.0 | 92.8 | | 10.5 | 96.3 | | 0.0 | 14.7 | | 8.5 | 27.2 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | | Skip | Gap | | Gap | Hold | |
| 30th %ile Green (s) | 6.5 | 96.5 | | 10.5 | 100.5 | | 0.0 | 12.1 | | 7.4 | 23.5 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | | Skip | Gap | | Gap | Hold | |
| 10th %ile Green (s) | 0.0 | 111.7 | | 10.5 | 128.7 | | 0.0 | 8.3 | | 0.0 | 8.3 | |
| 10th %ile Term Code | Skip | Coord | | Max | Coord | | Skip | Gap | | Skip | Hold | |
| Stops (vph) | 9 | 673 | | 99 | 323 | | 5 | 63 | | 26 | 25 | |
| Fuel Used(gal) | 0 | 25 | | 10 | 9 | | 0 | 2 | | 1 | 1 | |
| CO Emissions (g/hr) | 31 | 1769 | | 720 | 601 | | 9 | 142 | | 41 | 75 | |
| NOx Emissions (g/hr) | 6 | 344 | | 140 | 117 | | 2 | 28 | | 8 | 15 | |
| VOC Emissions (g/hr) | 7 | 410 | | 167 | 139 | | 2 | 33 | | 10 | 17 | |
| Dilemma Vehicles (#) | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 11 | 264 | | ~167 | 174 | | 8 | 88 | | 39 | 15 | |
| Queue Length 95th (ft) | 19 | 354 | | #399 | 261 | | 14 | 105 | | 52 | 21 | |
| Internal Link Dist (ft) | | 1544 | | | 712 | | | 877 | | | 435 | |
| Turn Bay Length (ft) | 80 | | | 220 | | | 100 | | | 120 | | |
| Base Capacity (vph) | 481 | 3188 | | 284 | 2370 | | 229 | 511 | | 245 | 556 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |

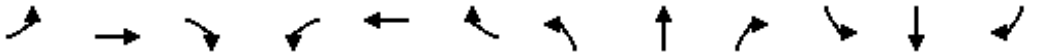
| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.09 | 0.47 | | 1.21 | 0.34 | | 0.04 | 0.24 | | 0.20 | 0.28 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 139 (93%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.21 | | | |
| Intersection Signal Delay: 30.8 | | Intersection LOS: C | |
| Intersection Capacity Utilization 62.3% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |
| ~ Volume exceeds capacity, queue is theoretically infinite. | | | |
| Queue shown is maximum after two cycles. | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | |
| Queue shown is maximum after two cycles. | | | |

Splits and Phases: 3: S Royal Oaks & Riverside Dr/Center Point Pl



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 112 | 772 | 60 | 850 | 993 | 281 | 99 | 272 | 1055 | 225 | 213 | 82 |
| Future Volume (vph) | 112 | 772 | 60 | 850 | 993 | 281 | 99 | 272 | 1055 | 225 | 213 | 82 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.988 | | | | 0.850 | | | 0.850 | | 0.961 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3241 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3400 | 4688 | 0 | 3286 | 3406 | 1620 | 3350 | 3639 | 2865 | 3319 | 3241 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 10 | | | | 149 | | | | | 31 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 700 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 11.9 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.80 | 0.90 | 0.80 | 0.93 | 0.91 | 0.88 | 0.82 | 0.80 | 0.93 | 0.92 | 0.74 | 0.81 |
| Heavy Vehicles (%) | 3% | 6% | 2% | 3% | 6% | 3% | 4% | 2% | 2% | 2% | 4% | 2% |
| Adj. Flow (vph) | 140 | 858 | 75 | 914 | 1091 | 319 | 121 | 340 | 1134 | 245 | 288 | 101 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 140 | 933 | 0 | 914 | 1091 | 319 | 121 | 340 | 1134 | 245 | 389 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

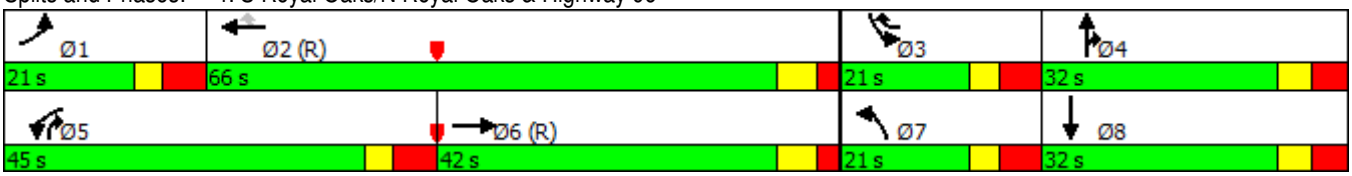


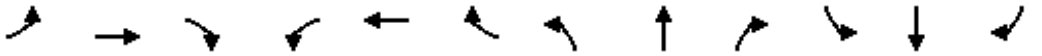
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (s) | 21.0 | 42.0 | | 45.0 | 66.0 | 21.0 | 21.0 | 32.0 | | 21.0 | 32.0 | |
| Total Split (%) | 15.0% | 30.0% | | 32.1% | 47.1% | 15.0% | 15.0% | 22.9% | | 15.0% | 22.9% | |
| Maximum Green (s) | 13.5 | 35.5 | | 37.5 | 59.5 | 13.5 | 13.5 | 24.5 | | 13.5 | 24.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 13.5 | 38.4 | | 40.0 | 64.9 | 84.0 | 12.4 | 27.5 | 72.0 | 15.1 | 30.2 | |
| Actuated g/C Ratio | 0.10 | 0.27 | | 0.29 | 0.46 | 0.60 | 0.09 | 0.20 | 0.51 | 0.11 | 0.22 | |
| v/c Ratio | 0.43 | 0.72 | | 0.97 | 0.69 | 0.31 | 0.41 | 0.48 | 0.77 | 0.69 | 0.54 | |
| Control Delay | 76.8 | 41.3 | | 61.0 | 40.4 | 8.7 | 64.1 | 52.4 | 31.8 | 70.7 | 48.2 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 76.8 | 41.3 | | 61.0 | 40.4 | 8.7 | 64.1 | 52.4 | 31.8 | 70.7 | 48.2 | |
| LOS | E | D | | E | D | A | E | D | C | E | D | |
| Approach Delay | | 46.0 | | | 44.1 | | | 38.6 | | | 56.9 | |
| Approach LOS | | D | | | D | | | D | | | E | |
| 90th %ile Green (s) | 13.5 | 35.5 | | 37.5 | 59.5 | 13.5 | 13.3 | 24.5 | | 13.5 | 24.7 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 70th %ile Green (s) | 12.4 | 35.5 | | 37.5 | 60.6 | 13.5 | 11.6 | 24.5 | | 13.5 | 26.4 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 50th %ile Green (s) | 11.2 | 35.5 | | 37.5 | 61.8 | 13.5 | 10.4 | 24.5 | | 13.5 | 27.6 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 30th %ile Green (s) | 9.9 | 35.5 | | 37.5 | 63.1 | 13.5 | 9.2 | 24.5 | | 13.5 | 28.8 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 10th %ile Green (s) | 8.1 | 37.6 | | 37.5 | 67.0 | 11.4 | 7.5 | 24.5 | | 11.4 | 28.4 | |
| 10th %ile Term Code | Gap | Coord | | Max | Coord | Gap | Gap | Max | | Gap | Hold | |
| Stops (vph) | 110 | 737 | | 759 | 947 | 98 | 92 | 236 | 829 | 214 | 238 | |
| Fuel Used(gal) | 3 | 18 | | 25 | 25 | 4 | 2 | 6 | 18 | 6 | 6 | |
| CO Emissions (g/hr) | 235 | 1272 | | 1740 | 1782 | 261 | 169 | 412 | 1253 | 427 | 449 | |
| NOx Emissions (g/hr) | 46 | 247 | | 338 | 347 | 51 | 33 | 80 | 244 | 83 | 87 | |
| VOC Emissions (g/hr) | 54 | 295 | | 403 | 413 | 60 | 39 | 95 | 290 | 99 | 104 | |
| Dilemma Vehicles (#) | 0 | 28 | | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 69 | 285 | | 419 | 535 | 78 | 54 | 145 | 459 | 112 | 153 | |
| Queue Length 95th (ft) | 93 | 338 | | m#446 | m544 | m122 | 78 | 172 | 561 | 159 | 167 | |
| Internal Link Dist (ft) | | 620 | | | 611 | | | 712 | | | 884 | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 388 | 1293 | | 938 | 1578 | 1035 | 370 | 714 | 1473 | 367 | 723 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.36 | 0.72 | | 0.97 | 0.69 | 0.31 | 0.33 | 0.48 | 0.77 | 0.67 | 0.54 | |

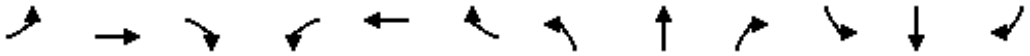
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 116 (83%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.97 | | | |
| Intersection Signal Delay: 44.4 | | Intersection LOS: D | |
| Intersection Capacity Utilization 71.7% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | |
| Queue shown is maximum after two cycles. | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 4: S Royal Oaks/N Royal Oaks & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 1786 | 196 | 111 | 1061 | 0 | 0 | 0 | 0 | 355 | 0 | 1039 |
| Future Volume (vph) | 0 | 1786 | 196 | 111 | 1061 | 0 | 0 | 0 | 0 | 355 | 0 | 1039 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6346 | 1509 | 1787 | 3388 | 0 | 0 | 0 | 0 | 3287 | 0 | 2654 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 184 | | | | | | | | | 115 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.91 | 0.90 | 0.86 | 0.87 | 1.00 | 1.00 | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 |
| Heavy Vehicles (%) | 2% | 3% | 7% | 1% | 3% | 2% | 2% | 2% | 2% | 6% | 2% | 3% |
| Adj. Flow (vph) | 0 | 1963 | 218 | 129 | 1220 | 0 | 0 | 0 | 0 | 418 | 0 | 1105 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 1963 | 218 | 129 | 1220 | 0 | 0 | 0 | 0 | 418 | 0 | 1105 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (s) | | 62.0 | 62.0 | 23.0 | 85.0 | | | | | 55.0 | | 55.0 |
| Total Split (%) | | 44.3% | 44.3% | 16.4% | 60.7% | | | | | 39.3% | | 39.3% |
| Maximum Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 60.5 | 60.5 | 15.5 | 81.0 | | | | | 49.5 | | 49.5 |
| Actuated g/C Ratio | | 0.43 | 0.43 | 0.11 | 0.58 | | | | | 0.35 | | 0.35 |
| v/c Ratio | | 0.72 | 0.29 | 0.65 | 0.62 | | | | | 0.36 | | 1.09 |
| Control Delay | | 27.6 | 5.1 | 71.8 | 19.3 | | | | | 34.6 | | 94.9 |
| Queue Delay | | 0.8 | 0.0 | 0.0 | 0.3 | | | | | 2.1 | | 0.0 |
| Total Delay | | 28.3 | 5.1 | 71.8 | 19.5 | | | | | 36.7 | | 94.9 |
| LOS | | C | A | E | B | | | | | D | | F |
| Approach Delay | | 26.0 | | | 24.5 | | | | | | | |
| Approach LOS | | C | | | C | | | | | | | |
| 90th %ile Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| 90th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 70th %ile Green (s) | | 56.0 | 56.0 | 17.0 | 79.0 | | | | | 47.5 | | 47.5 |
| 70th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 50th %ile Green (s) | | 57.6 | 57.6 | 15.4 | 79.0 | | | | | 47.5 | | 47.5 |
| 50th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| 30th %ile Green (s) | | 59.8 | 59.8 | 13.2 | 79.0 | | | | | 47.5 | | 47.5 |
| 30th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| 10th %ile Green (s) | | 63.2 | 63.2 | 9.8 | 79.0 | | | | | 47.5 | | 47.5 |
| 10th %ile Term Code | | Coord | Coord | Gap | Coord | | | | | Max | | Max |
| Stops (vph) | | 1165 | 39 | 111 | 497 | | | | | 256 | | 836 |
| Fuel Used(gal) | | 36 | 2 | 3 | 13 | | | | | 6 | | 31 |
| CO Emissions (g/hr) | | 2510 | 152 | 219 | 912 | | | | | 431 | | 2177 |
| NOx Emissions (g/hr) | | 488 | 30 | 43 | 177 | | | | | 84 | | 423 |
| VOC Emissions (g/hr) | | 582 | 35 | 51 | 211 | | | | | 100 | | 504 |
| Dilemma Vehicles (#) | | 50 | 0 | 0 | 34 | | | | | 0 | | 0 |
| Queue Length 50th (ft) | | 346 | 27 | 124 | 283 | | | | | 144 | | ~602 |
| Queue Length 95th (ft) | | 406 | m47 | m164 | m297 | | | | | 178 | | #754 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2743 | 756 | 229 | 1960 | | | | | 1162 | | 1012 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 215 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 420 | 0 | 0 | 0 | | | | | 581 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.85 | 0.29 | 0.56 | 0.70 | | | | | 0.72 | | 1.09 |

Intersection Summary

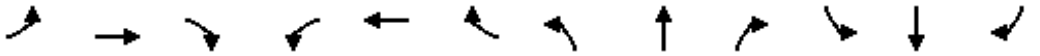
| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 106 (76%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.09 | | | |
| Intersection Signal Delay: 41.6 | | Intersection LOS: D | |
| Intersection Capacity Utilization 108.6% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

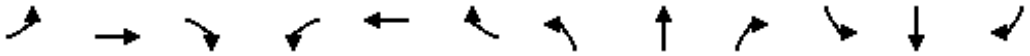
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Ent ramp to I-65/Exit ramp from I-65 & Highway 96



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1382 | 759 | 0 | 0 | 764 | 1217 | 408 | 0 | 364 | 0 | 0 | 0 |
| Future Volume (vph) | 1382 | 759 | 0 | 0 | 764 | 1217 | 408 | 0 | 364 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3302 | 3307 | 0 | 0 | 3539 | 2814 | 3302 | 0 | 1628 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 23 | | | 252 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 311 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 5.3 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.88 | 0.86 | 0.95 | 1.00 | 0.95 | 0.98 | 0.95 | 0.25 | 0.92 | 1.00 | 1.00 | 0.95 |
| Heavy Vehicles (%) | 2% | 5% | 2% | 2% | 2% | 1% | 2% | 0% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 1570 | 883 | 0 | 0 | 804 | 1242 | 429 | 0 | 396 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 1570 | 883 | 0 | 0 | 804 | 1242 | 429 | 0 | 396 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (s) | 56.0 | 116.0 | | | 60.0 | | 24.0 | | 24.0 | | | |
| Total Split (%) | 40.0% | 82.9% | | | 42.9% | | 17.1% | | 17.1% | | | |
| Maximum Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 50.0 | 110.0 | | | 53.5 | 79.5 | 16.5 | | 16.5 | | | |
| Actuated g/C Ratio | 0.36 | 0.79 | | | 0.38 | 0.57 | 0.12 | | 0.12 | | | |
| v/c Ratio | 1.33 | 0.34 | | | 0.59 | 0.77 | 1.10 | | 0.96 | | | |
| Control Delay | 204.9 | 3.4 | | | 36.8 | 27.0 | 131.8 | | 56.6 | | | |
| Queue Delay | 0.7 | 0.1 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 205.5 | 3.5 | | | 36.8 | 27.0 | 131.8 | | 56.6 | | | |
| LOS | F | A | | | D | C | F | | E | | | |
| Approach Delay | | 132.8 | | | 30.8 | | | | | | | |
| Approach LOS | | F | | | C | | | | | | | |
| 90th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 90th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 70th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 70th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 50th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 50th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 30th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 30th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| 10th %ile Green (s) | 50.0 | 110.0 | | | 53.5 | | 16.5 | | 16.5 | | | |
| 10th %ile Term Code | Max | Coord | | | Coord | | Max | | Max | | | |
| Stops (vph) | 1003 | 107 | | | 597 | 899 | 350 | | 119 | | | |
| Fuel Used(gal) | 73 | 4 | | | 13 | 18 | 15 | | 7 | | | |
| CO Emissions (g/hr) | 5083 | 310 | | | 923 | 1264 | 1025 | | 474 | | | |
| NOx Emissions (g/hr) | 989 | 60 | | | 180 | 246 | 200 | | 92 | | | |
| VOC Emissions (g/hr) | 1178 | 72 | | | 214 | 293 | 238 | | 110 | | | |
| Dilemma Vehicles (#) | 0 | 18 | | | 27 | 0 | 0 | | 0 | | | |
| Queue Length 50th (ft) | ~951 | 67 | | | 306 | 468 | ~228 | | 142 | | | |
| Queue Length 95th (ft) | #1078 | 75 | | | 375 | 573 | #338 | | #351 | | | |
| Internal Link Dist (ft) | | 476 | | | 231 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1179 | 2598 | | | 1352 | 1607 | 389 | | 414 | | | |
| Starvation Cap Reductn | 163 | 623 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 1.55 | 0.45 | | | 0.59 | 0.77 | 1.10 | | 0.96 | | | |

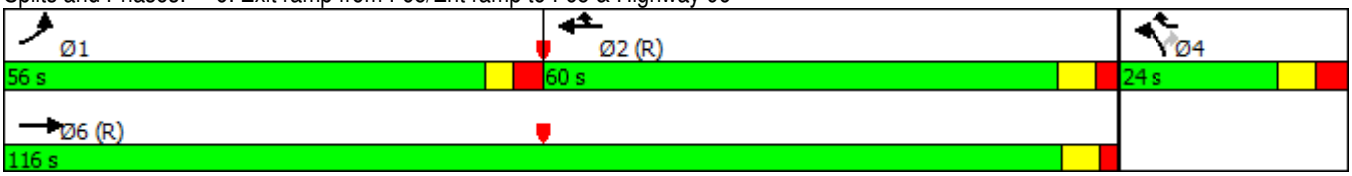
Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 140 | | | |
| Actuated Cycle Length: 140 | | | |
| Offset: 122 (87%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 140 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.33 | | | |
| Intersection Signal Delay: 87.9 | | Intersection LOS: F | |
| Intersection Capacity Utilization 108.6% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 92 | 827 | 45 | 147 | 56 | 118 | 114 | 38 | 121 | 191 | 765 | 145 |
| Future Volume (vph) | 92 | 827 | 45 | 147 | 56 | 118 | 114 | 38 | 121 | 191 | 765 | 145 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 8 | 11 | 11 | 11 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 12 |
| Storage Length (ft) | | 70 | 150 | 75 | | 0 | 100 | | 195 | 180 | 0 | |
| Storage Lanes | | 2 | 0 | 1 | | 0 | 1 | | 1 | 1 | 2 | |
| Taper Length (ft) | | 50 | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.94 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88 | 1.00 |
| Frt | | 0.989 | | | 0.906 | | | | 0.850 | | 0.850 | |
| Flt Protected | 0.950 | 0.956 | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1534 | 4801 | 0 | 1711 | 1631 | 0 | 1770 | 1925 | 1583 | 1770 | 2787 | 0 |
| Flt Permitted | 0.083 | 0.956 | | 0.704 | | | 0.285 | | | 0.261 | | |
| Satd. Flow (perm) | 134 | 4801 | 0 | 1268 | 1631 | 0 | 531 | 1925 | 1583 | 486 | 2787 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 132 | | | 68 | | | | 132 | | 132 | |
| Link Speed (mph) | | 30 | | | 25 | | | 40 | | 30 | | |
| Link Distance (ft) | | 552 | | | 721 | | | 918 | | 1624 | | |
| Travel Time (s) | | 12.5 | | | 19.7 | | | 15.6 | | 36.9 | | |
| Peak Hour Factor | 0.67 | 0.94 | 0.63 | 0.79 | 0.58 | 0.73 | 0.75 | 0.58 | 0.92 | 0.75 | 0.75 | 0.69 |
| Adj. Flow (vph) | 137 | 880 | 71 | 186 | 97 | 162 | 152 | 66 | 132 | 255 | 1020 | 210 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 137 | 951 | 0 | 186 | 259 | 0 | 152 | 66 | 132 | 255 | 1230 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Right | Right |
| Median Width(ft) | | 41 | | | 12 | | | 12 | | 12 | | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | 0 | | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | 16 | | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.20 | 1.04 | 1.04 | 1.04 | 1.04 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 15 | 9 | 15 | | 9 | 15 | | 9 | 15 | 9 | 9 |
| Number of Detectors | 1 | 1 | | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 42 | | 42 | 42 | | 42 | 42 | 42 | 42 | 42 | |
| Trailing Detector (ft) | -3 | -3 | | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | -3 | | -3 | -3 | | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 45 | | 45 | 45 | | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Turn Type | pm+pt | Prot | | D.P+P | NA | | D.P+P | NA | custom | pm+pt | Prot | |
| Protected Phases | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Permitted Phases | 6 | | | 4 | | | 8 | | 8 | 2 | | |
| Detector Phase | 1 | 6 | | 3 | 8 | | 7 | 4 | 5 | 5 | 2 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 20.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 18.0 | 57.0 | | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |

| Lane Group | EBL2 | EBL | EBR | SEL | SET | SER | NWL | NWT | NWR | SWL | SWR | SWR2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Split (s) | 18.0 | 57.0 | | 14.0 | 35.0 | | 14.0 | 35.0 | 14.0 | 14.0 | 53.0 | |
| Total Split (%) | 15.0% | 47.5% | | 11.7% | 29.2% | | 11.7% | 29.2% | 11.7% | 11.7% | 44.2% | |
| Maximum Green (s) | 12.0 | 51.0 | | 8.5 | 29.0 | | 8.5 | 29.0 | 8.0 | 8.0 | 47.0 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.5 | 3.5 | | 3.5 | 3.5 | 3.0 | 3.0 | 4.0 | |
| All-Red Time (s) | 3.0 | 2.0 | | 2.0 | 2.5 | | 2.0 | 2.5 | 3.0 | 3.0 | 2.0 | |
| Lost Time Adjust (s) | -2.5 | -1.5 | | -2.5 | -2.5 | | -2.5 | -2.5 | -2.5 | -2.5 | -1.5 | |
| Total Lost Time (s) | 3.5 | 4.5 | | 3.0 | 3.5 | | 3.0 | 3.5 | 3.5 | 3.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 1.5 | 5.0 | | 1.5 | 3.5 | | 1.5 | 3.5 | 1.5 | 1.5 | 5.0 | |
| Recall Mode | None | C-Min | | None | None | | None | None | None | None | C-Min | |
| Act Effct Green (s) | 74.5 | 61.4 | | 34.8 | 22.9 | | 34.2 | 21.9 | 36.7 | 70.9 | 59.5 | |
| Actuated g/C Ratio | 0.62 | 0.51 | | 0.29 | 0.19 | | 0.28 | 0.18 | 0.31 | 0.59 | 0.50 | |
| v/c Ratio | 0.61 | 0.38 | | 0.44 | 0.71 | | 0.58 | 0.19 | 0.23 | 0.64 | 0.85 | |
| Control Delay | 29.2 | 16.3 | | 34.6 | 43.2 | | 39.1 | 39.7 | 5.3 | 20.1 | 31.8 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 29.2 | 16.3 | | 34.6 | 43.2 | | 39.1 | 39.7 | 5.3 | 20.1 | 31.8 | |
| LOS | C | B | | C | D | | D | D | A | C | C | |
| Approach Delay | | 17.9 | | | 39.6 | | | 26.5 | | 29.8 | | |
| Approach LOS | | B | | | D | | | C | | C | | |
| 90th %ile Green (s) | 12.0 | 51.3 | | 8.5 | 28.7 | | 8.5 | 28.7 | 8.0 | 8.0 | 47.3 | |
| 90th %ile Term Code | Max | Coord | | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 70th %ile Green (s) | 12.0 | 56.1 | | 8.5 | 23.9 | | 8.5 | 23.9 | 8.0 | 8.0 | 52.1 | |
| 70th %ile Term Code | Max | Coord | | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 50th %ile Green (s) | 10.3 | 59.6 | | 8.5 | 20.4 | | 8.5 | 20.4 | 8.0 | 8.0 | 57.3 | |
| 50th %ile Term Code | Gap | Coord | | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 30th %ile Green (s) | 7.7 | 63.0 | | 8.5 | 17.0 | | 8.5 | 17.0 | 8.0 | 8.0 | 63.3 | |
| 30th %ile Term Code | Gap | Coord | | Max | Gap | | Max | Hold | Max | Max | Coord | |
| 10th %ile Green (s) | 7.0 | 69.7 | | 25.5 | 11.9 | | 7.6 | 0.0 | 7.3 | 7.3 | 70.0 | |
| 10th %ile Term Code | Min | Coord | | Hold | Gap | | Gap | Skip | Gap | Gap | Coord | |
| Stops (vph) | 47 | 445 | | 112 | 120 | | 84 | 31 | 14 | 91 | 658 | |
| Fuel Used(gal) | 1 | 9 | | 2 | 3 | | 2 | 1 | 1 | 4 | 21 | |
| CO Emissions (g/hr) | 84 | 637 | | 165 | 215 | | 171 | 59 | 71 | 259 | 1472 | |
| NOx Emissions (g/hr) | 16 | 124 | | 32 | 42 | | 33 | 12 | 14 | 50 | 286 | |
| VOC Emissions (g/hr) | 19 | 148 | | 38 | 50 | | 40 | 14 | 17 | 60 | 341 | |
| Dilemma Vehicles (#) | 0 | 0 | | 0 | 0 | | 0 | 2 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 42 | 130 | | 111 | 140 | | 88 | 43 | 0 | 78 | 422 | |
| Queue Length 95th (ft) | 70 | 188 | | 135 | 108 | | 105 | 49 | 40 | 116 | 447 | |
| Internal Link Dist (ft) | | 472 | | | 641 | | | 838 | | 1544 | | |
| Turn Bay Length (ft) | 70 | 70 | | 75 | | | 100 | | 195 | 180 | | |
| Base Capacity (vph) | 254 | 2522 | | 421 | 478 | | 265 | 505 | 578 | 400 | 1448 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.54 | 0.38 | | 0.44 | 0.54 | | 0.57 | 0.13 | 0.23 | 0.64 | 0.85 | |

| Intersection Summary | |
|---|---|
| Area Type: | Other |
| Cycle Length: 120 | |

| | |
|---|---|
| Actuated Cycle Length: 120 | |
| Offset: 117 (98%), Referenced to phase 2:SWL and 6:EBL, Start of Green | |
| Natural Cycle: 120 | |
| Control Type: Actuated-Coordinated | |
| Maximum v/c Ratio: 0.85 | |
| Intersection Signal Delay: 26.9 | Intersection LOS: C |
| Intersection Capacity Utilization 58.8% | ICU Level of Service B |
| Analysis Period (min) 15 | |

Splits and Phases: 1: Oak Meadow Dr. & S Royal Oaks

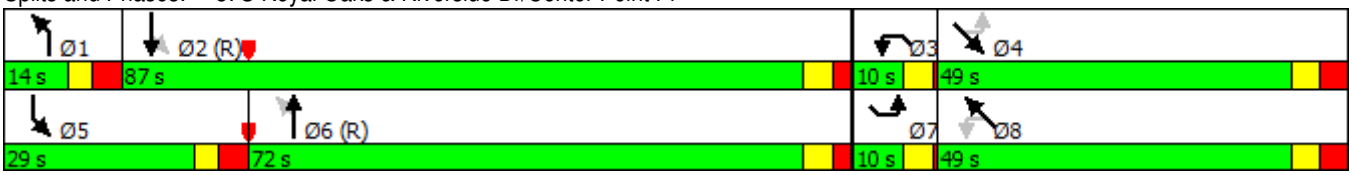
| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 90 | 1103 | 27 | 263 | 1126 | 93 | 83 | 64 | 123 | 46 | 58 | 300 |
| Future Volume (vph) | 90 | 1103 | 27 | 263 | 1126 | 93 | 83 | 64 | 123 | 46 | 58 | 300 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 10 | 11 | 12 | 12 | 11 | 12 | 11 | 11 | 12 | 12 | 11 | 12 |
| Grade (%) | | 1% | | | -2% | | | -1% | | | 2% | |
| Storage Length (ft) | 80 | | 135 | 220 | | 0 | 100 | | 0 | 120 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.91 | 0.91 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.995 | | | 0.987 | | | 0.906 | | | 0.876 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1676 | 4913 | 0 | 1805 | 3447 | 0 | 1736 | 1672 | 0 | 1752 | 1593 | 0 |
| Flt Permitted | 0.116 | | | 0.138 | | | 0.111 | | | 0.421 | | |
| Satd. Flow (perm) | 205 | 4913 | 0 | 262 | 3447 | 0 | 203 | 1672 | 0 | 776 | 1593 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 4 | | | 10 | | | 52 | | | 151 | |
| Link Speed (mph) | | 30 | | | 30 | | | 30 | | | 30 | |
| Link Distance (ft) | | 1624 | | | 792 | | | 957 | | | 515 | |
| Travel Time (s) | | 36.9 | | | 18.0 | | | 21.8 | | | 11.7 | |
| Peak Hour Factor | 0.79 | 0.95 | 0.64 | 0.75 | 0.90 | 0.76 | 0.86 | 0.71 | 0.82 | 0.75 | 0.88 | 0.94 |
| Heavy Vehicles (%) | 0% | 1% | 2% | 1% | 1% | 0% | 1% | 0% | 0% | 2% | 0% | 0% |
| Adj. Flow (vph) | 114 | 1161 | 42 | 351 | 1251 | 122 | 97 | 90 | 150 | 61 | 66 | 319 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 114 | 1203 | 0 | 351 | 1373 | 0 | 97 | 240 | 0 | 61 | 385 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 24 | | | 24 | | | 12 | | | 12 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.10 | 1.05 | 1.01 | 0.99 | 1.03 | 0.99 | 1.04 | 1.04 | 0.99 | 1.01 | 1.06 | 1.01 |
| Turning Speed (mph) | 15 | | 9 | 15 | | 9 | 15 | | 9 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | 1 | 1 | | 1 | 1 | | 1 | 1 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 226 | | 42 | 226 | | 42 | 42 | | 42 | 42 | |
| Trailing Detector (ft) | -3 | 220 | | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 220 | | -3 | 220 | | -3 | -3 | | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | | 45 | 45 | | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Turn Type | pm+pt | NA | | pm+pt | NA | | pm+pt | NA | | pm+pt | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | 6 | | | 2 | | | 4 | | | 8 | | |
| Detector Phase | 1 | 6 | | 5 | 2 | | 7 | 4 | | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |

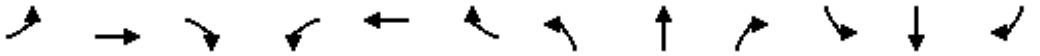
| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 5.0 | 10.0 | | 5.0 | 10.0 | | 6.0 | 7.0 | | 6.0 | 7.0 | |
| Minimum Split (s) | 15.0 | 70.0 | | 30.0 | 85.0 | | 10.0 | 50.0 | | 10.0 | 50.0 | |
| Total Split (s) | 14.0 | 72.0 | | 29.0 | 87.0 | | 10.0 | 49.0 | | 10.0 | 49.0 | |
| Total Split (%) | 8.8% | 45.0% | | 18.1% | 54.4% | | 6.3% | 30.6% | | 6.3% | 30.6% | |
| Maximum Green (s) | 7.5 | 66.0 | | 22.5 | 81.0 | | 6.0 | 42.0 | | 6.0 | 42.0 | |
| Yellow Time (s) | 3.0 | 3.5 | | 3.0 | 3.5 | | 3.5 | 3.5 | | 3.5 | 3.5 | |
| All-Red Time (s) | 3.5 | 2.5 | | 3.5 | 2.5 | | 0.5 | 3.5 | | 0.5 | 3.5 | |
| Lost Time Adjust (s) | -1.0 | -3.0 | | -1.0 | -3.0 | | -2.5 | -2.5 | | -2.5 | -2.5 | |
| Total Lost Time (s) | 5.5 | 3.0 | | 5.5 | 3.0 | | 1.5 | 4.5 | | 1.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.5 | 3.5 | | 3.5 | 3.5 | | 3.0 | 3.5 | | 3.0 | 3.5 | |
| Recall Mode | None | C-Min | | None | C-Min | | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 8.0 | | | 8.0 | |
| Flash Dont Walk (s) | | 16.0 | | | 20.0 | | | 32.0 | | | 35.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 82.3 | 76.3 | | 101.9 | 90.4 | | 50.8 | 38.1 | | 47.3 | 33.7 | |
| Actuated g/C Ratio | 0.51 | 0.48 | | 0.64 | 0.56 | | 0.32 | 0.24 | | 0.30 | 0.21 | |
| v/c Ratio | 0.62 | 0.51 | | 0.91 | 0.70 | | 0.52 | 0.55 | | 0.21 | 0.85 | |
| Control Delay | 33.6 | 31.2 | | 56.7 | 28.8 | | 47.7 | 45.7 | | 37.6 | 53.0 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 1.2 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 33.6 | 31.2 | | 56.7 | 30.0 | | 47.7 | 45.7 | | 37.6 | 53.0 | |
| LOS | C | C | | E | C | | D | D | | D | D | |
| Approach Delay | | 31.4 | | | 35.4 | | | 46.2 | | | 50.9 | |
| Approach LOS | | C | | | D | | | D | | | D | |
| 90th %ile Green (s) | 7.5 | 65.5 | | 22.5 | 80.5 | | 6.5 | 42.0 | | 6.5 | 42.0 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | | Max | Hold | | Max | Max | |
| 70th %ile Green (s) | 7.5 | 62.9 | | 22.5 | 77.9 | | 14.1 | 40.7 | | 10.4 | 37.0 | |
| 70th %ile Term Code | Max | Coord | | Max | Coord | | Gap | Hold | | Gap | Gap | |
| 50th %ile Green (s) | 7.5 | 69.8 | | 22.5 | 84.8 | | 12.4 | 34.9 | | 9.3 | 31.8 | |
| 50th %ile Term Code | Max | Coord | | Max | Coord | | Gap | Hold | | Gap | Gap | |
| 30th %ile Green (s) | 7.5 | 76.8 | | 22.5 | 91.8 | | 10.8 | 29.1 | | 8.1 | 26.4 | |
| 30th %ile Term Code | Max | Coord | | Max | Coord | | Gap | Hold | | Gap | Gap | |
| 10th %ile Green (s) | 7.5 | 91.6 | | 17.8 | 101.9 | | 8.5 | 31.1 | | 0.0 | 18.6 | |
| 10th %ile Term Code | Max | Coord | | Gap | Coord | | Gap | Hold | | Skip | Gap | |
| Stops (vph) | 47 | 770 | | 142 | 868 | | 57 | 127 | | 30 | 220 | |
| Fuel Used(gal) | 2 | 26 | | 5 | 19 | | 2 | 4 | | 1 | 7 | |
| CO Emissions (g/hr) | 141 | 1800 | | 381 | 1361 | | 122 | 268 | | 49 | 456 | |
| NOx Emissions (g/hr) | 27 | 350 | | 74 | 265 | | 24 | 52 | | 10 | 89 | |
| VOC Emissions (g/hr) | 33 | 417 | | 88 | 315 | | 28 | 62 | | 11 | 106 | |
| Dilemma Vehicles (#) | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Queue Length 50th (ft) | 47 | 327 | | 224 | 547 | | 72 | 175 | | 44 | 248 | |
| Queue Length 95th (ft) | 70 | 394 | | 262 | 676 | | 110 | 181 | | 65 | 340 | |
| Internal Link Dist (ft) | | 1544 | | | 712 | | | 877 | | | 435 | |
| Turn Bay Length (ft) | 80 | | | 220 | | | 100 | | | 120 | | |
| Base Capacity (vph) | 183 | 2367 | | 393 | 1967 | | 188 | 502 | | 294 | 552 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 349 | | 0 | 0 | | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | |

| Lane Group | NBL | NBT | NBR | SBL | SBT | SBR | SEL | SET | SER | NWL | NWT | NWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reduced v/c Ratio | 0.62 | 0.51 | | 0.89 | 0.85 | | 0.52 | 0.48 | | 0.21 | 0.70 | |

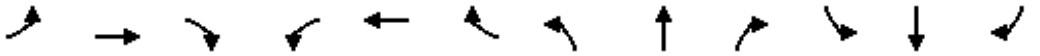
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 160 | | | |
| Actuated Cycle Length: 160 | | | |
| Offset: 123 (77%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green | | | |
| Natural Cycle: 160 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.91 | | | |
| Intersection Signal Delay: 36.8 | | Intersection LOS: D | |
| Intersection Capacity Utilization 80.6% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 3: S Royal Oaks & Riverside Dr/Center Point Pl





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 206 | 1108 | 63 | 976 | 1174 | 269 | 141 | 368 | 999 | 316 | 465 | 178 |
| Future Volume (vph) | 206 | 1108 | 63 | 976 | 1174 | 269 | 141 | 368 | 999 | 316 | 465 | 178 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 11 | 12 | 11 | 12 | 13 | 12 | 13 | 13 | 11 | 11 | 11 |
| Grade (%) | | 0% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 200 | | 300 | 285 | | 0 | 195 | | 450 | 220 | | 650 |
| Storage Lanes | 2 | | 1 | 2 | | 1 | 2 | | 2 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.91 | 0.91 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 0.88 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.991 | | | | 0.850 | | | 0.850 | | 0.953 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3326 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3467 | 4923 | 0 | 3351 | 3539 | 1652 | 3484 | 3712 | 2894 | 3385 | 3326 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | No | | | Yes |
| Satd. Flow (RTOR) | | 7 | | | | 87 | | | | | 44 | |
| Link Speed (mph) | | 40 | | | 40 | | | 30 | | | 30 | |
| Link Distance (ft) | | 700 | | | 691 | | | 792 | | | 964 | |
| Travel Time (s) | | 11.9 | | | 11.8 | | | 18.0 | | | 21.9 | |
| Peak Hour Factor | 0.92 | 0.93 | 0.81 | 0.87 | 0.91 | 0.89 | 0.74 | 0.83 | 0.89 | 0.83 | 0.95 | 0.80 |
| Heavy Vehicles (%) | 1% | 1% | 0% | 1% | 2% | 1% | 0% | 0% | 1% | 0% | 0% | 0% |
| Adj. Flow (vph) | 224 | 1191 | 78 | 1122 | 1290 | 302 | 191 | 443 | 1122 | 381 | 489 | 223 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 224 | 1269 | 0 | 1122 | 1290 | 302 | 191 | 443 | 1122 | 381 | 712 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 30 | | | 24 | | | 30 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.04 | 1.00 | 1.04 | 1.00 | 0.96 | 1.01 | 0.96 | 0.96 | 1.04 | 1.04 | 1.04 |
| Turning Speed (mph) | 18 | | 10 | 18 | | 10 | 18 | | 10 | 18 | | 10 |
| Number of Detectors | 1 | 1 | | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 236 | | 42 | 236 | 0 | 42 | 146 | 42 | 42 | 146 | |
| Trailing Detector (ft) | -3 | 230 | | -3 | 230 | 0 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Position(ft) | -3 | 230 | | -3 | 230 | 230 | -3 | -3 | -3 | -3 | -3 | |
| Detector 1 Size(ft) | 45 | 6 | | 45 | 6 | 6 | 45 | 45 | 45 | 45 | 45 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(ft) | | | | | | | | 140 | | | 140 | |
| Detector 2 Size(ft) | | | | | | | | 6 | | | 6 | |
| Detector 2 Type | | | | | | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | | | | | | | 0.0 | | | 0.0 | |

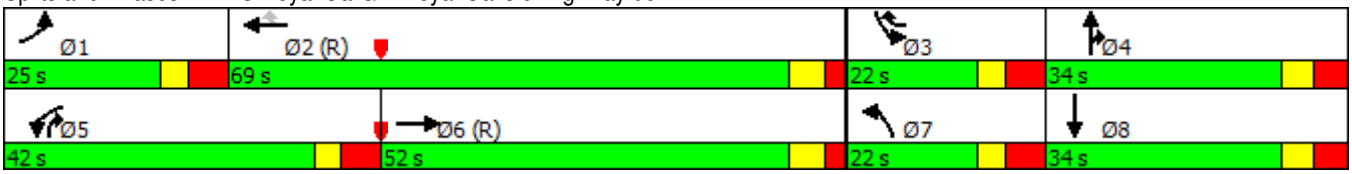


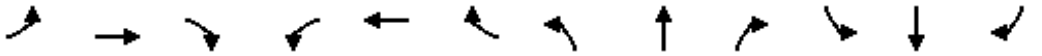
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Type | Prot | NA | | Prot | NA | pm+ov | Prot | NA | pt+ov | Prot | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Permitted Phases | | | | | | 2 | | | | | | |
| Detector Phase | 1 | 6 | | 5 | 2 | 3 | 7 | 4 | 4 5 | 3 | 8 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 6.0 | 13.0 | | 6.0 | 13.0 | 6.0 | 6.0 | 10.0 | | 6.0 | 10.0 | |
| Minimum Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (s) | 25.0 | 52.0 | | 42.0 | 69.0 | 22.0 | 22.0 | 34.0 | | 22.0 | 34.0 | |
| Total Split (%) | 16.7% | 34.7% | | 28.0% | 46.0% | 14.7% | 14.7% | 22.7% | | 14.7% | 22.7% | |
| Maximum Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| Yellow Time (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 3.0 | 3.0 | 3.5 | | 3.0 | 3.5 | |
| All-Red Time (s) | 4.5 | 2.5 | | 4.5 | 2.5 | 4.5 | 4.5 | 4.0 | | 4.5 | 4.0 | |
| Lost Time Adjust (s) | -2.5 | -2.5 | | -2.5 | -2.5 | -2.0 | -2.0 | -3.0 | | -2.0 | -3.0 | |
| Total Lost Time (s) | 5.0 | 4.0 | | 5.0 | 4.0 | 5.5 | 5.5 | 4.5 | | 5.5 | 4.5 | |
| Lead/Lag | Lead | Lag | | Lead | Lag | Lead | Lead | Lag | | Lead | Lag | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 3.0 | 6.0 | | 3.0 | 6.0 | 3.0 | 3.0 | 4.5 | | 3.0 | 4.5 | |
| Recall Mode | None | C-Min | | None | C-Min | None | None | None | | None | None | |
| Walk Time (s) | | 7.0 | | | 7.0 | | | 7.0 | | | 7.0 | |
| Flash Dont Walk (s) | | 37.0 | | | 24.0 | | | 36.0 | | | 36.0 | |
| Pedestrian Calls (#/hr) | | 0 | | | 0 | | | 0 | | | 0 | |
| Act Effct Green (s) | 17.3 | 48.0 | | 37.0 | 67.7 | 88.2 | 14.9 | 29.5 | 71.0 | 16.5 | 31.1 | |
| Actuated g/C Ratio | 0.12 | 0.32 | | 0.25 | 0.45 | 0.59 | 0.10 | 0.20 | 0.47 | 0.11 | 0.21 | |
| v/c Ratio | 0.56 | 0.80 | | 1.36 | 0.81 | 0.30 | 0.55 | 0.61 | 0.82 | 1.02 | 0.98 | |
| Control Delay | 68.7 | 44.7 | | 200.8 | 49.2 | 16.6 | 70.5 | 59.0 | 40.1 | 117.0 | 84.1 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.6 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | |
| Total Delay | 68.7 | 44.7 | | 200.8 | 49.8 | 16.6 | 70.7 | 59.0 | 40.3 | 117.0 | 84.1 | |
| LOS | E | D | | F | D | B | E | E | D | F | F | |
| Approach Delay | | 48.3 | | | 108.5 | | | 48.3 | | | 95.5 | |
| Approach LOS | | D | | | F | | | D | | | F | |
| 90th %ile Green (s) | 17.5 | 45.5 | | 34.5 | 62.5 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| 90th %ile Term Code | Max | Coord | | Max | Coord | Max | Max | Max | | Max | Max | |
| 70th %ile Green (s) | 16.7 | 45.5 | | 34.5 | 63.3 | 14.5 | 14.5 | 26.5 | | 14.5 | 26.5 | |
| 70th %ile Term Code | Gap | Coord | | Max | Coord | Max | Max | Max | | Max | Max | |
| 50th %ile Green (s) | 15.1 | 45.5 | | 34.5 | 64.9 | 14.5 | 13.5 | 26.5 | | 14.5 | 27.5 | |
| 50th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 30th %ile Green (s) | 13.4 | 45.5 | | 34.5 | 66.6 | 14.5 | 12.0 | 26.5 | | 14.5 | 29.0 | |
| 30th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| 10th %ile Green (s) | 11.1 | 45.5 | | 34.5 | 68.9 | 14.5 | 9.8 | 26.5 | | 14.5 | 31.2 | |
| 10th %ile Term Code | Gap | Coord | | Max | Coord | Max | Gap | Max | | Max | Hold | |
| Stops (vph) | 191 | 938 | | 759 | 1064 | 208 | 131 | 330 | 843 | 280 | 539 | |
| Fuel Used(gal) | 6 | 25 | | 55 | 32 | 5 | 4 | 9 | 19 | 11 | 19 | |
| CO Emissions (g/hr) | 401 | 1778 | | 3861 | 2216 | 359 | 253 | 595 | 1327 | 800 | 1315 | |
| NOx Emissions (g/hr) | 78 | 346 | | 751 | 431 | 70 | 49 | 116 | 258 | 156 | 256 | |
| VOC Emissions (g/hr) | 93 | 412 | | 895 | 514 | 83 | 59 | 138 | 308 | 185 | 305 | |
| Dilemma Vehicles (#) | 0 | 44 | | 0 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Queue Length 50th (ft) | 107 | 316 | | ~759 | 580 | 139 | 92 | 210 | 528 | ~203 | ~352 | |
| Queue Length 95th (ft) | 155 | 368 | | m#567 | m517 | m125 | 108 | 246 | 624 | #272 | #505 | |
| Internal Link Dist (ft) | | 620 | | | 611 | | | 712 | | | 884 | |

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turn Bay Length (ft) | 200 | | | 285 | | | 195 | | 450 | 220 | | |
| Base Capacity (vph) | 462 | 1580 | | 826 | 1598 | 1007 | 383 | 730 | 1369 | 372 | 725 | |
| Starvation Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | | 0 | 84 | 0 | 10 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.48 | 0.80 | | 1.36 | 0.85 | 0.30 | 0.51 | 0.61 | 0.83 | 1.02 | 0.98 | |

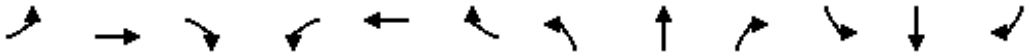
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 133 (89%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.36 | | | |
| Intersection Signal Delay: 78.8 | | Intersection LOS: E | |
| Intersection Capacity Utilization 90.0% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |
| ~ Volume exceeds capacity, queue is theoretically infinite. | | | |
| Queue shown is maximum after two cycles. | | | |
| # 95th percentile volume exceeds capacity, queue may be longer. | | | |
| Queue shown is maximum after two cycles. | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 4: S Royal Oaks/N Royal Oaks & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 0 | 2002 | 488 | 285 | 925 | 0 | 0 | 0 | 0 | 914 | 0 | 1449 |
| Future Volume (vph) | 0 | 2002 | 488 | 285 | 925 | 0 | 0 | 0 | 0 | 914 | 0 | 1449 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 11 |
| Grade (%) | | 0% | | | 0% | | | 0% | | | 1% | |
| Storage Length (ft) | 0 | | 0 | 420 | | 0 | 0 | | 0 | 350 | | 0 |
| Storage Lanes | 0 | | 1 | 0 | | 0 | 0 | | 0 | 2 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.86 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 1.00 | 0.88 |
| Frt | | | 0.850 | | | | | | | | | 0.850 |
| Flt Protected | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Flt Permitted | | | | 0.950 | | | | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 6408 | 1583 | 1787 | 3455 | 0 | 0 | 0 | 0 | 3450 | 0 | 2707 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 400 | | | | | | | | | 135 |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 501 | | | 556 | | | 756 | | | 888 | |
| Travel Time (s) | | 8.5 | | | 9.5 | | | 20.6 | | | 24.2 | |
| Peak Hour Factor | 1.00 | 0.93 | 0.78 | 0.71 | 0.86 | 1.00 | 1.00 | 1.00 | 1.00 | 0.87 | 1.00 | 0.88 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 1% | 1% | 2% | 2% | 2% | 2% | 1% | 2% | 1% |
| Adj. Flow (vph) | 0 | 2153 | 626 | 401 | 1076 | 0 | 0 | 0 | 0 | 1051 | 0 | 1647 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 2153 | 626 | 401 | 1076 | 0 | 0 | 0 | 0 | 1051 | 0 | 1647 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 12 | | | 12 | | | 24 | | | 24 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.05 |
| Turning Speed (mph) | 15 | | 12 | 15 | | 9 | 15 | | 9 | 18 | | 12 |
| Number of Detectors | | 1 | 0 | 1 | 1 | | | | | 1 | | 1 |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | | 300 | 0 | 42 | 300 | | | | | 42 | | 42 |
| Trailing Detector (ft) | | 294 | 0 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Position(ft) | | 294 | -3 | -3 | 294 | | | | | -3 | | -3 |
| Detector 1 Size(ft) | | 6 | 45 | 45 | 6 | | | | | 45 | | 45 |
| Detector 1 Type | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | | | | | Cl+Ex | | Cl+Ex |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Queue (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Detector 1 Delay (s) | | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.0 | | 0.0 |
| Turn Type | | NA | Perm | Prot | NA | | | | | Prot | | Prot |
| Protected Phases | | 6 | | 5 | 2 | | | | | 4 | | 4 |
| Permitted Phases | | | 6 | | | | | | | | | |
| Detector Phase | | 6 | 6 | 5 | 2 | | | | | 4 | | 4 |
| Switch Phase | | | | | | | | | | | | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | | 25.0 | 25.0 | 5.0 | 25.0 | | | | | 15.0 | | 15.0 |
| Minimum Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (s) | | 55.0 | 55.0 | 30.0 | 85.0 | | | | | 65.0 | | 65.0 |
| Total Split (%) | | 36.7% | 36.7% | 20.0% | 56.7% | | | | | 43.3% | | 43.3% |
| Maximum Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| Yellow Time (s) | | 4.0 | 4.0 | 3.0 | 4.0 | | | | | 4.0 | | 4.0 |
| All-Red Time (s) | | 2.0 | 2.0 | 3.0 | 2.0 | | | | | 3.5 | | 3.5 |
| Lost Time Adjust (s) | | -2.0 | -2.0 | -1.0 | -2.0 | | | | | -2.0 | | -2.0 |
| Total Lost Time (s) | | 4.0 | 4.0 | 5.0 | 4.0 | | | | | 5.5 | | 5.5 |
| Lead/Lag | | Lag | Lag | Lead | | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | | 4.5 | 4.5 | 3.0 | 4.5 | | | | | 3.0 | | 3.0 |
| Recall Mode | | C-Min | C-Min | None | C-Min | | | | | None | | None |
| Act Effct Green (s) | | 51.0 | 51.0 | 25.0 | 81.0 | | | | | 59.5 | | 59.5 |
| Actuated g/C Ratio | | 0.34 | 0.34 | 0.17 | 0.54 | | | | | 0.40 | | 0.40 |
| v/c Ratio | | 0.99 | 0.78 | 1.35 | 0.58 | | | | | 0.77 | | 1.43 |
| Control Delay | | 72.0 | 30.6 | 226.4 | 26.5 | | | | | 43.9 | | 229.0 |
| Queue Delay | | 1.3 | 0.0 | 0.0 | 0.9 | | | | | 1.8 | | 0.0 |
| Total Delay | | 73.3 | 30.6 | 226.4 | 27.4 | | | | | 45.7 | | 229.0 |
| LOS | | E | C | F | C | | | | | D | | F |
| Approach Delay | | 63.7 | | | 81.4 | | | | | | | |
| Approach LOS | | E | | | F | | | | | | | |
| 90th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 90th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 70th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 70th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 50th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 50th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 30th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 30th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| 10th %ile Green (s) | | 49.0 | 49.0 | 24.0 | 79.0 | | | | | 57.5 | | 57.5 |
| 10th %ile Term Code | | Coord | Coord | Max | Coord | | | | | Max | | Max |
| Stops (vph) | | 1876 | 474 | 222 | 498 | | | | | 776 | | 998 |
| Fuel Used(gal) | | 64 | 12 | 16 | 13 | | | | | 18 | | 82 |
| CO Emissions (g/hr) | | 4472 | 814 | 1146 | 935 | | | | | 1262 | | 5755 |
| NOx Emissions (g/hr) | | 870 | 158 | 223 | 182 | | | | | 246 | | 1120 |
| VOC Emissions (g/hr) | | 1036 | 189 | 266 | 217 | | | | | 292 | | 1334 |
| Dilemma Vehicles (#) | | 105 | 0 | 0 | 51 | | | | | 0 | | 0 |
| Queue Length 50th (ft) | | 637 | 324 | ~525 | 287 | | | | | 457 | | ~1192 |
| Queue Length 95th (ft) | | m#693 | m295 | #521 | 430 | | | | | 515 | | #1297 |
| Internal Link Dist (ft) | | 421 | | | 476 | | | 676 | | | 808 | |
| Turn Bay Length (ft) | | | | 420 | | | | | | 350 | | |
| Base Capacity (vph) | | 2178 | 802 | 297 | 1865 | | | | | 1368 | | 1155 |
| Starvation Cap Reductn | | 0 | 0 | 0 | 464 | | | | | 0 | | 0 |
| Spillback Cap Reductn | | 14 | 0 | 0 | 0 | | | | | 172 | | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | | | | | 0 | | 0 |
| Reduced v/c Ratio | | 0.99 | 0.78 | 1.35 | 0.77 | | | | | 0.88 | | 1.43 |

Intersection Summary

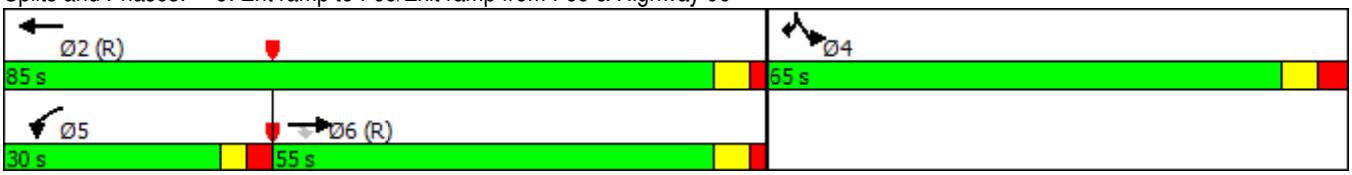
| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 104 (69%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.43 | | | |
| Intersection Signal Delay: 103.9 | | Intersection LOS: F | |
| Intersection Capacity Utilization 84.9% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

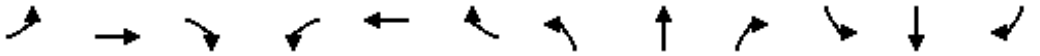
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

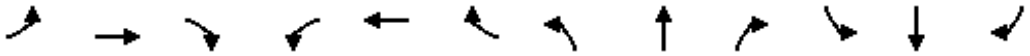
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Ent ramp to I-65/Exit ramp from I-65 & Highway 96





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 619 | 2297 | 0 | 0 | 895 | 998 | 315 | 0 | 164 | 0 | 0 | 0 |
| Future Volume (vph) | 619 | 2297 | 0 | 0 | 895 | 998 | 315 | 0 | 164 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 11 | 11 | 12 | 12 | 12 | 12 | 11 | 12 | 13 | 12 | 12 | 12 |
| Grade (%) | | 1% | | | 0% | | | 1% | | | 0% | |
| Storage Length (ft) | 0 | | 0 | 0 | | 0 | 270 | | 0 | 0 | | 0 |
| Storage Lanes | 2 | | 0 | 0 | | 2 | 2 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 50 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 0.88 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | | 0.850 | | | 0.850 | | | |
| Flt Protected | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (prot) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Flt Permitted | 0.950 | | | | | | 0.950 | | | | | |
| Satd. Flow (perm) | 3270 | 3371 | 0 | 0 | 3539 | 2787 | 3302 | 0 | 1597 | 0 | 0 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | | 226 | | | 69 | | | |
| Link Speed (mph) | | 40 | | | 40 | | | 25 | | | 25 | |
| Link Distance (ft) | | 556 | | | 1845 | | | 685 | | | 941 | |
| Travel Time (s) | | 9.5 | | | 31.4 | | | 18.7 | | | 25.7 | |
| Peak Hour Factor | 0.97 | 0.98 | 1.00 | 0.25 | 0.91 | 0.93 | 0.92 | 1.00 | 0.87 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 3% | 3% | 2% | 0% | 2% | 2% | 2% | 2% | 4% | 2% | 2% | 2% |
| Adj. Flow (vph) | 638 | 2344 | 0 | 0 | 984 | 1073 | 342 | 0 | 189 | 0 | 0 | 0 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 638 | 2344 | 0 | 0 | 984 | 1073 | 342 | 0 | 189 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) | | 22 | | | 26 | | | 22 | | | 22 | |
| Link Offset(ft) | | 0 | | | 0 | | | 0 | | | 0 | |
| Crosswalk Width(ft) | | 16 | | | 16 | | | 16 | | | 16 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.05 | 1.05 | 1.01 | 1.00 | 1.00 | 1.00 | 1.05 | 1.01 | 0.96 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 18 | | 9 | 15 | | 10 | 15 | | 15 | 15 | | 9 |
| Number of Detectors | 1 | 1 | | | 1 | 0 | 1 | | 1 | | | |
| Detector Template | | | | | | | | | | | | |
| Leading Detector (ft) | 42 | 300 | | | 300 | 0 | 42 | | 50 | | | |
| Trailing Detector (ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Position(ft) | -3 | 294 | | | 294 | 0 | -3 | | 0 | | | |
| Detector 1 Size(ft) | 45 | 6 | | | 6 | 50 | 45 | | 50 | | | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | | Cl+Ex | Cl+Ex | Cl+Ex | | Cl+Ex | | | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Turn Type | Prot | NA | | | NA | custom | Prot | | Perm | | | |
| Protected Phases | 1 | 6 | | | 2 | 2 4 | 4 | | | | | |
| Permitted Phases | | | | | | | | | 4 | | | |
| Detector Phase | 1 | 6 | | | 2 | 2 4 | 4 | | 4 | | | |
| Switch Phase | | | | | | | | | | | | |

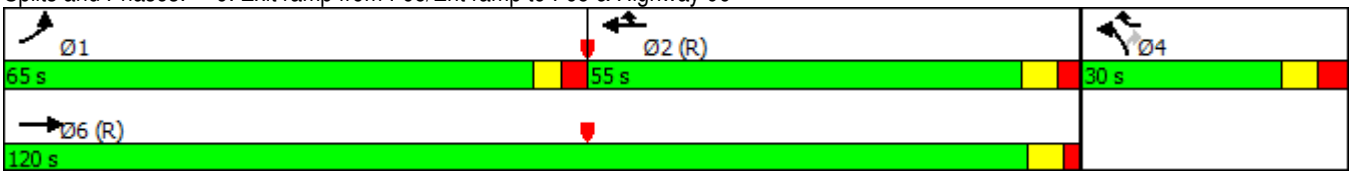


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum Initial (s) | 12.0 | 18.0 | | | 18.0 | | 7.0 | | 7.0 | | | |
| Minimum Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (s) | 65.0 | 120.0 | | | 55.0 | | 30.0 | | 30.0 | | | |
| Total Split (%) | 43.3% | 80.0% | | | 36.7% | | 20.0% | | 20.0% | | | |
| Maximum Green (s) | 59.0 | 114.0 | | | 48.5 | | 22.5 | | 22.5 | | | |
| Yellow Time (s) | 3.0 | 4.0 | | | 4.0 | | 4.0 | | 4.0 | | | |
| All-Red Time (s) | 3.0 | 2.0 | | | 2.5 | | 3.5 | | 3.5 | | | |
| Lost Time Adjust (s) | 0.0 | 0.0 | | | 0.0 | | 0.0 | | 0.0 | | | |
| Total Lost Time (s) | 6.0 | 6.0 | | | 6.5 | | 7.5 | | 7.5 | | | |
| Lead/Lag | Lead | | | | Lag | | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | | | | |
| Vehicle Extension (s) | 4.0 | 4.5 | | | 4.5 | | 3.0 | | 3.0 | | | |
| Recall Mode | None | C-Min | | | C-Min | | None | | None | | | |
| Act Effct Green (s) | 37.2 | 114.6 | | | 70.9 | 102.3 | 21.9 | | 21.9 | | | |
| Actuated g/C Ratio | 0.25 | 0.76 | | | 0.47 | 0.68 | 0.15 | | 0.15 | | | |
| v/c Ratio | 0.79 | 0.91 | | | 0.59 | 0.54 | 0.71 | | 0.65 | | | |
| Control Delay | 79.7 | 23.9 | | | 31.8 | 10.9 | 69.9 | | 48.9 | | | |
| Queue Delay | 0.0 | 5.4 | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Total Delay | 79.7 | 29.3 | | | 31.8 | 10.9 | 69.9 | | 48.9 | | | |
| LOS | E | C | | | C | B | E | | D | | | |
| Approach Delay | | 40.1 | | | 20.9 | | | | | | | |
| Approach LOS | | D | | | C | | | | | | | |
| 90th %ile Green (s) | 45.2 | 114.0 | | | 62.3 | | 22.5 | | 22.5 | | | |
| 90th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 70th %ile Green (s) | 40.9 | 114.0 | | | 66.6 | | 22.5 | | 22.5 | | | |
| 70th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 50th %ile Green (s) | 37.2 | 114.0 | | | 70.3 | | 22.5 | | 22.5 | | | |
| 50th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 30th %ile Green (s) | 34.1 | 114.0 | | | 73.4 | | 22.5 | | 22.5 | | | |
| 30th %ile Term Code | Gap | Coord | | | Coord | | Max | | Max | | | |
| 10th %ile Green (s) | 28.8 | 117.2 | | | 81.9 | | 19.3 | | 19.3 | | | |
| 10th %ile Term Code | Gap | Coord | | | Coord | | Gap | | Gap | | | |
| Stops (vph) | 610 | 1847 | | | 646 | 395 | 295 | | 100 | | | |
| Fuel Used(gal) | 18 | 38 | | | 23 | 19 | 7 | | 3 | | | |
| CO Emissions (g/hr) | 1284 | 2656 | | | 1632 | 1299 | 521 | | 208 | | | |
| NOx Emissions (g/hr) | 250 | 517 | | | 317 | 253 | 101 | | 40 | | | |
| VOC Emissions (g/hr) | 298 | 615 | | | 378 | 301 | 121 | | 48 | | | |
| Dilemma Vehicles (#) | 0 | 83 | | | 30 | 0 | 0 | | 0 | | | |
| Queue Length 50th (ft) | 342 | 589 | | | 366 | 218 | 165 | | 112 | | | |
| Queue Length 95th (ft) | m344 | m499 | | | 485 | 327 | 222 | | 190 | | | |
| Internal Link Dist (ft) | | 476 | | | 1765 | | | 605 | | | 861 | |
| Turn Bay Length (ft) | | | | | | | 270 | | | | | |
| Base Capacity (vph) | 1286 | 2575 | | | 1672 | 1982 | 495 | | 298 | | | |
| Starvation Cap Reductn | 0 | 199 | | | 0 | 0 | 0 | | 0 | | | |
| Spillback Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Storage Cap Reductn | 0 | 0 | | | 0 | 0 | 0 | | 0 | | | |
| Reduced v/c Ratio | 0.50 | 0.99 | | | 0.59 | 0.54 | 0.69 | | 0.63 | | | |

Intersection Summary

| | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 150 | | | |
| Actuated Cycle Length: 150 | | | |
| Offset: 138 (92%), Referenced to phase 2:WBT and 6:EBT, Start of Green | | | |
| Natural Cycle: 150 | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.91 | | | |
| Intersection Signal Delay: 35.1 | | Intersection LOS: D | |
| Intersection Capacity Utilization 84.9% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |
| m Volume for 95th percentile queue is metered by upstream signal. | | | |

Splits and Phases: 6: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



**APPENDIX D**
**TRIP GENERATION**

**TRIP GENERATION CALCULATIONS – Assisted Living**

The following calculations are based on the data compiled for ITE Land Use Code 254.

**Average Daily Traffic**

T = 2.74 (X)
T = 2.74 (**208**)
T = 570 vehicles

Enter = 0.50 (570) = 285 vehicles
Exit = 0.50 (570) = 285 vehicles

**AM traffic during peak hour of adjacent street**

T = 0.23 (X)
T = 0.23 (**208**)
T = 47 vehicles

Enter = 0.72 (47) = 34 vehicles
Exit = 0.28 (47) = 13 vehicles

**PM traffic during peak hour of adjacent street**

T = 0.37 (X)
T = 0.37 (**208**)
T = 77 vehicles

Enter = 0.39 (77) = 30 vehicles
Exit = 0.61 (77) = 47 vehicles

**TRIP GENERATION CALCULATIONS – Multi-Family (South)**

The following calculations are based on the data compiled for ITE Land Use Code 220.

**Average Daily Traffic**

T = 6.65 (X)
T = 6.65 (**98**)
T = 652 vehicle-trips

Enter = 0.50 (652) = 326 vehicles
Exit = 0.50 (652) = 326 vehicles

**A.M. traffic during peak hour of adjacent street**

T = 0.51 (X)
T = 0.51 (**98**)
T = 50 vehicle-trips

Enter = 0.20 (50) = 10 vehicles
Exit = 0.80 (50) = 40 vehicles

**P.M. traffic during peak hour of adjacent street**

T = 0.62 (X)
T = 0.62 (**98**)
T = 60 vehicle-trips

Enter = 0.65 (60) = 39 vehicles
Exit = 0.35 (60) = 21 vehicles

**TRIP GENERATION CALCULATIONS – Multi-Family (North)**

The following calculations are based on the data compiled for ITE Land Use Code 220.

**Average Daily Traffic**

T = 6.65 (X)
T = 6.65 (**204**)
T = 1,356 vehicle-trips

Enter = 0.50 (1,356) = 678 vehicles
Exit = 0.50 (1,356) = 678 vehicles

**A.M. traffic during peak hour of adjacent street**

T = 0.51 (X)
T = 0.51 (**204**)
T = 104 vehicle-trips

Enter = 0.20 (104) = 21 vehicles
Exit = 0.80 (104) = 83 vehicles

**P.M. traffic during peak hour of adjacent street**

T = 0.62 (X)
T = 0.62 (**204**)
T = 126 vehicle-trips

Enter = 0.65 (126) = 82 vehicles
Exit = 0.35 (126) = 44 vehicles

**TRIP GENERATION CALCULATIONS – Specialty Retail**

The following calculations are based on the data compiled for ITE Land Use Code 826.

**Average Daily Traffic**

T = 44.32 (X)
T = 44.32 (**15.000**)
T = 664 vehicle-trips

Enter = 0.50 (664) = 332 vehicles
Exit = 0.50 (664) = 332 vehicles

**A.M. traffic during peak hour of adjacent street**

T = 6.84 (X)
T = 6.84 (**15.000**)
T = 102 vehicle-trips

Enter = 0.48 (102) = 49 vehicles
Exit = 0.52 (102) = 53 vehicles

**P.M. traffic during peak hour of adjacent street**

T = 2.71 (X)
T = 2.71 (**15.000**)
T = 41 vehicle-trips

Enter = 0.44 (41) = 18 vehicles
Exit = 0.56 (41) = 23 vehicles

HISTORIC FRANKLIN TENNESSEE

# MEMORANDUM

**DATE:** April 20, 2016

**TO:** Franklin Municipal Planning Commission

**FROM:** Amy Diaz-Barriga, Current Planning Supervisor
Bob Martin, Interim Director of Planning and Sustainability

**Subject**

..title

Consideration Of Resolution 2016-20, To Be Entitled: "A Resolution Approving A Development Plan For Epoch Development PUD Subdivision With 1 Modifications Of Development Standards (Parking Reduction), For The Property Located West Of Interstate 65, At 840 And 880 Oak Meadow Drive."

..body

**Project Information**

**COF Project Number: 6086**
**Applicant:** **Adam Crunk, Crunk Engineering**
**Owner:** **Warner Bass**

**Background/Staff Comments**

The design of this plan is to accommodate buildings and parking lots, with no regard to the open space that will benefit the residents. This means that ***there will be too much density and surface parking*** for the site. None of their buildings seem to have a primary entrance, and seven of the entry points into the building violate the requirement that "primary entrances or facades shall not be oriented towards off-street parking lots, garages, or carports", per section 5.3.5(3)(a)(ii) of the Zoning Ordinance. They are not providing the required amount of green space within their formal open spaces. Section 5.5.3(5)(iii)(A) of the Zoning Ordinance states that "no more than 25 percent of the formal open space set-aside shall be paved." Their plan includes the leasing/amenity center, the pool house, and both pools in their formal open space calculations, and this amount of impervious surface amounts to approximately 40 percent of their provided formal open space. The leasing offices within the Leasing/Amenity Center building cannot be considered as part of their formal open space. Furthermore, all of the green open spaces that *are* within the plan seem to be "throw away" spaces, without being integrated into the plan and without consideration for how these spaces could benefit the residents.

Beyond open space and building orientation, there are other issues with the site. There will be no traffic-calming devices along the drive aisle that parallels the I-65 corridor. It is over 800 feet in length, and without a jog in the vehicular path or other traffic calming designs, drivers can gain considerable speeds that create an unsafe environment for both residents and visitors. Engineering is also skeptical that a fire truck can make the turning radius shown on the driveway connecting to the access drive to

Home Depot. While the turn is shown to work in two-dimensions on the plan, this driveway is sloping at an angle such that, without a profile of the intersection, there is a concern that the fire truck may tip over trying to make a turn. In terms of stormwater, Engineering feels that the small amount of detention shown, as well as the lack of any water-quality areas shown, very well may be insufficient to make the plan feasible. There is also a concern that the grading along Oak Meadow Drive for the northern portion of the site is shown within the right-of-way, which is prohibited. As this area of the plan is graded now, water would run down this hill directly onto the right-of-way, without being captured in any way for detention and water quality. Lastly, the volume of water being re-directed to the north of the property is cause for concern without verifying the size of the existing pipe, which this plan had not done.

**Project Considerations**

*Project Considerations are not conditions of this approval, but are intended to highlight issues that should be considered in the overall site design or may be required when more detailed plans are submitted for review. These items are not meant to be exhaustive and all City requirements and ordinances must be met with each plan submittal.*

This plan has no rational nexus between the open spaces and their usefulness for the residents. A plan that increases the heights and reduces the footprints of these buildings, and incorporates parking structures into the site, could open the door to a design that creates thoughtful and usable open spaces for the residents, as well as more spaces for stormwater requirements.

**Modifications of Standards**

The applicant is requesting a modification of standards to the minimum parking standards provided in Table 5-9 of the Zoning Ordinance. The table requires 1.5 spaces for every one-bedroom unit, 2.5 spaces for every two-bedroom unit, and 3 spaces for every three-bedroom unit. With their breakdown of unit types, the plan requires an equivalent to 2.14 parking spaces per unit. The applicant is requesting to use a calculation of 1.75 parking spaces per unit. The requirements of Table 5-9 were recently revised to reduce the required parking spaces for multifamily uses. In 2013, Planning did a study of parking requirements and corresponding demand of the multifamily uses within Franklin, in response for several Modifications of Standards to reduce required parking standards. After the study was completed, it found that while a reduction in the parking requirements was warranted, and some developments that requested parking reductions were now undersized to meet their actual parking demand. A revision to Table 5-9 was approved, and it was understood at the time that Planning would no longer support a modification of standards for reduced parking on attached residential uses.

Further, the Fire Department has had several issues with attached residential developments and their parking lots. Several developments seem to be underparked, and residents or visitors have resorted to parking along drive aisles or within fire lanes, making access for fire trucks a serious concern. Specifically, Dwell has been cited by Fire many times for parking in drive aisles. Additional fire lane striping has been painted onto these drive aisles, and residents still continue to park in these illegal areas. Dwell has even contact Wayne Mobley with Fire and has asked how they can create more

parking on-site. It is important to remember that Dwell received a Modification of Standards for a reduced parking standard that equated to 1.91 parking spaces per unit.

Because of the recent revision to the parking standards table, and the trouble to the Fire Department caused by underparked developments, disapproval of this M.O.S is recommended.

**Design Modifications**

The applicant is requesting a design modification to section 5.3.5(3)(b)(ii), which states that the maximum length of any attached residential building shall be 200 feet. They are requesting a maximum length of 215 feet. The conceptual elevations show an acceptable level of architectural detailing and façade variation, and therefore Planning recommends approval of this design modification.

**Recommendation**

..recommendation

**Disapproval.**

..end

See attached pages for a list of staff recommended conditions of approval.

**PROCEDURAL REQUIREMENTS:**

1. If the plan receives BOMA approval, the applicant shall upload the corrected plan to the online plan review website (https://franklin.contractorsplanroom.com/secure/). All revisions to the approved plans shall be "clouded." With the resubmittal, each condition of approval/open issue in the online plan review system shall contain a full response from the applicant as to the satisfaction or completion of that condition.
2. The city's project identification number shall be included on all correspondence with any city department relative to this project.

**COF no: 6086**

**CONDITIONS OF APPROVAL:**

## Engineering - 2015 Site Plan Checklist

### General Comments

#### 1. C3.0 - Overall Grading & Drainage Plan

- The grading plan has changed since the previous submittal. These issues must be addressed. A sewer manhole is indicated at the southern property corner of the northern section. A storm drainage headwall and pipe are in close proximity of the manhole. The headwall must be located outside of any sewer easement. Provide the discharge point and the swale or grassy area for the swimming pool discharge. Swimming pool backwash is not permitted to flow into the sewer system or any bioretention or stormwater quality area. Provide the capacity of the downstream stormwater pipes and structures.

## Engineering - PUD Plan Checklist

### General Comments

#### 2. F. Development Plan

- The engineering department told the applicant at the original pre-application meeting that they should evaluate the proposed development and subdivisions of these parcels together and not separately. During the first round of review it was our understanding that access to undeveloped commercial property would be provided through a cross access easement associated with this PUD. After discussing this in detail we need to provide some additional clarity to this issue. Below is a new comment resulting from internal discussions.

Access to a corner lot fronting on an arterial street, and bordered by a collector or local street shall be required to have access **only from the collector** or local street. The engineering department is recommending disapproval of this PUD plan until we determine how the access will be provided from the collector roadway. On Collector streets, no driveway shall be established within two-hundred and thirty (230) feet of an intersecting street. The proposed undeveloped commercial property does not have 230 feet of frontage. The proposed undeveloped commercial property needs to have a commercial access to Oak Meadow Drive for engineering to support this subdivision. A cross access easement that goes directly in front of the Amenity & Leasing Center is not adequate to support the future undeveloped commercial property.

The Existing median cut on S Royal Oaks Blvd was measured at approximately 450’ from the radius return of Oak Meadow Drive. South Royal Oaks is one of 4 streets that provides East / West Connection from I-65 to Mack Hatcher Parkway. Access along this roadway should be limited and controlled. Access to South Royal Oaks was not evaluated as part of the traffic impact study. The applicant shall change the lot lines and provide the necessary roadway frontage along Oak Meadow Drive to allow for a commercial property. The shared access shall be designed to handle the existing/proposed use (commercial/office).

Engineering is recommending disapproval of the proposed PUD.

#### 3. I. Utility Plan

- 

The reply to the previous issue "Clearly label locations of any trash compactors on the utility plan. Trash compactors must be covered and connected to the sewer system with the proper separator." brings about the following issue. The sewer service line that serves the maintenance building must be a separate service line from the line that serves the compactor. Sewer service lines must serve one building only. An 8" sewer line must be extended to the end service line.

## Engineering - Site Plan Checklist

### General Comments

#### 4. E. Roadway Design and Plan & Profile

- Sight triangles will be re-evaluated at site plan submittal and must be shown on the landscape plans.

#### 5. I. Grading Plan

- The previous comment "Applicant shall provide existing and proposed site topography with clear contour labels. Post-development contours must tie to existing within limits of disturbance. Aerial topography shall not be used as the basis of design for site work or to establish existing elevations for construction purposes." was not completely addressed. Provide labeling on the existing contours. Show how stormwater will flow from the site adjacent to Oak Meadows Drive and be intercepted so it will not flow onto the street. The survey information is not complete. There and existing drainage structures with no connecting pipes. Grading onto the Oak Meadows Drive right-of-way is not permitted for the embankment below the building.

#### 6. I. Grading Plan

- The previous comment "Applicant shall provide top and bottom retaining wall elevations at critical locations on grading plan. The height of the retaining wall must meet City of Franklin Standards." was not completely addressed. The placement of the wall indicates grading to be placed in the Oak Meadow Drive right-of-way which is not permitted. A sidewalk must be installed along the entire development adjacent to Oak Meadow Drive. Detention pond calculations are not required for the development plan but the space provided for detention indicates it will not provide the required volume. There will also be areas required to meet water quality and infiltration requirements which have not been considered in the design.

#### 7. Access

-

The previous comment "Provide a profile of the steep entrance ramp and show that vehicles are able to enter and exit the ramp to the north and the south." was not completely addressed. Provide a profile of the existing access drive located on the western boundary of the northern portion of the site. Continue the profile onto the drive to the northern apartment units. Show that emergency equipment can travel downhill on the joint access drive make the turn and continue uphill on the access drive to that apartments. Make it clear that the equipment will not roll over or damage the equipment in anyway. Also show that the emergency equipment can travel down the access drive from the apartments and continue up the hill on the joint access drive.

## Fire-Planning

### General Comments

#### 8. Access

- The applicant has not fully addressed the previous review comment concerning drive aisle length measurements not to exceed 150 without a code-compliant turn-around (International Fire Code).

The drive aisle at the Amenity/Leasing Center is approximately 265 feet from centerline of the main roadway to the end of the drive aisle without an acceptable turn-around.

The dead-end drive aisle extending to the front of the 25-unit building at the eastern edge of the South Site measures at 160 feet from the center line of the main roadway.

The applicant shall ensure no dead-end drive aisle exists over 150 feet without an acceptable turn-around in accordance with the International Fire Code.

#### 9. Fire Protection

- The flow test result provided has a test date of April 30, 2016.

The development plan package was accepted for review on April 8, 2016. The review occurred on April 13, 2016.

The applicant shall provide clarification on the fire demand flow test date because, as submitted, the test occurred 22 calendar days after the documents were submitted for review

## Planning

### 2016-03-14 The Epoch Development PUD Plans.pdf

#### 10. Cover sheet

- The applicant shall add sheet numbers to all architectural elevation sheets.

#### 11. Site Plan/Site Layout page

- The applicant shall show the 30' utility easement on the site layout sheet, in the same location as identified on the Watson Glen Subdivision, Section 1, Revision 17

#### 12. Open Space

- The applicant will be required to revise the site plan to provide for the required formal open space (1.52 acres); the current plan is deficient the required formal open space, because amenity centers and pools cannot be used for formal open spaces.

#### 13. Site Plan/Site Layout page

- The applicant shall revise the plan to remove the "raceway" drive aisle that parallels the highway. At over 800' of uninterrupted drive lane with no design elements included to slow a driver down, this situation will create a speedway through the development. It is also an undesirable design, as there is nothing--building, open space, or site feature--at the end of the drive aisle to act as a terminus.

## Planning (Landscape)

### General Comments

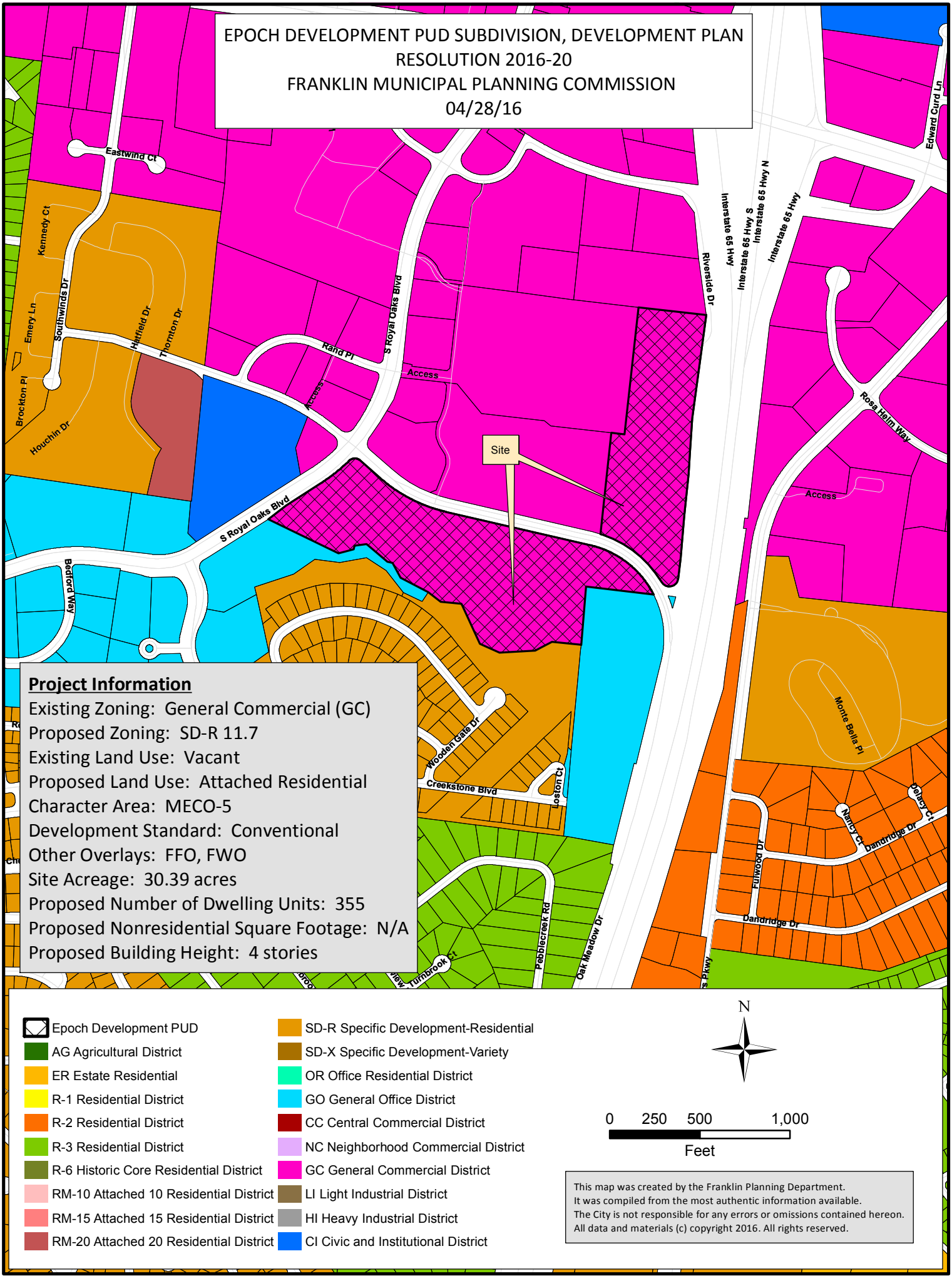
#### 14. Parking lot street along I-65

- This is a condition to break this up!

#### 15. Site Plan

- If the applicant had met with the staff as requested instead of just adjusting some of the site all of the issues with site could have been resolved.

All concerns and conditions remain unresolved.


EPOCH DEVELOPMENT PUD SUBDIVISION, DEVELOPMENT PLAN
RESOLUTION 2016-20
FRANKLIN MUNICIPAL PLANNING COMMISSION
04/28/16
Eastwind Ct
Kennedy Ct
Emery Ln
Southwinds Dr
Hatfield Dr
Thornton Dr
Brockton Pl
Houchin Dr
Rand Pl
S Royal Oaks Blvd
Access
Access
Site
Riverside Dr
Interstate 65 Hwy
Interstate 65 Hwy S
Interstate 65 Hwy N
Interstate 65 Hwy
Edward Curd Ln
Rosa Helm Way
Access
S Royal Oaks Blvd
Bedford Way
Wooden Gate Dr
Creekstone Blvd
Loston Ct
Monte Bella Pl
Nancy Ct
Delacy Ct
Dandridge Dr
Fullwood Dr
Dandridge Dr
Pebblecreek Rd
Oak Meadow Dr
Turnbrook Ct
Project Information
Existing Zoning: General Commercial (GC)
Proposed Zoning: SD-R 11.7
Existing Land Use: Vacant
Proposed Land Use: Attached Residential
Character Area: MECO-5
Development Standard: Conventional
Other Overlays: FFO, FWO
Site Acreage: 30.39 acres
Proposed Number of Dwelling Units: 355
Proposed Nonresidential Square Footage: N/A
Proposed Building Height: 4 stories
Epoch Development PUD
AG Agricultural District
ER Estate Residential
R-1 Residential District
R-2 Residential District
R-3 Residential District
R-6 Historic Core Residential District
RM-10 Attached 10 Residential District
RM-15 Attached 15 Residential District
RM-20 Attached 20 Residential District
SD-R Specific Development-Residential
SD-X Specific Development-Variety
OR Office Residential District
GO General Office District
CC Central Commercial District
NC Neighborhood Commercial District
GC General Commercial District
LI Light Industrial District
HI Heavy Industrial District
CI Civic and Institutional District
N
0 250 500 1,000
Feet
This map was created by the Franklin Planning Department.
It was compiled from the most authentic information available.
The City is not responsible for any errors or omissions contained hereon.
All data and materials (c) copyright 2016. All rights reserved.

**RESOLUTION 2016-20**

**TO BE ENTITLED: "A RESOLUTION APPROVING A DEVELOPMENT PLAN FOR EPOCH DEVELOPMENT PUD SUBDIVISION WITH 1 MODIFICATIONS OF DEVELOPMENT STANDARDS (PARKING REDUCTION), FOR THE PROPERTY LOCATED WEST OF INTERSTATE 65, AT 840 AND 880 OAK MEADOW DRIVE."**

**WHEREAS**, the Board of Mayor and Alderman (BOMA) of the City of Franklin, Tennessee, has, or will, approve the zoning for the property as part of Ordinance 2016-008; and

**WHEREAS,** the Planned Unit Development (PUD) process is a review procedure that is intended to encourage innovative land planning and design and avoid the monotony sometimes associated with large developments by:

(a) Reducing or eliminating the inflexibility that sometimes results from strict application of zoning standards that were designed primarily for individual lots;

(b) Allowing greater freedom in selecting the means to provide access, light, open space, and design amenities;

(c) Encouraging a sensitive design that respects the surrounding established land use character and natural or man-made features of the site including, but not limited to, trees, historic features, streams, hillsides, and floodplains;

(d) Promoting quality design and environmentally sensitive development by allowing development to take advantage of special site characteristics, locations, and land uses; and

(e) Allowing deviations from certain zoning standards that would otherwise apply if not contrary to the general spirit and intent of this ordinance; and

**WHEREAS**, the PUD process requires the approval of a Development Plan that is reviewed and approved by BOMA, after a public hearing and a recommendation by the Franklin Municipal Planning Commission.

**NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF MAYOR AND ALDERMAN OF THE CITY OF FRANKLIN, TENNESSEE, AS FOLLOWS:**

**SECTION I.** That the legal description of the property included in the Development Plan is as follows:

PREMISES CONSIDERED

| Map-Parcel | Acres |
|---|---|
| 79-88 (portion of) | 13.06 |
| 79.101.19 | 17.33 |
| Total | 30.39 |

**LOT 24**
**MAP 79, PORTION OF PARCEL 88.00**
**SURVEY TRACT 1**

A TRACT OF LAND IN THE NINTH CIVIL DISTRICT OF WILLIAMSON COUNTY, CITY OF FRANKLIN, TENNESSEE AND BEING GENERALLY BOUNDED ON THE NORTH BY OAK MEADOW DRIVE, (RIGHT-OF-WAY WIDTH VARIES), ON THE EAST BY NASHVILLE LODGE NO. 72, B.P.O. ELKS,



Law Dept. approved 04.18.16

RECORDED IN DEED BOOK 1708, PAGE 12, REGISTER'S OFFICE FOR WILLIAMSON COUNTY, TENNESSEE (R.O.W.C.,T.) ON THE SOUTH BY OPEN SPACE LOT 808 AS SHOWN ON THE PLAN ENTITLED "CREEKSTONE COMMONS, P.U.D SUBDIVISION, SECTION FOUR" OF RECORD IN PLAT BOOK P58, PAGE 10, R.O.W.C.,T. AND LOT 27 AS SHOWN ON THE PLAN ENTITLED "CREEKSTONE COMMONS, REVISION FOUR" OF RECORD IN PLAT BOOK P49, PAGE 110, R.O.W.C.,T. AND ON THE WEST BY THE REMAINDER OF LOT 24 OF FINAL PLAN OF WATSON GLEN SUBDIVISION, SECTION 1, REVISION 10, OF RECORD IN PLAT BOOK 29, PAGE 139, R.O.W.C.T AND BEING DESCRIBED ACCORDING TO A SURVEY DATED OCTOBER 15, 2015 AND PREPARED BY KEVIN L. BIRDWELL, R.L.S. NO. 1797 WHOSE ADDRESS IS RAGAN SMITH ASSOCIATES, 315 WOODLAND STREET, NASHVILLE, TN 37206 AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING IN THE EAST RIGHT-OF-WAY LINE OF SOUTH ROYAL OAKS BOULEVARD AND BEING THE SOUTH END OF A CURVE AT THE INTERSECTION OF THE EAST RIGHT-OF-WAY LINE OF SOUTH ROYAL OAKS BOULEVARD AND THE SOUTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE AND PROCEEDING AS FOLLOWS:

THENCE, WITH A CURVE TO THE RIGHT HAVING A RADIUS OF 50.00 FEET, AN ARC LENGTH OF 72.76 FEET, A CENTRAL ANGLE OF 83 DEGREES 22 MINUTES 19 SECONDS, AND A CHORD BEARING AND DISTANCE OF NORTH 89 DEGREES 31 MINUTES 21 SECONDS EAST, 66.50 FEET TO AN IRON ROD (NEW) WITH CAP STAMPED (RSA) IN THE SOUTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE;

THENCE, WITH THE SOUTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE THE FOLLOWING TWO CALLS:

1. SOUTH 48 DEGREES 47 MINUTES 29 SECONDS EAST, 121.81 FEET;
2. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 820.00 FEET, AN ARC LENGTH OF 71.61 FEET, A CENTRAL ANGLE OF 05 DEGREES 00 MINUTES 12 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 51 DEGREES 17 MINUTES 35 SECONDS EAST, 71.58 FEET TO AN IRON ROD (NEW) WITH CAP STAMPED (RSA), THE **POINT OF BEGINNING** OF THE HEREIN DESCRIBED TRACT OF LAND AND PROCEEEDING AS FOLLOWS:

THENCE, WITH SAID SOUTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE THE FOLLOWING THREE CALLS:

1. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 820.00 FEET, AN ARC LENGTH OF 330.94 FEET, A CENTRAL ANGLE OF 23 DEGREES 07 MINUTES 24 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 65 DEGREES 21 MINUTES 21 SECONDS EAST, 328.69 FEET TO AN IRON ROD (OLD) WITH CAP STAMPED (RSA);
2. SOUTH 76 DEGREES 55 MINUTES 03 SECONDS EAST, 834.46 FEET TO AN IRON ROD (NEW)WITH CAP STAMPED (RSA);
3. WITH A CURVE TO THE RIGHT HAVING A RADIUS OF 537.96 FEET, AN ARC LENGTH OF 464.57 FEET, A CENTRAL ANGLE OF 49 DEGREES 28 MINUTES 46 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 52 DEGREES 10 MINUTES 40 SECONDS EAST, 450.27 FEET TO AN IRON ROD (NEW)WITH CAP STAMPED (RSA);

THENCE, LEAVING THE SOUTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE AND WITH THE NORTH LINE OF THE NASHVILLE LODGE NO. 72, B.P.O. ELKS PROPERTY, NORTH 83 DEGREES 59 MINUTES 15 SECONDS WEST, 376.29 FEET TO A 1/2 INCH DIAMETER IRON ROD (OLD),

THENCE, WITH THE WEST LINE OF THE NASHVILLE LODGE NO. 72, B.P.O. ELKS PROPERTY, SOUTH 05 DEGREES 14 MINUTES 00 SECONDS WEST, PASSING A WITNESS IRON ROD (NEW) ON THE NORTH SIDE OF WATSON BRANCH AT A DISTANCE OF 298.26 AND A TOTAL DISTANCE OF 323.26 FEET TO A POINT IN THE CENTER OF WATSON BRANCH, SAID POINT BEING THE NORTHEAST CORNER OF LOT 808 ON SAID PLAN OF CREEKSTONE COMMONS P.U.D. SUDIVISION, SECTION FOUR;

THENCE, WITH THE CENTERLINE OF WATSON BRANCH AND THE NORTH LINE OF LOT 808 OF SAID CREEKSTONE COMMONS P.U.D. SUBDIVISION, SECTION FOUR AND THE NORTH LINE OF LOT 27 ON SAID PLAN OF CREEKSTONE COMMONS SUBDIVISION, REVISION 4 THE FOLLOWING SIXTEEN BEARINGS AND DISTANCES:

1. NORTH 83 DEGREES 48 MINUTES 10 SECONDS WEST, 161.22 FEET;
2. SOUTH 61 DEGREES 46 MINUTES 08 SECONDS WEST, 106.65 FEET;
3. SOUTH 86 DEGREES 48 MINUTES 30 SECONDS WEST, 198.12 FEET;

4. NORTH 65 DEGREES 28 MINUTES 52 SECONDS WEST, 120.02 FEET;
5. NORTH 24 DEGREES 43 MINUTES 04 SECONDS WEST, 244.21 FEET;
6. NORTH 84 DEGREES 36 MINUTES 00 SECONDS WEST, 115.35 FEET;
7. NORTH 52 DEGREES 04 MINUTES 01 SECONDS WEST, 87.70 FEET;
8. NORTH 57 DEGREES 18 MINUTES 12 SECONDS WEST, 163.19 FEET;
9. NORTH 29 DEGREES 52 MINUTES 55 SECONDS WEST, 101.80 FEET;
10. NORTH 74 DEGREES 02 MINUTES 09 SECONDS WEST, 41.15 FEET;
11. NORTH 48 DEGREES 56 MINUTES 27 SECONDS WEST, 137.25 FEET;
12. SOUTH 88 DEGREES 57 MINUTES 25 SECONDS WEST, 67.60 FEET,
13. SOUTH 10 DEGREES 32 MINUTES 54 SECONDS WEST, 26.12 FEET,
14. SOUTH 74 DEGREES 19 MINUTES 35 SECONDS WEST, 89.75 FEET,
15. NORTH 75 DEGREES 22 MINUTES 06 SECONDS WEST, 55.08 FEET,
16. NORTH 62 DEGREES 35 MINUTES 03 SECONDS WEST, 10.27 FEET,

THENCE, LEAVING WATSON BRANCH WITH A THE CENTERLINE OF A DRAINAGE DITCH AND SEVERING SAID LOT 24 OF FINAL PLAN OF WATSON GLEN SUBDIVISION, SECTION 1, REVISION 10, THE FOLLOWING SEVEN BEARINGS AND DISTANCES:

1. NORTH 39 DEGREES 40 MINUTES 55 SECONDS EAST, 27.30 FEET,
2. SOUTH 89 DEGREES 07 MINUTES 57 SECONDS EAST, 31.47 FEET,
3. NORTH 25 DEGREES 32 MINUTES 12 SECONDS EAST, 70.78 FEET,
4. NORTH 10 DEGREES 00 MINUTES 40 SECONDS WEST, 49.37 FEET,
5. NORTH 54 DEGREES 59 MINUTES 41 SECONDS EAST, 103.02 FEET,
6. NORTH 40 DEGREES 36 MINUTES 36 SECONDS EAST, 74.71 FEET,
7. NORTH 53 DEGREES 28 MINUTES 05 SECONDS EAST, 164.68 FEET TO THE POINT OF BEGINNING AND CONTAINING 754,942 SQUARE FEET OR 17.33 ACRES, MORE OR LESS.

**and**

## LOT 32
## MAP 79, PARCEL 101.00

A TRACT OF LAND IN THE NINTH CIVIL DISTRICT OF WILLIAMSON COUNTY, CITY OF FRANKLIN, TENNESSEE, AND BEING LOT 32 AS SHOWN ON THE FINAL PLAT ENTITLED “WATSON GLEN SUBDIVISION, SECTION 2, REVISION 1, RESUBDIVISION OF LOT 31” OF RECORD IN PLAT BOOK P62, PAGE 45, REGISTER'S OFFICE FOR WILLIAMSON COUNTY TENNESSEE (R.O.W.C.T.). AND BEING GENERALLY BOUNDED ON THE NORTH BY LOT 10 AS SHOWN ON PLAN ENTITLED “WATSON GLEN SUBDIVISION, SECTION 2” OF RECORD IN PLAT BOOK 13, PAGE 85, R.O.W.C.T., ON THE EAST BY RIVERSIDE DRIVE (IMPROVED AND UNIMPROVED ROAD, RIGHT-OF-WAY WIDTH VARIES), ON THE SOUTH BY OAK MEADOW DRIVE (RIGHT-OF-WAY WITH VARIES), AND ON THE WEST BY LOT 2 AS SHOWN ON THE PLAN ENTITLED “WATSON GLEN SUBDIVISION, SECTION 1, REVISION 10, (RESUBDIVISION OF LOT 2 AND OF RIVERSIDE BUSINESS PARK SUBDIVISION, SECTION 1, REVISION 4, LOT 11) OF RECORD IN PLAT BOOK 29, PAGE 139, R.O.W.C.T. AND LOT 31 ON SAID PLAN ENTITLED “WATSON GLEN SUBDIVISION, SECTION 2, REVISION 1, RESUBDIVISION OF LOT 31” OF RECORD IN PLAT BOOK P62, PAGE 45, R.OW.C.T., AND BEING DESCRIBED ACCORDING TO A SURVEY DATED OCTOBER 15, 2015 AND PREPARED BY KEVIN L BIRDWELL, R.L.S. NO. 1797 WHOSE ADDRESS IS RAGAN SMITH ASSOCIATES, 315 WOODLAND STREET, NASHVILLE, TN 37206 AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

**COMMENCING** AT AN IRON ROD (OLD) WITH CAP STAMPED “RAGAN-SMITH ASSOCIATES” (RSA), SAID PIN BEING IN THE EASTERLY RIGHT-OF-WAY OF SOUTH ROYAL OAKS BOULEVARD AND BEING THE NORTH END OF A CURVE AT THE INTERSECTION OF THE EAST RIGHT-OF-WAY LINE OF SOUTH ROYAL OAKS BOULEVARD AND THE NORTH RIGHT-OF-WAY LINE OF OAK MEADOW DRIVE AND BEING A WESTERLY CORNER OF LOT 30 OF THE FINAL PLAT ENTITLED “WATSON GLEN SUBDIVISION, SECTION 2 OF RECORD IN PLAT BOOK P43, PAGE 40, R.O.W.C.T.;

THENCE, WITH A CURVE TO THE LEFT HAVING A RADIUS OF 50.00 FEET, AN ARC LENGTH OF 73.83 FEET, A CENTRAL ANGLE OF 84 DEGREES 35 MINUTES 53 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 06 DEGREES 29 MINUTES 38 SECONDS EAST, 67.30 FEET TO AN IRON ROD (OLD) WITH CAP STAMPED (RSA) IN THE NORTHERLY RIGHT-OF-WAY OF OAK MEADOW DRIVE (RIGHT-OF-WAY WIDTH VARIES);

THENCE, CONTINUING WITH SAID RIGHT-OF-WAY AND WITH THE SOUTHERLY LINE OF SAID LOT 30 THE FOLLOWING TWO CALLS:

1. SOUTH 48 DEGREES 47 MINUTES 29 SECONDS EAST, 157.42 FEET IRON ROD (OLD) WITH CAP STAMPED (RSA);

2. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 750.00 FEET, AN ARC LENGTH OF 251.97 FEET, A CENTRAL ANGLE OF 19 DEGREES 14 MINUTES 55 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 58 DEGREES 24 MINUTES 57 SECONDS EAST, 250.78 FEET TO AN IRON ROD (OLD) WITH CAP STAMPED (RSA) AT THE SOUTHWEST CORNER OF LOT 31 ON THE PLAN ENTITLED "WATSON GLEN SUBDIVISION, SECTION 2, REVISON 1, RESUBDIVISION OF LOT 31" OF RECORD IN PLAT BOOK P62, PAGE 45, R.O.W.C.T.;
THENCE, CONTINUING WITH SAID RIGHT-OF-WAY AND WITH THE SOUTHERLY LINE OF SAID LOT 31 THE FOLLOWING THREE CALLS:
1. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 750.00 FEET, AN ARC LENGTH OF 116.20 FEET, A CENTRAL ANGLE OF 08 DEGREES 52 MINUTES 38 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 72 DEGREES 28 MINUTES 44 SECONDS EAST, 116.09 FEET TO AN IRON ROD (OLD) WITH CAP STAMPED (RSA);
2. SOUTH 76 DEGREES 55 MINUTES 03 SECONDS EAST, 811.13 FEET TO AN IRON ROD (OLD);
3. WITH A CURVE TO THE RIGHT HAVING A RADIUS OF 607.96 FEET, AN ARC LENGTH OF 43.08 FEET, A CENTRAL ANGLE OF 04 DEGREES 03 MINUTES 37 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 74 DEGREES 53 MINUTES 15 SECONDS EAST, 43.07 FEET TO A PK NAIL (OLD) IN THE CENTERLINE OF AN ACCESS DRIVE, THE **POINT OF BEGINNING** OF THE HEREIN DESCRIBED TRACT OF LAND AND PROCEEEDING AS FOLLOWS:
4. THENCE, LEAVING SAID RIGHT-OF-WAY OF OAK MEADOW DRIVE WITH THE CENTERLINE OF SAID ACCESS DRIVE AND THE EAST LINE OF SAID LOT 31 ON THE PLAN ENTITLED "WATSON GLEN SUBDIVISION, SECTION 2, REVISON 1, RESUBDIVISION OF LOT 31" OF RECORD IN PLAT BOOK P62, PAGE 45, R.O.W.C.T.;NORTH 06 DEGREES 14 MINUTES 29 SECONDS EAST, 564.50 FEET TO A PK NAIL (OLD) IN THE SOUTH LINE OF LOT 2 AS SHOWN ON THE PLAN ENTITLED "WATSON GLEN SUBDIVISION, SECTION 1, REVISION 10, (RESUBDIVISION OF LOT 2 AND OF RIVERSIDE BUSINESS PARK SUBDIVISION, SECTION 1, REVISION 4, LOT 11);
THENCE, WITH THE SOUTH AND EAST LINE OF SAID LOT 2, THE FOLLOWING TWO BEARINGS AND DISTANCES:
1. SOUTH 83 DEGREES 35 MINUTES 44 SECONDS EAST, 73.68 FEET TO AN IRON ROD (OLD) WITH CAP STAMPED (RSA);
2. NORTH 06 DEGREES 24 MINUTES 16 SECONDS EAST, 708.89 FEET TO PUNCH HOLE IN A LIGHT BASE IN THE SOUTH LINE OF SAID LOT 10 OF FINAL PLAT ENTITLED "WATSON GLEN SUBDIVISION, SECTION 2";
THENCE, WITH THE SOUTH LINE OF SAID LOT 10, SOUTH 83 DEGREES 32 MINUTES 35 SECONDS EAST, 377.77 FEET TO CONCRETE MONUMENT OLD IN THE WESTERLY RIGHT-OF-WAY OF RIVERSIDE DRIVE (RIGHT-OF-WAY WIDTH VARIES);
THENCE, WITH THE WESTERLY RIGHT-OF-WAY OF RIVERSIDE DRIVE (IMPROVED AND UNIMPROVED ROAD), THE FOLLOWING FOUR CALLS:
1. SOUTH 07 DEGREES 40 MINUTES 29 SECONDS WEST, 577.88 FEET TO AN IRON ROD (OLD);
2. SOUTH 04 DEGREES 01 MINUTES 39 SECONDS WEST, 310.67 FEET TO AN IRON ROD (OLD);
3. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 11300.00 FEET, AN ARC LENGTH OF 470.04 FEET, A CENTRAL ANGLE OF 02 DEGREES 23 MINUTES 00 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 05 DEGREES 13 MINUTES 09 SECONDS WEST, 470.01 FEET TO A CONCRETE MONUMENT (OLD);
4. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 11300.00 FEET, AN ARC LENGTH OF 112.73 FEET, A CENTRAL ANGLE OF 00 DEGREES 34 MINUTES 18 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 06 DEGREES 41 MINUTES 48 SECONDS WEST, 112.73 FEET TO A CONCRETE MONUMENT (OLD);
THENCE, LEAVING SAID RIGHT-OF-WAY OF RIVERSIDE DRIVE AND WITH THE NORTH RIGHT-OF-WAY OF OAK MEADOW DRIVE (RIGHT-OF-WAY WIDTH VARIES) THE FOLLOWING TWO CALLS:
1. WITH A CURVE TO THE RIGHT HAVING A RADIUS OF 50.00 FEET, AN ARC LENGTH OF 123.89 FEET, A CENTRAL ANGLE OF 141 DEGREES 58 MINUTES 19 SECONDS, AND A CHORD BEARING AND DISTANCE OF SOUTH 77 DEGREES 58 MINUTES 06 SECONDS WEST, 94.54 FEET TO AN IRON ROD (OLD);
2. WITH A CURVE TO THE LEFT HAVING A RADIUS OF 607.96 FEET, AN ARC LENGTH OF 443.66 FEET, A CENTRAL ANGLE OF 41 DEGREES 48 MINUTES 42 SECONDS, AND A CHORD BEARING AND DISTANCE OF NORTH 51 DEGREES 57 MINUTES 06 SECONDS WEST, 433.88 FEET TO THE **POINT OF BEGINNING** AND CONTAINING 569,021 SQUARE FEET OR 13.06 ACRES, MORE OR LESS.

**SECTION II:** That the attached Location Map and Development Plan shall serve the purpose of further delimiting the geographical boundaries as described by this Resolution.

**SECTION III:** That the overall entitlements for the Epoch Development PUD Subdivision are as follows:

| Entitlements | Epoch Development |
|---|---|
| Base Zone District | SD-R 12.0 |
| Character Area Overlay | MECO-5 |
| Other Zoning Overlays | FFO, FWO |
| Development Standard | Conventional |
| Number of Dwelling Units | 355 |
| Number of Nonresidential Square Footage | 0 |
| Number of Hotel Rooms | 0 |
| Connectivity Index | n/a |
| Open Space Requirements | 4.56 acres |
| Number of Phases in Development | 1 |

**SECTION IV:** That the Development Plan, the exhibits accompanying the Development Plan, and all conditions and restrictions placed upon the Development Plan by the Franklin Municipal Planning Commission and this Board shall be made a part of this Resolution as though copied verbatim herein, and that a permanent record of the Development Plan, the exhibits accompanying the Development Plan, and all such conditions and restrictions shall be kept in the Franklin Planning and Sustainability Department.

**SECTION V:** That the following Modifications of Development Standards (MOS) were requested and acted upon by the Board of Mayor and Alderman, after review and recommendation by the Franklin Municipal Planning Commission:

| | |
|---|---|
| MOS 1: **Parking Reduction**<br><br>Approved: _____<br><br>Denied: _____ | Request to reduce the parking requirement to 1.75 spaces per unit.<br><br>*Staff recommended disapproval.* |

**SECTION VI.** That this Resolution shall take effect from and after its passage on its first and final reading, the health, safety, and welfare of the citizens requiring it.

_____ _____

**ERIC S. STUCKEY** **DR. KEN MOORE**
City Administrator Mayor

Approved as to form by:

_____
Shauna R. Billingsley
City Attorney

PREAPPLICATION CONFERENCE: _____02/04/16_____

BOMA/FMPC JOINT CONCEPTUAL WORKSHOP: _____02/25/16_____

NEIGHBORHOOD MEETING: _____03/02/16_____

PLANNING COMMISSION RECOMMENDED APPROVAL: _____

PUBLIC HEARING AND BOMA APPROVAL: _____

## SITE DATA

| | |
|---|---|
| PROJECT NAME | OAK MEADOWS EPOCH DEVELOPMENT<br>REZONING & PUD APPLICATION |
| PROJECT NUMBER: | TBD |
| LOTS: | 2 EXISTING, 3 PROPOSED |
| ADDRESS: | 840 & 880 OAK MEADOWS DR. |
| CITY: | FRANKLIN |
| COUNTY: | WILLIAMSON |
| STATE: | TENNESSEE |
| CIVIL DISTRICT: | 9TH |
| MAP, GROUP AND PARCEL NUMBERS: | MAP 79, PARCELS 88.00 (PORTION OF) & 101.19 |
| EXISTING ZONING: | GC (GENERAL COMMERCIAL) |
| PROPOSED ZONING: | SD-R (12) (SPECIFIC DEVELOPMENT RESIDENTIAL 12 UNITS/AC) |
| CHARACTER AREA OVERLAY: | MECO-5 |
| OTHER APPLICABLE OVERLAYS: | FFO & FWO |
| APPLICABLE DEVELOPMENT STANDARD: | CONVENTIONAL |
| ACREAGE OF SITE: | 13.06 + 17.33 = 30.39 ACRES |
| SQUARE FOOTAGE OF SITE: | 569,021 + 754,942 = 1,323,963 SQUARE FEET |
| MINIMUM REQUIRED SETBACK LINES: | ATTACHED RESIDENTIAL USE |
| YARD FRONTING COLLECTOR (OAK MEADOWS) | 40' |
| SIDE YARD | 15' |
| REAR YARD | 30' |
| OWNER (BOTH PARCELS): | E. WARNER BASS, TRUSTEE |
| ADDRESS: | 150 3RD AVE. SOUTH, SUITE 2800, NASHVILLE, TN 37201 |
| PHONE NO.: | 615.742.6400 |
| E-MAIL ADDRESS: | wbass@bassberry.com |
| CONTACT NAME: | MR. WARNER BASS |
| MINERAL RIGHTS: | CONTROLLED BY CURRENT PROPERTY OWNER |
| APPLICANT: | CRUNK ENGINEERING LLC |
| ADDRESS: | 1894 GEN. GEORGE PATTON DR., SUITE 600<br>FRANKLIN, TN 37067 |
| PHONE NO.: | 615.873.1795 |
| E-MAIL ADDRESS: | adam@crunkeng.com |
| CONTACT NAME: | MR. ADAM CRUNK, P.E. |

DENSITY

| | |
|---|---|
| ATTACHED DWELLING UNITS | 355 UNITS |
| LAND AREA | 30.39 ACRES |
| LAND AREA WITHIN FLOODPLAIN OVERLAY | 8.32 ACRES |
| OVERALL DENSITY | 11.7 UNITS/ACRE |
| NET DENSITY (MINUS OVERLAY CONSTRAINT) | 16.1 UNITS/ACRE |

BUILDING HEIGHT

| | |
|---|---|
| ALLOWABLE | 6 STORIES MAXIMUM |
| PROPOSED | NORTH PARCEL - 4 STORIES<br>SOUTH PARCEL 2/3 STORIES (2 STORY FACING STREET) |

| | |
|---|---|
| PROPOSED LANDSCAPE SURFACE RATIO: | NORTH SITE - 0.42; SOUTH SITE - 0.56; COMBINED - 0.50 |
| MINIMUM LANDSCAPE SURFACE RATIO: | 0.20 |

PARKING

EXISTING 0

REQUIRED (1.5/1BR + 2.5/2BR + 3/3BR)

| NORTH SITE | | SOUTH SITE | |
|---|---|---|---|
| 1BR - 104 UNITS * 1.5 = | 156 SPACES | 1BR - 45 UNITS * 1.5 = | 68 SPACES |
| 2BR - 112 UNITS * 2.5 = | 280 SPACES | 2BR - 50 UNITS * 2.5 = | 125 SPACES |
| 3BR - 24 UNITS * 3.0 = | 72 SPACES | 3BR - 20 UNITS * 3.0 = | 60 SPACES |
| TOTAL REQUIRED | = 508 SPACES | TOTAL REQUIRED | = 253 SPACES |
| INCLUDING 9 ADA SPACES | | INCLUDING 7 ADA SPACES | |

MAXIMUM PARKING: NORTH SITE - 610 SPACES; SOUTH SITE - 304 SPACES

*MODIFICATION OF STANDARD REQUEST TO REDUCE PARKING REQUIREMENT TO 1.75 PER UNIT
NORTH SITE = 240 X 1.75 = 420 SPACES
SOUTH SITE = 115 X 1.75 = 202 SPACES

PROPOSED

| NORTH SITE | | SOUTH SITE (APTS. ONLY) | |
|---|---|---|---|
| REGULAR SPACES | 329 | REGULAR SPACES | 198 |
| COMPACT SPACES (22 % OF TOTAL) | 84 | COMPACT SPACES (8 % OF TOTAL) | 19 |
| ADA SPACES | 16 | ADA SPACES | 8 |
| TOTAL PROVIDED | 429 | TOTAL PROVIDED | 225 |
| | | SOUTH SITE (AMENITY CTR.) | |
| | | REGULAR SPACES | 24 |
| | | COMPACT SPACES (0% OF TOTAL) | 0 |
| | | ADA SPACES | 2 |
| | | TOTAL PROVIDED | 26 |

TREE CANOPY:

| | | |
|---|---|---|
| EXISTING CANOPY COVERAGE | NORTH SITE - 9% | SOUTH SITE - 65% |
| REQUIRED PERCENTAGE TO REMAIN | NORTH SITE - 54% | SOUTH SITE - 36% |
| PROPOSED PERCENTAGE TO REMAIN | NORTH SITE - 54% | SOUTH SITE - 42% |

PARKLAND DEDICATION: FEE IN LIEU OF FOR 5.37 ACRES, 355 TOTAL UNITS PROPOSED

OPEN SPACE:

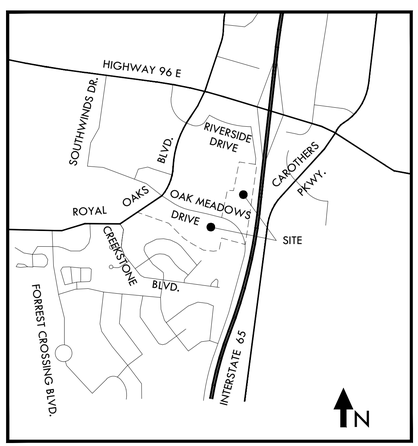
| | |
|---|---|
| TOTAL OPEN SPACE REQ'D (15% OF 30.39 AC.) | 4.56 AC. |
| FORMAL OPEN SPACE REQUIRED (33% OF OPEN SPACE REQUIRED) | 1.52 AC. |
| | 1.65 AC. PROVIDED |
| INFORMAL OPEN SPACE REQUIRED (67% OF OPEN SPACE REQUIRED) | 3.04 AC. |
| | 8.9 AC. PROVIDED |

USE BUFFER: 50-FT CLASS C INCOMPATIBLE LAND USE BUFFER (SOUTH PORTION OF SOUTH SITE)
40-FT INTERSTATE BUFFER (EAST PORTION OF NORTH SITE)

### NOTES:

PROPERTY IS LOCATED ON MAP 79 AS A PORTION OF LOT 88.00 AND PARCEL 101.19 CONTAINING 30.39 ACRES.

PARCEL 88.00 DOES LIE WITHIN THE 100-YEAR FLOOD PLAIN AS INDICATED BY FIRM MAP NO. 47187C0212F DATED SEPTEMBER 29, 2006.




VICINITY MAP
NO SCALE

# REZONING & PUD

# The Epoch Development

# PUD SUBDIVISION, DEVELOPMENT PLAN

## Franklin, Williamson County, Tennessee

## CITY OF FRANKLIN PROJECT NO. 6086

APRIL 7 2016

PREPARED FOR:

## EPOCH RESIDENTIAL

359 Carolina Avenue
Winter Park, Florida
(407) 644-9055

### DESIGN MODIFICATION REQUEST:

A DESIGN MODIFICATION ALLOWING A BUILDING LENGTH OF 215 FT, AS OPPOSED TO 200 FT, IS REQUESTED BASED ON THE CRITERIA OUTLINED IN THE ZONING ORDINANCE SECTION 5.3.11 (2) AS FOLLOWS:

1. THE BUILDINGS ARE ORIENTED IN A WAY TO MINIMIZE THE VIEW-SHED IMPACT TO TRAVELERS ALONG I-65 AND OAK MEADOW DRIVE. THE BUILDINGS HAVE AN UNDULATING FACADE THAT MINIMIZES IMPACT OF THE BROAD VIEW OF THE BUILDING. IF THE DESIGN MODIFICATION WAS DISAPPROVED, THEN THE BUILDING WOULD GET LONGER IN THE OTHER DIRECTION. NO DETRIMENTAL IMPACTS ARE ANTICIPATED TO THE PUBLIC HEALTH, SAFETY, OR WELFARE.
2. THE DESIGN MODIFICATION IS BEING SOUGHT AS A SPECIFIC DESIGN TO THIS PARCEL TO UTILIZE THE SITE AS EFFICIENTLY AS POSSIBLE. THEREFORE THIS REQUEST IS SPECIFIC TO THIS PROJECT, AND IN FACT, IS NOT BEING REQUESTED ON THE SOUTHERN PARCEL.
3. THE DESIGN MODIFICATION IS NECESSARY TO MAXIMIZE THE EFFICIENCY OF THE SITE AND PROVIDE VIABLE LIVING SPACES WITHIN THE PROPOSED DWELLING UNITS.
4. THE DESIGN MODIFICATION WILL IN NO WAY VARY THE PROVISIONS OF THE LAND USE ORDINANCE AS WE BELIEVE THE REQUEST IS MINOR IN NATURE AND NOT NOTICEABLE TO THE NAKED EYE.

### MODIFICATION OF STANDARDS REQUEST:

1. REDUCE PARKING REQUIREMENT TO 1.75 SPACES PER UNIT, AS JUSTIFIED BY PARKING DEMAND STUDY.

### FEE IN LIEU OF REQUEST:

1. PARKLAND DEDICATION.

## INDEX OF SHEETS


| SHEET NO. | SHEET TITLE |
|---|---|
| C0.0 | COVER SHEET |
| C1.0 | OVERALL EXISTING CONDITIONS |
| C1.1 | NORTH SITE EXISTING CONDITIONS |
| C1.2 | SOUTH SITE EXISTING CONDITIONS |
| C2.0 | OVERALL DEVELOPMENT PLAN |
| C2.1 | NORTH SITE DEVELOPMENT PLAN |
| C2.2 | SOUTH SITE DEVELOPMENT PLAN |
| C2.3 | GENERAL LIGHTING PLAN |
| C3.0 | OVERALL GRADING & DRAINAGE PLAN |
| C3.1 | SOUTH SITE GRADING & DRAINAGE PLAN |
| C3.2 | SOUTH & NORTH SITE GRADING & DRAINAGE PLAN |
| C3.3 | NORTH SITE GRADING & DRAINAGE PLAN |
| C4.0 | OVERALL ACCESS PLAN |
| C4.1 | NORTH SITE ACCESS PLAN |
| C4.2 | SOUTH SITE ACCESS PLAN |
| C5.0 | OVERALL UTILITY PLAN |
| C5.1 | NORTH SITE UTILITY PLAN |
| C5.2 | SOUTH SITE UTILITY PLAN |
| A1.0 | NORTH PARCEL ELEVATION |
| A2.0 | NORTH PARCEL SIDE ELEVATION |
| A3.0 | SOUTH PARCEL NORTH ELEVATION |
| A4.0 | SOUTH PARCEL SOUTH ELEVATION |
| A5.0 | AMENITY/CLUBHOUSE CENTER ELEVATION |
| A6.0 | POOL PAVILION ELEVATION |


KENNETH LINEHAN REGISTERED ARCHITECT AGRICULTURE COMMERCE No. 11410 STATE OF TENNESSEE 4/7/16

ARCHITECT OF RECORD:


KENNETH LINEHAN, AIA, LEED AP
FUGLEBURG KOCH ARCHITECTS
2555 TEMPLE TRAIL
WINTER PARK, FL 32789
407-629-0595
kenl@fuglebergkoch.com



CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


ENGINEERING CRUNK

WILSON COUNTY REGISTERED LANDSCAPE ARCHITECT AGRICULTURE COMMERCE No. 114100 STATE OF TENNESSEE 4/7/16

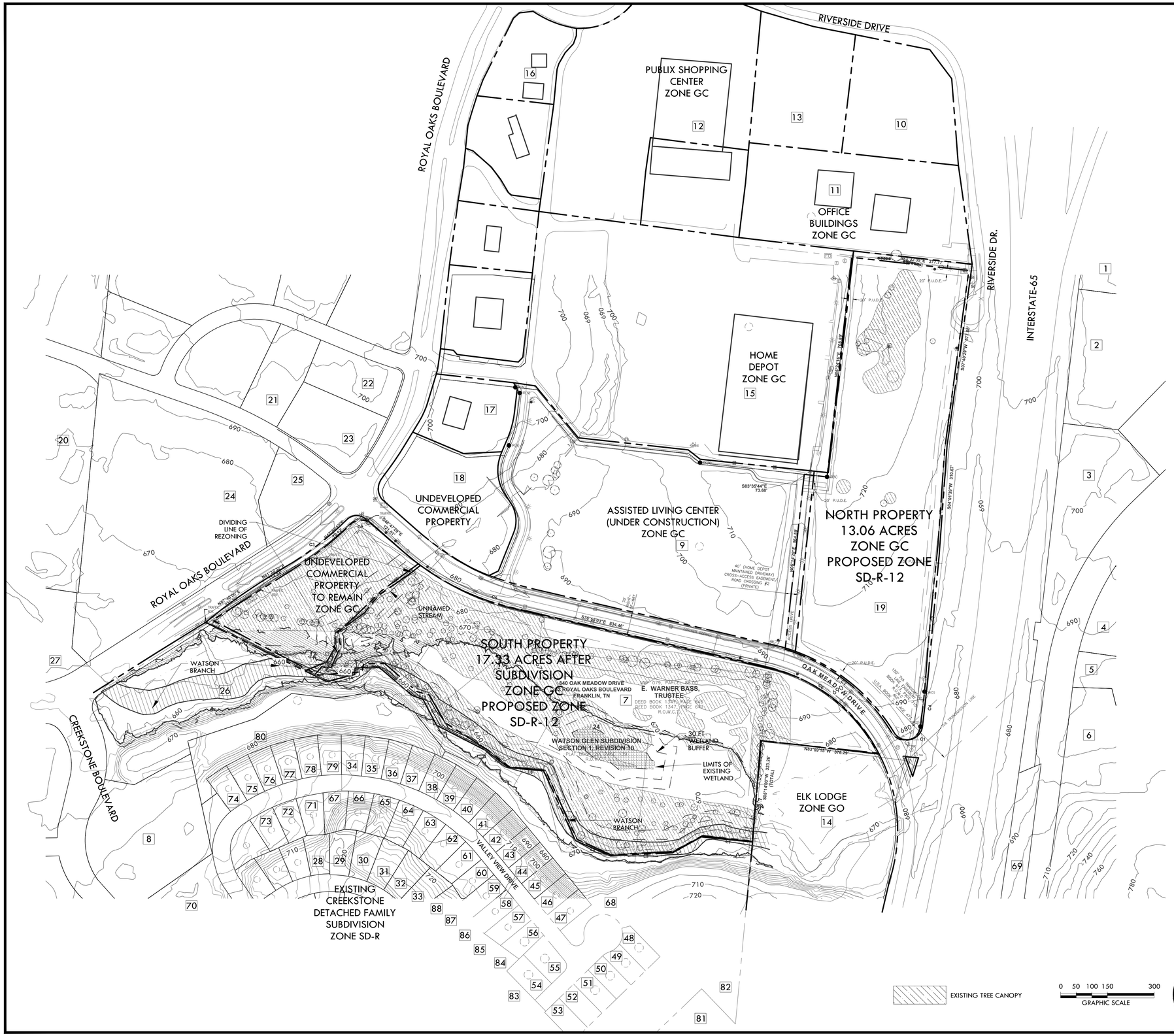
THE EPOCH DEVELOPMENT
PUD SUBDIVISION, DEVELOPMENT PLAN
COF #6086 FRANKLIN, TN

| REVISIONS | | |
|---|---|---|
| No. | DATE | |
| | | |

04/07/16 15001

C0.0

COVER SHEET




| ID | PRCUID | DEED / PLAT | LAND USE | OWNER | ZONING |
|---|---|---|---|---|---|
| 1 | 079---06905 | DB 3844 DP 619 PB16 PP114 | HOTEL | BRE/LQ PROP LLC | GC |
| 2 | 079---06906 | DB 2966 DP 435 PB22 PP11 | AUTO DLR | ADKINS RODNEY G | GC |
| 3 | 079---07600 | DB 4341 DP763 PB22 PP11 | CHURCH | CHURCH GATE THE | GC |
| 4 | 079---08000 | DB6337 DP70 PB61 PP69 | REC | SOAR ADVENTURE TOWER LLC | GC |
| 5 | 079---08200 | DB5165 DP555 | UNDEV. | NICHOLS J DONALD | SD-R |
| 6 | 079---08300 | DB1350 DP525 | ATTACHED RESID. | UNITED DOMINION REALTY LP | GC |
| 7 | 079---08800 | DB1347 DP645 PB29 PP139 | UNDEV. | BASS E WARNER TR | GC |
| 8 | 079---10001 | DB2192 DP320 PB31 PP125 | DAYCARE | WOOD & WOOD LLC | GO |
| 9 | 079---10100 | DB6533 DP243 PB62 PP45 | ASST. LVG | DOMINION SENIOR LIVING OF FRANKLIN L | GC |
| 10 | 079---10101 | DB5434 DP660 | OFFICE | 5107 LLC | GC |
| 11 | 079---10102 | DB2200 DP199 PB19 PP59 | OFFICE | UN DON REALTY LLC | GC |
| 12 | 079---10103 | DB5459 DP859 PB99 PP3 | RETAIL | PUBLIX TENNESSEE LLC | GC |
| 13 | 079---10104 | DB6168 DP806 PB22 PP120 | ASST. LVG | FRANKLIN TN SENIOR CARE PROPERTY LLC | GC |
| 14 | 079---10105 | - | REC | NASHVILLE LODGE #72 BPO ELKS | GO |
| 15 | 079---10110 | DB4406 DP792 PB29 PP139 | RETAIL | HD DEVELOPMENT OF MARYLAND INC | GC |
| 16 | 079---10114 | DB5459 DP859 PB29 PP139 | RETAIL | PUBLIX TENNESSEE LLC | GC |
| 17 | 079---10116 | DB3792 DP29 PB29 PP139 | RETAIL | FIRST-CITIZENS BANK AND TR CO | GC |
| 18 | 079---10117 | PB 43 PP40 | UNDEV. | BASS E WARNER TR | GC |
| 19 | 079---10119 | PB 43 PP40 | UNDEV. | BASS E WARNER TR | GC |
| 20 | 079O-A01401 | DB4197 DP993 PB41 PP33 | UNDEV. | SWJ2 TENNESSEE LLC | RM-20 |
| 21 | 079O-A00300 | DB4200 DP849 PB27 PP4 | INSTIT. | CHURCH CORNERSTONE MINISTRIES INC | GC |
| 22 | 079O-A00301 | DB5790 DP107 PB29 PP10 | RETAIL | MAGLI CHERYL S FAMILY TRUST | GC |
| 23 | 079O-A00302 | DB5871 DP528 PB26 PP10 | RETAIL | LCJ LLC | GC |
| 24 | 079O-A00400 | DB794 DP881 PB12 PP76 | | UNITED STATES POSTAL SERV | CI |
| 25 | 079O-A00401 | DB1946 DP286 PB12 PP76 | RETAIL | COMMUNITY BANK | GC |
| 26 | 079O-C02500 | DB5136 DP628 | UNDEV. | CADENCE BANK NA | GO |
| 27 | 079O-C02800 | PB47 PP142 | UNDEV. | ROYAL OAKS PARK SOUTH | GO |
| 28 | 079O-D00100 | DB5814 DP815 PB55 PP146 | RESIDENTIAL | THURM DAVID M | SD-R |
| 29 | 079O-D00200 | DB5807 DP985 PB55 PP146 | RESIDENTIAL | HAMILTON MALLORY | SD-R |
| 30 | 079O-D00300 | DB4624 DP480 PB55 PP146 | RESIDENTIAL | LYLE JORDAN WILLIAM | SD-R |
| 31 | 079O-D00400 | DB5780 DP388 PB55 PP146 | RESIDENTIAL | EVANGELISTA BERNARDINO JR | SD-R |
| 32 | 079O-D00500 | DB5841 DP984 PB55 PP146 | RESIDENTIAL | CASTANEDA ORESTES | SD-R |
| 33 | 079O-D00600 | DB5809 DP135 PB55 PP146 | RESIDENTIAL | VOSS STEPHEN M | SD-R |
| 34 | 079O-E00100 | DB6536 DP118 PB58 PP10 | RESIDENTIAL | KHOT SOHAM | SD-R |
| 35 | 079O-E00200 | DB6190 DP252 PB58 PP10 | RESIDENTIAL | GOOCH RYAN M | SD-R |
| 36 | 079O-E00300 | DB6218 DP405 PB58 PP10 | RESIDENTIAL | SULLIVAN JOHN | SD-R |
| 37 | 079O-E00400 | DB6232 DP972 PB58 PP10 | RESIDENTIAL | CULLEN ROBERT BARRY | SD-R |
| 38 | 079O-E00500 | DB6231 DP1 PB58 PP10 | RESIDENTIAL | MILLER ROBERT FRANK | SD-R |
| 39 | 079O-E00600 | DB6288 DP734 PB58 PP10 | RESIDENTIAL | DHARANI KHAIRUNISSA | SD-R |
| 40 | 079O-E00700 | DB6218 DP407 PB58 PP10 | RESIDENTIAL | KNOX CONSUELA S | SD-R |
| 41 | 079O-E00800 | DB6229 DP797 PB58 PP10 | RESIDENTIAL | DAWKINS BRETTON GUY | SD-R |
| 42 | 079O-E00900 | DB6296 DP854 PB58 PP10 | RESIDENTIAL | COMEAUX MARGARET A | SD-R |
| 43 | 079O-E01000 | DB6273 DP312 PB58 PP10 | RESIDENTIAL | SMITH CHRISTOPHER S | SD-R |
| 44 | 079O-E01100 | DB6281 DP281 PB58 PP10 | RESIDENTIAL | DANIELS THOMAS | SD-R |
| 45 | 079O-E01200 | DB6541 DP640 PB58 PP10 | RESIDENTIAL | SUNDARAM BARATH SHANMUGA | SD-R |
| 46 | 079O-E01300 | DB6331 DP190 PB58 PP10 | RESIDENTIAL | HOSSAIN MOHAMMAD | SD-R |
| 47 | 079O-E01400 | DB6264 DP154 PB58 PP10 | RESIDENTIAL | MAPLESDEN LAWRENCE | SD-R |
| 48 | 079O-E01500 | DB6346 DP779 PB58 PP10 | RESIDENTIAL | BECHARD BRIAN | SD-R |
| 49 | 079O-E01600 | DB6529 DP817 PB58 PP10 | RESIDENTIAL | VIDYAM SATHEESH | SD-R |
| 50 | 079O-E01700 | DB6145 DP168 PB58 PP10 | RESIDENTIAL | RUSSO JOHN M | SD-R |
| 51 | 079O-E01800 | DB6177 DP164 PB58 PP10 | RESIDENTIAL | QUIGLEY J PATRICK | SD-R |
| 52 | 079O-E01900 | DB6151 DP238 PB58 PP10 | RESIDENTIAL | BONHAM SYDNEY | SD-R |
| 53 | 079O-E02000 | DB6158 DP254 PB58 PP10 | RESIDENTIAL | BURGER JORDAN | SD-R |
| 54 | 079O-E02100 | DB6172 DP871 PB58 PP10 | RESIDENTIAL | NOLAN MICHAEL S TRUST | SD-R |
| 55 | 079O-E02200 | DB6195 DP626 PB58 PP10 | RESIDENTIAL | PARSI SREEKANTH | SD-R |
| 56 | 079O-E02300 | DB6529 DP771 PB58 PP10 | RESIDENTIAL | KOLLI MURALL KRISHNA | SD-R |
| 57 | 079O-E02400 | DB6252 DP619 PB58 PP10 | RESIDENTIAL | RAMAN VENKATESH | SD-R |
| 58 | 079O-E02500 | DB6231 DP816 PB58 PP10 | RESIDENTIAL | RAJENDRAN THAMIL S | SD-R |
| 59 | 079O-E02600 | DB6195 DP601 PB58 PP10 | RESIDENTIAL | DOPPALAPUDI SRIKANTH | SD-R |
| 60 | 079O-E02700 | DB6182 DP362 PB58 PP10 | RESIDENTIAL | CHINTAKINDI VARUN K | SD-R |
| 61 | 079O-E02800 | DB6177 DP138 PB58 PP10 | RESIDENTIAL | KRISHNAN JAGADEESWARAN | SD-R |
| 62 | 079O-E02900 | DB6152 DP63 PB58 PP10 | RESIDENTIAL | MOHAMED ABDUL R J | SD-R |
| 63 | 079O-E03000 | DB6153 DP125 PB58 PP10 | RESIDENTIAL | PICHAIMUTHU NARAYANAN | SD-R |
| 64 | 079O-E03100 | DB6160 DP536 PB58 PP10 | RESIDENTIAL | ZELLER JAMES S JR | SD-R |
| 65 | 079O-E03200 | DB6583 DP472 PB58 PP10 | RESIDENTIAL | MURRAY KIMBERLY | SD-R |
| 66 | 079O-E03300 | DB6172 DP802 PB58 PP10 | RESIDENTIAL | ZIPPER NATHAN M | SD-R |
| 67 | 079O-E03400 | DB6154 DP157 PB58 PP10 | RESIDENTIAL | VIGIL MARIO G | SD-R |
| 68 | 079O-E03500 | DB6104 DP222 PB58 PP10 | RESIDENTIAL | CREEKSTONES HOMEOWNERS ASSOCIATION I | SD-R |
| 69 | 089---02609 | DB13915 DP 891 PB149 P17 | RESIDENTIAL | A T & T CORP BY & THROUGH | R-2 |
| 70 | 089B-O04200 | DB5309 DP243 PB54 PP20 | RESIDENTIAL | CREEKSTONE HOMEOWNERS ASSOCIATION IN | SD-R |
| 71 | 089B-O04600 | DB5727 DP67 PB54 PP20 | RESIDENTIAL | BLACKSHER NICOLE E | SD-R |
| 72 | 089B-O04700 | DB6656 DP836 PB54 PP20 | RESIDENTIAL | DRUSE JONATHAN | SD-R |
| 73 | 089B-O04800 | DB5674 DP620 PB54 PP20 | RESIDENTIAL | KUMAR RATNA | SD-R |
| 74 | 089B-O05000 | DB6412 DP384 PB54 PP20 | RESIDENTIAL | BLANKENSHIP JON I | SD-R |
| 75 | 089B-O05100 | DB5710 DP738 PB54 PP20 | RESIDENTIAL | BURRELL GERALD MARK | SD-R |
| 76 | 089B-O05200 | DB5716 DP104 PB54 PP20 | RESIDENTIAL | BUCKNER RICHARD D | SD-R |
| 77 | 089B-O05300 | DB5604 DP513 PB54 PP20 | RESIDENTIAL | LERCHE MICHAEL | SD-R |
| 78 | 089B-O05400 | DB6046 DP929 PB54 PP20 | RESIDENTIAL | RUSSELL KAREN KINGSBURY | SD-R |
| 79 | 089B-O05500 | DB5747 DP463 PB54 PP20 | RESIDENTIAL | THEURER DAVID S | SD-R |
| 80 | 089B-O05600 | DB5309 DP243 PB54 PP20 | RESIDENTIAL | CREEKSTONE HOMEOWNERS ASSOCIATION IN | SD-R |
| 81 | 089B-P01500 | DB6057 DP780 PB56 PP76 | RESIDENTIAL | BARLOW JOHN | SD-R |
| 82 | 089B-P01600 | DB6118 DP165 PB56 PP76 | RESIDENTIAL | ERWIN DEVAN A | SD-R |
| 83 | 089B-P02000 | DB6031 DP735 PB56 PP76 | RESIDENTIAL | PATEL NIKUNJ M | SD-R |
| 84 | 089B-P02100 | DB5983 DP439 PB56 PP76 | RESIDENTIAL | JANI BHAVESHKUMAR | SD-R |
| 85 | 089B-P02200 | DB5989 DP962 PB56 PP76 | RESIDENTIAL | HARRIS JOHN | SD-R |
| 86 | 089B-P02300 | DB6000 DP115 PB56 PP76 | RESIDENTIAL | LEDGISTER KEVIN ARTHUR | SD-R |
| 87 | 089B-P02400 | DB6377 DP104 PB56 PP76 | RESIDENTIAL | JOHANSEN MICHAEL | SD-R |
| 88 | 089B-P02500 | DB5899 DP690 PB56 PP76 | RESIDENTIAL | COLLIER EDWARD W III | SD-R |


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

FRANKLIN, TN

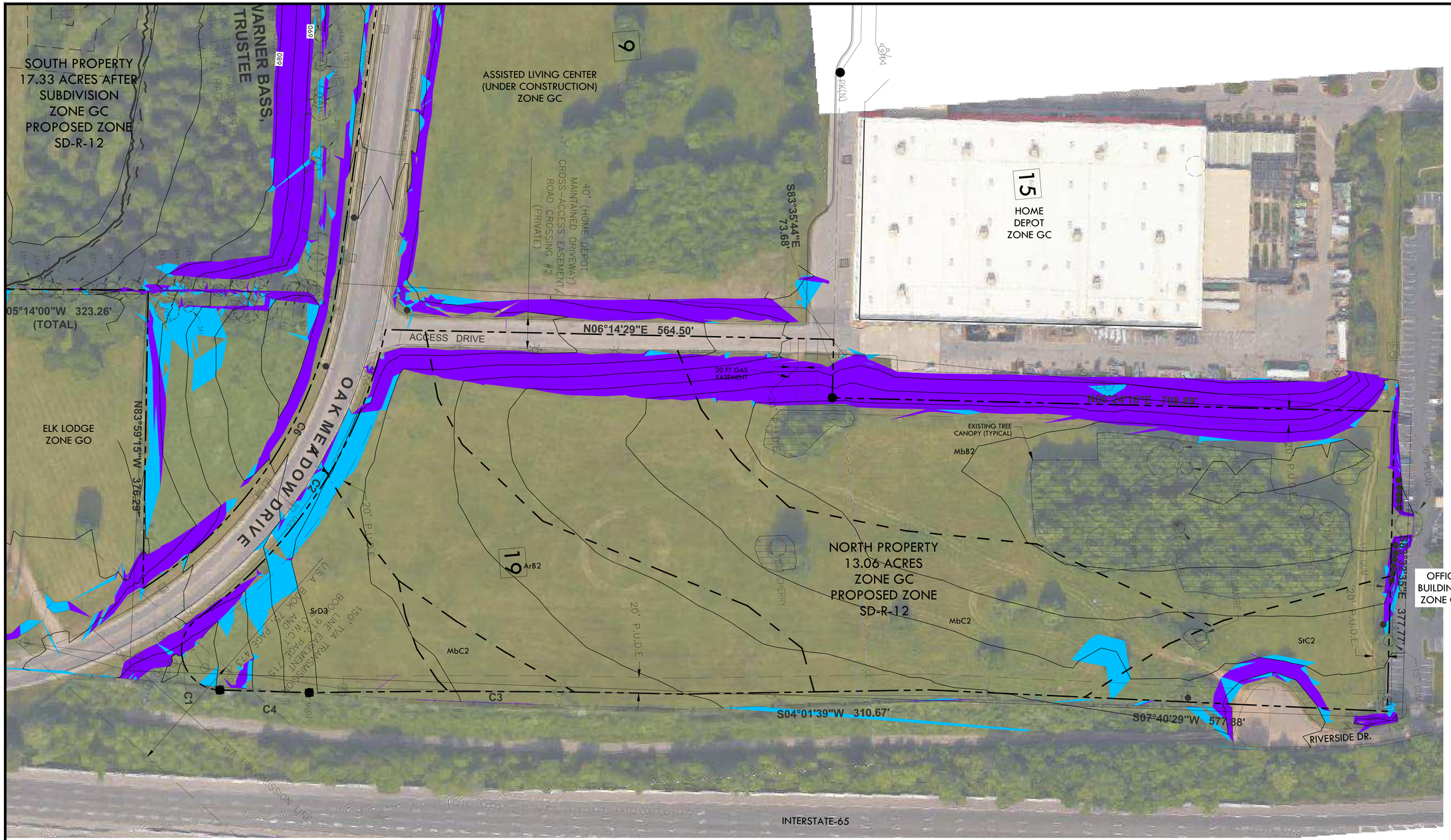
COF #6086

| REVISIONS | |
|---|---|
| No. | DATE |
| | |

04/07/16 15001

# C1.0

OVERALL EXISTING CONDITIONS PLAN




SLOPE LEGEND

GREATER THAN 14% AND LESS THAN 20% SLOPE

GREATER THAN 20% SLOPE

SOIL TYPES

| | |
|---|---|
| ArB2 | Armour silt loam, 2% to 5 % slopes, eroded |
| CaC2 | Captina silt loam, phosphatic, 5% to 12% slopes, eroded |
| Eg | Egam silt loam, phosphatic |
| Hu | Huntington silt loam, phosphatic |
| InE3 | Inman silty clay loam, 20% to 30% slopes, severely eroded |
| MbB2 | Maury silt loam, 2% to 5% slopes, eroded |
| MbC2 | Maury silt loam, 5% to 12% slopes, eroded |
| SrC3 | Stiversville clay loam, 5% to 12% slopes, eroded |
| SrD3 | Stiversville clay loam, 12% to 20% slopes, severely eroded |
| StC2 | Stiversville silt loam, 5% to 12% slopes, eroded |

CURVE TABLE

| CURVE | RADIUS | LENGTH | DELTA | TANGENT | CHORD | CHD BRG |
|---|---|---|---|---|---|---|
| C1 | 50.00' | 123.89' | 141°58'19" | 145.10 | 94.54' | S77°58'06"W |
| C2 | 607.96' | 443.66' | 41°48'42" | 232.23 | 433.88' | N51°57'06"W |
| C3 | 11300.00' | 470.04' | 2°23'00" | 235.06 | 470.01' | S05°13'09"W |
| C4 | 11300.00' | 112.73' | 0°34'18" | 56.37 | 112.73' | S06°41'48"W |

0 30 60 120
GRAPHIC SCALE

N


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

COF #6086 FRANKLIN, TN

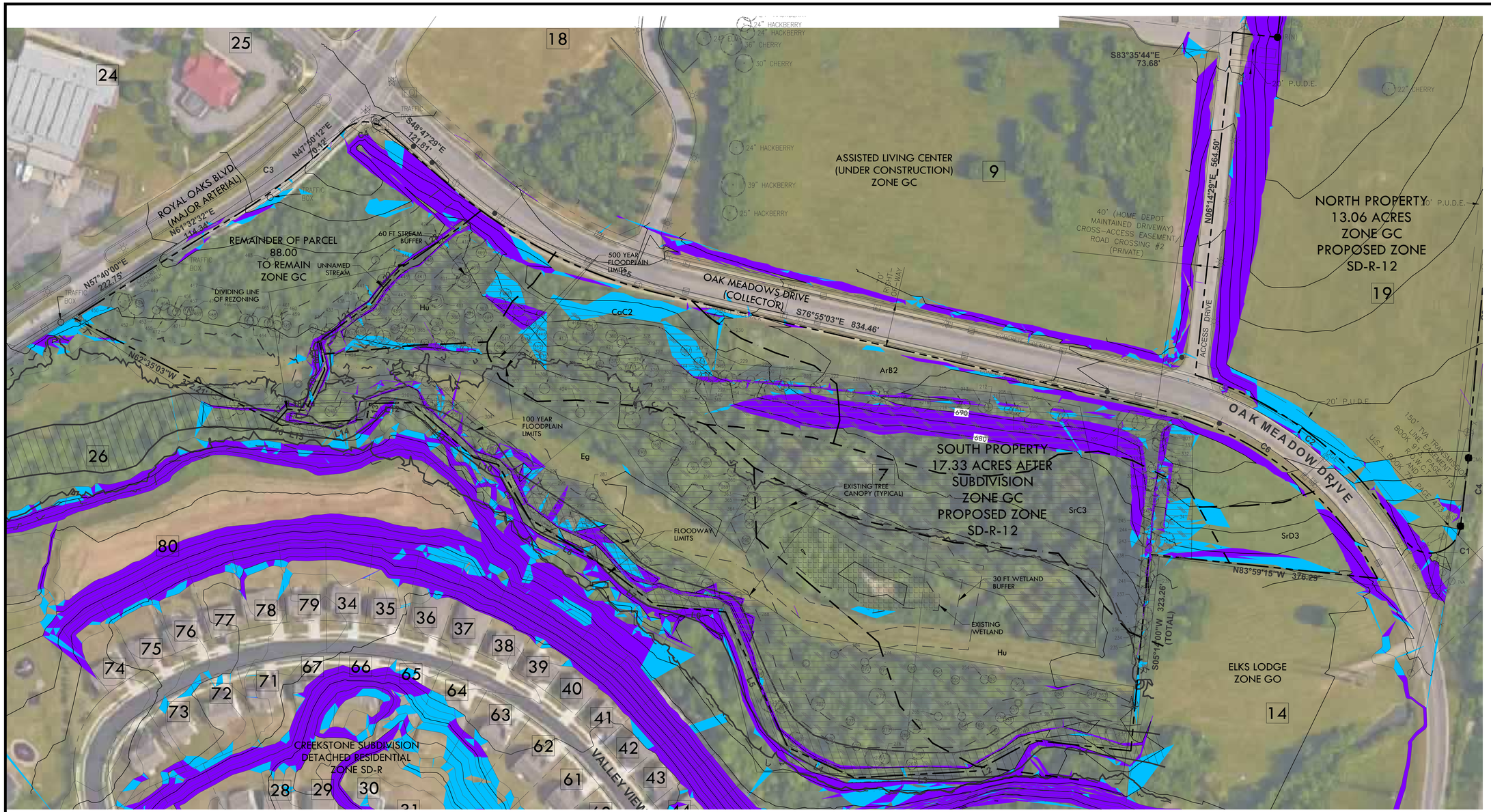
REVISIONS

| No. | DATE |
|---|---|
| | |

04/07/16 15001

# C1.1

NORTH SITE
EXISTING
CONDITIONS PLAN




SLOPE LEGEND

- GREATER THAN 14% AND LESS THAN 20% SLOPE
- GREATER THAN 20% SLOPE

SOIL TYPES

| | |
|---|---|
| ArB2 | Armour silt loam, 2% to 5 % slopes, eroded |
| CaC2 | Captina silt loam, phosphatic, 5% to 12% slopes, eroded |
| Eg | Egam silt loam, phosphatic |
| Hu | Huntington silt loam, phosphatic |
| InE3 | Inman silty clay loam, 20% to 30% slopes, severely eroded |
| MbB2 | Maury silt loam, 2% to 5% slopes, eroded |
| MbC2 | Maury silt loam, 5% to 12% slopes, eroded |
| SrC3 | Stiversville clay loam, 5% to 12% slopes, eroded |
| SrD3 | Stiversville clay loam, 12% to 20% slopes, severely eroded |
| StC2 | Stiversville silt loam, 5% to 12% slopes, eroded |

0 40 80 160
GRAPHIC SCALE

N


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

COF #6086 FRANKLIN, TN

REVISIONS

| No. | DATE |
|---|---|
| | |

04/07/16 15001

# C1.2

SOUTH SITE EXISTING CONDITIONS PLAN

CREEKSTONE SUBDIVISION CROSS SECTION
THROUGH WATSON BRANCH

BRICK TRASH ENCLOSURE EXAMPLE

## SITE DATA

| | |
|---|---|
| PROJECT NAME | OAK MEADOWS EPOCH DEVELOPMENT<br>REZONING & PUD APPLICATION |
| PROJECT NUMBER: | TBD |
| LOTS: | 2 EXISTING, 3 PROPOSED |
| ADDRESS: | 840 & 880 OAK MEADOWS DR. |
| CITY: | FRANKLIN |
| COUNTY: | WILLIAMSON |
| STATE: | TENNESSEE |
| CIVIL DISTRICT: | 9TH |
| MAP, GROUP AND PARCEL NUMBERS: | MAP 79, PARCELS 88.00 (PORTION OF) & 101.19 |
| EXISTING ZONING: | GC (GENERAL COMMERCIAL) |
| PROPOSED ZONING: | SD-R (12) (SPECIFIC DEVELOPMENT RESIDENTIAL 12 UNITS/AC) |
| CHARACTER AREA OVERLAY: | MECO-5 |
| OTHER APPLICABLE OVERLAYS: | FFO & FWO |
| APPLICABLE DEVELOPMENT STANDARD: | CONVENTIONAL |
| ACREAGE OF SITE: | 13.06 + 17.33 = 30.39 ACRES |
| SQUARE FOOTAGE OF SITE: | 569,021 + 754,942 = 1,323,963 SQUARE FEET |
| MINIMUM REQUIRED SETBACK LINES: | ATTACHED RESIDENTIAL USE |
| YARD FRONTING COLLECTOR (OAK MEADOWS) | 40' |
| SIDE YARD | 15' |
| REAR YARD | 30' |
| OWNER (BOTH PARCELS): | E. WARNER BASS, TRUSTEE |
| ADDRESS: | 150 3RD AVE. SOUTH, SUITE 2800, NASHVILLE, TN 37201 |
| PHONE NO.: | 615.742.6400 |
| E-MAIL ADDRESS: | wbass@bassberry.com |
| CONTACT NAME: | MR. WARNER BASS |
| MINERAL RIGHTS: | CONTROLLED BY CURRENT PROPERTY OWNER |
| APPLICANT: | CRUNK ENGINEERING LLC |
| ADDRESS: | 1894 GEN. GEORGE PATTON DR., SUITE 600<br>FRANKLIN, TN 37067 |
| PHONE NO.: | 615.873.1795 |
| E-MAIL ADDRESS: | adam@crunkeng.com |
| CONTACT NAME: | MR. ADAM CRUNK, P.E. |
| DENSITY | |
| ATTACHED DWELLING UNITS | 355 UNITS |
| LAND AREA | 30.39 ACRES |
| LAND AREA WITHIN FLOODPLAIN OVERLAY | 8.32 ACRES |
| OVERALL DENSITY | 11.7 UNITS/ACRE |
| NET DENSITY (MINUS OVERLAY CONSTRAINT) | 16.1 UNITS/ACRE |
| BUILDING HEIGHT | |
| ALLOWABLE | 6 STORIES MAXIMUM |
| PROPOSED | NORTH PARCEL - 4 STORIES<br>SOUTH PARCEL 2/3 STORIES (2 STORY FACING STREET) |
| PROPOSED LANDSCAPE SURFACE RATIO: | NORTH SITE - 0.42; SOUTH SITE - 0.56; COMBINED - 0.50 |
| MINIMUM LANDSCAPE SURFACE RATIO: | 0.20 |

PARKING

EXISTING 0

REQUIRED (1.5/1BR + 2.5/2BR + 3/3BR)

| NORTH SITE | | SOUTH SITE | |
|---|---|---|---|
| 1BR - 104 UNITS * 1.5 = | 156 SPACES | 1BR - 45 UNITS * 1.5 = | 68 SPACES |
| 2BR - 112 UNITS * 2.5 = | 280 SPACES | 2BR - 50 UNITS * 2.5 = | 125 SPACES |
| 3BR - 24 UNITS * 3.0 = | 72 SPACES | 3BR - 20 UNITS * 3.0 = | 60 SPACES |
| TOTAL REQUIRED | = 508 SPACES | TOTAL REQUIRED | = 253 SPACES |
| INCLUDING 9 ADA SPACES | | INCLUDING 7 ADA SPACES | |

MAXIMUM PARKING: NORTH SITE - 610 SPACES; SOUTH SITE - 304 SPACES

*MODIFICATION OF STANDARD REQUEST TO REDUCE PARKING REQUIREMENT TO 1.75 PER UNIT
NORTH SITE = 240 X 1.75 = 420 SPACES
SOUTH SITE = 115 X 1.75 = 202 SPACES

PROPOSED

| NORTH SITE | | SOUTH SITE (APTS. ONLY) | |
|---|---|---|---|
| REGULAR SPACES | 329 | REGULAR SPACES | 198 |
| COMPACT SPACES (22 % OF TOTAL) | 84 | COMPACT SPACES (8 % OF TOTAL) | 19 |
| ADA SPACES | 16 | ADA SPACES | 8 |
| TOTAL PROVIDED | 429 | TOTAL PROVIDED | 225 |
| | | SOUTH SITE (AMENITY CTR.) | |
| | | REGULAR SPACES | 24 |
| | | COMPACT SPACES (0% OF TOTAL) | 0 |
| | | ADA SPACES | 2 |
| | | TOTAL PROVIDED | 26 |

TREE CANOPY:

| | | |
|---|---|---|
| EXISTING CANOPY COVERAGE | NORTH SITE - 9% | SOUTH SITE - 65% |
| REQUIRED PERCENTAGE TO REMAIN | NORTH SITE - 54% | SOUTH SITE - 36% |
| PROPOSED PERCENTAGE TO REMAIN | NORTH SITE - 54% | SOUTH SITE - 42% |

PARKLAND DEDICATION: FEE IN LIEU OF FOR 5.37 ACRES, 355 TOTAL UNITS PROPOSED

OPEN SPACE:

| | |
|---|---|
| TOTAL OPEN SPACE REQ'D (15% OF 30.39 AC.) | 4.56 AC. |
| FORMAL OPEN SPACE REQUIRED (33% OF OPEN SPACE REQUIRED) | 1.52 AC.<br>1.65 AC. PROVIDED |
| INFORMAL OPEN SPACE REQUIRED (67% OF OPEN SPACE REQUIRED) | 3.04 AC.<br>8.9 AC. PROVIDED |

USE BUFFER: 50-FT CLASS C INCOMPATIBLE LAND USE BUFFER (SOUTH PORTION OF SOUTH SITE)
40-FT INTERSTATE BUFFER (EAST PORTION OF NORTH SITE)

### PROJECT NOTES:

1) The proposed project complies with the Land Use Plan as it was amended in December 2015 to allow for attached residential uses along with a mixture of other uses. The project is in the McEwen Character Area, Special Area 5. Conventional standards are proposed project since that is the predominant design character of the fully developed surrounding area. The project will remain compatible with its surroundings by proposing two story buildings on the southern site to act as a transition from single family uses to the south and commercial developments to the north. The Northern site will have four story heights to match the adjacent office buildings to the north. The Northern site lends itself to a denser development due to its proximity to the interstate, and surrounding commercial uses.
2) The architectural intent can be best described by the attached elevations proposed for the project. The Southern site intent is to have more of a single family or townhome look. The Northern site intent is to blend with the souther site and new assisted living center that is currently under construction.
3) There are no planned phases of the project. The intent is to begin construction on both parcels at the end of 2016, with the possibility of opening units on the southern property in 2018 and having fully completed the northern property by 2019.

PROPERTY IS LOCATED ON MAP 79 AS A PORTION OF LOT 88.00 AND PARCEL 101.19 CONTAINING 30.39 ACRES.

PARCEL 88.00 DOES LIE WITHIN THE 100-YEAR FLOOD PLAIN AS INDICATED BY FIRM MAP NO. 47187C0212F DATED SEPTEMBER 29, 2006.

### STATEMENT OF IMPACT:

The proposed project will add 355 multi-family units. The property is currently undeveloped within the existing City Limits of the City of Franklin. Therefore, no new land is being developed outside the existing jurisdiction of City of Franklin Police, Fire, or Solid Waste services.

The project is approximately a 4 mile driving distance from the Police Station; 1.5 mile driving distance from the nearest fire station on Murfreesboro Rd.
The project will have two dumpster locations for solid waste. One serving 240 units and the other serving 115 units.
No new parkland is being dedicated as part of this project. However, this project will contribute to parkland funds.

0 50 100 150 300
GRAPHIC SCALE


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


ENGINEERING CRUNK

WILSON COUNTY
REGISTERED LANDSCAPE ARCHITECT
AGRICULTURE
4/7/16
No. 114180
STATE OF TENNESSEE

# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

COF #6086 FRANKLIN, TN

| REVISIONS | |
|---|---|
| No. | DATE |

04/07/16 15001

# C2.0

OVERALL DEVELOPMENT PLAN

TOTAL OF 240 UNITS ON NORTH PARCEL

| CURVE TABLE | | | | | | |
|---|---|---|---|---|---|---|
| CURVE | RADIUS | LENGTH | DELTA | TANGENT | CHORD | CHD BRG |
| C1 | 50.00' | 123.89' | 141°58'19" | 145.10 | 94.54' | S77°58'06"W |
| C2 | 607.96' | 443.66' | 41°48'42" | 232.23 | 433.88' | N51°57'06"W |
| C3 | 11300.00' | 470.04' | 2°23'00" | 235.06 | 470.01' | S05°13'09"W |
| C4 | 11300.00' | 112.73' | 0°34'18" | 56.37 | 112.73' | S06°41'48"W |

0 30 60 120
GRAPHIC SCALE


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


# THE EPOCH DEVELOPMENT

PUD SUDBIVISION, DEVELOPMENT PLAN

COF #6086 FRANKLIN, TN

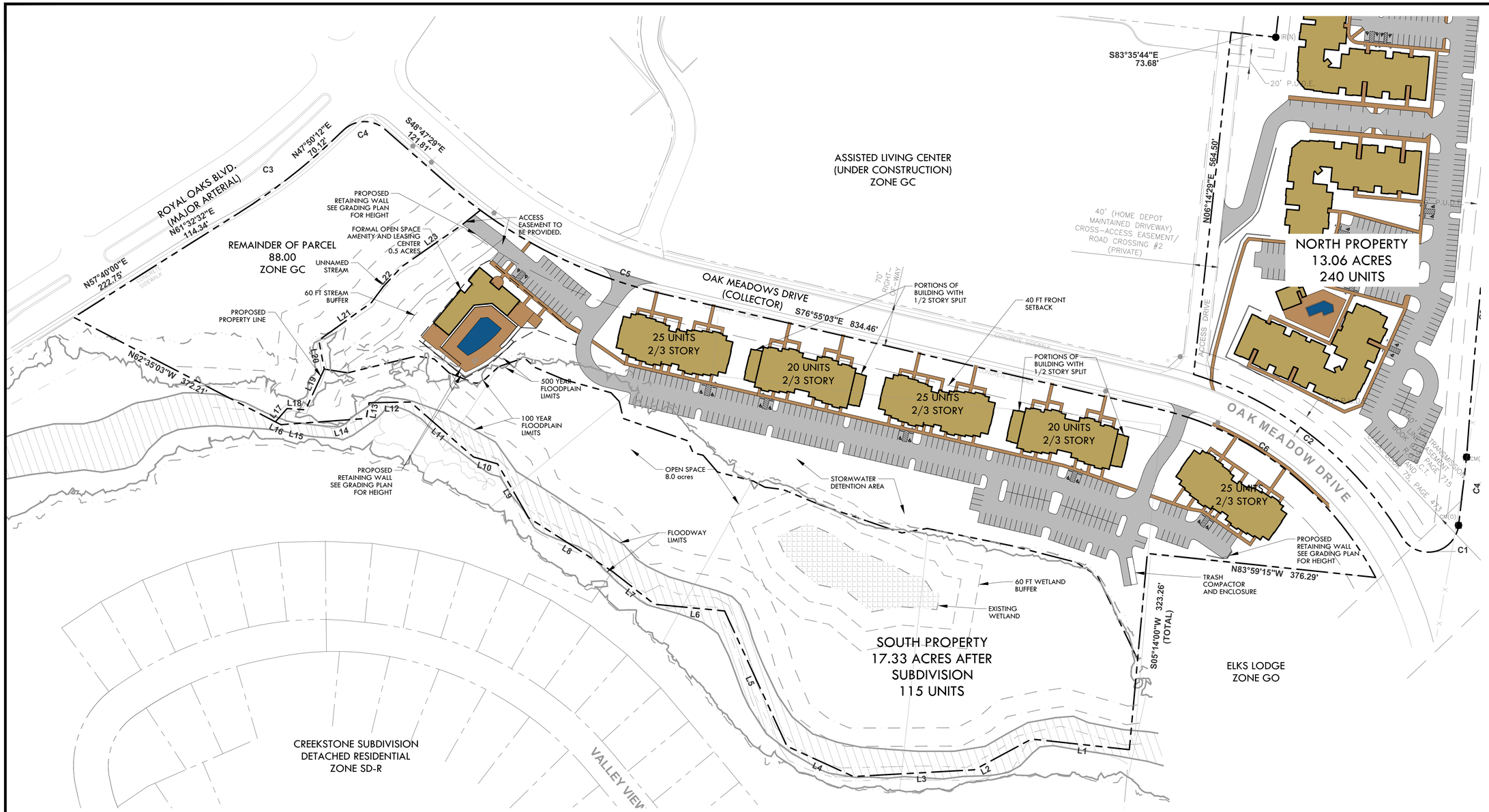
REVISIONS

| No. | DATE |
|---|---|
| | |

04/07/16 15001

# C2.1

NORTH SITE
DEVELOPMENT
PLAN




| LINE TABLE | | |
|---|---|---|
| LINE | BEARING | DISTANCE |
| L1 | N83°48'10"W | 161.22' |
| L2 | S61°46'08"W | 106.65' |
| L3 | S86°48'30"W | 198.12' |
| L4 | N65°28'52"W | 120.02' |
| L5 | N24°43'04"W | 244.21' |
| L6 | N84°36'00"W | 115.35' |
| L7 | N52°04'01"W | 87.70' |
| L8 | N57°18'12"W | 163.19' |
| L9 | N29°52'55"W | 101.80' |
| L10 | N74°02'09"W | 41.15' |
| L11 | N48°56'27"W | 137.25' |
| L12 | S88°57'25"W | 67.60' |
| L13 | S10°32'54"W | 26.12' |

| LINE TABLE | | |
|---|---|---|
| LINE | BEARING | DISTANCE |
| L14 | S74°19'35"W | 89.75' |
| L15 | N75°22'06"W | 55.08' |
| L16 | N62°35'03"W | 10.27' |
| L17 | N39°40'55"E | 27.30' |
| L18 | S89°07'57"E | 31.47' |
| L19 | N25°32'12"E | 70.78' |
| L20 | N10°00'40"W | 49.37' |
| L21 | N54°59'41"E | 103.02' |
| L22 | N40°36'36"E | 74.71' |
| L23 | N53°28'05"E | 164.68' |

| CURVE TABLE | | | | | | |
|---|---|---|---|---|---|---|
| CURVE | RADIUS | LENGTH | DELTA | TANGENT | CHORD | CHD BRG |
| C5 | 820.00' | 330.94' | 23°07'24" | 167.75 | 328.69' | S65°21'21"E |
| C6 | 537.96' | 464.57' | 49°28'46" | 247.89 | 450.27' | S52°10'40"E |

TOTAL OF 115 UNITS ON SOUTH PARCEL

0 40 80 160
GRAPHIC SCALE

N


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


# THE EPOCH DEVELOPMENT

PUD SUDBIVISION, DEVELOPMENT PLAN

COF #6086 FRANKLIN, TN

REVISIONS

| No. | DATE |
|---|---|
| | |

04/07/16 15001

# C2.2

SOUTH SITE DEVELOPMENT PLAN

OFFICE BUILDINGS ZONE GC

RIVERSIDE DRIVE

S83°32'35"E 377.77'

20' P.U.D.E.

PUBLIX SHOPPING CENTER ZONE GC

ROYAL OAKS BOULEVARD

IR(N)

IP(N)

IR(N)

PK(N)

S83°35'44"E 73.68'

IR(N)

UNDEVELOPED COMMERCIAL PROPERTY

HOME DEPOT ZONE GC

N06°24'16"E 708.89'

RIVERSIDE DR.

S07°40'29"W 577.88'

INTERSTATE-65

S04°01'39"W 316.67'

NORTH PROPERTY
13.06 ACRES
240 UNITS

N06°14'29"E 664.50'

121-75LA WALL UNIT (TYP.)

ROYAL OAKS BOULEVARD

N47°50'12"E 70.12'

C4

C3

S48°47'29"E 121.61'

N61°32'32"E 114.34'

UNDEVELOPED COMMERCIAL PROPERTY TO REMAIN ZONE GC

ASSISTED LIVING CENTER (UNDER CONSTRUCTION) ZONE GC

40' (HOME DEPOT MAINTAINED DRIVEWAY) CROSS-ACCESS EASEMENT/ ROAD CROSSING #2 (PRIVATE)

70' RIGHT-OF-WAY

ACCESS DRIVE

121-75LA WALL UNIT

RMS LED LIGHT 25-FT POLE HEIGHT (TYP.)

C5

S76°55'03"E 834.46'

OAK MEADOWS DRIVE

OAK MEADOW DRIVE

C6

C2

C3

L23 L22 L21 L20 L19 L18 L17 L16 L15 L14 L13 L12 L11 L10 L9 L8 L7 L6 L5 L4 L3 L2 L1

372.21'

WATSON BRANCH

SOUTH PROPERTY
17.33 ACRES
112 UNITS

121-75LA WALL UNIT (TYP.)

RMS LED LIGHT 25-FT POLE HEIGHT (TYP.)

N83°59'15"W 376.29'

RMS LED LIGHT 25-FT POLE HEIGHT

S05°14'00"W 323.26' (TOTAL)

EXISTING CREEKSTONE DETACHED FAMILY SUBDIVISION ZONE SD-R

ELK LODGE ZONE GO

VALLEY VIEW

C1

0 50 100 150 300
GRAPHIC SCALE

N

## SITE LIGHTING DATA

NOTE:

STREET LIGHT LOCATIONS AND QUANTITIES ARE APPROXIMATE. FINAL POSITIONING AND QUANTITIES SHALL BE AT THE DIRECTION OF MTEMC.

| | |
|---|---|
| DEVELOPMENT STANDARD: | CONVENTIONAL |
| LAND USE: | RESIDENTIAL |
| ZONING DISTRICT: | SD-R (SPECIFIC DEVELOPMENT RESIDENTIAL |
| HEIGHT OF PROPOSED BUILDING: | 30 FT. |
| POLE HEIGHT: | 25 FT. & 10 FT. |
| POLE/FIXTURE COLOR: | BLACK/WHITE |
| COLOR OF LIGHT: | WHITE |

THE LIGHTING PLAN HAS BEEN DESIGNED TO MEET THE CITY OF FRANKLIN STANDARDS AND THE APPROVAL OF THE PLANNING COMMISSION / CITY OF FRANKLIN.

CHANGES SHALL NOT BE MADE TO THE APPROVED LIGHTING PLAN UNLESS APPROVED BY EITHER THE RELEVANT DEPARTMENT SUPERINTENDENT OR THE PLANNING COMMISSION.


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


ENGINEERING CRUNK

WILSON CRAIG REGISTERED LANDSCAPE ARCHITECT AGRICULTURE COMMERCE No. 114180 STATE OF TENNESSEE 4/7/16

# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

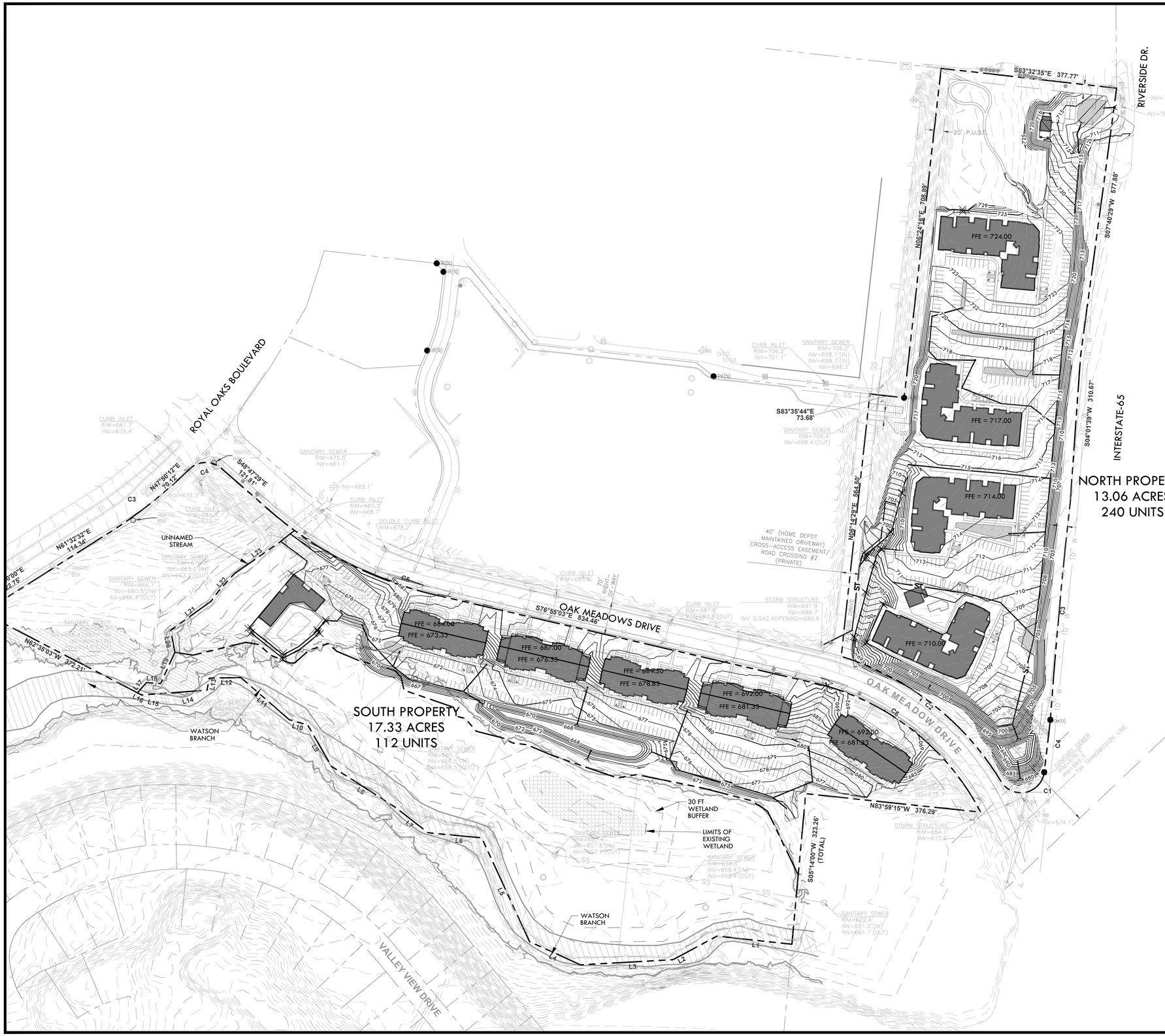
COF #6086 FRANKLIN, TN

| REVISIONS | |
|---|---|
| No. | DATE |

04/07/16 15001

C2.3

GENERAL LIGHTING PLAN




Grading & Drainage General Notes

1. Grading Permit is required for any project disturbing more than 10,000 sf, adding more than 5,000 sf of impervious surface or for any site grading requiring stockpiling of material.
2. The Developer shall provide the necessary labor and supervision required to support field testing by the independent testing firm and inspections by City officials at no cost to the City. Test reports of field testing if applicable shall be submitted directly to the Street Department. Defects disclosed by tests shall be rectified.
3. An authorized representative of the City shall make a final inspection of the project after completion to determine acceptability of the work and for release of performance bonds if required. Before this final inspection can be made, the Engineer responsible for the project shall certify in writing to the City Engineer that the work has been completed in accordance with approved plans and specifications.
4. Drainage facilities including, but not limited to, culverts, detention basins and ditches, as well as the roadway sub-grade, base stone and binder & surface coarse shall be inspected, tested and given approval at each stage of installation prior to proceeding to the next stage of construction. Final construction inspection for approval and acceptance of streets and drainage systems will not be granted until all work has been completed in accordance with the approved
5. Locating and coordination for the relocation of existing utilities is the responsibility of the contractor. Tennessee's One-Call and the City of Franklin utility location service shall be utilized in addition to coordination with local utility owners. The contractor shall at all times protect existing utilities and will be responsible for costs due to damage caused to any utility lines.

STORMWATER NARRATIVE

THE PROPOSED DEVELOPMENT IS DIVIDED INTO TWO SITE AREAS, A 13.06 ACRE NORTH SITE AND A 17.33 ACRE SOUTH SITE. THE NORTH SITE OUTFALLS TO AN EXISTING PIPE IN THE SOUTHEAST CORNER OF THE SITE THAT CROSSES OAK MEADOWS DRIVE TO WATSON BRANCH. THE SOUTH SITE SLOPES TO THE SOUTH INTO WATSON BRANCH WHICH RUNS ALONG THE SOUTHERN PROPERTY LINE. EACH SITE WILL CONTAIN RAIN GARDEN/BIO-RETENTION AREAS THAT WILL TREAT THE NEW IMPERVIOUS AREAS. PERVIOUS PAVEMENT AREAS WILL BE PROVIDED IN DESIGNED LOCATIONS WITHIN THE PARKING LOTS TO PROVIDE ADDITIONAL STORMWATER TREATMENT. THESE AREAS WILL THEN BE ROUTED TO A STORMWATER DETENTION AREA ADJACENT TO THE OUTFALL LOCATIONS FOR BOTH SITED TO ENSURE THE SITE MEETS THE DETENTION REQUIREMENTS.

IMPACT STATEMENT:

THE PROPOSED DEVELOPMENT CONTAINS TWO SITE FEATURES THAT WILL BE PROTECTED DURING CONSTRUCTION. THE SOUTH SITE CONTAINS A WETLAND AREA AS WELL AS A STREAM, WATSON BRANCH. THE SITE HAS BEEN DESIGNED NOT TO IMPACT THESE SITE FEATURES. THE REQUIRED BUFFERS FOR EACH FEATURE HAVE BEEN SHOWN ON THESE PLANS.

GRADING & DRAINAGE DATA CHART

- SITE AREA
  - NORTH = 13.06 AC
  - SOUTH = 17.33 AC
  - TOTAL = 30.39
- IMPERVIOUS AREA
  - NORTH = 6.31 AC
  - SOUTH = 4.19 AC
  - TOTAL = 10.50 AC
- DISTURBED AREA
  - NORTH = 9.7 AC
  - SOUTH = 8.4 AC
  - TOTAL = 18.1 AC
- Rv VALUE = 0.406*
- PEAK FLOW RUNOFF *
  - T.B.D

*PROPOSED DEVELOPMENT WILL COMPLY WITH CITY OF FRANKLIN STORMWATER REQUIREMENTS TO PROVIDE A TREATED Rv VALUE OF LESS THAN OR EQUAL TO 0.200. THE PROPOSED DEVELOPMENT WILL DETAIN THE PEAK FLOWS FOR THE 2 YEAR THROUGH 100 YEAR STROM EVENTS.

STREAM BUFFER NOTE:

THERE SHALL BE NO MOWING, CLEARING, GRADING, CONSTRUCTION, STORAGE, OR DISTURBANCE OF VEGETATION IN RIPARIAN BUFFERS EXCEPT AS PERMITTED BY THE CITY ENGINEER, OR HIS DESIGNEE.


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


ENGINEERING CRUNK

JEFFREY WILSON CRUNK — REGISTERED — AGRICULTURE — COMMERCE — No. 114180 — STATE OF TENNESSEE — 4/7/16

# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

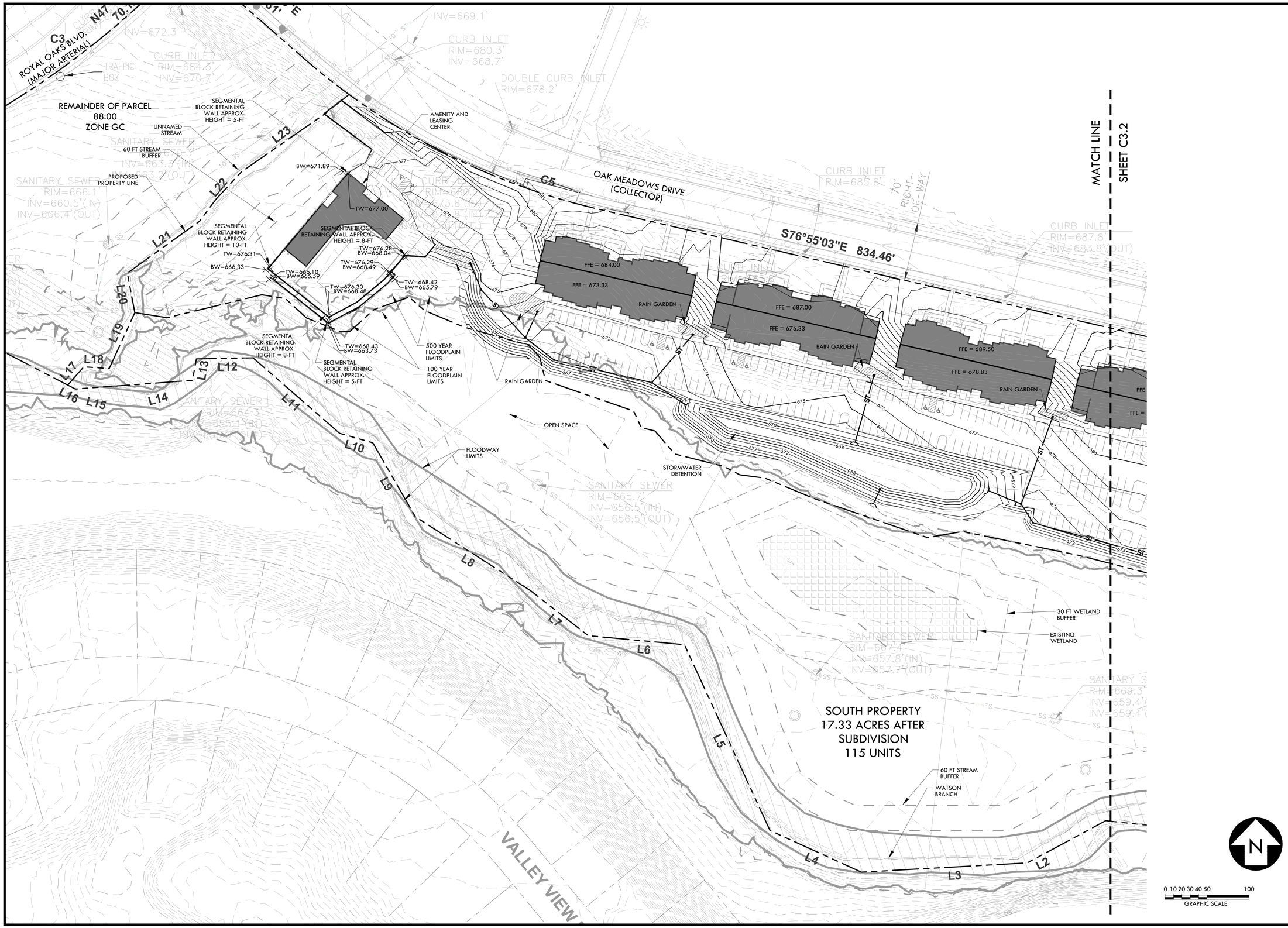
COF #6086 FRANKLIN, TN

| REVISIONS | |
|---|---|
| No. | DATE |

04/07/16 15001

C3.0

OVERALL GRADING PLAN




CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM

# THE EPOCH DEVELOPMENT

PUD SUDBIVISION, DEVELOPMENT PLAN

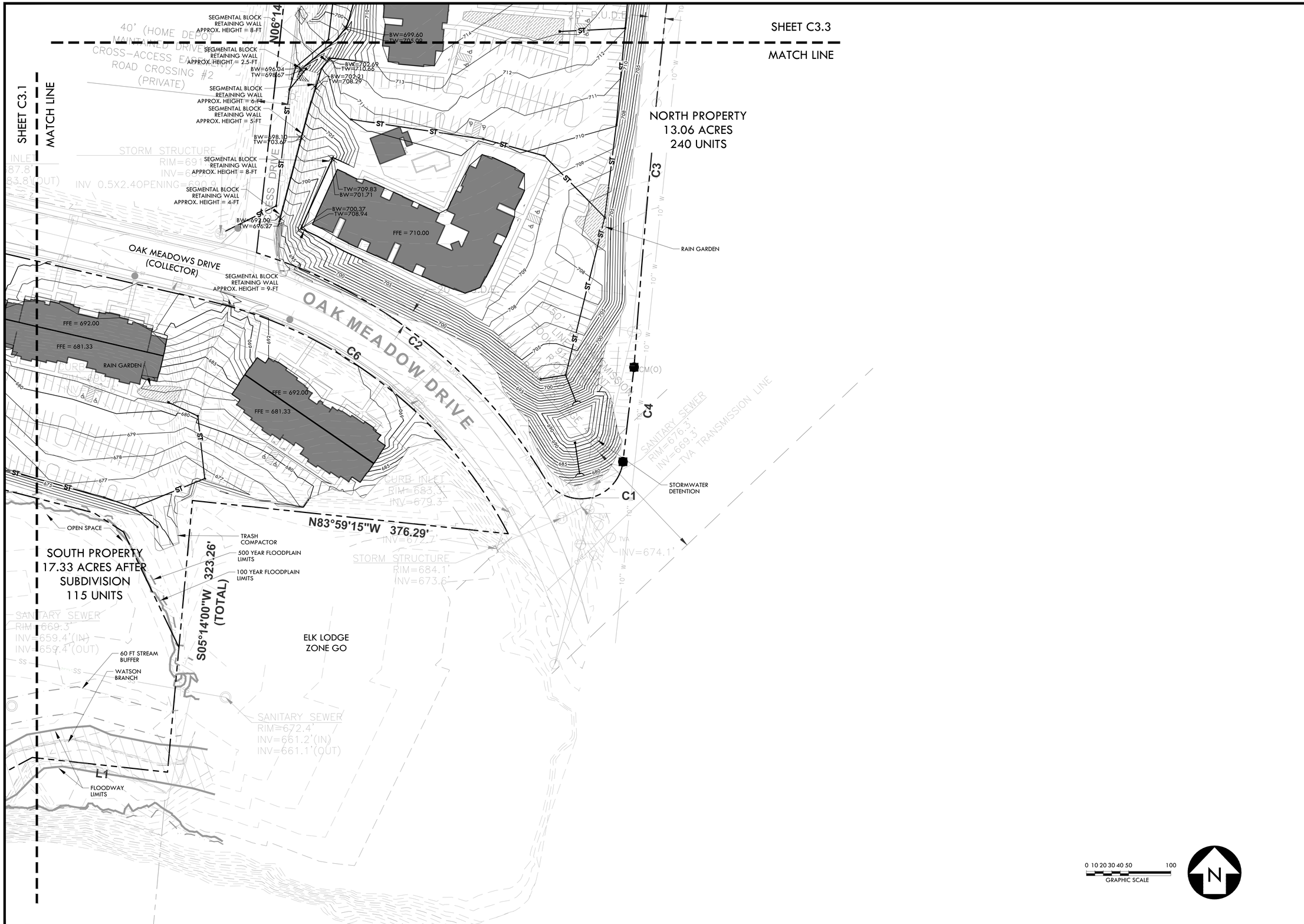
COF #6086 FRANKLIN, TN

| REVISIONS | |
|---|---|
| No. | DATE |

04/07/16 15001

# C3.1

SOUTH SITE GRADING PLAN




CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM

# THE EPOCH DEVELOPMENT

PUD SUDBIVISION, DEVELOPMENT PLAN

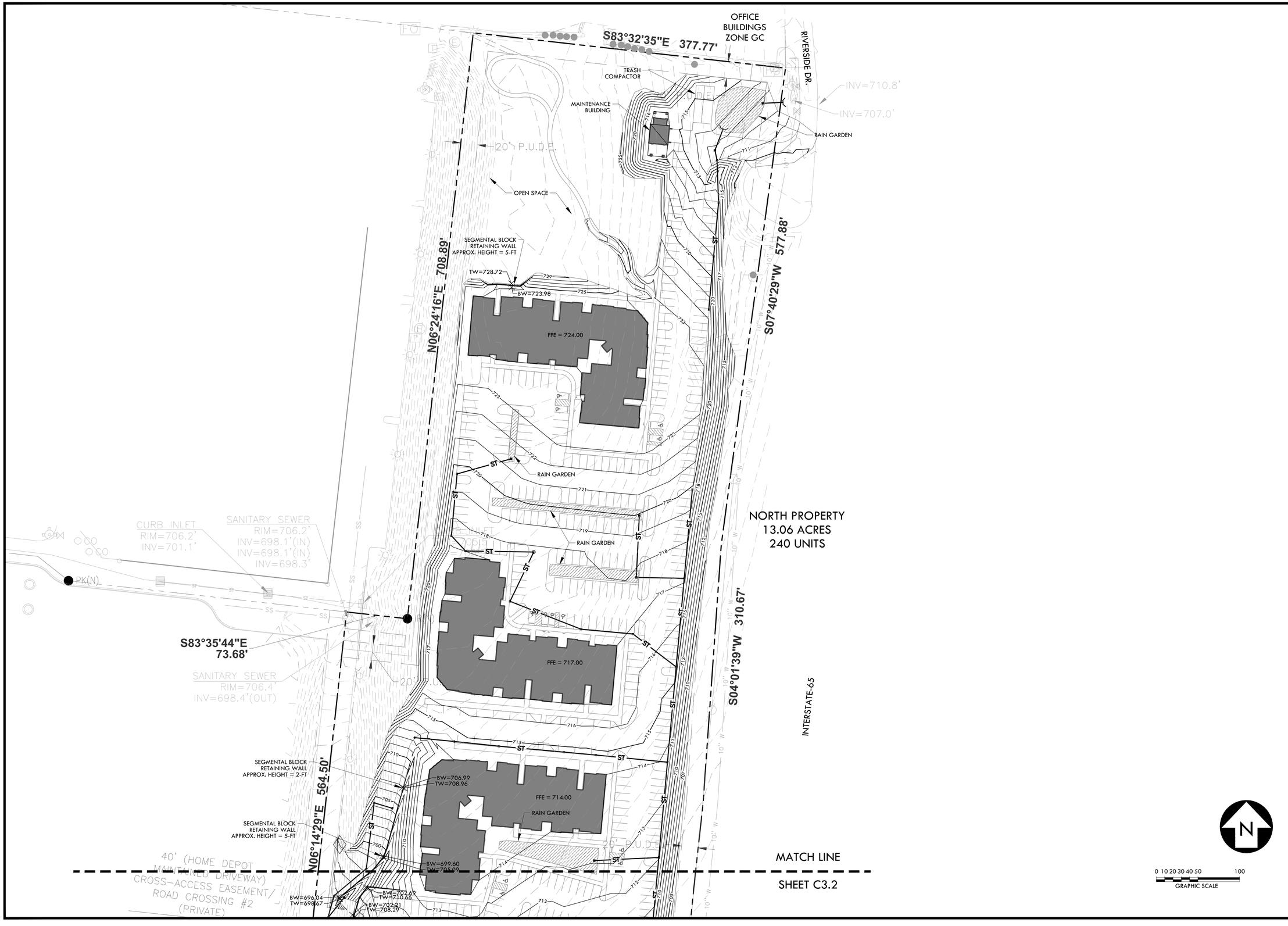
COF #6086 FRANKLIN, TN

| REVISIONS | |
|---|---|
| No. | DATE |

04/07/16 15001

# C3.2

SOUTH & NORTH SITE GRADING PLAN





CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


# THE EPOCH DEVELOPMENT

PUD SUDBIVISION, DEVELOPMENT PLAN

COF #6086 FRANKLIN, TN

| REVISIONS | |
|---|---|
| No. | DATE |

04/07/16 15001

# C3.3

NORTH SITE GRADING PLAN

NOTE THAT NO NEW R.O.W. IS PROPOSED FOR THIS PROJECT. REFER TO TRAFFIC STUDY FOR INFORMATION REGARDING L.O.S.

STATEMENT OF IMPACT:
The proposed project will add 355 multi-family units with access along Oak Meadow Drive and Riverside Drive. The primary road corridor serving the project is the major arterial South Royal Oaks Boulevard. Based on the traffic study performed for this project, the majority of traffic will be directed in the northernly direction toward Cool Springs.

R.O.W. & Access General Notes

1. Prior to beginning any construction, the Developer and/or Contractor, shall obtain all necessary permits as required by law. Such permits may include, but are not limited to, those required by State of Tennessee, Williamson County and other City of Franklin agencies.
2. All off-site work within the public right-ofway shall require an approved traffic control plan which complies with the MUTCD. No off-site excavation may be undertaken in any street, road, alley or right-of-way of any utility or temporary construction easement of the City of Franklin by any entity unless 72-hour notice has been given to the City of Franklin Traffic Operations Center. The contractor shall have an approved traffic control plan onsite during construction.
3. Construction materials shall be fully tested in accordance with the designations and requirements within the referenced "TDOT Standard Specifications" sections, unless otherwise noted within the "Standard Specifications" section of the City of Franklin Transportation & Street Technical Standards.
4. An authorized representative of the City shall make a final inspection of the project after completion to determine acceptability of the work and for release of performance bonds if required. Before this final inspection can be made, the Engineer responsible for the project shall certify in writing to the City Engineer that the work has been completed in accordance with approved plans and specifications.
5. Locating and coordination for the relocation of existing utilities is the responsibility of the contractor. Tennessee's One-Call and the City of Franklin utility location service shall be utilized in addition to coordination with local utility owners. The contractor shall at all times protect existing utilities and will be responsible for costs due to damage caused to any utility lines.
6. All temporary striping shall conform to "Standard Specifications for Road and Bridge Construction," published by TDOT, the latest revision except as herein amended. When approved, temporary striping shall be required prior to the opening of a street for travel where pavement and/or permanent striping cannot be completed due to weather and/or time constraints.
7. Thermoplastic pavement markings should be used on all public and private City street projects. Thermoplastic traffic striping and pavement markings shall conform to Section 716.03 "Thermoplastic Pavement Markings", of the Tennessee Department of Transportation Specifications (TDOT), and to the City of Franklin Transportation & Street Technical Standards.

The Epoch Development R.O.W. & Access Data Chart
Daily Trip Generation: 2,360 veh per day
Peak Hour Trip Generation: 145 AM / 143 PM veh per hour
Traffic Impact Study Required: YES
Circulation Plan Required: NO

Access Management
Min. Distance Between Intersection: 600 FT
Min. Distance Between high volume/alleys & Intersections: 300 FT
Min. Distance Between driveway & Intersections: 300 ft
Driveway Width (two-way): 24 ft
Driveway Approach Street Configuration: 15 ft Radius Return or Curb Cut.

FIRE TRUCK TURNING MOVEMENT INFORMATION

Number of Front Axles 1
Front Track Width = 8'
Wheels on Each Front Axle = 2
Number of Rear Axles = 2
Rear Track Width = 8'
Wheel Base = 21.316' (Front Axle to Front Rear Axle)
Rear Axle Spacing = 4.417'
Body Length = 50.0417
Width = 8.333'
Rear Overhang = 22.1424'
Body Style = Fire Truck
Turning Radius Wall to Wall = 42'


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM

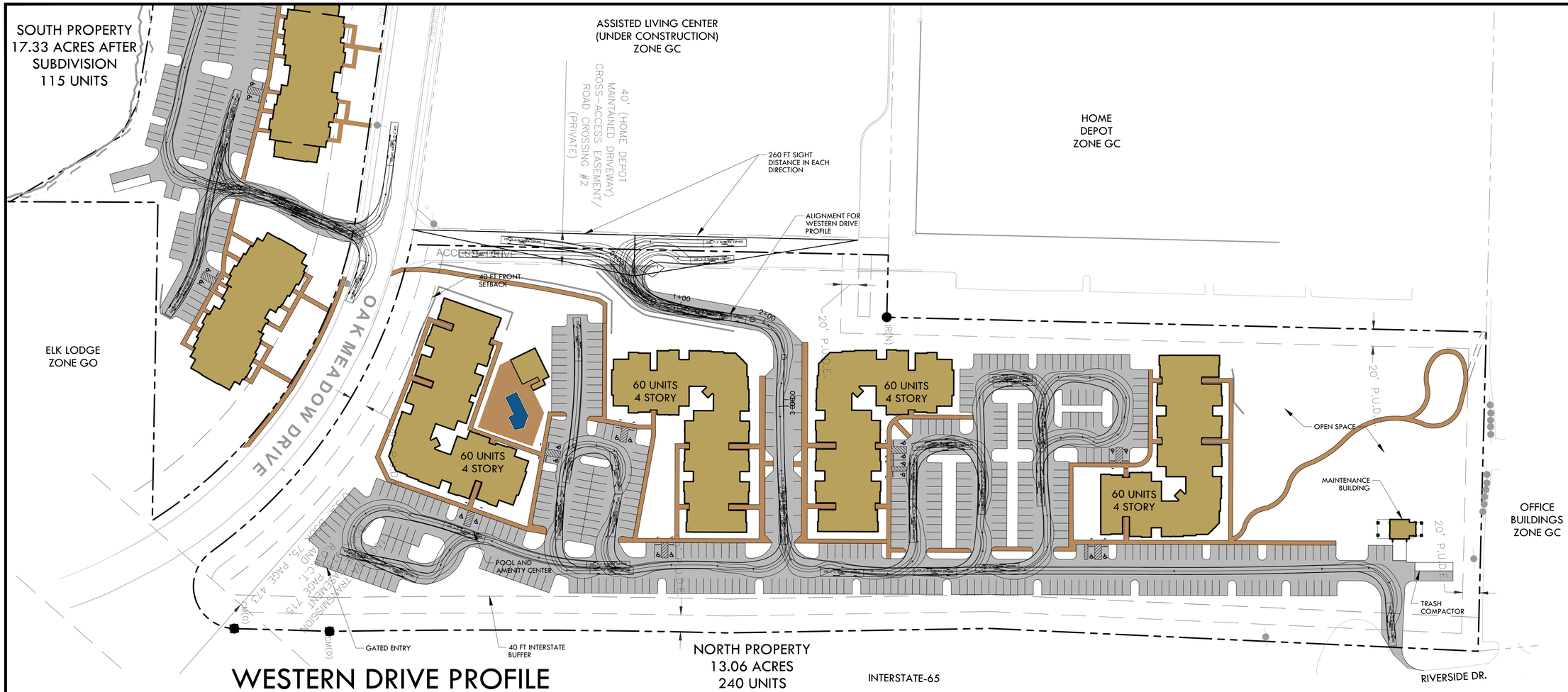

REGISTERED ENGINEER AGRICULTURE COMMERCE No. 114180 STATE OF TENNESSEE
4/7/16

# THE EPOCH DEVELOPMENT
PUD SUDBIVISION, DEVELOPMENT PLAN
COF #6086 FRANKLIN, TN

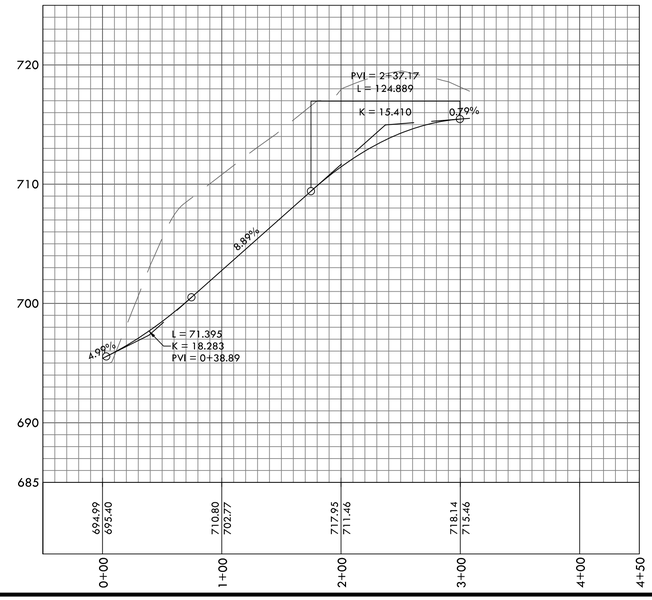
| REVISIONS | |
|---|---|
| No. | DATE |

04/07/16 15001

# C4.0
OVERALL ACCESS PLAN




## WESTERN DRIVE PROFILE




0 30 60 120
GRAPHIC SCALE

CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM

# THE EPOCH DEVELOPMENT

PUD SUDBIVISION, DEVELOPMENT PLAN

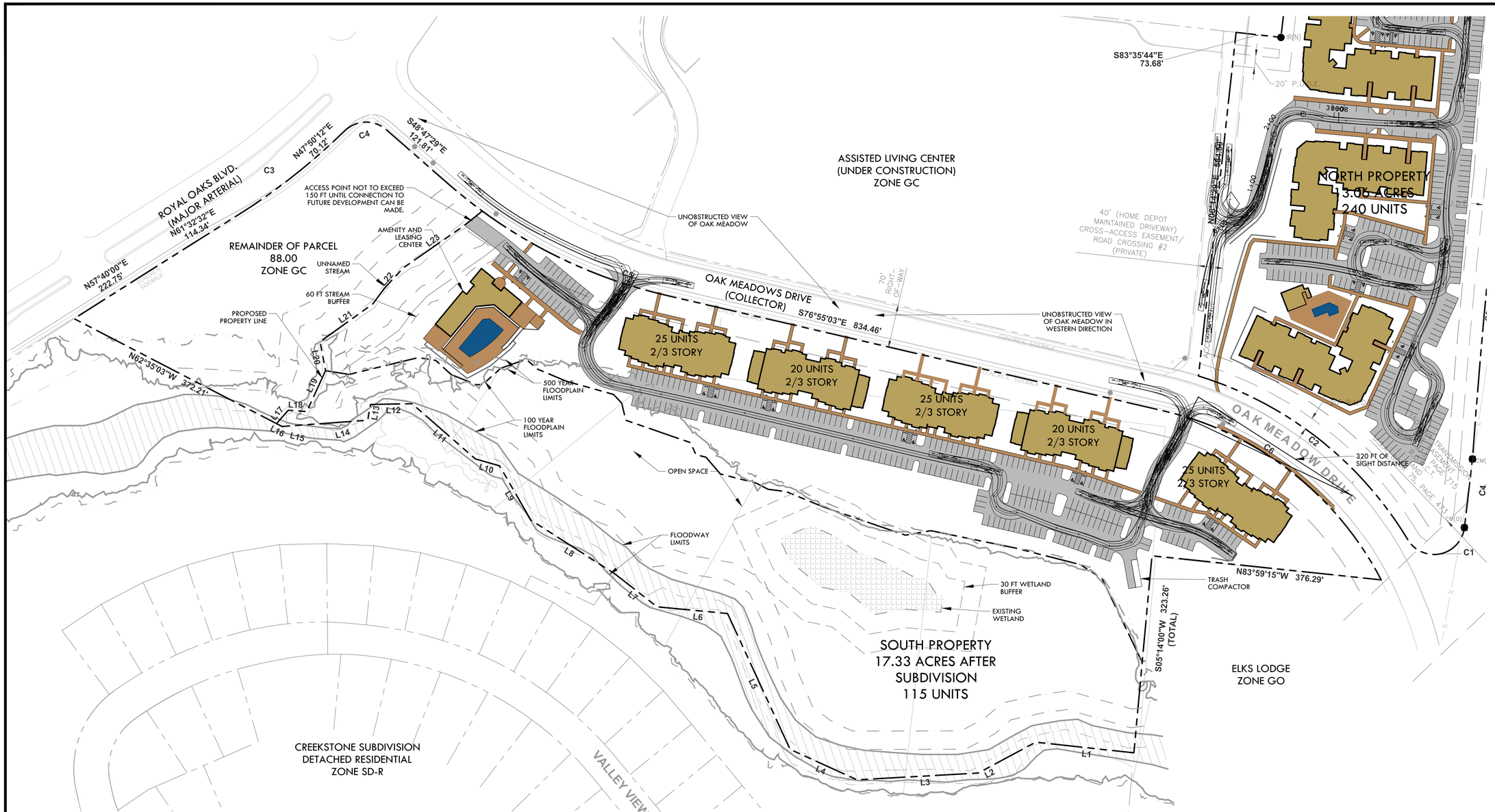
COF #6086 FRANKLIN, TN

| REVISIONS | |
|---|---|
| No. | DATE |

04/07/16 15001

# C4.1

NORTH SITE
ACCESS
PLAN




CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM

# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

FRANKLIN, TN

COF #6086

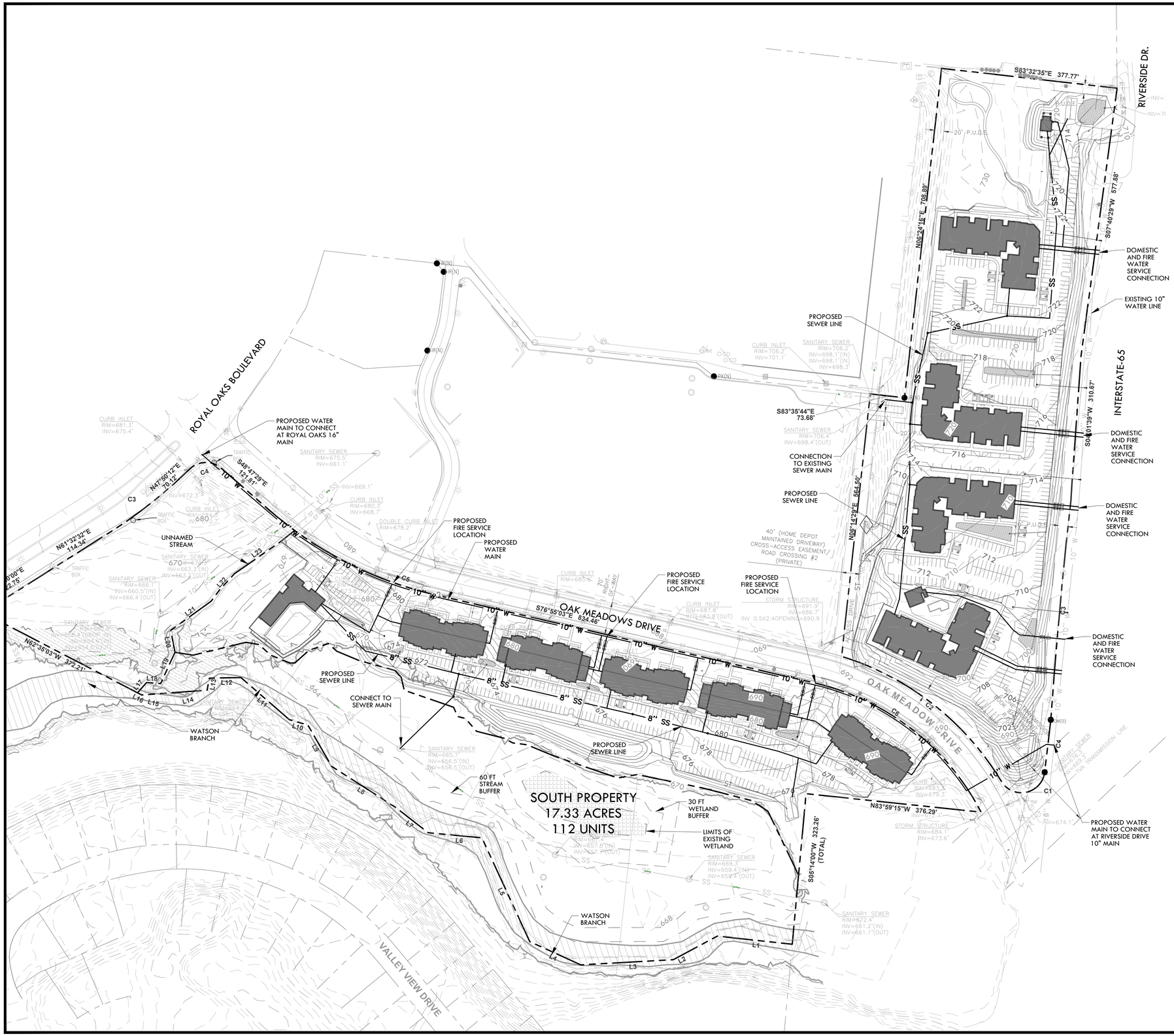
REVISIONS

| No. | DATE |
|---|---|
| | |

04/07/16 15001

# C4.2

SOUTH SITE ACCESS PLAN




STATEMENT OF IMPACTS

The proposed project is the construction of 355 new attached dwelling units with a mixture of one, two, and three bedroom units. The project will result in a projected flow of 101,250 GPD. The Northern site will be served by water off of the existing 10" main in the old Riverside Drive ROW, and sewer at the existing manhole behind the Home Depot. The Southern site will be served by water with a new 8" main along Oak Meadow Dr. that will connect from Royal Oaks Blvd. and tie into the 10" main along the old Riverside Drive ROW, and sewer will be served by the existing 24" main that runs along Watson Branch on the subject property. Reclaimed water is not located in the project vicinity.

Water & Sewer General Notes

1. All persons who undertake the construction of water, sewer and/or reclaimed water lines located in, or affecting services provided by the City of Franklin shall comply with the requirements and regulations set forth in the "General Requirements & Technical Specifications, Water Management Department, City of Franklin, Tennessee" latest edition, along with any amendments, additions, or alteration that may thereafter be adopted by the board of mayor and aldermen by resolution.
2. Contractor shall obtain Water & Sewer Infrastructure Installation Permit prior to scheduling required Pre-Construction Site Meeting. Contractor shall complete the PreConstruction Site Meeting prior to commencing with construction.
3. Contractor shall obtain and keep all of the following items on the jobsite at all times during construction:
   a. Approved, Stamped and Signed Water and/or Sewer Plans
   b. Water & Sewer Infrastructure Installation Permit, with all steps completed and signed by appropriate City employees.
   c. Copy of approved availability request response letter.
   d. A copy of all approved Cut Sheets.
4. Acceptance of City of Franklin public water infrastructure, sanitary sewer infrastructure and/or reclaimed water infrastructure shall become the responsibility of the City of Franklin, TN following approval from the City of Franklin Inspectors and acceptance by the Franklin Municipal Planning Commission. The Acceptance date shall be based on the day maintenance sureties are established by the Franklin Municipal Planning Commission.
5. Prior to the acceptance of City of Franklin public water infrastructure, sanitary sewer infrastructure and/or reclaimed water infrastructure the contractor shall be required to submit as-built drawings to the Planning and Sustainability Department.
6. All off-site work within the public right-of-way shall require an approved traffic control plan which complies with the MUTCD. No off-site excavation may be undertaken in any street, road, alley or right-of-way of any utility or temporary construction easement of the City of Franklin by any entity unless 72-hour notice has been given to the City of Franklin Traffic Operations Center. The contractor shall have an approved traffic control plan onsite during construction.
7. Any damages caused to existing utilities during construction shall, at his own expense, be replaced or repaired to original condition and quality, as approved by the owner and representative of the appropriate utility company, by the Contractor.
8. The City of Franklin is not a member of TN one call, contractor's responsibility to contact Franklin Water Management, no less than 72 hours prior to commencing work.
   City of Franklin Water Management Contact:
   124 Lumber Dr.
   Franklin, TN 37064
   Attn: Utility Inspector
   (615) 794-4554

WATER & SEWER DATA CHART

| | |
|---|---|
| Facility Type: | APARTMENTS |
| Unit Flow in GPD: | 250 GPD for 1-bedroom |
| | 300 GPD for 2-bedroom |
| | 350 GPD for 3-bedroom |
| Number of Units: | 149 1-bedroom |
| | 162 2-bedroom |
| | 44 3-bedroom |
| Total Flow in GPD: | 101,250 GPD |

0 50 100 200
GRAPHIC SCALE

N


CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM


# THE EPOCH DEVELOPMENT

PUD SUDBIVISION, DEVELOPMENT PLAN

COF #6086 FRANKLIN, TN

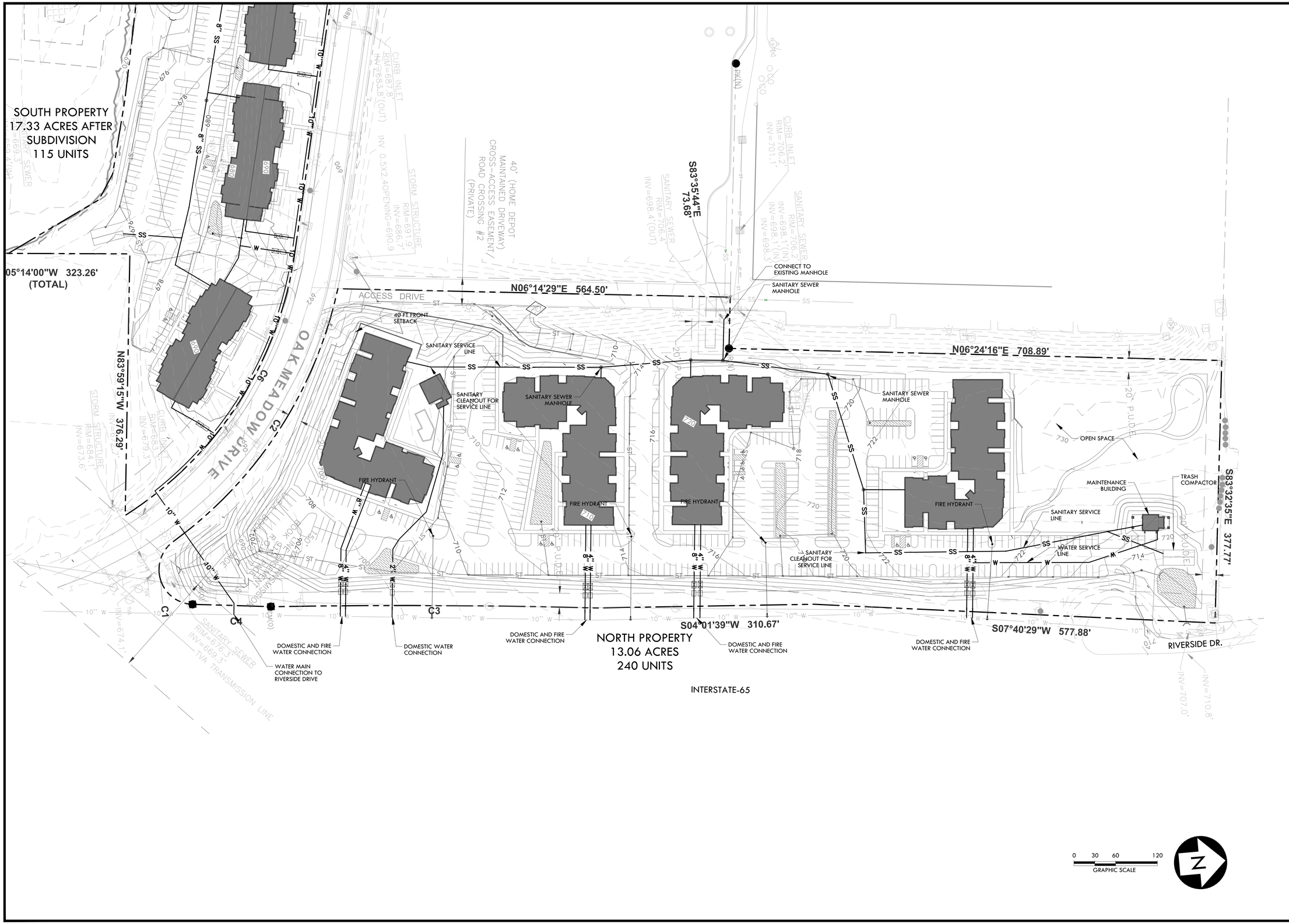
REVISIONS

| No. | DATE |
|---|---|
| | |

04/07/16 15001

# C5.0

OVERALL UTILITY PLAN




CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM

# THE EPOCH DEVELOPMENT

PUD SUDBIVISION, DEVELOPMENT PLAN

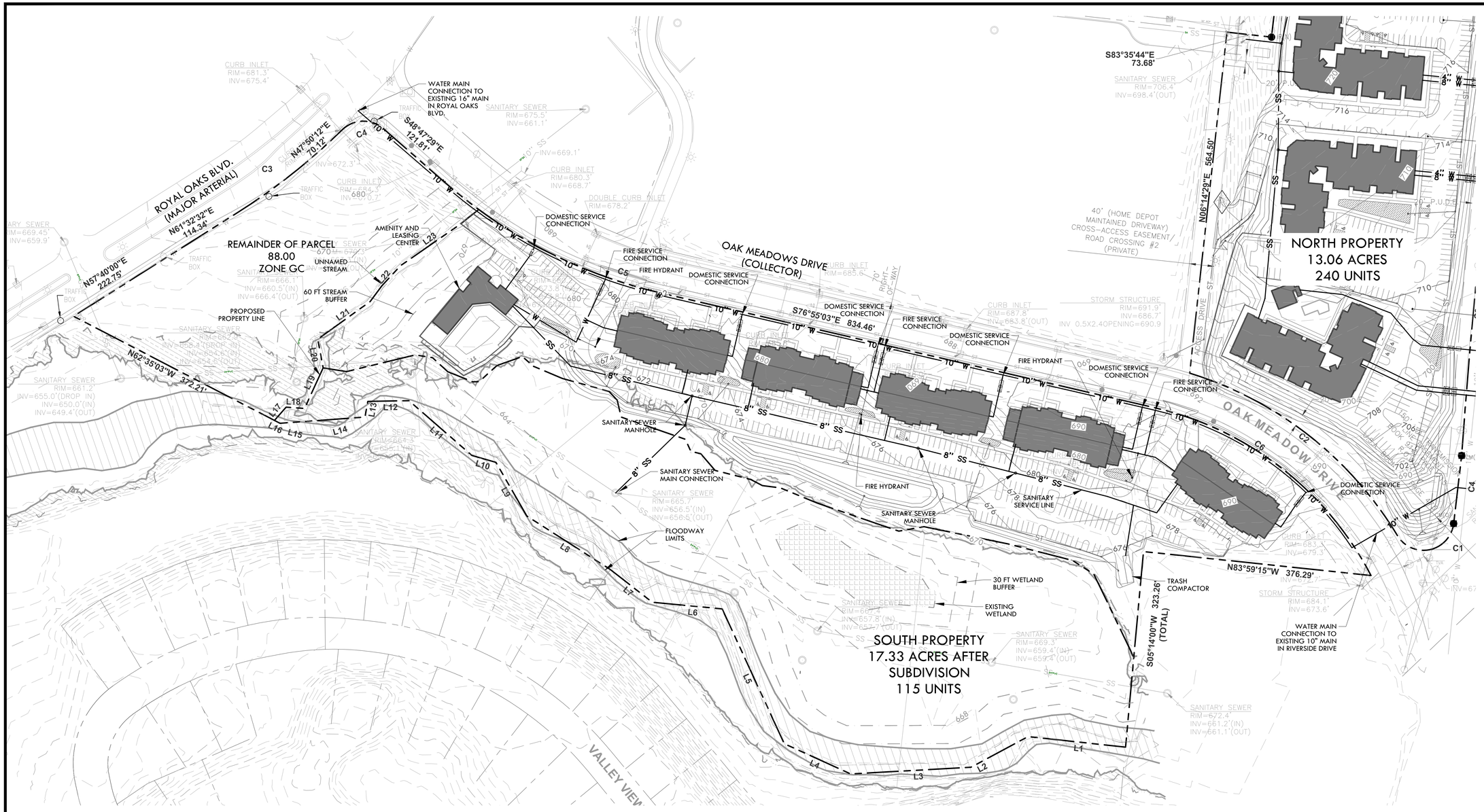
COF #6086 FRANKLIN, TN

| REVISIONS | |
|---|---|
| No. | DATE |

04/07/16 15001

# C5.1

NORTH SITE
UTILITY
PLAN




CRUNK ENGINEERING LLC
1894 GENERAL GEORGE PATTON DR.
SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM

# THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

COF #6086 FRANKLIN, TN

| REVISIONS | |
|---|---|
| No. | DATE |

04/07/16 15001

# C5.2

SOUTH SITE UTILITY PLAN

GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1/16" = 1'-0"

ELEVATION

NORTH PARCEL

PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# BUILDING ELEVATIONS

2016-04-07

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

SIDE ELEVATION

NORTH PARCEL

GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1/16" = 1'-0"

PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# BUILDING ELEVATIONS

2016-04-07

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

NORTH ELEVATION
(OAK MEADOW DRIVE)

## SOUTH PARCEL

GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1/16" = 1'-0"

PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# BUILDING ELEVATIONS

2016-04-07

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

SOUTH ELEVATION

GRAPHIC SCALE

16 0 4 8 16

( IN INCHES )
1/16" = 1'-0"

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

SOUTH PARCEL

PROJECT #6068

# BUILDING ELEVATIONS

2016-04-07

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

GRAPHIC SCALE

8 0 2 4 8

( IN INCHES )
1/8" = 1'-0"

AMENITY / CLUBHOUSE CENTER
ELEVATION

SOUTH PARCEL

KENNETH LINEHAN
REGISTERED ARCHITECT
DEPARTMENT OF AGRICULTURE
COMMERCE
No. 105419
STATE OF TENNESSEE

A5.0

PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# BUILDING ELEVATIONS

2016-04-07

# THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

GRAPHIC SCALE

8 0 2 4 8

( IN INCHES )
1/8" = 1'-0"

POOL PAVILION ELEVATION

NORTH PARCEL

KENNETH LINEHAN
REGISTERED ARCHITECT
DEPARTMENT OF AGRICULTURE
COMMERCE
No. 10541
STATE OF TENNESSEE

A6.0

PROJECT #6068

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

# BUILDING ELEVATIONS

2016-04-07

# THE EPOCH DEVELOPMENT

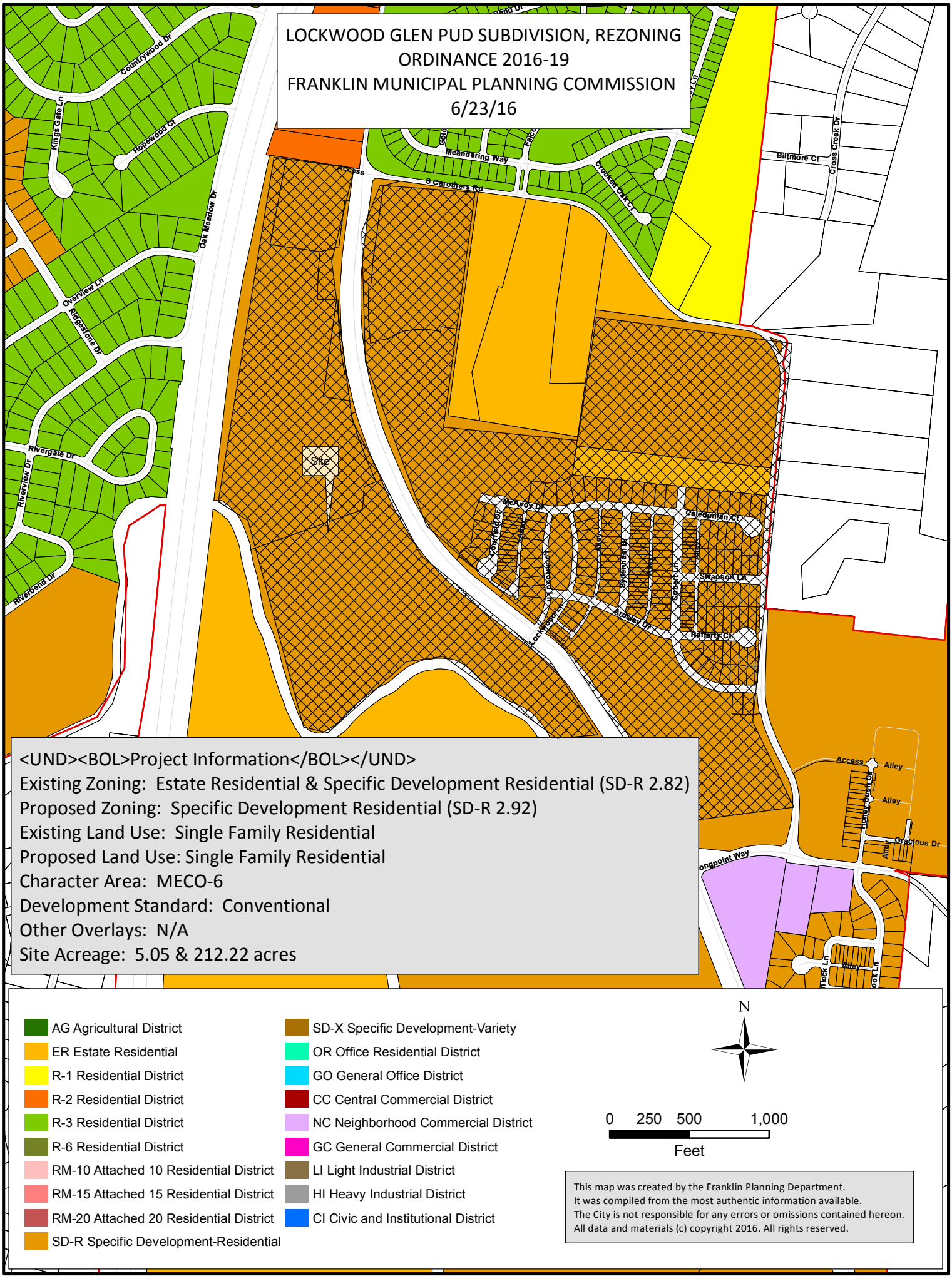
FRANKLIN, TENNESSEE

© 2016 FUGLEBERG KOCH, PLLC
2555 TEMPLE TRAIL WINTER PARK, FLORIDA 32789 TEL: 407-629-0595 FAX: 407-628-1057 LICENSE NO. 3705

Formal Open Space locations: not integrated into the site, but rather “left-over” spaces after building and parking lot locations were set

Detention locations

# LOCKWOOD GLEN PUD SUBDIVISION, REZONING ORDINANCE 2016-19
# FRANKLIN MUNICIPAL PLANNING COMMISSION
# 6/23/16




<UND><BOL>Project Information</BOL></UND>
Existing Zoning: Estate Residential & Specific Development Residential (SD-R 2.82)
Proposed Zoning: Specific Development Residential (SD-R 2.92)
Existing Land Use: Single Family Residential
Proposed Land Use: Single Family Residential
Character Area: MECO-6
Development Standard: Conventional
Other Overlays: N/A
Site Acreage: 5.05 & 212.22 acres

- AG Agricultural District
- ER Estate Residential
- R-1 Residential District
- R-2 Residential District
- R-3 Residential District
- R-6 Residential District
- RM-10 Attached 10 Residential District
- RM-15 Attached 15 Residential District
- RM-20 Attached 20 Residential District
- SD-R Specific Development-Residential
- SD-X Specific Development-Variety
- OR Office Residential District
- GO General Office District
- CC Central Commercial District
- NC Neighborhood Commercial District
- GC General Commercial District
- LI Light Industrial District
- HI Heavy Industrial District
- CI Civic and Institutional District

N

0 250 500 1,000
Feet

This map was created by the Franklin Planning Department.
It was compiled from the most authentic information available.
The City is not responsible for any errors or omissions contained hereon.
All data and materials (c) copyright 2016. All rights reserved.

| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L1 | 577.00 | S81° 25' 13"E |
| L2 | 31.70 | N7° 13' 56"E |
| L4 | 582.26 | S82° 20' 54"E |
| L5 | 1007.65 | S7° 57' 01"W |
| L6 | 387.69 | S7° 26' 55"W |
| L7 | 824.24 | S80° 41' 16"E |
| L8 | 343.04 | N8° 26' 26"E |
| L9 | 462.57 | N8° 01' 21"E |
| L10 | 586.85 | S82° 24' 09"E |
| L12 | 304.54 | S80° 56' 29"E |
| L14 | 33.26 | S28° 37' 07"E |
| L16 | 132.33 | S5° 13' 31"W |
| L17 | 409.91 | S5° 50' 37"W |
| L18 | 176.27 | S5° 50' 37"W |
| L19 | 24.60 | S83° 46' 25"E |
| L20 | 110.27 | S6° 04' 28"W |
| L22 | 542.39 | S2° 27' 07"W |

| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L23 | 295.29 | S1° 41' 23"W |
| L25 | 169.35 | S47° 37' 03"W |
| L26 | 249.50 | S47° 37' 03"W |
| L27 | 196.32 | S49° 03' 53"W |
| L28 | 166.16 | S48° 22' 44"W |
| L30 | 725.93 | N84° 15' 00"W |
| L31 | 59.34 | N5° 38' 57"E |
| L32 | 23.93 | N40° 39' 23"W |
| L33 | 262.02 | N17° 52' 55"W |
| L34 | 265.99 | N20° 52' 26"W |
| L35 | 71.18 | N24° 21' 08"W |
| L36 | 128.68 | N39° 51' 01"W |
| L37 | 364.80 | N57° 12' 14"W |
| L38 | 85.11 | N43° 47' 46"W |
| L39 | 76.98 | N52° 31' 09"W |
| L40 | 178.83 | N78° 58' 32"W |
| L41 | 55.76 | S86° 16' 14"W |

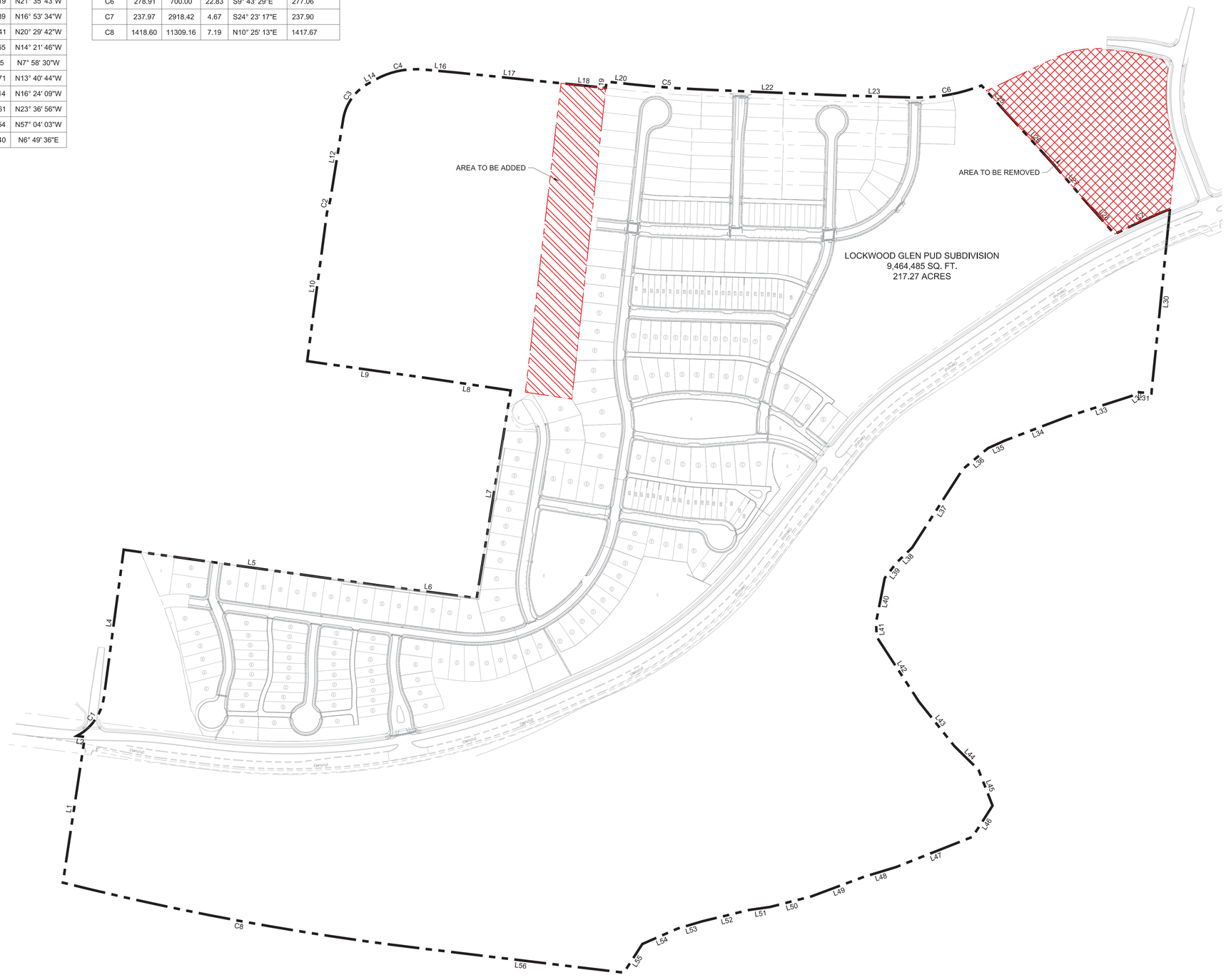
| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L42 | 301.01 | S56° 53' 55"W |
| L43 | 222.92 | S51° 26' 40"W |
| L44 | 132.82 | S44° 27' 33"W |
| L45 | 150.64 | S68° 36' 30"W |
| L46 | 145.06 | N57° 18' 02"W |
| L47 | 322.19 | N21° 35' 43"W |
| L48 | 134.89 | N16° 53' 34"W |
| L49 | 215.41 | N20° 29' 42"W |
| L50 | 168.55 | N14° 21' 46"W |
| L51 | 81.95 | N7° 58' 30"W |
| L52 | 188.71 | N13° 40' 44"W |
| L53 | 101.14 | N16° 24' 09"W |
| L54 | 150.61 | N23° 36' 56"W |
| L55 | 133.54 | N57° 04' 03"W |
| L56 | 808.40 | N6° 49' 36"E |

| Curve Table | | | | | |
|---|---|---|---|---|---|
| Curve # | Length | Radius | Delta | Chord Direction | Chord Length |
| C1 | 192.68 | 202.54 | 54.51 | S55° 05' 41"E | 185.50 |
| C2 | 66.85 | 432.00 | 8.87 | S76° 30' 31"E | 66.78 |
| C3 | 178.08 | 195.00 | 52.32 | S54° 46' 48"E | 171.95 |
| C4 | 191.97 | 325.00 | 33.84 | S11° 41' 48"E | 189.19 |
| C5 | 249.92 | 3953.11 | 3.62 | S4° 15' 48"W | 249.88 |
| C6 | 278.91 | 700.00 | 22.83 | S9° 43' 29"E | 277.06 |
| C7 | 237.97 | 2918.42 | 4.67 | S24° 23' 17"E | 237.90 |
| C8 | 1418.60 | 11309.16 | 7.19 | N10° 25' 13"E | 1417.67 |

**Property Description**

Land situated in the 9th Civil District and the 14th Civil District of Williamson County, Tennessee, being a portion of the properties conveyed to Lockwood Family LP by Dorris R. Lockwood, of record in Deed book 1777, Page 759, and Deed book 1777, Page 761, and a portion of the property conveyed to Lockwood Construction Company by Anthony B. Jamison, of record in Deed book 656, Page 650, in the Register's Office of Williamson County, Tennessee (R.O.W.C., TN.), and being more particularly described as follows;

**Beginning** at a concrete Right of Way monument in the easterly margin of Interstate 65, being the northwest corner of the Crescent Lockwood, LLC. property of record in Book 6362, Page 691, R.O.W.C.; thence leaving said Interstate 65 margin, S 81°25'13" E, for a distance of 577.00' to an iron rod (old); thence, N 07°13'56" E, for a distance of 31.70' to an iron rod in the southwest margin of Carothers Road; thence, with a curve to the left, with an arc length of 192.68', a radius of 202.54', with a chord bearing of S 55°05'41" E, and a chord length of 185.50' to an iron rod (old); thence, S 82°20'54" E, for a distance of 582.26' to an iron rod (old); thence, leaving said margin, along the west property line of Alligood, Deed Book 1202, Page 845 (R.O.W.C., TN.) S 07°57'01" W, for a distance of 1007.65' to an iron rod (old); thence, S 07°26'55" W, for a distance of 387.69' to an iron rod (old); thence, along the south property lines of above mentioned Alligood, and Davis property of record in Deed Book 435, Page 126 (R.O.W.C., TN.) S 80°41'16" E, for a distance of 824.24' to an iron rod (old); thence, along east property line of said Davis property, N 08°26'26" E, for a distance of 343.04' to an iron rod (old); thence, along east property line of the Strain property of record in Record Book 5632, Page 184 (R.O.W.C., TN.) N 08°01'21" E, for a distance of 462.57' to an iron rod (old) in the center of an old road bed; thence, along said center of old road, S 82°24'09" E, for a distance of 586.85' to an iron rod (old) in the southerly margin of Carothers Road; thence, along said margin for the next seven (7) calls, with a curve to the left, with an arc length of 66.85', with a radius of 432.00', with a chord bearing of S 76°30'31" E, and chord length of 66.78' to an iron rod (old); thence, S 80°56'29" E, for a distance of 304.54' to an iron rod (old); thence, with a curve to the right, with an arc length of 178.08', a radius of 195.00', with a chord bearing of S 54°46'48" E, and chord length of 171.95' to an iron rod (old); thence, S 28°37'07" E, for a distance of 33.26' to an iron rod (old); thence, with a curve to the right, with an arc length of 191.97', a radius of 325.00', with a chord bearing of S 11°41'48" E, and chord length of 189.19'; thence, S 05°13'31" W, for a distance of 132.33'; thence, S 05°50'37" W, passing an iron rod (old) at a distance of 409.91' for a total distance of 586.18' to an iron rod (set); thence, S 05°50'37" W, for a distance of 409.91' to an iron rod (old); thence, S 83°46'25" E, for a distance of 24.60' to a point in the centerline of said Carothers Road; thence, along said centerline for the next six (6) calls, S 06°04'28" W, for a distance of 110.27' to a point; thence, with a curve to the left, with an arc length of 249.92', a radius of 3953.11', a chord bearing of S 04°15'48" W, and chord length of 249.88' to a point; thence, S 02°27'07" W, for a distance of 542.39' to a point; thence, S 01°41'23" W, for a distance of 295.29' to a point; thence, with a curve to the left with an arc length of 278.90', with a radius of 700.00', with a chord bearing of S 09°43'29" E, and chord length of 277.10' to a point; thence, leaving said centerline, S 47°37'03" W, passing an iron rod (old) at 125.09', an iron rod (old) at additional 249.50', for a total distance of 418.85'; thence, S 49°03'53" W, a distance of 196.32' to an iron rod (old); thence, S 48°22'44" W, passing an iron rod (old) at a distance of 93.57', for a total distance of 166.16' to an iron rod (old); thence, with a curve to the right, with an arc length of 237.93', a radius of 2,929.79', with a chord bearing of S 24°23'35" E, and chord length of 237.87' to an iron rod (old); thence, N 84°15'00" W, for a distance of 725.92' to a point in the center of the Harpeth River, passing a witness rod at top of bank at a distance of 665.34'; thence, along said centerline of river for the next twenty-five (25) calls, N 05°38'57" E, a distance of 59.34' to a point; thence, N 40°39'23" W, for a distance of 23.93' to a point; thence, N 17°52'55" W, for a distance of 262.02' to a point; thence, N 20°52'26" W, for a distance of 265.99' to a point; thence, N 24°21'08" W, for a distance of 71.18' to a point; thence, N 39°51'01" W, for a distance of 128.68' to a point; thence, N 57°12'14" W, for a distance of 364.80' to a point; thence, N 43°47'46" W, for a distance of 85.11' to a point; thence, N 52°31'09" W, for a distance of 76.98' to a point; thence, N 78°58'32" W, for a distance of 178.83' to a point; thence, S 86°16'14" W, for a distance of 55.76' to a point; thence, S 56°53'55" W, for a distance of 301.01' to a point; thence, S 51°26'40" W, for a distance of 222.92' to a point; thence, S 44°27'33" W, for a distance of 132.82' to a point; thence, S 68°36'30" W, for a distance of 150.64' to a point; thence, N 57°18'02" W, for a distance of 145.06' to a point; thence, N 21°35'43" W, for a distance of 322.19' to a point; thence, N 16°53'34" W, for a distance of 134.89' to a point; thence, N 20°29'42" W, for a distance of 215.41' to a point; thence, N 14°21'46" W, for a distance of 168.55' to a point; thence, N 07°58'30" W, for a distance of 81.95' to a point; thence, N 13°40'44" W, for a distance of 188.71' to a point; thence, N 16°24'09" W, for a distance of 101.14' to a point; thence, N 23°36'56" W, for a distance of 150.61' to a point; thence, N 57°04'03" W, for a distance of 133.54' to a point; thence, along above mentioned east margin of Interstate 65, N 06°49'36" E, passing a witness rod (old) at a distance of 200.00', for a total distance of 808.40' to an iron rod (old); thence, with a curve to the right, with an arc length of 1418.60', a radius of 11309.16', with a chord bearing of N 10°25'13" E, and chord length of 1417.67' to the **Point of Beginning**, Containing 9,464,484.9 Sq. Ft. or 217.27 Acres. According to a survey made by Fisher Arnold, dated June, 2009.




TN STATE PLANE CORD., ZONE5301, FIPZONE 4100;
NAD83 DATUM
GRAPHIC SCALE (IN FEET)
200 0 100 200 400
1 inch = 200 ft.

EDGE
PLANNING | LANDSCAPE ARCHITECTURE | URBAN DESIGN
210 Twelfth Avenue South
Suite 202
Nashville, Tennessee 37203
P 615-250-8154
F 615-250-8155

ENERGY LAND & INFRASTRUCTURE
1420 DONELSON PIKE, SUITE A12 • NASHVILLE, TN 37217
OFFICE: 615.333.0325 • EMAIL: INFO@ELI-LLC.COM
ENGINEERS • SURVEYORS • INFRASTRUCTURE • ENVIRONMENTAL

© 2024 ENERGY LAND & INFRASTRUCTURE, LLC. ALL RIGHTS RESERVED

# KING PROPERTY PARCEL REZONING

CITY OF FRANKLIN PROJECT NO. 6121
FRANKLIN, TENNESSEE

| Rev. | Date | Revision Description |
|---|---|---|
| 1 | 5/4/16 | Per City of Franklin Comments |

LARRY C. WALLACE
REGISTERED ENGINEER
5-4-16
STATE OF TENNESSEE

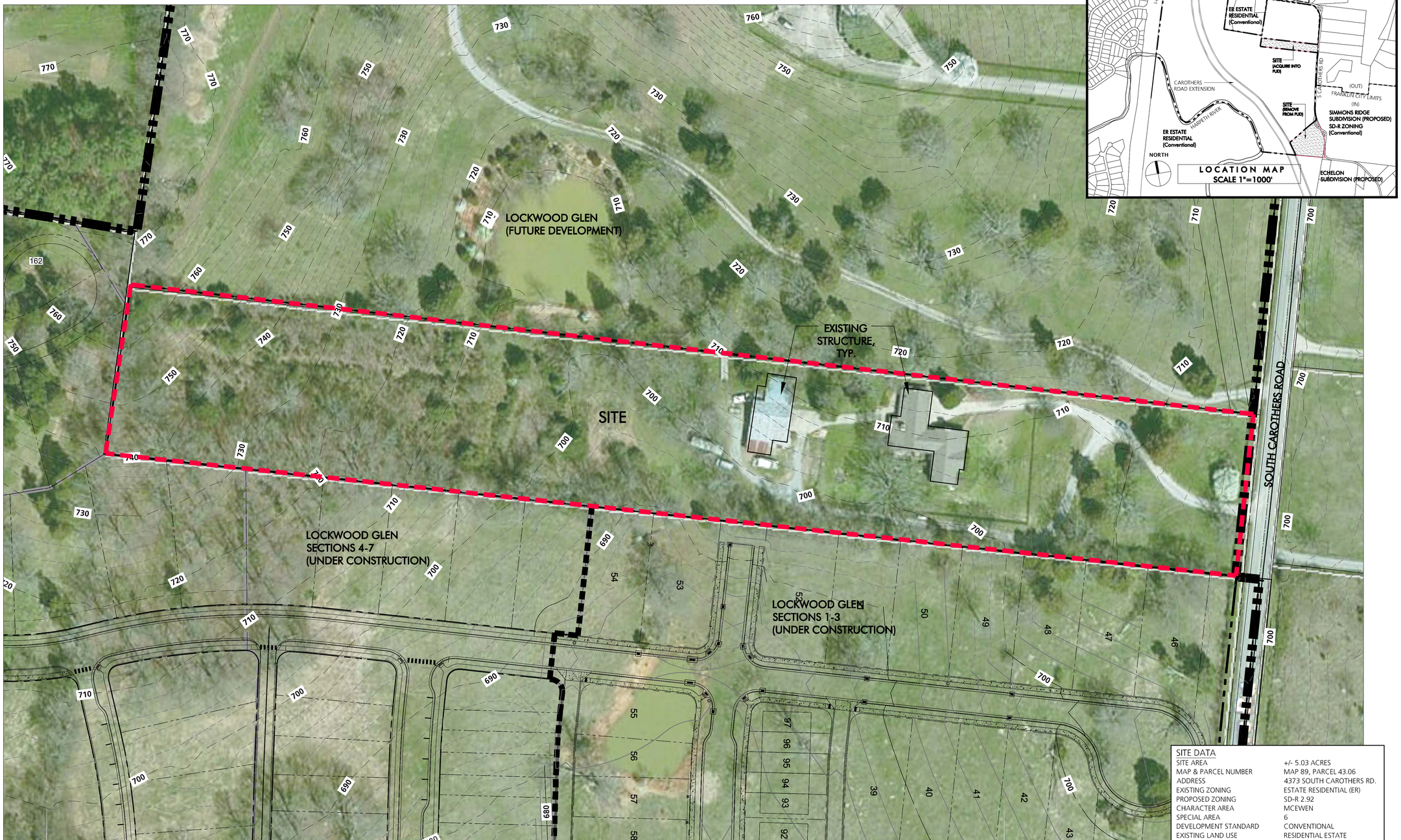
| | |
|---|---|
| Issue Date: | 11 April 2016 |
| ELI Project No: | 14-11-1102.4 |
| Drafted By: | RDP |
| Checked By: | LCW |

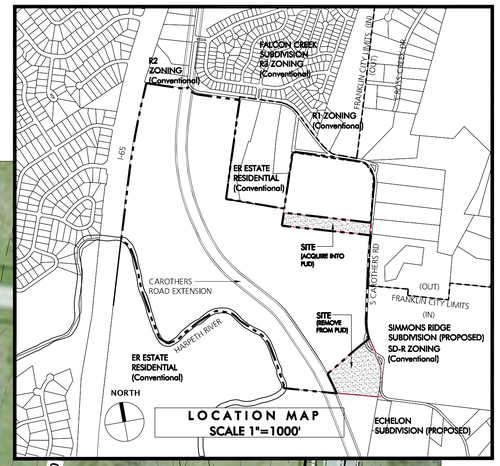
Sheet Title:

REVISED BOUNDARY DESCRIPTION

Sheet No.

C 0.4




**PROPERTY DESCRIPTION**

LAND SITUATED IN THE 9TH CIVIL DISTRICT AND THE 14TH CIVIL DISTRICT OF WILLIAMSON COUNTY, TENNESSEE, AND CURRENTLY KNOWN AS THE KING PROPERTY OF RECORD IN RECORD BOOK 5945, PAGE 236, IN THE REGISTER'S OFFICE OF WILLIAMSON COUNTY, TENNESSEE (R.O.W.C., TN.), AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS;

**COMMENCING** AT AN IRON ROD (OLD) IN THE WESTERLY MARGIN OF CAROTHERS ROAD; THENCE, S 05°50'37" W, FOR A DISTANCE OF 409.91' TO THE **POINT OF BEGINNING**, SAID POINT BEING AN IRON ROD (OLD) AND THE NORTHEAST CORNER OF HEREIN DESCRIBED PROPERTY; THENCE, ALONG SAID WESTERLY MARGIN, S 05°50'37" W, FOR A DISTANCE OF 176.28' TO AN IRON ROD (SET); THENCE, LEAVING WESTERLY MARGIN, ALONG THE NORTH LINE OF LOCKWOOD GLEN, SECTION 4, N 83°46'25" W, FOR A DISTANCE OF 1,250.97' TO AN IRON ROD (OLD) BEING THE SOUTHWEST CORNER OF HEREIN DESCRIBED PROPERTY; THENCE, WITH THE EAST LINE OF THE CRESCENT LOCKWOOD PROPERTY OF RECORD IN RECORD BOOK 6121, PAGE 973 (R.O.W.C., TN.), AND THE WEST LINE OF HEREIN DESCRIBED PROPERTY, N 08°31'03" E, FOR A DISTANCE OF 184.00' TO AN IRON ROD (OLD) BEING THE NORTHWEST CORNER OF HEREIN DESCRIBED PROPERTY; THENCE, S 83°25'00" E, FOR A DISTANCE OF 1,217.86' TO THE **POINT OF BEGINNING**. CONTAINING 220,060.8 SQ. FT. OR 5.05 ACRES. ACCORDING TO A SURVEY MADE BY FISHER ARNOLD, DATED JUNE, 2009.


DEVELOPER:
KHRIS PASCARELLA
CRESCENT LOCKWOOD, LLC
205 POWELL AVENUE
BRENTWOOD, TN 37027
(615) 312-8242
kpascarella@pearlstreetpartners.com

APPLICANT:
JOHN HAAS
EDGE
210 12TH AVE. SOUTH
SUITE 202
NASHVILLE TN, 37203
(615) 250-8154
jhaas@edgela.com


SITE DATA

| | |
|---|---|
| SITE AREA | +/- 5.03 ACRES |
| MAP & PARCEL NUMBER | MAP 89, PARCEL 43.06 |
| ADDRESS | 4373 SOUTH CAROTHERS RD. |
| EXISTING ZONING | ESTATE RESIDENTIAL (ER) |
| PROPOSED ZONING | SD-R 2.92 |
| CHARACTER AREA | MCEWEN |
| SPECIAL AREA | 6 |
| DEVELOPMENT STANDARD | CONVENTIONAL |
| EXISTING LAND USE | RESIDENTIAL ESTATE |
| PROPOSED LAND USE | RESIDENTIAL SINGLE-FAMILY (INCORPORATE INTO LOCKWOOD GLEN COMMUNITY) |

0' 25' 50' 100'

NORTH


CONSULTANTS

EDGE
PLANNING LANDSCAPE ARCHITECTURE GRAPHIC DESIGN
210 Twelfth Avenue South
Suite 202
Nashville, Tennessee 37203
P 615-250-8154
F 615-250-8155


SEAL

JOHN DAVID HAAS JR. REGISTERED LANDSCAPE ARCHITECT TENNESSEE NO. 314
05/05/16

PROJECT TITLE

KING PARCEL
REZONING
C.O.F. #6121
FRANKLIN, TN

CLIENT

CRESCENT
LOCKWOOD LLC.
FRANKLIN, TN.

| | |
|---|---|
| PROJECT NO. | 6121 |
| Date | 04/11/16 |
| Revisions | |
| 05.05.16 | PER C.O.F. COMMENTS |

Sheet Title

REZONING
SHEET

Sheet Number

R-1.0

EDGE PLANNING
LANDSCAPE ARCHITECTURE
URBAN DESIGN

Monday June 6th

To: Eric Stuckey, City Administrator & Members of the Board of Mayor and Alderman

Concerning Projects:
COF # 6120 Lockwood Glen Development Plan Revision #1
COF # 6121 Lockwood Glen – King Parcel Rezoning
COF # 6122 Lockwood Glen – Neighborhood Commercial Rezoning

**Re: Request to move BOMA 2nd Reading & Public Hearing Date**

The applicant respectfully requests to move the date of the City of Franklin's Board of Mayor and Alderman's 2nd Reading/Public Hearing for the projects listed above.

The applicant requests that the Approval schedule be amended as follows:

8/23 BOMA – 2nd Reading & Public Hearing
9/13 BOMA – 3rd & Final Reading

Thank you for your consideration.
Please contact me if you have any questions.

Clint Genoble
Associate
EDGE Planning, Landscape Architecture & Urban Design

210 TWELFTH AVENUE SOUTH, SUITE 202 NASHVILLE, TENNESSEE 37203
615.250.8154 phone 615.250.8155 fax www.edgela.com

**ORDINANCE 2016-19**

**TO BE ENTITLED, "AN ORDINANCE TO REZONE 5.05 ACRES FROM ESTATE RESIDENTIAL – ER DISTRICT TO SPECIFIC DEVELOPMENT – RESIDENTIAL – SD-R (2.92) DISTRICT AND REZONE 212.22 ACRES FROM SPECIFIC DEVELOPMENT – RESIDENTIAL – SD-R (2.82) DISTRICT TO SPECIFIC DEVELOPMENT – RESIDENTIAL – SD-R (2.92) DISTRICT FOR THE PROPERTY LOCATED ALONG CAROTHERS PARKWAY, EAST OF INTERSTATE 65, AND SOUTH OF SOUTH CAROTHERS ROAD."**

**WHEREAS,** the City of Franklin, Tennessee, encourages responsible growth and the sensible transition of land uses and densities; and

**WHEREAS**, the Specific Development-Residential district provides zoning for land uses compatible with both the Franklin Land Use Plan and surrounding development; and

**WHEREAS,** the Board of Mayor and Aldermen (BOMA) of the City of Franklin, Tennessee, adopted Resolution 2016-28 approving a Plan Unit Development (PUD) Development Plan as required by the Franklin Zoning Ordinance; and

**WHEREAS,** the zoning has been reviewed and approved by BOMA after a public hearing and a recommendation by the Franklin Municipal Planning Commission.

**NOW THEREFORE BE IT ORDAINED BY THE BOARD OF MAYOR AND ALDERMEN OF THE CITY OF FRANKLIN, TENNESSEE, AS FOLLOWS:**

**SECTION I.** That the following described property shall be, and is hereby, rezoned from its present zoning classification of Estate Residential – ER District to Specific Development SD-R (2.92) District:

PREMISES CONSIDERED

| Map-Parcel | Acres |
|---|---|
| 089-4306 | 5.05 |
| Total | 5.05 |

**Property Description**

Land situated in the 9th Civil District and the 14th Civil District of Williamson County, Tennessee, and currently known as the King property of record in Record book 5945, Page 236, in the Register's Office of Williamson County, Tennessee (R.O.W.C., TN.), and being more particularly described as follows;

**Commencing** at an iron rod (old) in the westerly margin of Carothers Road; thence, S 05°50'37" W, for a distance of 409.91' to the **Point of Beginning**, said point being an iron rod (old) and the northeast corner of herein described property; thence, along said westerly margin, S 05°50'37" W, for a distance of 176.28' to an iron rod (set); thence, leaving westerly margin, along the north line of Lockwood Glen, Section 4, N 83°46'25" W, for a distance of 1,250.97' to an iron rod (old) being the southwest corner of herein described property; thence, with the east line of the Crescent Lockwood property of record in Record

book 6121, Page 973 (R.O.W.C., TN.), and the west line of herein described property, N 08°31'03" E, for a distance of 184.00' to an iron rod (old) being the northwest corner of herein described property; thence, S 83°25'00" E, for a distance of 1,217.86' to the **Point of Beginning**. Containing 220,060.8 Sq. Ft. or 5.05 Acres. According to a survey made by Fisher Arnold, dated June, 2009.

**SECTION II.** That the following described property shall be, and is hereby, rezoned from its present zoning classification of Specific Development SD-R (2.82) District to Specific Development SD-R (2.92) District:

**Property Description**

Land situated in the 9th Civil District and the 14th Civil District of Williamson County, Tennessee, being a portion of the properties conveyed to Lockwood Family LP by Dorris R. Lockwood, of record in Deed book 1777, Page 759, and Deed book 1777, Page 761, and a portion of the property conveyed to Lockwood Construction Company by Anthony B. Jamison, of record in Deed book 656, Page 650, in the Register's Office of Williamson County, Tennessee (R.O.W.C., TN.), and being more particularly described as follows;

**Beginning** at a concrete Right of Way monument in the easterly margin of Interstate 65, being the northwest corner of the Crescent Lockwood, LLC. property of record in Book 6362, Page 691, R.O.W.C.; thence leaving said Interstate 65 margin, S 81°25'13" E, for a distance of 577.00' to an iron rod (old); thence, N 07°13'56" E, for a distance of 31.70' to an iron rod in the southwest margin of Carothers Road; thence, with a curve to the left, with an arc length of 192.68', a radius of 202.54', with a chord bearing of S 55°05'41" E, and a chord length of 185.50' to an iron rod (old); thence, S 82°20'54" E, for a distance of 582.26' to an iron rod (old); thence, leaving said margin, along the west property line of Alligood, Deed Book 1202, Page 845 (R.O.W.C., TN.) S 07°57'01" W, for a distance of 1007.65' to an iron rod (old); thence, S 07°26'55" W, for a distance of 387.69' to an iron rod (old); thence, along the south property lines of above mentioned Alligood, and Davis property of record in Deed Book 435, Page 126 (R.O.W.C., TN.) S 80°41'16" E, for a distance of 824.24' to an iron rod (old); thence, along east property line of said Davis property, N 08°26'26" E, for a distance of 343.04' to an iron rod (old); thence, along east property line of the Strain property of record in Record Book 5632, Page 184 (R.O.W.C., TN.) N 08°01'21" E, for a distance of 462.57' to an iron rod (old) in the center of an old road bed; thence, along said center of old road, S 82°24'09" E, for a distance of 586.85' to an iron rod (old) in the southerly margin of Carothers Road; thence, along said margin for the next seven (7) calls, with a curve to the left, with an arc length of 66.85', with a radius of 432.00', with a chord bearing of S 76°30'31" E, and chord length of 66.78' to an iron rod (old); thence, S 80°56'29" E, for a distance of 304.54' to an iron rod (old); thence, with a curve to the right, with an arc length of 178.08', a radius of 195.00', with a chord bearing of S 54°46'48" E, and chord length of 171.95' to an iron rod (old); thence, S 28°37'07" E, for a distance of 33.26' to an iron rod (old); thence, with a curve to the right, with an arc length of 191.97', a radius of 325.00', with a chord bearing of S 11°41'48" E, and chord length of 189.19'; thence, S 05°13'31" W, for a distance of 132.33'; thence, S 05°50'37" W, passing an iron rod (old) at a distance of 409.91' to an iron rod (old); thence, leaving said Carothers Road, along the existing north property line of the King property of record in Record Book 5945, Page 236 (R.O.W.C., TN.) N 83°25'00" W, for a distance of 1217.86' to an iron rod (old); thence, S 08°01'03" W, for a distance of 184.00' to an iron rod (old); thence, S 83°46'25" E, for a distance of 1250.97' to a point in the centerline of said Carothers Road; thence, along said centerline for the next six (6) calls, S 06°04'28" W, for

a distance of 110.27' to a point; thence, with a curve to the left, with an arc length of 249.92', a radius of 3953.11', a chord bearing of S 04°15'48" W, and chord length of 249.88' to a point; thence, S 02°27'07" W, for a distance of 542.39' to a point; thence, S 01°41'23" W, for a distance of 295.29' to a point; thence, with a curve to the left with an arc length of 278.90', with a radius of 700.00', with a chord bearing of S 09°43'29" E, and chord length of 277.10' to a point; thence, leaving said centerline, S 47°37'03" W, passing an iron rod (old) at 169.35', an iron rod (old) at additional 249.50', for a total distance of 418.85'; thence, S 49°03'53" W, a distance of 196.32' to an iron rod (old); thence, S 48°22'44" W, passing an iron rod (old) at a distance of 93.57', for a total distance of 166.16' to an iron rod (old); thence, with a curve to the right, with an arc length of 237.97', a radius of 2,918.42', with a chord bearing of S 24°23'17" E, and chord length of 237.90' to an iron rod (old); thence, N 84°15'00" W, for a distance of 725.92' to a point in the center of the Harpeth River, passing a witness rod at top of bank at a distance of 665.34'; thence, along said centerline of river for the next twenty-five (25) calls, N 05°38'57" E, a distance of 59.34' to a point; thence, N 40°39'23" W, for a distance of 23.93' to a point; thence, N 17°52'55" W, for a distance of 262.02' to a point; thence, N 20°52'26" W, for a distance of 265.99' to a point; thence, N 24°21'08" W, for a distance of 71.18' to a point; thence, N 39°51'01" W, for a distance of 128.68' to a point; thence, N 57°12'14" W, for a distance of 364.80' to a point; thence, N 43°47'46" W, for a distance of 85.11' to a point; thence, N 52°31'09" W, for a distance of 76.98' to a point; thence, N 78°58'32" W, for a distance of 178.83' to a point; thence, S 86°16'14" W, for a distance of 55.76' to a point; thence, S 56°53'55" W, for a distance of 301.01' to a point; thence, S 51°26'40" W, for a distance of 222.92' to a point; thence, S 44°27'33" W, for a distance of 132.82' to a point; thence, S 68°36'30" W, for a distance of 150.64' to a point; thence, N 57°18'02" W, for a distance of 145.06' to a point; thence, N 21°35'43" W, for a distance of 322.19' to a point; thence, N 16°53'34" W, for a distance of 134.89' to a point; thence, N 20°29'42" W, for a distance of 215.41' to a point; thence, N 14°21'46" W, for a distance of 168.55' to a point; thence, N 07°58'30" W, for a distance of 81.95' to a point; thence, N 13°40'44" W, for a distance of 188.71' to a point; thence, N 16°24'09" W, for a distance of 101.14' to a point; thence, N 23°36'56" W, for a distance of 150.61' to a point; thence, N 57°04'03" W, for a distance of 133.54' to a point; thence, along above mentioned east margin of Interstate 65, N 06°49'36" E, passing a witness rod (old) at a distance of 200.00', for a total distance of 808.40' to an iron rod (old); thence, with a curve to the right, with an arc length of 1,418.60', a radius of 11,309.16', with a chord bearing of N 10°25'13" E, and chord length of 1,417.67' to the **Point of Beginning**. Containing 9,244,424.1 Sq. Ft. or 212.22 Acres. According to a survey made by Fisher Arnold, dated June, 2009.

**SECTION III.** That the attached Location Map shall serve the purpose of further delimiting the geographical boundaries as described by this Ordinance.

**SECTION IV.** BE IT FINALLY ORDAINED by the Board of Mayor and Aldermen of the City of Franklin, Tennessee, that this Ordinance shall take effect from and after its passage on third and final reading, the health, safety, and welfare of the citizens requiring it.

**ATTEST:** **CITY OF FRANKLIN, TENNESSEE:**

By: _____ By: _____

**Eric Stuckey** **Dr. Ken Moore**

City Administrator/Recorder Mayor

Approved as to form by:

_____
Shauna R. Billingsley
City Attorney

PLANNING COMMISSION RECOMMENDED: _____

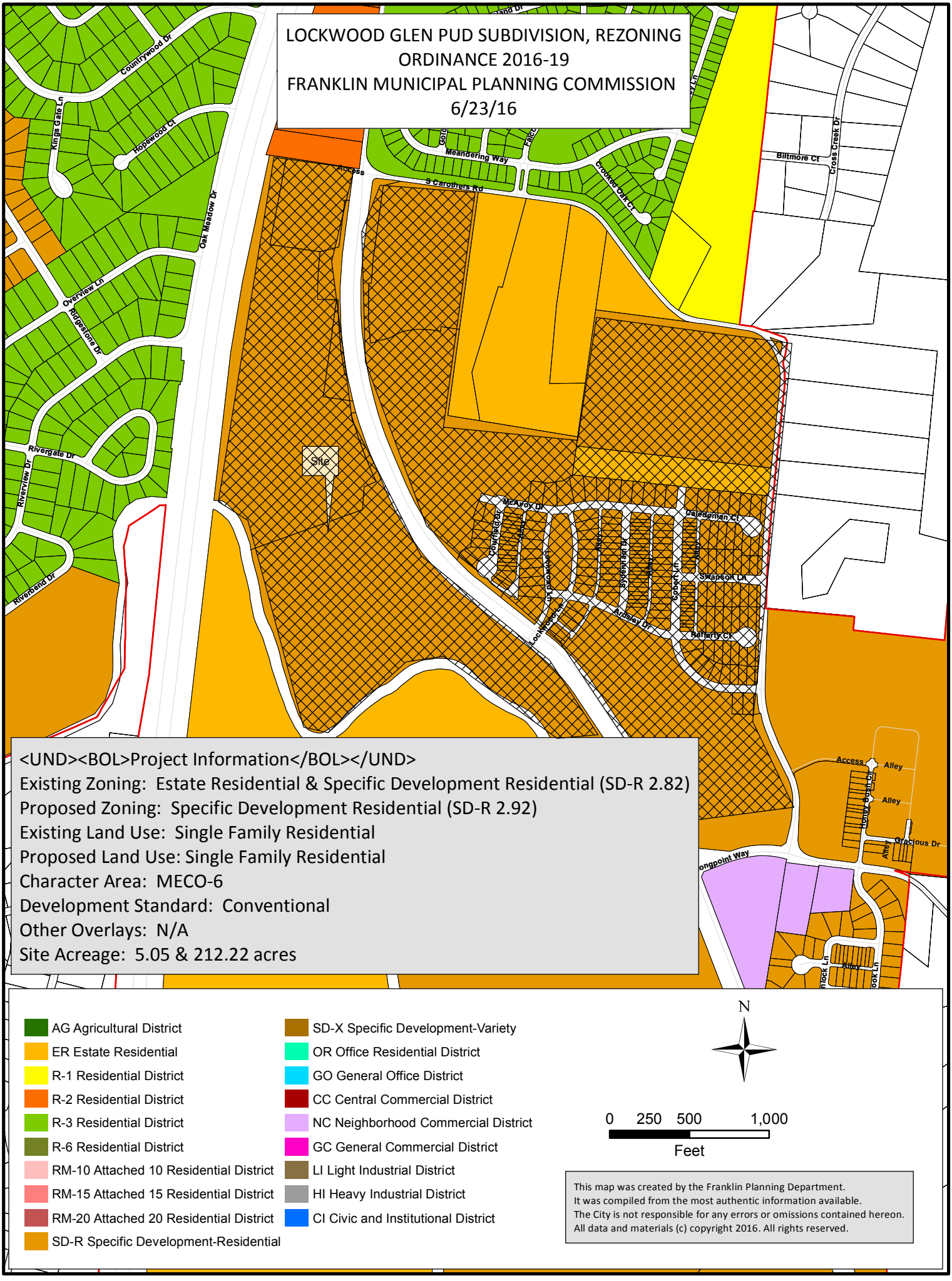
PASSED FIRST READING: _____

PUBLIC HEARING HELD: _____

PASSED SECOND READING: _____

PASSED THIRD READING: _____

# LOCKWOOD GLEN PUD SUBDIVISION, REZONING ORDINANCE 2016-19
# FRANKLIN MUNICIPAL PLANNING COMMISSION
# 6/23/16



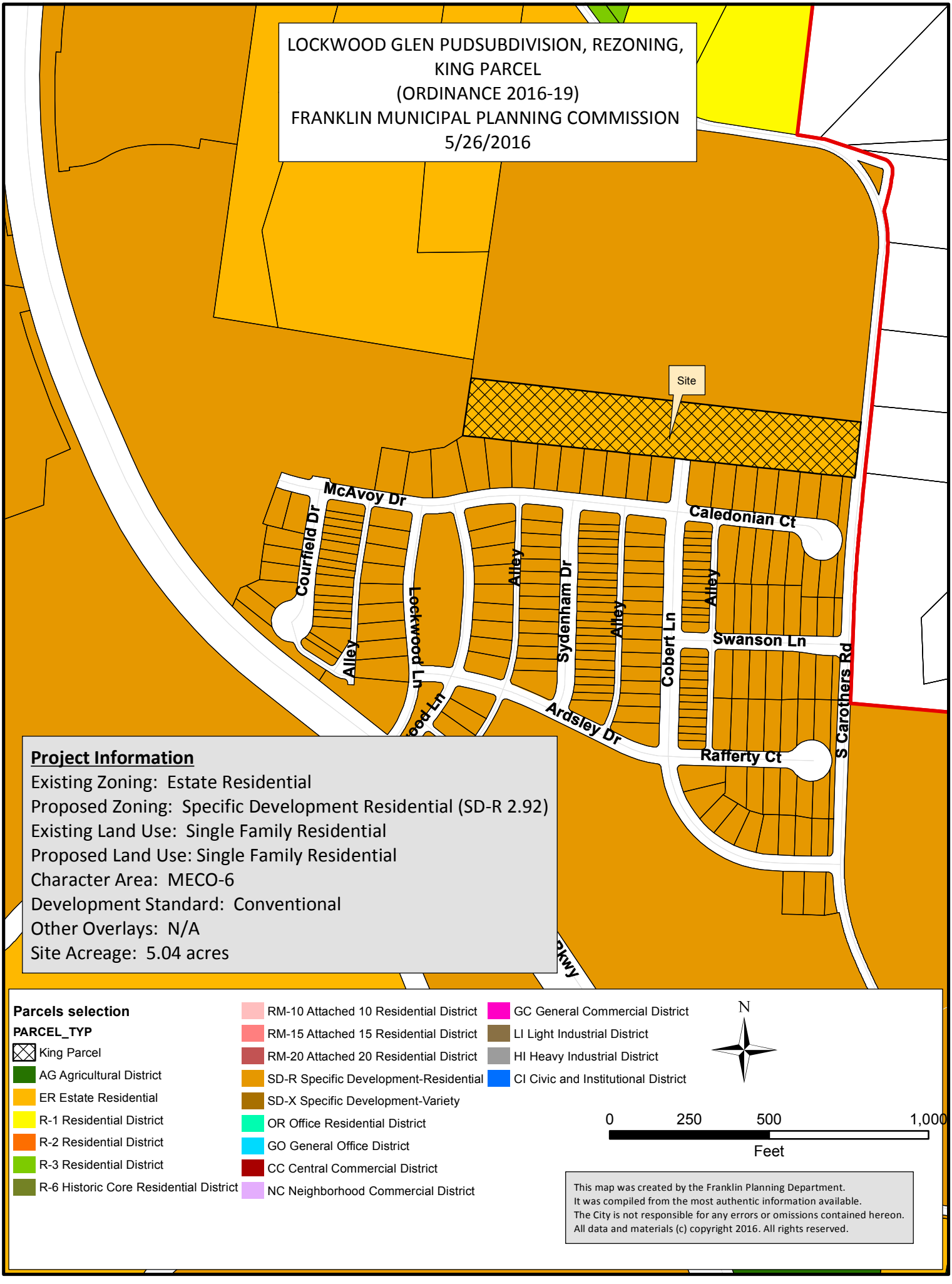

<UND><BOL>Project Information</BOL></UND>
Existing Zoning: Estate Residential & Specific Development Residential (SD-R 2.82)
Proposed Zoning: Specific Development Residential (SD-R 2.92)
Existing Land Use: Single Family Residential
Proposed Land Use: Single Family Residential
Character Area: MECO-6
Development Standard: Conventional
Other Overlays: N/A
Site Acreage: 5.05 & 212.22 acres

- AG Agricultural District
- ER Estate Residential
- R-1 Residential District
- R-2 Residential District
- R-3 Residential District
- R-6 Residential District
- RM-10 Attached 10 Residential District
- RM-15 Attached 15 Residential District
- RM-20 Attached 20 Residential District
- SD-R Specific Development-Residential
- SD-X Specific Development-Variety
- OR Office Residential District
- GO General Office District
- CC Central Commercial District
- NC Neighborhood Commercial District
- GC General Commercial District
- LI Light Industrial District
- HI Heavy Industrial District
- CI Civic and Institutional District

N

0 250 500 1,000
Feet

This map was created by the Franklin Planning Department.
It was compiled from the most authentic information available.
The City is not responsible for any errors or omissions contained hereon.
All data and materials (c) copyright 2016. All rights reserved.


LOCKWOOD GLEN PUDSUBDIVISION, REZONING,
KING PARCEL
(ORDINANCE 2016-19)
FRANKLIN MUNICIPAL PLANNING COMMISSION
5/26/2016
Site
McAvoy Dr
Courfield Dr
Alley
Lockwood Ln
Alley
Sydenham Dr
Alley
Cobert Ln
Alley
Caledonian Ct
Swanson Ln
S Carothers Rd
Ardsley Dr
Rafferty Ct
Project Information
Existing Zoning: Estate Residential
Proposed Zoning: Specific Development Residential (SD-R 2.92)
Existing Land Use: Single Family Residential
Proposed Land Use: Single Family Residential
Character Area: MECO-6
Development Standard: Conventional
Other Overlays: N/A
Site Acreage: 5.04 acres
Parcels selection
PARCEL_TYP
King Parcel
AG Agricultural District
ER Estate Residential
R-1 Residential District
R-2 Residential District
R-3 Residential District
R-6 Historic Core Residential District
RM-10 Attached 10 Residential District
RM-15 Attached 15 Residential District
RM-20 Attached 20 Residential District
SD-R Specific Development-Residential
SD-X Specific Development-Variety
OR Office Residential District
GO General Office District
CC Central Commercial District
NC Neighborhood Commercial District
GC General Commercial District
LI Light Industrial District
HI Heavy Industrial District
CI Civic and Institutional District
N
0 250 500 1,000
Feet
This map was created by the Franklin Planning Department.
It was compiled from the most authentic information available.
The City is not responsible for any errors or omissions contained hereon.
All data and materials (c) copyright 2016. All rights reserved.

**RESOLUTION 2016-28**

**TO BE ENTITLED: "A RESOLUTION APPROVING A REVISED DEVELOPMENT PLAN FOR LOCKWOOD GLEN PUD SUBDIVISION, FOR THE PROPERTY LOCATED ALONG CAROTHERS PARKWAY, EAST OF INTERSTATE 65, AND SOUTH OF SOUTH CAROTHERS ROAD."**

**WHEREAS,** the Planned Unit Development (PUD) process is a review procedure that is intended to encourage innovative land planning and design and avoid the monotony sometimes associated with large developments by:

(a) Reducing or eliminating the inflexibility that sometimes results from strict application of zoning standards that were designed primarily for individual lots;

(b) Allowing greater freedom in selecting the means to provide access, light, open space, and design amenities;

(c) Encouraging a sensitive design that respects the surrounding established land use character and natural or man-made features of the site including, but not limited to, trees, historic features, streams, hillsides, and floodplains;

(d) Promoting quality design and environmentally sensitive development by allowing development to take advantage of special site characteristics, locations, and land uses; and

(e) Allowing deviations from certain zoning standards that would otherwise apply if not contrary to the general spirit and intent of this ordinance; and

**WHEREAS**, the PUD process requires the approval of a Development Plan that is reviewed and approved by the Board of Mayor and Aldermen (BOMA), after a public hearing and a recommendation by the Franklin Municipal Planning Commission (FMPC).

**NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF MAYOR AND ALDERMEN OF THE CITY OF FRANKLIN, TENNESSEE, AS FOLLOWS:**

**SECTION I.** That the legal description of the property included in the Development Plan, as amended, is as follows:

**Property Description**

Land situated in the 9th Civil District and the 14th Civil District of Williamson County, Tennessee, being a portion of the properties conveyed to Lockwood Family LP by Dorris R. Lockwood, of record in Deed book 1777, Page 759, and Deed book 1777, Page 761, and a portion of the property conveyed to Lockwood Construction Company by Anthony B. Jamison, of record in Deed book 656, Page 650, in the Register's Office of Williamson County, Tennessee (R.O.W.C., TN.), and being more particularly described as follows;

**Beginning** at a concrete Right of Way monument in the easterly margin of Interstate 65, being the northwest corner of the Crescent Lockwood, LLC. property of record in Book 6362, Page 691, R.O.W.C.; thence leaving said Interstate 65 margin, S 81°25'13" E, for a distance of 577.00' to an iron rod (old); thence, N 07°13'56" E, for a distance of 31.70' to an iron rod in the southwest margin of Carothers Road; thence, with a curve to the left, with an arc length of 192.68', a radius of 202.54', with a chord bearing of S 55°05'41" E, and a chord length of 185.50' to an iron rod (old); thence, S 82°20'54" E, for a distance of 582.26' to an iron rod (old); thence, leaving said margin, along the west property line of Alligood, Deed Book 1202, Page 845 (R.O.W.C., TN.) S 07°57'01" W, for a distance of 1007.65' to an iron rod (old); thence, S 07°26'55" W, for a distance of 387.69' to an iron rod (old); thence, along the south property lines of above mentioned Alligood, and Davis property of record in Deed Book 435, Page 126 (R.O.W.C., TN.) S 80°41'16" E, for a distance of 824.24' to an iron rod (old); thence, along east property line of said Davis property, N 08°26'26" E, for a distance of 343.04' to an iron rod (old); thence, along east property line of the Strain property of record in Record Book 5632, Page 184 (R.O.W.C., TN.) N 08°01'21" E, for a distance of 462.57' to an iron rod (old) in the center of an old road bed; thence, along said center of old road, S 82°24'09" E, for a distance of 586.85' to an iron rod (old) in the southerly margin of Carothers Road; thence, along said margin for the next seven (7) calls, with a curve to the left, with an arc length of 66.85', with a radius of 432.00', with a chord bearing of S 76°30'31" E, and chord length of 66.78' to an iron rod (old); thence, S 80°56'29" E, for a distance of 304.54' to an iron rod (old); thence, with a curve to the right, with an arc length of 178.08', a radius of 195.00', with a chord bearing of S 54°46'48" E, and chord length of 171.95' to an iron rod (old); thence, S 28°37'07" E, for a distance of 33.26' to an iron rod (old); thence, with a curve to the right, with an arc length of 191.97', a radius of 325.00', with a chord bearing of S 11°41'48" E, and chord length of 189.19'; thence, S 05°13'31" W, for a distance of 132.33'; thence, S 05°50'37" W, passing an iron rod (old) at a distance of 409.91' for a total distance of 586.18' to an iron rod (set); thence, S 05°50'37" W, for a distance of 409.91' to an iron rod (old); thence, S 83°46'25" E, for a distance of 24.60' to a point in the centerline of said Carothers Road; thence, along said centerline for the next six (6) calls, S 06°04'28" W, for a distance of 110.27' to a point; thence, with a curve to the left, with an arc length of 249.92', a radius of 3953.11', a chord bearing of S 04°15'48" W, and chord length of 249.88' to a point; thence, S 02°27'07" W, for a distance of 542.39' to a point; thence, S 01°41'23" W, for a distance of 295.29' to a point; thence, with a curve to the left with an arc length of 278.90', with a radius of 700.00', with a chord bearing of S 09°43'29" E, and chord length of 277.10' to a point; thence, leaving said centerline, S 47°37'03" W, passing an iron rod (old) at 125.09', an iron rod (old) at additional 249.50', for a total distance of 418.85'; thence, S 49°03'53" W, a distance of 196.32' to an iron rod (old); thence, S 48°22'44" W, passing an iron rod (old) at a distance of 93.57', for a total distance of 166.16' to an iron rod (old); thence, with a curve to the right, with an arc length of 237.93', a radius of 2,929.79', with a chord bearing of S 24°23'35" E, and chord length of 237.87' to an iron rod (old); thence, N 84°15'00" W, for a distance of 725.92' to a point in the center of the Harpeth River, passing a witness rod at top of bank at a distance of 665.34'; thence, along said centerline of river for the next twenty-five (25) calls, N 05°38'57" E, a distance of 59.34' to a point; thence, N 40°39'23" W, for a distance of 23.93' to a point; thence, N 17°52'55" W, for a distance of 262.02' to a point; thence, N 20°52'26" W, for a distance of 265.99' to a point; thence, N 24°21'08" W, for a distance of 71.18' to a point; thence, N 39°51'01" W, for a distance of 128.68' to a point; thence, N 57°12'14" W, for a distance of 364.80' to a point; thence, N 43°47'46" W, for a distance of 85.11' to a point; thence, N 52°31'09" W, for a distance of 76.98' to a point; thence, N 78°58'32" W, for a distance of 178.83' to a point; thence, S 86°16'14" W, for a distance of 55.76' to a point; thence, S 56°53'55" W, for a distance of 301.01' to a point; thence, S 51°26'40" W, for a distance of 222.92' to a point; thence, S 44°27'33" W, for a distance of 132.82' to a point; thence, S 68°36'30" W, for a distance of 150.64' to a point; thence, N 57°18'02" W, for a distance of 145.06' to a point; thence, N 21°35'43" W, for a distance of 322.19' to a point; thence, N 16°53'34" W, for a distance of 134.89' to a point; thence, N 20°29'42" W, for a distance of 215.41' to a point; thence, N 14°21'46" W, for a distance of 168.55' to a point; thence, N 07°58'30" W, for a distance of 81.95' to a point; thence, N 13°40'44" W, for a distance of 188.71' to a point; thence, N 16°24'09" W, for a distance of 101.14' to a point; thence, N 23°36'56" W, for a distance of 150.61' to a point; thence, N 57°04'03" W, for a distance of 133.54' to a point; thence, along above mentioned east margin of Interstate 65, N 06°49'36" E, passing a witness rod (old) at a distance of 200.00', for a total distance of 808.40' to an iron rod (old); thence, with a curve to the right, with an arc length of 1418.60', a radius of 11309.16', with a chord bearing of N 10°25'13" E, and chord length of 1417.67' to the **Point of Beginning**. Containing 9,464,484.9 Sq. Ft. or 217.27 Acres. According to a survey made by Fisher Arnold, dated June, 2009.

**SECTION II:** That the attached Location Map and Development Plan, as amended, shall serve the purpose of further delimiting the geographical boundaries as described by this Resolution.

**SECTION III:** That the overall entitlements, as amended, for the LOCKWOOD GLEN PUD SUBDIVISION are as follows:

| Entitlements | Lockwood Glen |
|---|---|
| Base Zone District | Specific Development Residential- 2.92 |
| Character Area Overlay | MECO-6 |
| Other Zoning Overlays | FWO, FFO |
| Development Standard | Conventional |
| Number of Dwelling Units | 638 |
| Open Space Requirements | 20.53 acres |
| Original Concept Plan Approval | Ordinance No. 2008-02<br><br>Date of approval: 5/27/2008 |
| Revision Number | 1 |

**SECTION IV:** That the Development Plan, the exhibits accompanying the Development Plan, and all conditions and restrictions placed upon the Development Plan by the Franklin Municipal Planning Commission and this Board shall be made a part of this Resolution as though copied verbatim herein, and that a permanent record of the Development Plan, the exhibits accompanying the Development Plan, and all such conditions and restrictions shall be kept in the Franklin Planning and Sustainability Department.

**SECTION V.** That this Resolution shall take effect from and after its passage on its first and final reading, the health, safety, and welfare of the citizens requiring it.

_____
**ERIC S. STUCKEY**
City Administrator

_____
**DR. KEN MOORE**
Mayor

Approved as to form by:

_____
**Kristen L. Corn**
Assistant City Attorney

PREAPPLICATION CONFERENCE: _____

BOMA/FMPC JOINT CONCEPTUAL WORKSHOP: _____

NEIGHBORHOOD MEETING: _____

PLANNING COMMISSION RECOMMENDED APPROVAL: _____

PUBLIC HEARING AND BOMA APPROVAL: _____



Law Dept. Approved 5.18.16

**COF no: 6120**

**CONDITIONS OF APPROVAL:**

## Engineering - PUD Plan Checklist

### General Comments

#### 1. H. Stormwater Management Plan

- Applicant shall delineate the existing applicable drainage areas and include in design. The drainage areas must not be altered to increase the offsite stormwater runoff in any particular drainage area.

## Engineering - Site Plan Checklist

### General Comments

#### 2. D. Site Plan

- Applicant shall show sidewalks that meet the Minimum Width requirement per Section 5.10.13(4) of the Zoning Ordinance:

(a) In no instance shall a sidewalk located within a public street right-of-way have a minimum width less than 5 ft. ***(Sheet C4.0 shows 4')***
(b) Sidewalks running in a perpendicular direction from off-street parking spaces shall have a minimum width of 7 ft.
(c) Sidewalks abutting a nonresidential or mixed-use structure shall have a minimum width of 8 ft.
(d) Sidewalks designed as multiuse paths shall have a minimum width of 10 ft. The width may be reduced to 8 ft in portions of the path to minimize disturbance to existing vegetation or other environmental constraints.

## Parks

### General Comments

#### 3. Parkland information

- Parks- Due to a revision to the master plan, 14 new units have been added to site. This addition will be subject to parkland dedication for the new units.

Fees in lieu or land dedication shall be applied to the site.

14units x 1200sf =16,800sf needed to meet ordinance. This could be deducted from the price of the land when the city purchase the Robinson Lake property or shown as accounted for by land dedication on the final plat.

## Planning (Landscape)

### General Comments

#### 4. Tree Protection

- Applicant shall clearly delineate and label all tree protection areas.

## Water/Sewer

### Dev Plan Rev 05.05.16.pdf

#### 5. Sanitary sewer

- Applicant shall add note to the development plan for sanitary sewer.
  - Where sanitary sewer lines cross proposed lot lines, no structures, patios, a/c equipment, utilities or drive lanes shall be constructed in COF sewer easement. All sewer easements are exclusive sewer easements and shall remain open for maintenance.

# DEVELOPMENT PLAN REVISION SUBMITTAL

# LOCKWOOD GLEN

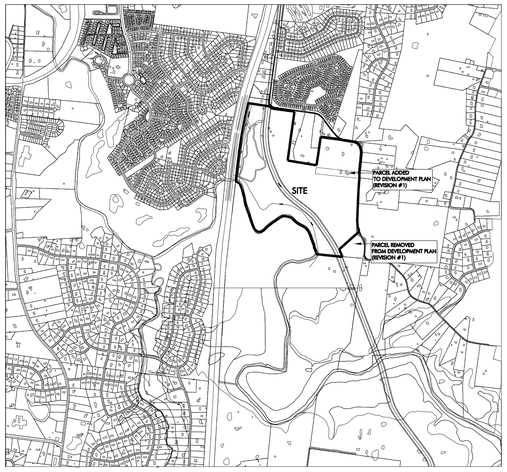
## PUD SUBDIVISION
## DEVELOPMENT PLAN REVISION #1

SD-R (SPECIFIC DEVELOPMENT - RESIDENTIAL)

FRANKLIN, TENNESSEE

CITY OF FRANKLIN PROJECT NO. 6120

APRIL 11, 2016
MAY 05, 2016




## SITE LOCATION MAP

NORTH

## SITE DATA:

| | |
|---|---|
| SUBDIVISION/DEVELOPMENT: | LOCKWOOD GLEN PUD SUBDIVISION |
| CITY OF FRANKLIN PROJECT NUMBER | 6120 |
| TAX MAP & PARCELS | MAP 89 - PARCELS 48.01, 43.01, 43.06 |
| ADDRESS | SOUTH CAROTHERS ROAD |
| CITY | FRANKLIN |
| COUNTY | WILLIAMSON |
| STATE | TENNESSEE |
| CIVIL DISTRICT | 14TH |
| EXISTING ZONING- CHARACTER OVERLAY | SD-R 2.92 - McEWEN CHARACTER AREA 6 |
| OTHER APPLICABLE OVERLAYS | FLOODWAY FRINGE OVERLAY (FFO)<br>FLOODWAY OVERLAY DISTRICT (FWO) |
| APPLICABLE DEVELOPMENT STANDARDS | CONVENTIONAL |
| CIVIL DISTRICT: | 14 |
| OWNERS REPRESENTATIVE: | CRESCENT LOCKWOOD, LLC. |
| ADDRESS: | 205 POWELL AVENUE<br>BRENTWOOD, TN. 37027 |
| PHONE NO.: | 615.312.8242 |
| CONTACT NAME: | KHRIS PASCARELLA |
| E-MAIL ADDRESS: | kpascarella@PEARLSTREETPARTNERS.COM |
| APPLICANT: | EDGE PLANNING, LANDSCAPE ARCHITECTURE & URBAN DESIGN |
| ADDRESS: | 210 12TH AVENUE SOUTH, SUITE 202 - NASHVILLE TN 37203 |
| PHONE NO.: | (615) 250-8154 |
| CONTACT: | (615) 250-8155<br>JOHN HAAS - jhaas@edgela.com |
| CIVIL ENGINEER: | ENERGY LAND AND INFRASTRUCTURE |
| ADDRESS: | 1420 DONELSON PIKE, SUITE A12, NASHVILLE, TN 37217 |
| PHONE NO.: | (615) 360-8440 |
| FAX NO.: | (615) 360-8476 |
| CONTACT: | MICHAEL RAY- michael.ray@ELI-LLC.com |

MINERAL RIGHTS FOR THIS PROPERTY ARE HELD BY OWNER OF RECORD.

## RESIDENTIAL PHASING (PROJECTED)

| DEVELOPMENT | COMMENCEMENT DATE : YEAR | SINGLE FAMILY & TOWNHOME DWELLING UNITS | MULTI-FAMILY DWELLING UNITS | RATE OF DEVELOPMENT | ESTIMATED COMPLETION DATE |
|---|---|---|---|---|---|
| | | | | | |
| SECTION 1 | 2013 | 46 | 0 | ---- | 2014 |
| SECTION 2 | 2014 | 13 | 0 | ---- | 2014 |
| SECTION 3 | 2014 | 38 | 0 | ---- | 2015 |
| SECTION 4 | 2014 | 44 | 0 | ---- | 2015 |
| SECTION 5 | 2015 | 27 | 0 | ---- | 2015 |
| SECTION 6 | 2015 | 26 | 0 | ---- | 2016 |
| SECTION 7 | 2015 | 28 | 0 | ---- | 2016 |
| SECTION 8 | 2015 | 50 | 0 | ---- | 2016 |
| SECTION 9 | 2015 | 21 | 0 | ---- | 2016 |
| SECTION 10 | 2016 | 0 | 239 | ---- | 2016 |

NOTE: THIS DEVELOPMENT PLAN REVISION DOES NOT SEEK TO REVISE ANY CONDITIONS OR PARAMETERS CONTAINED IN THE APPROVED LOCKWOOD GLEN DEVELOPMENT PATTERN BOOK. ALL CONDITIONS AND REGULATIONS SET FORTH SHALL REMAIN.

## RESIDENTIAL LAND USE DATA (PER APPROVED CONCEPT PLAN)

| DEVELOPMENT | APPROVAL DATE | PR ZONED ACRES | SINGLE FAMILY & TOWNHOME DWELLING UNITS | MULTI-FAMILY DWELLING UNITS | TOTAL DWELLING UNITS | LOT NUMBERS OF BUILDABLE LOTS | LOT NUMBERS OF OPEN SPACE LOTS | PROPOSED FORMAL OPEN SPACE | REMAINING FORMAL OPEN SPACE | PROPOSED INFORMAL OPEN SPACE | REMAINING INFORMAL OPEN SPACE | REMAINING ACRES | REMAINING DWELLINGS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CONCEPT PLAN | SEPT. 2008 | *220.90 | 384 | 240 | 624 | - | - | 6.92 AC | - | 88.91 AC | - | *220.90 | 624 |
| SECTION 1 | MAY 2013 | **9.80 | 46 | 0 | 46 | 1-11, 25-38, 63-83 | 98,99,101,102 | 0.00 | 6.92 AC | 0.26 AC | 88.65 AC | 211.10 | 578 |
| SECTION 2 | MAY 2013 | 3.00 | 13 | 0 | 13 | 12-24 | 100 | 0.00 | 6.92 AC | 0.15 AC | 88.5 AC | 208.1 | 565 |
| SECTION 3 | MAY 2013 | 7.20 | 38 | 0 | 38 | 39-62 | 103 | 0.00 | 6.92 AC | 0.21 AC | 88.29 AC | 200.9 | 527 |
| SECTION 4 | APRIL 2014 | 6.59 | 44 | 0 | 44 | 106-149 | ----- | ----- | 6.92 AC | ----- | 88.29 AC | 194.31 | 483 |
| SECTION 5 | APRIL 2014 | 10.56 | 27 | 0 | 27 | 150-154, 211-219, 222-234 | 221,235,236, 237 | 3.19 | 3.73 AC | 1.02 AC | 87.27 AC | 183.75 | 456 |
| SECTION 6 | APRIL 2014 | 4.03 | 26 | 0 | 26 | 184-190, 192-210 | 237 | ----- | 3.73 AC | 0.37AC | 86.9 AC | 179.72 | 430 |
| SECTION 7 | APRIL 2014 | 12.62 | 28 | 0 | 28 | 155-161, 163-183 | 162, 237,238 | 2.72 | 1.01 AC | 3.01 AC | 83.89 AC | 167.1 | 402 |
| SECTION 8 | TBD | 12.35 | 50 | 0 | 50 | 239-276, 299-310 | 311-312 | 0.00 | 1.01 AC | 1.76 AC | 82.13 AC | 154.75 | 352 |
| SECTION 9 | TBD | 5.63 | 21 | 0 | 21 | 289-309 | 313-315 | 0.00 | 1.01 AC | 0.64 AC | 81.49 AC | 149.12 | 331 |
| SECTION 10 | TBD | 15.56 | 0 | 239 | 239 | ----- | ----- | 1.08 | 0 | 1.57 AC | 79.92 AC | 133.56 | 92 |
| SECTION 11 | TBD | 1.88 | 0 | 0 | 0 | 238 | 238 | N/A | 0 | N/A | 79.92 AC | 133.56 | 92 |

* TOTAL SITE AREA FROM SURVEY = 220.90 AC
** INCLUDES 0.78 ACRES CAROTHERS ROAD R.O.W. DEDICATION

## LOCKWOOD GLEN - RESIDENTIAL LAND USE DATA - DEVELOPMENT PLAN REVISION #1

| DEVELOPMENT | SITE PLAN SUBMITTED | APPROVAL DATE | PREVIOUS PR ZONED ACRES | TOTAL SD-R ZONED ACRES PER PUD REVISION 04/11/16 | APPROVED DWELLING UNITS | TOTAL DWELLING UNITS PER PUD REVISION 04/11/16 | APPROVED REMAINING ACRES | TOTAL REMAINING SD-R ZONED ACRES PER PUD REVISION 04/11/16 | APPROVED REMAINING DWELLINGS | TOTAL REMAINING DWELLING UNITS PER PUD REVISION 04/11/16 |
|---|---|---|---|---|---|---|---|---|---|---|
| CONCEPT PLAN | N/A | SEPT. 2008 | *220.90 | **** 218.58 | 624 | 638 (+14) | *220.90 | **** 218.58 | 624 | 638 (+14) |
| SECTION 1 | X | MAY 2013 | **9.80 | **9.80 | 46 | 46 | 211.10 | 208.78 | 578 | 592 |
| SECTION 2 | X | MAY 2013 | 3.00 | 3.00 | 13 | 13 | 208.1 | 205.78 | 565 | 579 |
| SECTION 3 | X | MAY 2013 | 7.20 | 7.20 | 38 | 38 | 200.9 | 198.58 | 527 | 541 |
| SECTION 4 | X | APRIL 2014 | 6.59 | 6.59 | 44 | 44 | 194.31 | 191.99 | 483 | 497 |
| SECTION 5 | X | APRIL 2014 | 10.56 | 10.56 | 27 | 27 | 183.75 | 181.43 | 456 | 470 |
| SECTION 6 | X | APRIL 2014 | 4.03 | 4.03 | 26 | 26 | 179.72 | 177.40 | 430 | 444 |
| SECTION 7 | X | APRIL 2014 | 12.62 | 12.62 | 28 | 28 | 167.1 | 164.78 | 402 | 416 |
| SECTION 8 | X | JAN. 2016 | 12.35 | 12.35 | 50 | 50 | 154.75 | 152.43 | 352 | 366 |
| SECTION 9 | X | TBD | 5.63 | 5.63 | 21 | 21 | 149.12 | 146.80 | 331 | 345 |
| SECTION 10 | X | TBD | 15.56 | 15.56 | 239 | 239 | 133.56 | 131.24 | 92 | 106 |
| SECTION 11 | X | TBD | 1.88 | 1.88 | 0 | 0 | ***133.56 | ***131.24 | 92 | 106 |
| SECTION 12 | | ----- | 27.90 | 32.93 | 51 | 79 | 105.66 | 98.31 | 41 | 27 |
| SECTION 13 | | ----- | 8.36 | *****1.01 | 10 | 2 | 97.30 | 97.30 | 31 | 25 |
| SECTION 14 | | ----- | 3.81 | 3.81 | 6 | 6 | 93.49 | 93.49 | 25 | 19 |
| SECTION 15 | | ----- | 4.41 | 4.41 | 16 | 16 | 89.08 | 89.08 | 9 | 3 |

* TOTAL SITE AREA FROM SURVEY = 220.90 AC
** INCLUDES 0.78 ACRES CAROTHERS ROAD R.O.W. DEDICATION

*** SECTION 11 IS THE SITE PLAN SUBMITTAL OF THE AMENITY CENTER - THIS ACREAGE IS INCLUDED IN SECTION 7
**** REVISED ACREAGE PER ACQUISITION OF +/- 5.35 ACRES AND THE REMOVAL OF +/- 7.35 ACRES TO NC ZONING
***** SECTION 13 - +/- 7.35 ACRES REZONED TO NEIGHBORHOOD COMMERCIAL (NC)

## INDEX OF SHEETS


| SHEET # | TITLE |
|---|---|
| C-0.0 | COVER SHEET |
| C-0.1 | APPROVED CONCEPT PLAN |
| C-0.3 | WORKING CONCEPT PLAN |
| C-0.4 | REVISED BOUNDARY DESCRIPTION |
| C-1.0 | EXISTING CONDITIONS PLAN |
| C-2.0 | DEVELOPMENT PLAN |
| C-3.0 | GRADING & DRAINAGE PLAN |
| C-4.0 | ROW & ACCESS PLAN |
| C-5.0 | UTILITY PLAN |
| A-1.0 | TYPICAL SINGLE-FAMILY ELEVATIONS |


MICHAEL L. RAY
REGISTERED ENGINEER
STATE OF TENNESSEE
05/05/2016

JOHN DAVID HAAS, IV
REGISTERED LANDSCAPE ARCHITECT
STATE OF TENNESSEE
05/05/16

PREPARED FOR:

CRESCENT LOCKWOOD, LLC.

227 W. TRADE STREET, SUITE 1000
CHARLOTTE, NC. 28202
615.312.8242

PREPARED BY:

ENERGY LAND & INFRASTRUCTURE
1420 DONELSON PIKE, SUITE A12 • NASHVILLE, TN 37217
OFFICE 615-383-6300 • WWW.ELI-LLC.COM
ENGINEERS • SURVEYORS • INFRASTRUCTURE • ENVIRONMENTAL

EDGE
PLANNING LANDSCAPE ARCHITECTURE URBAN DESIGN
210 12th Ave. South, Suite 202
Nashville, Tennessee 37203
P 615-250-8154 F 615-250-8155

PROJECT #: xxxxx

# APPROVED CONCEPT PLAN (09/10/08)

| LINE TABLE | | |
|---|---|---|
| LINE | LENGTH | BEARING |
| L-1 | 577.00 | S81°25'13"E |
| L-2 | 31.70 | N07°13'56"E |
| L-3 | 582.26 | S82°20'54"E |
| L-4 | 1007.65 | S07°57'01"W |
| L-5 | 387.69 | S07°26'55"W |
| L-6 | 824.24 | S80°41'16"E |
| L-7 | 343.04 | N08°26'26"E |
| L-8 | 462.57 | N08°01'21"E |
| L-9 | 586.85 | S82°24'09"E |
| L-10 | 304.54 | S80°56'29"E |
| L-11 | 33.26 | S28°37'07"E |
| L-12 | 132.33 | S05°13'31"W |
| L-13 | 409.91 | S05°50'37"W |
| L-14 | 1217.86 | N83°25'00"W |
| L-15 | 184.00 | S08°31'03"W |
| L-16 | 1250.97 | S83°46'25"E |
| L-17 | 110.27 | S06°04'28"W |
| L-18 | 542.39 | S02°27'07"W |
| L-19 | 295.29 | S01°41'23"W |
| L-20 | 250.14 | S25°42'58"E |
| L-21 | 335.92 | S02°39'49"W |
| L-22 | 1366.73 | N84°15'00"W |
| L-23 | 59.34 | N05°38'57"E |
| L-24 | 23.93 | N40°39'23"W |
| L-25 | 262.02 | N17°52'55"W |
| L-26 | 265.99 | N20°52'26"W |
| L-27 | 71.18 | N24°21'08"W |
| L-28 | 128.68 | N39°51'01"W |
| L-29 | 364.80 | N57°12'14"W |
| L-30 | 85.11 | N43°47'46"W |
| L-31 | 76.98 | N52°31'09"W |
| L-32 | 178.83 | N78°58'32"W |
| L-33 | 55.76 | S86°16'14"W |
| L-34 | 301.01 | S56°53'55"W |
| L-35 | 222.92 | S51°26'40"W |
| L-36 | 132.82 | S44°27'33"W |
| L-37 | 150.64 | S68°36'30"W |
| L-38 | 145.06 | N57°18'02"W |
| L-39 | 322.19 | N21°35'43"W |
| L-40 | 134.89 | N16°53'34"W |
| L-41 | 215.41 | N20°29'42"W |
| L-42 | 168.55 | N14°21'46"W |
| L-43 | 81.95 | N07°58'30"W |
| L-44 | 188.71 | N13°40'44"W |
| L-45 | 101.14 | N16°24'09"W |
| L-46 | 150.61 | N23°36'56"W |
| L-47 | 133.54 | N57°04'03"W |
| L-48 | 808.40 | N06°49'36"E |

## LEGEND

| | | |
|---|---|---|
| EXISTING CONTOURS | SLOPES 14-19% | SECTION LINE |
| PROPOSED CONTOURS | SLOPES +20% | OPEN SPACE AREAS |

0' 100' 200' 400'

NORTH

## SITE DATA

THIS SITE IS FOUND IN THE CITY OF FRANKLIN, WILLIAMSON COUNTY, TENNESSEE MAP 89, PARCELS 43.01, 46, 47 & 48.

| | |
|---|---|
| GROSS SITE AREA: | ±220.90 AC. |
| EXISTING ZONING: | LR-LOW RESIDENTIAL |
| EXISTING LAND USE: | AGRICULTURAL |
| PROPOSED LAND USE: | RESIDENTIAL (PR) |
| PROPOSED ZONING: | PR - PLANNED RESIDENTIAL (PR 2.82) |
| TOTAL PROPOSED DWELLING UNITS: | 240 MULTI-FAMILY ATTACHED<br>384 SINGLE FAMILY LOT<br>(STREET ACCESS 147)<br>(ALLEY ACCESS 221)<br>(PRIVATE ACCESS 16)<br>624 TOTAL UNITS |

| NET DENSITY: | |
|---|---|
| GROSS ACREAGE | ± 220.90 AC |
| FLOODPLAIN | (-) ± 73.61 AC |
| TVA EASEMENT | (-) ± 5.17 AC |
| PROPOSED R.O.W. DEDICATION | (-) ± 14.76 AC SOUTH CAROTHERS PKWY. EXTENSION |
| OPEN SPACE: | (-) ± 20.53 AC |
| | ± 106.83 AC |

| | |
|---|---|
| PROPOSED NET DENSITY: | 5.84 NET DU/A |
| PROPOSED GROSS DENSITY: | 2.82 DU/A |

## MINIMUM OPEN SPACE REQUIREMENTS

20% OF GROSS SITE AREA REQUIRED FOR OPEN SPACE
TOTAL OPEN SPACE REQUIRED: 20% OF 206.14 AC = 1,795,892 SF (41.23 AC)
TOTAL OPEN SPACE PROVIDED = 95.83 AC (46% OF SITE GROSS ACREAGE)

DEVELOPABLE ACREAGE = TOTAL SITE - DEDICATED ROW - FLOODPLAIN = +/-132.53 AC

### FORMAL OPEN SPACE

| KEY | CLASS | AREA OF OPEN SPACE | MAXIMUM PAVED AREA |
|---|---|---|---|
| Area F-1 | FORMAL | 0.25 AC | .06 AC |
| Area F-2 | FORMAL | 3.17 AC | .79 AC |
| Area F-3 | FORMAL | 2.75 AC | .69 AC |
| Area F-4 | FORMAL | 0.50 AC | .13 AC |
| Area F-5 | FORMAL | 0.25 AC | .06 AC |

FORMAL O/S REQUIRED: 6.63 AC (5% OF DEVELOPABLE SITE AREA)
TOTAL FORMAL O/S PROVIDED: 301,435 SF (6.92 AC) 5%

### INFORMAL OPEN SPACE

| KEY | CLASS | AREA OF OPEN SPACE |
|---|---|---|
| Area I-1 | INFORMAL | 6.54 AC |
| Area I-2 | INFORMAL | 2.44 AC |
| Area I-3 | INFORMAL | 2.48 AC |
| Area I-4 | INFORMAL | 2.20 AC |
| Area I-5 | INFORMAL | 75.25 AC |

INFORMAL O/S REQUIRED: 13.25 AC
(10% OF DEVELOPABLE SITE AREA)
TOTAL INFORMAL O/S PROVIDED:
3,872,920 SF (88.91 AC.) 67%

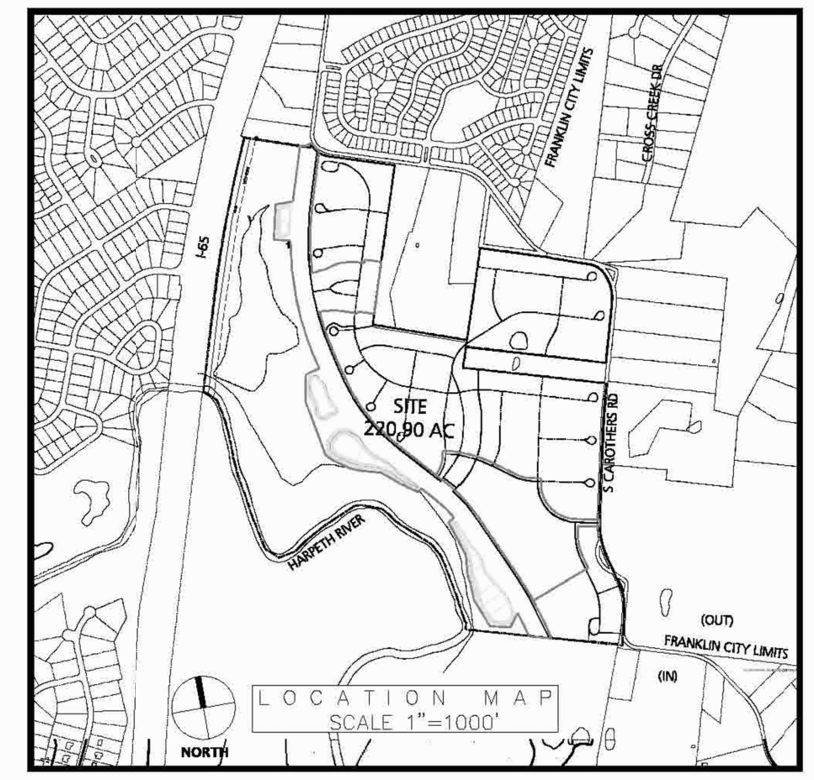
## LOT CALCULATIONS

| LOT # | SQ./ FT. | ACRES | LOT # | SQ./ FT. | ACRES | LOT # | SQ./ FT. | ACRES | LOT # | SQ./ FT. | ACRES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6,742.23 | 0.15 | 93 | 3,344.09 | 0.07 | 185 | 3,119.99 | 0.07 | 277 | 26,389.02 | 0.60 |
| 2 | 6,240.07 | 0.14 | 94 | 3,903.37 | 0.08 | 186 | 3,655.41 | 0.08 | 278 | 19,280.53 | 0.44 |
| 3 | 6,181.02 | 0.14 | 95 | 3,717.52 | 0.08 | 187 | 3,877.07 | 0.08 | 279 | 23,451.58 | 0.53 |
| 4 | 9,907.79 | 0.22 | 96 | 3,119.99 | 0.07 | 188 | 3,338.96 | 0.07 | 280 | 13,492.26 | 0.30 |
| 5 | 7,373.89 | 0.16 | 97 | 3,119.99 | 0.07 | 189 | 3,427.84 | 0.07 | 281 | 13,494.99 | 0.30 |
| 6 | 6,383.31 | 0.14 | 98 | 3,120.00 | 0.07 | 190 | 3,858.31 | 0.08 | 282 | 13,637.75 | 0.31 |
| 7 | 6,418.39 | 0.14 | 99 | 3,119.99 | 0.07 | 191 | 4,057.10 | 0.09 | 283 | 12,598.02 | 0.28 |
| 8 | 6,655.75 | 0.15 | 100 | 3,119.99 | 0.07 | 192 | 8,989.94 | 0.20 | 284 | 12,599.99 | 0.28 |
| 9 | 6,741.48 | 0.15 | 101 | 3,120.00 | 0.07 | 193 | 7,662.57 | 0.17 | 285 | 12,599.99 | 0.28 |
| 10 | 6,000.01 | 0.13 | 102 | 4,350.20 | 0.09 | 194 | 6,840.58 | 0.15 | 286 | 15,236.05 | 0.34 |
| 11 | 5,999.99 | 0.13 | 103 | 4,350.20 | 0.09 | 195 | 6,759.99 | 0.15 | 287 | 12,865.89 | 0.29 |
| 12 | 5,286.37 | 0.12 | 104 | 3,120.00 | 0.07 | 196 | 6,760.00 | 0.15 | 288 | 12,573.67 | 0.28 |
| 13 | 5,109.73 | 0.11 | 105 | 3,119.99 | 0.07 | 197 | 4,155.36 | 0.09 | 289 | 15,338.02 | 0.35 |
| 14 | 4,848.56 | 0.11 | 106 | 3,119.99 | 0.07 | 198 | 4,140.05 | 0.09 | 290 | 17,327.85 | 0.39 |
| 15 | 4,713.98 | 0.10 | 107 | 3,120.00 | 0.07 | 199 | 4,144.90 | 0.09 | 291 | 17,884.45 | 0.41 |
| 16 | 4,713.98 | 0.10 | 108 | 3,640.00 | 0.08 | 200 | 4,878.33 | 0.11 | 292 | 31,087.21 | 0.71 |
| 17 | 4,713.98 | 0.10 | 109 | 2,735.29 | 0.06 | 201 | 4,905.80 | 0.11 | 293 | 18,606.76 | 0.42 |
| 18 | 4,707.08 | 0.10 | 110 | 3,120.00 | 0.07 | 202 | 4,140.05 | 0.09 | 294 | 14,550.48 | 0.33 |
| 19 | 4,646.69 | 0.10 | 111 | 3,120.00 | 0.07 | 203 | 4,140.05 | 0.09 | 295 | 12,611.00 | 0.28 |
| 20 | 4,631.37 | 0.10 | 112 | 4,350.22 | 0.09 | 204 | 4,140.05 | 0.09 | 296 | 13,698.54 | 0.31 |
| 21 | 5,548.16 | 0.12 | 113 | 8,460.47 | 0.19 | 205 | 4,140.05 | 0.09 | 297 | 18,896.01 | 0.43 |
| 22 | 5,102.47 | 0.11 | 114 | 7,572.62 | 0.17 | 206 | 6,111.96 | 0.14 | 298 | 11,411.38 | 0.26 |
| 23 | 5,282.47 | 0.12 | 115 | 7,580.84 | 0.17 | 207 | 4,930.93 | 0.11 | 299 | 10,154.26 | 0.23 |
| 24 | 4,872.61 | 0.11 | 116 | 8,437.83 | 0.19 | 208 | 4,485.44 | 0.10 | 300 | 10,603.39 | 0.24 |
| 25 | 4,662.50 | 0.10 | 117 | 7,610.20 | 0.17 | 209 | 4,469.99 | 0.10 | 301 | 9,100.02 | 0.20 |
| 26 | 4,666.44 | 0.10 | 118 | 6,719.99 | 0.15 | 210 | 4,469.99 | 0.10 | 302 | 9,099.99 | 0.20 |
| 27 | 4,792.44 | 0.11 | 119 | 6,734.60 | 0.15 | 211 | 4,469.99 | 0.10 | 303 | 10,186.46 | 0.23 |
| 28 | 4,792.44 | 0.11 | 120 | 7,227.60 | 0.16 | 212 | 4,469.99 | 0.10 | 304 | 13,686.46 | 0.31 |
| 29 | 4,792.44 | 0.11 | 121 | 7,592.33 | 0.17 | 213 | 4,469.99 | 0.10 | 305 | 13,719.99 | 0.31 |
| 30 | 4,840.89 | 0.11 | 122 | 7,980.52 | 0.18 | 214 | 6,136.20 | 0.14 | 306 | 12,182.55 | 0.27 |
| 31 | 5,013.39 | 0.11 | 123 | 8,538.59 | 0.19 | 215 | 4,998.72 | 0.11 | 307 | 13,719.74 | 0.31 |
| 32 | 5,171.02 | 0.11 | 124 | 9,221.62 | 0.21 | 216 | 4,470.00 | 0.10 | 308 | 13,720.00 | 0.31 |
| 33 | 4,392.42 | 0.10 | 125 | 9,201.38 | 0.21 | 217 | 4,470.00 | 0.10 | 309 | 13,686.46 | 0.31 |
| 34 | 3,416.55 | 0.07 | 126 | 6,612.11 | 0.15 | 218 | 4,469.99 | 0.10 | 310 | 10,186.46 | 0.23 |
| 35 | 4,617.16 | 0.10 | 127 | 6,601.77 | 0.15 | 219 | 4,470.00 | 0.10 | 311 | 9,100.00 | 0.20 |
| 36 | 4,729.38 | 0.10 | 128 | 6,794.55 | 0.15 | 220 | 4,469.99 | 0.10 | 312 | 9,100.00 | 0.20 |
| 37 | 4,363.15 | 0.10 | 129 | 7,436.81 | 0.17 | 221 | 4,815.76 | 0.11 | 313 | 9,158.77 | 0.21 |
| 38 | 4,449.82 | 0.10 | 130 | 8,142.14 | 0.18 | 222 | 4,906.62 | 0.11 | 314 | 9,698.82 | 0.22 |
| 39 | 4,449.74 | 0.10 | 131 | 6,323.58 | 0.14 | 223 | 5,068.74 | 0.11 | 315 | 10,345.17 | 0.23 |
| 40 | 4,338.22 | 0.09 | 132 | 6,480.37 | 0.14 | 224 | 5,048.40 | 0.11 | 316 | 10,991.52 | 0.25 |
| 41 | 4,445.35 | 0.10 | 133 | 6,720.00 | 0.15 | 225 | 5,138.54 | 0.11 | 317 | 13,669.73 | 0.31 |
| 42 | 5,611.53 | 0.12 | 134 | 7,118.06 | 0.16 | 226 | 5,224.69 | 0.11 | 318 | 8,660.81 | 0.19 |
| 43 | 6,469.16 | 0.14 | 135 | 7,183.97 | 0.16 | 227 | 5,128.87 | 0.11 | 319 | 8,735.61 | 0.20 |
| 44 | 6,009.10 | 0.13 | 136 | 7,156.77 | 0.16 | 228 | 10,075.57 | 0.23 | 320 | 8,810.41 | 0.20 |
| 45 | 6,076.97 | 0.13 | 137 | 7,094.27 | 0.16 | 229 | 7,689.01 | 0.17 | 321 | 8,885.20 | 0.20 |
| 46 | 5,912.97 | 0.13 | 138 | 8,303.71 | 0.19 | 230 | 5,526.43 | 0.12 | 322 | 8,959.74 | 0.20 |
| 47 | 5,459.12 | 0.12 | 139 | 7,507.45 | 0.17 | 231 | 5,521.62 | 0.12 | 323 | 8,840.33 | 0.20 |
| 48 | 5,958.01 | 0.13 | 140 | 4,912.15 | 0.11 | 232 | 5,516.78 | 0.12 | 324 | 9,077.74 | 0.20 |
| 49 | 5,921.90 | 0.13 | 141 | 5,655.62 | 0.12 | 233 | 5,534.74 | 0.12 | 325 | 8,932.44 | 0.20 |
| 50 | 6,763.03 | 0.15 | 142 | 5,064.73 | 0.11 | 234 | 4,866.74 | 0.11 | 326 | 8,962.84 | 0.20 |
| 51 | 5,244.52 | 0.12 | 143 | 5,680.52 | 0.13 | 235 | 5,026.78 | 0.11 | 327 | 15,313.65 | 0.35 |
| 52 | 4,963.46 | 0.11 | 144 | 4,731.16 | 0.10 | 236 | 5,795.73 | 0.13 | 328 | 8,775.04 | 0.20 |
| 53 | 4,961.70 | 0.11 | 145 | 4,967.53 | 0.11 | 237 | 5,778.33 | 0.13 | 329 | 8,774.99 | 0.20 |
| 54 | 4,938.69 | 0.11 | 146 | 4,884.82 | 0.11 | 238 | 5,684.65 | 0.13 | 330 | 8,775.00 | 0.20 |
| 55 | 5,407.57 | 0.12 | 147 | 4,747.02 | 0.10 | 239 | 5,482.57 | 0.12 | 331 | 8,775.00 | 0.20 |
| 56 | 5,996.37 | 0.13 | 148 | 4,806.64 | 0.11 | 240 | 5,541.09 | 0.12 | 332 | 8,774.99 | 0.20 |
| 57 | 5,842.66 | 0.13 | 149 | 4,866.24 | 0.11 | 241 | 5,526.43 | 0.12 | 333 | 8,775.00 | 0.20 |
| 58 | 5,005.18 | 0.11 | 150 | 5,375.34 | 0.12 | 242 | 5,531.24 | 0.12 | 334 | 8,773.70 | 0.20 |
| 59 | 4,555.83 | 0.10 | 151 | 5,548.84 | 0.12 | 243 | 5,526.43 | 0.12 | 335 | 9,507.49 | 0.21 |
| 60 | 5,805.69 | 0.13 | 152 | 7,194.43 | 0.16 | 244 | 6,641.45 | 0.15 | 336 | 13,499.11 | 0.30 |
| 61 | 6,034.39 | 0.13 | 153 | 8,177.25 | 0.18 | 245 | 6,904.85 | 0.15 | 337 | 12,418.04 | 0.28 |
| 62 | 6,766.46 | 0.15 | 154 | 5,968.41 | 0.13 | 246 | 5,526.43 | 0.12 | 338 | 9,690.15 | 0.22 |
| 63 | 7,557.99 | 0.17 | 155 | 5,637.09 | 0.12 | 247 | 5,531.24 | 0.12 | 339 | 8,744.32 | 0.20 |
| 64 | 7,427.64 | 0.17 | 156 | 6,683.78 | 0.15 | 248 | 5,531.25 | 0.12 | 340 | 9,096.01 | 0.20 |
| 65 | 6,995.81 | 0.16 | 157 | 4,974.46 | 0.11 | 249 | 5,531.25 | 0.12 | 341 | 9,099.99 | 0.20 |
| 66 | 6,414.70 | 0.14 | 158 | 4,940.60 | 0.11 | 250 | 5,466.95 | 0.12 | 342 | 9,100.00 | 0.20 |
| 67 | 7,783.96 | 0.17 | 159 | 4,939.99 | 0.11 | 251 | 5,461.34 | 0.12 | 343 | 9,100.00 | 0.20 |
| 68 | 6,798.82 | 0.15 | 160 | 4,940.00 | 0.11 | 252 | 5,644.37 | 0.12 | 344 | 9,099.90 | 0.20 |
| 69 | 6,798.82 | 0.15 | 161 | 4,939.99 | 0.11 | 253 | 5,878.79 | 0.13 | 345 | 9,026.53 | 0.20 |
| 70 | 7,582.86 | 0.17 | 162 | 4,939.99 | 0.11 | 254 | 5,683.12 | 0.13 | 346 | 9,099.99 | 0.20 |
| 71 | 6,420.66 | 0.14 | 163 | 4,938.54 | 0.11 | 255 | 5,258.32 | 0.12 | 347 | 9,099.99 | 0.20 |
| 72 | 7,545.86 | 0.17 | 164 | 4,939.63 | 0.11 | 256 | 5,410.97 | 0.12 | 348 | 9,099.99 | 0.20 |
| 73 | 6,519.52 | 0.14 | 165 | 4,939.90 | 0.11 | 257 | 5,563.62 | 0.12 | 349 | 9,099.99 | 0.20 |
| 74 | 7,683.72 | 0.17 | 166 | 5,087.12 | 0.11 | 258 | 5,716.27 | 0.13 | 350 | 9,100.00 | 0.20 |
| 75 | 5,370.74 | 0.12 | 167 | 5,349.10 | 0.12 | 259 | 7,289.83 | 0.16 | 351 | 9,099.99 | 0.20 |
| 76 | 6,187.55 | 0.14 | 168 | 6,037.49 | 0.13 | 260 | 7,267.18 | 0.16 | 352 | 9,099.99 | 0.20 |
| 77 | 5,462.86 | 0.12 | 169 | 4,356.44 | 0.10 | 261 | 9,093.77 | 0.20 | 353 | 10,487.09 | 0.24 |
| 78 | 8,579.90 | 0.19 | 170 | 3,388.35 | 0.07 | 262 | 9,099.99 | 0.20 | 354 | 10264.58 | 0.23 |
| 79 | 7,805.17 | 0.17 | 171 | 3,447.36 | 0.07 | 263 | 9,099.99 | 0.20 | 355 | 13430.29 | 0.30 |
| 80 | 7,073.05 | 0.16 | 172 | 3,174.42 | 0.07 | 264 | 9,099.99 | 0.20 | 356 | 18542.42 | 0.42 |
| 81 | 5,885.03 | 0.13 | 173 | 3,119.99 | 0.07 | 265 | 10,158.15 | 0.23 | 357 | 13793.68 | 0.31 |
| 82 | 6,567.90 | 0.15 | 174 | 3,650.38 | 0.08 | 266 | 10,182.84 | 0.23 | 358 | 7940.69 | 0.18 |
| 83 | 6,794.15 | 0.15 | 175 | 3,640.00 | 0.08 | 267 | 9,099.99 | 0.20 | 359 | 9495.89 | 0.22 |
| 84 | 7,908.50 | 0.18 | 176 | 3,115.92 | 0.07 | 268 | 9,099.99 | 0.20 | 360 | 8522.96 | 0.20 |
| 85 | 7,434.38 | 0.17 | 177 | 3,119.99 | 0.07 | 269 | 8,898.90 | 0.20 | 361 | 8803.75 | 0.20 |
| 86 | 3,524.04 | 0.08 | 178 | 3,120.00 | 0.07 | 270 | 9,301.09 | 0.21 | 362 | 11160.40 | 0.26 |
| 87 | 3,204.88 | 0.07 | 179 | 3,119.99 | 0.07 | 271 | 9,099.99 | 0.20 | 363 | 11161.18 | 0.17 |
| 88 | 3,648.53 | 0.08 | 180 | 3,639.99 | 0.08 | 272 | 8,885.51 | 0.20 | 364 | 9528.46 | 0.22 |
| 89 | 3,645.42 | 0.08 | 181 | 3,640.00 | 0.08 | 273 | 9,558.90 | 0.21 | 365 | 9284.45 | 0.21 |
| 90 | 3,122.96 | 0.07 | 182 | 3,119.99 | 0.07 | 274 | 16,006.02 | 0.36 | 366 | 9065.30 | 0.21 |
| 91 | 3,121.39 | 0.07 | 183 | 3,120.00 | 0.07 | 275 | 14,162.92 | 0.32 | 367 | 8450.00 | 0.19 |
| 92 | 3,256.83 | 0.07 | 184 | 3,119.99 | 0.07 | 276 | 18,387.53 | 0.42 | 368 | 8470.02 | 0.19 |


SURVEY PROVIDED BY:
WILLIAM M. KEEL
FISHER & ARNOLD, INC.
1420 DONELSON PIKE, SUITE A12
NASHVILLE TN 37217
mkeel@fisherarnold.com
(615) 383-6300

APPLICANT:
JOHN HAAS
EDGE PLANNING, LANDSCAPE ARCHITECTURE & GRAPHIC DESIGN
210 12TH AVENUE SOUTH, SUITE 202
NASHVILLE TN 37203
jhaas@edgela.com
(615) 250-8154

DEVELOPER:
KHRIS PASCARELLA
SOUTH CAROTHERS PARTNERS, LLC
205 POWELL PLACE
BRENTWOOD, TN 37027
kpascarella@pearlstreetpartners.com
(615) 312-8242


## GENERAL NOTES

1. BOUNDARY AND SITE INFORMATION PROVIDED BY FISHER AND ARNOLD, INC. TOPOGRAPHIC INFORMATION PROVIDED BY WILLIAMSON COUNTY GIS.
2. ALL REFUSE WILL BE COLLECTED BY PUBLIC PROVIDER.
3. PROPERTY CAN BE REFERENCED AS TAX MAP 89, PARCELS 43.01, 46, 47, & 48.
4. THERE ARE NO HISTORICAL STRUCTURES ON THIS SITE.
5. A TRAFFIC STUDY WAS CONDUCTED BY FISCHBACH TRANSPORTATION GROUP, INC WHICH CONCLUDED THAT THIS PROJECT WILL GENERATE A TOTAL OF 5,082 VEHICLE TRIPS PER DAY.
6. INITIAL DISCUSSION WITH THE CITY OF FRANKLIN ENGINEERING INDICATES THERE IS ADEQUATE CAPACITY TO SERVE THE PROPOSED DEVELOPMENT WITH SEWER SERVICES. SPECIFIC UPGRADES TO THE SEWER SYSTEMS, AS OUTLINED BY THE CITY OF FRANKLIN ENGINEERING DEPT., WILL BE NECESSARY TO PROPERLY SERVE THE PROPOSED DEVELOPMENT.
7. FROM THIS SITE, IT IS APPROXIMATELY 2.5 MILES TO THE FIRE STATION ON HWY. 96/JORDAN ROAD AND 4 MILES TO THE CITY POLICE DEPARTMENT LOCATED DOWNTOWN AT CITY HALL. THE NEAREST PARK AND RECREATIONAL FACILITIES ARE LOCATED APPROXIMATELY 3.7 MILES WEST OF THE DEVELOPMENT ON HWY. 96 (PINKERTON PARK). CHEEK PARK AND THE WILLIAMSON COUNTY RECREATION CENTER ARE APPROXIMATELY 5.5 MILES FROM THE PROPOSED DEVELOPMENT.
8. THIS DEVELOPMENT WILL RESULT IN AN INCREASE OF 624 HOUSEHOLD UNITS (384 SINGLE FAMILY; 240 MULTI-FAMILY ATTACHED). BASED ON AN AVERAGE OF 0.64 SCHOOL AGE STUDENTS PER SINGLE FAMILY HOUSEHOLD, THIS WILL INCREASE THE CURRENT STUDENT SCHOOL POPULATION BY A TOTAL OF ±400 STUDENTS WITHIN THE FOLLOWING CATEGORES: LIBERTY ELEMENTARY (3.91 MILES), FREEDOM INTERMEDIATE (5.11), FREEDOM MIDDLE (5.44 MILES), CENTENNIAL HIGH (3.77 MILES).
9. ALL PUBLIC IMPROVEMENTS TO BE LOCATED IN AN EASEMENT.
10. ALL TREES LOCATED IN THE PROPOSED DEVELOPMENT OVER 4" DBH THAT ARE TO BE PRESERVED OR REMOVED ARE LOCATED ON THE TREE CLEARING PLAN (C2.00 - 2.30). BEFORE CONSTRUCTION IS TO BEGIN, THE DRIP LINE OF PRESERVED TREES WILL BE PROTECTED BY THE INSTALLATION OF TREE PROTECTION FENCING. NO CONSTRUCTION ACTIVITY OR STORAGE WILL OCCUR WITHIN THIS ZONE.
11. THE SUBJECT PROPERTY IS REFERENCED ON FIRM [FLOOD INSURANCE RATE MAP] NUMBER 47187C0214 "F" DATED: SEPTEMBER 29, 2006. THIS MAP DEPICTS THE PORTIONS OF THE SITE THAT LIES WITHIN A FLOODWAY [FW] OR FLOODWAY FRINGE [FF] BOUNDARY AND IS IDENTIFED ON THE CONCEPT PLAN.
12. UTILITY AVAILABILITY LETTERS HAVE BEEN SUBMITTED TO THE CITY OF FRANKLIN AND THE MILLCROFTEN UTILITY DISTRICT, BUT AT THE TIME OF SUBMITTAL NO RESPONSE HAS BEEN RECEIVED.
   I) EXISTING FACILITIES
      1) SANITARY SEWER SYSTEM
         A) UTILITY DISTRICT JURISDICTION: CITY OF FRANKLIN
         B) UTILITY DISTRICT ADDITIONAL FLOW IS 384 SFUE AND 240 MFUE.
            1 SFUE = 350 GALLONS/UNIT/DAY
            SFUE - SINGLE FAMILY UNIT EQUIVALENT
            1 MFUE = 350 GALLONS/UNIT/DAY
            MFUE - MULTI-FAMILY UNIT EQUIVALENT
      2) DOMESTIC WATER SUPPLY
         A) UTILITY DISTRICT JURISDICTION: MILLCROFTEN UTILITY DISTRICT
         B) UTILITY DISTRICT ADDITIONAL FLOW IS 214,550 GPD
      3) NATURAL GAS SERVICE
         A) UTILITY DISTRICT JURISDICTION: ATMOS ENERGY
      4) ELECTRIC SERVICE
         A) UTILITY DISTRICT JURISDICTION: MIDDLE TENNESSEE ELECTRIC MEMBERSHIP CORPORATION
   II) PROPOSED FACILITIES
      A) DEMAND IN GALLONS PER DAY
      624 UNITS X 350 GPD = 218,400 GPD
13. SOUTH CAROTHERS PARTNERS, LLC INTENDS TO PLACE RESTRICTIVE COVENANTS OVER THE SUBJECT PROPERTY PRIOR TO DEEDING OVER ANY LOT TO THIRD PARTY BUYERS. A HOMEOWNER'S ASSOCIATION WILL BE ESTABLISHED TO OVERSEE MAINTENANCE OF THE GROUNDS AND IMPROVEMENTS. EACH RESIDENTIAL UNIT IN THE PROJECT WILL PAY REGULAR ASSESSMENTS INTO AN ACCOUNT ESTABLISHED TO FUND SUCH MAINTENANCE AND CAPITAL IMPROVEMENTS. AMONG OTHER PROVISIONS THE COVENANTS WILL ADDRESS ISSUES RELATED TO MAINTENANCE,USE RESTRICTIONS, EXTERIOR ALTERATIONS, AND DISPOSAL OF REFUSE.
14. LIGHTING WILL BE PEDESTRIAN IN SCALE AND LOCATED TO ENSURE SAFE MOVEMENT OF PEDESTRIANS/VEHICLES AND FOR SECURITY PURPOSES WHILE ADHERING TO THE CITY OF FRANKLIN DESIGN STANDARDS. MIDDLE TENNESSEE ELECTRIC SHALL APPROVE STREET LIGHT STANDARDS. DIRECTIONAL LIGHTING WILL BE DESIGNED SO AS TO MINIMIZE GLARE AND REFLECTION ON ADJACENT PROPERTIES.
15. SIGNS WILL MEET THE REQUIREMENTS OF CITY OF FRANKLIN ZONING ORDINANCE, CHAPTER 8.7 SIGNS. SIGN CONTROLS WILL BE ESTABLISHED, FOR THE DEVELOPMENT, TO SAFELY FACILITATE PEDESTRIAN AND VEHICULAR MOVEMENT IN AN ATTRACTIVE AND EFFICIENT MANNER. SIGNAGE WILL BE COMPATIBLE WITH THE SURROUNDINGS, WILL BE APPROPRIATE TO RESIDENTIAL SCALE AND EXPRESS THE IDENTITY OF THE DEVELOPMENT.
16. WATER FACILITIES - WATER SERVICE WILL BE COORDINATED WITH THE MILLCROFTON UTILITY DISTRICT AND THE CITY OF FRANKLIN TO PROVIDE ADEQUATE FLOW AND CAPACITY. ALL WATERMAINS SHALL BE LOCATED IN A 20' PUBLIC UTILITY EASEMENT.
17. SEWER FACILITIES - SEWER SERVICE WILL BE COORDINATED WITH THE CITY OF FRANKLIN TO PROVIDE ADEQUATE FLOW AND CAPACITY. ALL SEWER LINES SHALL BE LOCATED IN A 20' SANITARY SEWER EASEMENT.
18. REPURIFIED WATER FACILITIES - THERE ARE NO REPURIFIED WATER FACILITIES CURRENTLY IN PROXIMITY TO THE SITE. THE CITY OF FRANKLIN HAS PROPOSED A ZERO DISCHARGE WASTEWATER TREATMENT PLANT NEARBY THAT COULD SERVE THIS DEVELOPMENT.
19. STREETS - SOUTH CAROTHERS ROAD IS A LOCAL STREET. SOUTH CAROTHERS PARKWAY IS A MAJOR ARTERIAL. ALL ROADS WITHIN NICHOLS BEND ARE LOCAL STREETS UNLESS OTHERWISE NOTED.
20. ALL FACILITIES SHALL BE DESIGNED TO MEET ALL CITY OF FRANKLIN ORDINANCES.
21. ALL CITY OF FRANKLIN DESIGN STANDARDS WILL BE FOLLOWED UNLESS OTHERWISE NOTED IN AN APPLICATION TO MODIFY STANDARDS.
22. THE PROPOSED DEVELOPMENT WILL UTILIZE CONVENTIONAL SUBURBAN DEVELOPMENT STREET WIDTH STANDARDS. (SEE ATTACHED PATTERN BOOK)
23. THE APPLICANT REQUESTS A MODIFICATION OF THE DESIGN STANDARDS IN REGARDS TO PAGE 1-17, TABLE 5,SITE DEVELOPMENT REQUIREMENTS FOR RESIDENTIAL DEVELOPMENT OF THE CITY OF FRANKLIN ZONING ORDINANCE. THE APPLICANT REQUESTS THAT THE MINIMUM FRONT STREET YARD SETBACK SHALL BE 8'-0".
24. THE APPLICANT REQUESTS A MODIFICATION OF THE DESIGN STANDARDS IN REGARDS TO THE PROPOSED REAR YARD SETBACKS FOR ALLEY LOADED PRODUCTS. 4' REAR YARD SETBACKS ARE PROPOSED TO CREATE A DRIVEWAY LENGTH OF 5' MINIMUM OR GREATER THAN 22'.
25. STORMWATER DETENTION FACILITIES WILL BE CONSTRUCTED TO MINIMIZE IMPACTS OF INCREASED RUNOFF ON DOWNSTREAM PROPERTIES. THE PROPOSED DETENTION AREA WILL BE USED FOR ALL OF THE DETENTION FOR 2-100 YEAR STORMS. WATER QUALITY WILL BE PROVIDED BY UTILIZATION OF STORMWATER QUALITY STRUCTURES.


EDGE
PLANNING LANDSCAPE ARCHITECTURE GRAPHIC DESIGN
210 Twelfth Avenue South
Suite 202
Nashville, Tennessee 37203
P 615-250-8154 F 615-250-8155


CONSULTANTS

SEAL

JOHN DAVID HAAS, JR. REGISTERED AGRICULTURE COMMERCE TENNESSEE NO. 674 LANDSCAPE ARCHITECT
9-10-08

PROJECT TITLE

## NICHOLS BEND
## FRANKLIN, TENNESSEE
## CONCEPT PLAN

CLIENT

SOUTH CAROTHERS PARTNERS, LLC

CITY OF FRANKLIN #1619
PROJECT NO. 07265
Date 07/11/08

Revisions

| | |
|---|---|
| 01/02/08 | PER CITY COMMENTS |
| 02/05/08 | PER CITY COMMENTS |
| 07/11/08 | PER POST PC CONDITIONS |
| 09/10/08 | PER POST PC CONDITIONS |

Sheet Title

CONCEPT PLAN

Sheet Number

C1.00


EDGE
PLANNING LANDSCAPE ARCHITECTURE URBAN DESIGN
210 Twelfth Avenue South
Suite 202
Nashville, Tennessee 37203
P 615-250-8154 F 615-250-8155

ENERGY LAND & INFRASTRUCTURE
1420 DONELSON PIKE, SUITE A12 • NASHVILLE, TN 37217
OFFICE 615-383-6300 • WWW.ELI-LLC.COM
ENGINEERS • SURVEYORS • INFRASTRUCTURE • ENVIRONMENTAL



© 2014 ENERGY LAND & INFRASTRUCTURE, LLC. ALL RIGHTS RESERVED


CONSULTANTS

SEAL

PROJECT TITLE

## LOCKWOOD GLEN PUD SUBDIVISION
## DEVELOPMENT PLAN REVISION #1
## C.O.F. #6120
## FRANKLIN, TN

CLIENT

CRESCENT LOCKWOOD LLC.
FRANKLIN, TN.

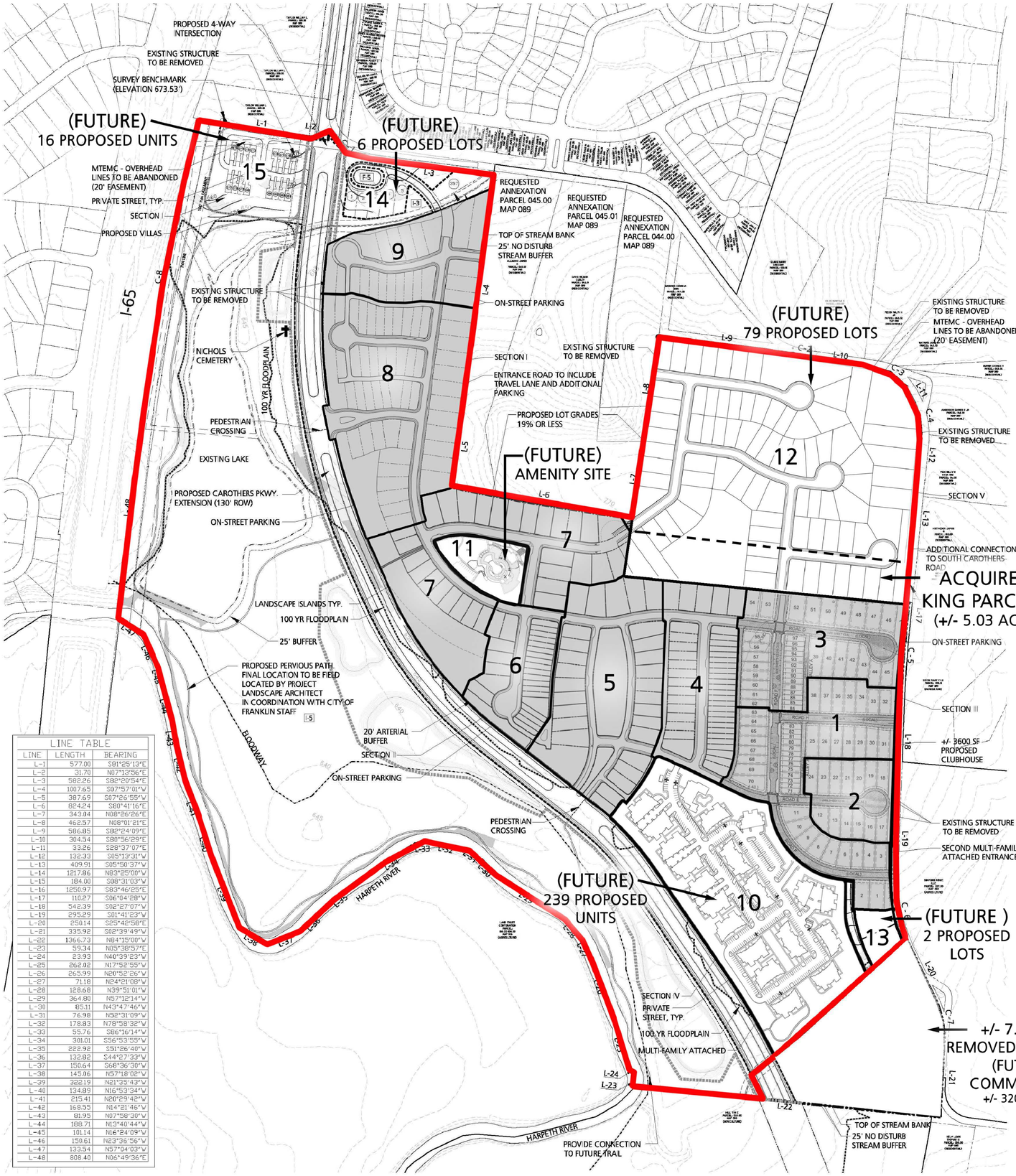
PROJECT NO. 6120
Date 04/11/16
Revisions
05/05/16 COF COMMENTS

Sheet Title

APPROVED CONCEPT PLAN

Sheet Number

C 0.1




| LINE TABLE | | |
|---|---|---|
| LINE | LENGTH | BEARING |
| L-1 | 577.00 | S81°25'13"E |
| L-2 | 31.70 | N07°13'56"E |
| L-3 | 582.26 | S82°20'54"E |
| L-4 | 1007.65 | S07°57'01"W |
| L-5 | 387.69 | S67°26'55"W |
| L-6 | 824.24 | S80°41'16"E |
| L-7 | 343.04 | N08°26'26"E |
| L-8 | 462.57 | N08°01'21"E |
| L-9 | 586.85 | S82°24'09"E |
| L-10 | 304.54 | S80°56'29"E |
| L-11 | 33.26 | S29°37'07"E |
| L-12 | 192.33 | S05°13'31"W |
| L-13 | 409.91 | S05°50'37"W |
| L-14 | 1217.86 | N83°25'00"W |
| L-15 | 184.00 | S08°31'03"W |
| L-16 | 1250.97 | S83°46'25"E |
| L-17 | 110.27 | S06°04'28"W |
| L-18 | 542.39 | S82°27'07"E |
| L-19 | 295.29 | S01°41'23"W |
| L-20 | 250.14 | S25°42'58"E |
| L-21 | 335.92 | S02°39'49"W |
| L-22 | 1366.73 | N84°15'00"W |
| L-23 | 59.34 | N05°38'57"E |
| L-24 | 23.93 | N40°29'23"W |
| L-25 | 262.02 | N17°52'55"W |
| L-26 | 265.99 | N20°52'26"W |
| L-27 | 71.18 | N24°21'08"W |
| L-28 | 128.68 | N39°51'01"W |
| L-29 | 364.80 | N57°12'14"W |
| L-30 | 85.11 | N43°47'46"W |
| L-31 | 76.98 | N52°31'09"W |
| L-32 | 178.83 | N78°58'32"W |
| L-33 | 55.76 | S86°16'14"W |
| L-34 | 301.01 | S56°53'55"W |
| L-35 | 222.92 | S31°26'40"W |
| L-36 | 132.82 | S44°27'33"W |
| L-37 | 150.64 | S68°36'30"W |
| L-38 | 145.06 | N57°18'02"W |
| L-39 | 322.19 | N21°35'43"W |
| L-40 | 134.89 | N16°53'34"W |
| L-41 | 215.41 | N20°29'42"W |
| L-42 | 168.95 | N14°21'46"W |
| L-43 | 81.95 | N07°58'30"W |
| L-44 | 188.71 | N13°40'44"W |
| L-45 | 101.14 | N16°24'09"W |
| L-46 | 150.61 | N23°36'56"W |
| L-47 | 133.54 | N57°04'03"W |
| L-48 | 808.40 | N06°49'36"E |

LEGEND

EXISTING CONTOURS
PROPOSED CONTOURS
SLOPES 14-19%
SLOPES +20%
SECTION LINE
OPEN SPACE AREAS

0' 100' 200' 400'
NORTH
NOT TO SCALE

## SITE DATA (PER APPROVED CONCEPT PLAN)

THIS SITE IS FOUND IN THE CITY OF FRANKLIN, WILLIAMSON COUNTY, TENNESSEE
MAP 89, PARCELS 43.01, 46, 47 & 48.

| | |
|---|---|
| GROSS SITE AREA: | ±220.90 AC. |
| EXISTING ZONING: | LR-LOW RESIDENTIAL |
| EXISTING LAND USE: | AGRICULTURAL |
| PROPOSED LAND USE: | RESIDENTIAL (PR) |
| PROPOSED ZONING: | PR - PLANNED RESIDENTIAL (PR 2.82) |
| TOTAL PROPOSED DWELLING UNITS: | 240 MULTI-FAMILY ATTACHED<br>384 SINGLE FAMILY LOT<br>(STREET ACCESS 147)<br>(ALLEY ACCESS 221)<br>(PRIVATE ACCESS 16)<br>624 TOTAL UNITS |

| NET DENSITY: | |
|---|---|
| GROSS ACREAGE | ± 220.90 AC |
| FLOODPLAIN | (-) ± 73.61 AC |
| TVA EASEMENT | (-) ± 5.17 AC |
| PROPOSED R.O.W. DEDICATION | (-) ± 14.76 AC SOUTH CAROTHERS PKWY. EXTENSION |
| OPEN SPACE: | (-) ± 20.53 AC |
| | ± 106.83 AC |
| PROPOSED NET DENSITY: | 5.84 NET DU/A |
| PROPOSED GROSS DENSITY: | 2.82 DU/A |

## REVISED SITE DATA

| | |
|---|---|
| CURRENT LOCKWOOD GLEN SITE AREA | 220.90 AC |
| PROPOSED COMMERCIAL AREA | - 7.35 AC |
| LOCKWOOD GLEN RESIDENTIAL AREA | 213.55 AC |
| KING PARCEL ADDITION | + 5.03 AC |
| TOTAL LOCKWOOD GLEN RESIDENTIAL AREA | 218.58 AC |
| PROPOSED SITE DENSITY | 2.92 |
| TOTAL UNITS PROPOSED | 638 UNITS |
| TOTAL UNITS UNDER REVIEW OR APPROVED THROUGH SITE PLAN | 533 |
| TOTAL REMAINING UNITS | 105 |

## LOCKWOOD GLEN - RESIDENTIAL LAND USE DATA - DEVELOPMENT PLAN REVISION #1

| DEVELOPMENT | SITE PLAN SUBMITTED | APPROVAL DATE | PREVIOUS PR ZONED ACRES | TOTAL SD-R ZONED ACRES PER PUD REVISION 04/11/16 | APPROVED DWELLING UNITS | TOTAL DWELLING UNITS PER PUD REVISION 04/11/16 | APPROVED REMAINING ACRES | TOTAL REMAINING SD-R ZONED ACRES PER PUD REVISION 04/11/16 | APPROVED REMAINING DWELLINGS | TOTAL REMAINING DWELLING UNITS PER PUD REVISION 04/11/16 |
|---|---|---|---|---|---|---|---|---|---|---|
| CONCEPT PLAN | N/A | SEPT. 2008 | *220.90 | **** 218.58 | 624 | 638 (+14) | *220.90 | **** 218.58 | 624 | 638 (+14) |
| SECTION 1 | X | MAY 2013 | **9.80 | **9.80 | 46 | 46 | 211.10 | 208.78 | 578 | 592 |
| SECTION 2 | X | MAY 2013 | 3.00 | 3.00 | 13 | 13 | 208.1 | 205.78 | 565 | 579 |
| SECTION 3 | X | MAY 2013 | 7.20 | 7.20 | 38 | 38 | 200.9 | 198.58 | 527 | 541 |
| SECTION 4 | X | APRIL 2014 | 6.59 | 6.59 | 44 | 44 | 194.31 | 191.99 | 483 | 497 |
| SECTION 5 | X | APRIL 2014 | 10.56 | 10.56 | 27 | 27 | 183.75 | 181.43 | 456 | 470 |
| SECTION 6 | X | APRIL 2014 | 4.03 | 4.03 | 26 | 26 | 179.72 | 177.40 | 430 | 444 |
| SECTION 7 | X | APRIL 2014 | 12.62 | 12.62 | 28 | 28 | 167.1 | 164.78 | 402 | 416 |
| SECTION 8 | X | JAN. 2016 | 12.35 | 12.35 | 50 | 50 | 154.75 | 152.43 | 352 | 366 |
| SECTION 9 | X | TBD | 5.63 | 5.63 | 21 | 21 | 149.12 | 146.80 | 331 | 345 |
| SECTION 10 | X | TBD | 15.56 | 15.56 | 239 | 239 | 133.56 | 131.24 | 92 | 106 |
| SECTION 11 | X | TBD | 1.88 | 1.88 | 0 | 0 | ***133.56 | ***131.24 | 92 | 106 |
| SECTION 12 | | ----- | 27.90 | 32.93 | 51 | 79 | 105.66 | 98.31 | 41 | 27 |
| SECTION 13 | | ----- | 8.36 | *****1.01 | 10 | 2 | 97.30 | 97.30 | 31 | 25 |
| SECTION 14 | | ----- | 3.81 | 3.81 | 6 | 6 | 93.49 | 93.49 | 25 | 19 |
| SECTION 15 | | ----- | 4.41 | 4.41 | 16 | 16 | 89.08 | 89.08 | 9 | 3 |

* TOTAL SITE AREA FROM SURVEY = 220.90 AC
** INCLUDES 0.78 ACRES CAROTHERS ROAD R.O.W. DEDICATION

*** SECTION 11 IS THE SITE PLAN SUBMITTAL OF THE AMENITY CENTER - THIS ACREAGE IS INCLUDED IN SECTION 7
**** REVISED ACREAGE PER ACQUISITION OF +/- 5.35 ACRES AND THE REMOVAL OF +/- 7.35 ACRES TO NC ZONING
***** SECTION 13 - +/- 7.35 ACRES REZONED TO NEIGHBORHOOD COMMERCIAL (NC)

SEE SHEET C-0.4 "REVISED PUD BOUNDARY" FOR REVISED DEVELOPMENT PROPERTY, BOUNDARY CALLS, AND LEGAL DESCRIPTION

LEGEND

SECTIONS WITH SITE PLAN APPROVAL
REVISED LOCKWOOD GLEN PUD AREA

SURVEY PROVIDED BY:
WILLIAM M. KEEL
FISHER & ARNOLD, INC.
1420 DONELSON PIKE, SUITE A12
NASHVILLE TN 37217
mkee@fisherarnold.com
(615) 383-6300

APPLICANT:
JOHN HAAS
EDGE PLANNING, LANDSCAPE ARCHITECTURE & GRAPHIC DESIGN
210 12TH AVENUE SOUTH, SUITE 202
NASHVILLE TN 37203
jhaas@edge.a.com
(615) 250-8154

DEVELOPER:
KHRIS PASCARELLA
SOUTH CAROTHERS PARTNERS, LLC
205 POWELL PLACE
BRENTWOOD, TN 37027
kpascarella@pearlstreetpartners.com
(615) 312-8242

EDGE
PLANNING · LANDSCAPE ARCHITECTURE · URBAN DESIGN
210 Twelfth Avenue South
Suite 202
Nashville, Tennessee 37203
P 615-250-8154 F 615-250-8155

ENERGY LAND & INFRASTRUCTURE
1420 DONELSON PIKE, SUITE A12 · NASHVILLE, TN 37217
OFFICE 615-383-6300 · WWW.ELI-LLC.COM
ENGINEERS · SURVEYORS · INFRASTRUCTURE · ENVIRONMENTAL
© 2016 EDGE PLANNING + LANDSCAPE ARCHITECTURE, LLC. ALL RIGHTS RESERVED

CONSULTANTS

SEAL

PROJECT TITLE
LOCKWOOD GLEN PUD SUBDIVISION
DEVELOPMENT PLAN REVISION #1
C.O.F. #6120
FRANKLIN, TN

CLIENT
CRESCENT LOCKWOOD LLC.
FRANKLIN, TN.

PROJECT NO. 6120
Date 04/11/16
Revisions
05/05/16 COF COMMENTS

Sheet Title
WORKING CONCEPT PLAN

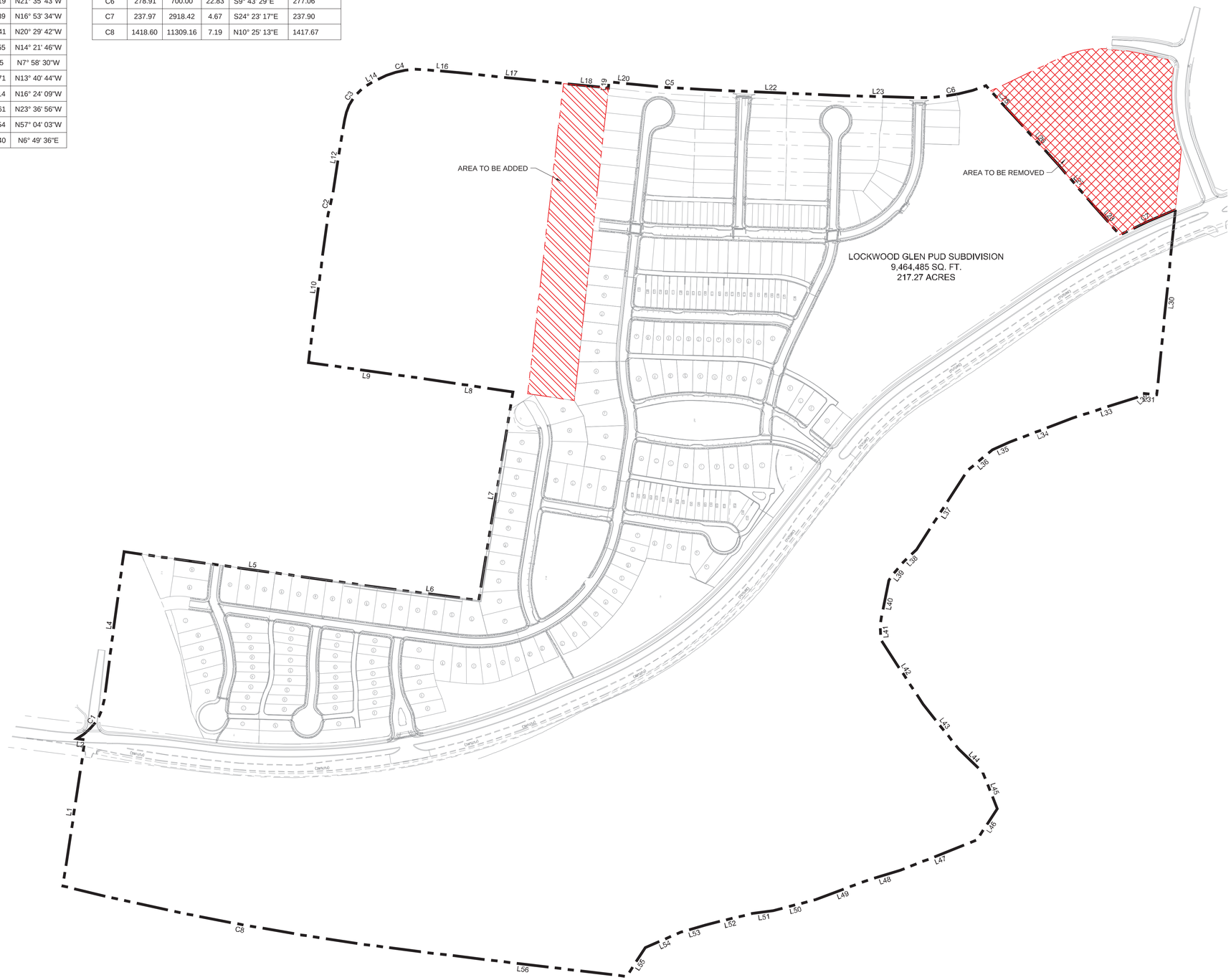
Sheet Number
C 0.2

| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L1 | 577.00 | S81° 25' 13"E |
| L2 | 31.70 | N7° 13' 56"E |
| L4 | 582.26 | S82° 20' 54"E |
| L5 | 1007.65 | S7° 57' 01"W |
| L6 | 387.69 | S7° 26' 55"W |
| L7 | 824.24 | S80° 41' 16"E |
| L8 | 343.04 | N8° 26' 26"E |
| L9 | 462.57 | N8° 01' 21"E |
| L10 | 586.85 | S82° 24' 09"E |
| L12 | 304.54 | S80° 56' 29"E |
| L14 | 33.26 | S28° 37' 07"E |
| L16 | 132.33 | S5° 13' 31"W |
| L17 | 409.91 | S5° 50' 37"W |
| L18 | 176.27 | S5° 50' 37"W |
| L19 | 24.60 | S83° 46' 25"E |
| L20 | 110.27 | S6° 04' 28"W |
| L22 | 542.39 | S2° 27' 07"W |

| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L23 | 295.29 | S1° 41' 23"W |
| L25 | 169.35 | S47° 37' 03"W |
| L26 | 249.50 | S47° 37' 03"W |
| L27 | 196.32 | S49° 03' 53"W |
| L28 | 166.16 | S48° 22' 44"W |
| L30 | 725.93 | N84° 15' 00"W |
| L31 | 59.34 | N5° 38' 57"E |
| L32 | 23.93 | N40° 39' 23"W |
| L33 | 262.02 | N17° 52' 55"W |
| L34 | 265.99 | N20° 52' 26"W |
| L35 | 71.18 | N24° 21' 08"W |
| L36 | 128.68 | N39° 51' 01"W |
| L37 | 364.80 | N57° 12' 14"W |
| L38 | 85.11 | N43° 47' 46"W |
| L39 | 76.98 | N52° 31' 09"W |
| L40 | 178.83 | N78° 58' 32"W |
| L41 | 55.76 | S86° 16' 14"W |

| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L42 | 301.01 | S56° 53' 55"W |
| L43 | 222.92 | S51° 26' 40"W |
| L44 | 132.82 | S44° 27' 33"W |
| L45 | 150.64 | S68° 36' 30"W |
| L46 | 145.06 | N57° 18' 02"W |
| L47 | 322.19 | N21° 35' 43"W |
| L48 | 134.89 | N16° 53' 34"W |
| L49 | 215.41 | N20° 29' 42"W |
| L50 | 168.55 | N14° 21' 46"W |
| L51 | 81.95 | N7° 58' 30"W |
| L52 | 188.71 | N13° 40' 44"W |
| L53 | 101.14 | N16° 24' 09"W |
| L54 | 150.61 | N23° 36' 56"W |
| L55 | 133.54 | N57° 04' 03"W |
| L56 | 808.40 | N6° 49' 36"E |

| Curve Table | | | | | |
|---|---|---|---|---|---|
| Curve # | Length | Radius | Delta | Chord Direction | Chord Length |
| C1 | 192.68 | 202.54 | 54.51 | S55° 05' 41"E | 185.50 |
| C2 | 66.85 | 432.00 | 8.87 | S76° 30' 31"E | 66.78 |
| C3 | 178.08 | 195.00 | 52.32 | S54° 46' 48"E | 171.95 |
| C4 | 191.97 | 325.00 | 33.84 | S11° 41' 48"E | 189.19 |
| C5 | 249.92 | 3953.11 | 3.62 | S4° 15' 48"W | 249.88 |
| C6 | 278.91 | 700.00 | 22.83 | S9° 43' 29"E | 277.06 |
| C7 | 237.97 | 2918.42 | 4.67 | S24° 23' 17"E | 237.90 |
| C8 | 1418.60 | 11309.16 | 7.19 | N10° 25' 13"E | 1417.67 |




**Property Description**

Land situated in the 9th Civil District and the 14th Civil District of Williamson County, Tennessee, being a portion of the properties conveyed to Lockwood Family LP by Dorris R. Lockwood, of record in Deed book 1777, Page 759, and Deed book 1777, Page 761, and a portion of the property conveyed to Lockwood Construction Company by Anthony B. Jemison, of record in Deed book 656, Page 650, in the Register's Office of Williamson County, Tennessee (R.O.W.C., TN), and being more particularly described as follows;

**Beginning** at a concrete Right of Way monument in the easterly margin of Interstate 65, being the northwest corner of the Crescent Lockwood, LLC property of record in Book 6362, Page 691, R.O.W.C., thence leaving said Interstate 65 margin, S 81°25'13" E, for a distance of 577.00' to an iron rod (old), thence, N 07°13'56" E, for a distance of 31.70' to an iron rod in the southwest margin of Carothers Road; thence, with a curve to the left, with an arc length of 192.68', a radius of 202.54', with a chord bearing of S 55°05'41" E, and a chord length of 185.50' to an iron rod (old), thence, S 82°20'54" E, for a distance of 582.26' to an iron rod (old); thence, leaving said margin, along the west property line of Alligood, Deed Book 1262, Page 845 (R.O.W.C., TN) S 07°57'01" W, for a distance of 1007.65' to an iron rod (old); thence, S 07°26'55" W, for a distance of 387.69' to an iron rod (old), thence, along the south property lines of above mentioned Alligood, and Davis property of record in Deed Book 435, Page 126 (R.O.W.C., TN) S 80°41'16" E, for a distance of 824.24' to an iron rod (old); thence, along east property line of said Davis property, N 08°26'26" E, for a distance of 343.04' to an iron rod (old), thence, along east property line of the Strain property of record in Record Book 5632, Page 184 (R.O.W.C., TN) N 08°01'21" E, for a distance of 462.57' to an iron rod (old) in the center of an old road bed; thence, along said center of old road, S 82°24'09" E, for a distance of 586.85' to an iron rod (old) in the southerly margin of Carothers Road, thence, along said margin for the next seven (7) calls, with a curve to the left, with an arc length of 66.85', with a radius of 432.00', with a chord bearing of S 76°30'31" E, and chord length of 66.78' to an iron rod (old), thence, S 80°56'29" E, for a distance of 304.54' to an iron rod (old), thence, with a curve to the right, with an arc length of 178.08', a radius of 195.00', with a chord bearing of S 54°46'48" E, and chord length of 171.95' to an iron rod (old), thence, S 28°37'07" E, for a distance of 33.26' to an iron rod (old), thence, with a curve to the right, with an arc length of 191.97', a radius of 325.00', with a chord bearing of S 11°41'48" E, and chord length of 189.19', thence, S 05°13'31" W, for a distance of 132.33', thence, S 05°50'37" W, passing an iron rod (old) at a distance of 409.91' for a total distance of 586.18' to an iron rod (set), thence, S 05°50'37" W, for a distance of 409.91' to an iron rod (old); thence, S 85°46'25" E, for a distance of 24.60' to a point in the centerline of said Carothers Road; thence, along said centerline for the next six (6) calls, S 06°04'28" W, for a distance of 110.27' to a point; thence, with a curve to the left, with an arc length of 249.92', a radius of 3953.11', a chord bearing of S 04°13'48" W, and chord length of 249.88' to a point; thence, S 02°27'07" W, for a distance of 542.39' to a point; thence, S 01°41'23" W, for a distance of 295.29' to a point; thence, with a curve to the left with an arc length of 278.90', with a radius of 700.00', with a chord bearing of S 09°43'29" E, and chord length of 277.10' to a point; thence, leaving said centerline, S 47°37'03" W, passing an iron rod (old) at 125.09', an iron rod (old) at additional 249.50', for a total distance of 418.85', thence, S 49°03'53" W, a distance of 196.32' to an iron rod (old), thence, S 48°22'44" W, passing an iron rod (old) at a distance of 93.57', for a total distance of 166.16' to an iron rod (old); thence, with a curve to the right, with an arc length of 237.97', a radius of 2,920.75', with a chord bearing of S 24°23'35" E, and chord length of 237.87' to an iron rod (old); thence, N 84°1.900" W, for a distance of 725.93' to a point in the center of the Harpeth River, passing a witness rod at top of bank at a distance of 665.34', thence, along said centerline of river for the next twenty-five (25) calls, N 05°58'57" E, a distance of 59.34' to a point; thence, N 40°39'23" W, for a distance of 23.93' to a point; thence, N 17°52'55" W, for a distance of 262.02' to a point, thence, N 20°52'26" W, for a distance of 265.99' to a point, thence, N 24°21'08" W, for a distance of 71.18' to a point; thence, N 39°51'01" W, for a distance of 128.68' to a point, thence, N 57°12'14" W, for a distance of 364.80' to a point; thence, N 43°47'46" W, for a distance of 85.11' to a point; thence, N 52°31'09" W, for a distance of 76.98' to a point; thence, N 78°58'32" W, for a distance of 178.83' to a point; thence, S 86°16'14" W, for a distance of 55.76' to a point; thence, S 56°53'55" W, for a distance of 301.01' to a point; thence, S 51°26'40" W, for a distance of 222.92' to a point; thence, S 44°27'33" W, for a distance of 132.82' to a point; thence, S 68°36'30" W, for a distance of 150.64' to a point, thence, N 57°18'02" W, for a distance of 145.06' to a point; thence, N 21°35'43" W, for a distance of 322.19' to a point; thence, N 16°53'34" W, for a distance of 134.89' to a point; thence, N 20°29'42" W, for a distance of 215.41' to a point; thence, N 14°21'46" W, for a distance of 168.55' to a point; thence, N 07°58'30" W, for a distance of 81.95' to a point, thence, N 13°40'44" W, for a distance of 188.71' to a point; thence, N 16°24'09" W, for a distance of 101.14' to a point; thence, N 23°36'56" W, for a distance of 150.61' to a point; thence, N 57°04'03" W, for a distance of 133.54' to a point; thence, along above mentioned east margin of Interstate 65, N 06°49'36" E, passing a witness rod (old) at a distance of 200.00', for a total distance of 808.40' to an iron rod (old); thence, with a curve to the right, with an arc length of 1418.60', a radius of 11309.16', with a chord bearing of N 10°25'13" E, and chord length of 1417.67' to the **Point of Beginning**. Containing 9,464,484.9 Sq. Ft. or 217.27 Acres. According to a survey made by Fisher Arnold, dated June, 2009.

N

TN STATE PLANE CORD., ZONE5301, FIPZONE 4100;
NAD83 DATUM
GRAPHIC SCALE (IN FEET)
200 0 100 200 400
1 inch = 200 ft.


EDGE
PLANNING • LANDSCAPE ARCHITECTURE • URBAN DESIGN
210 Twelfth Avenue South
Suite 202
Nashville, Tennessee 37203
P 615-250-8154
F 615-250-8155

ENERGY LAND & INFRASTRUCTURE
1420 DONELSON PIKE, SUITE A12 • NASHVILLE, TN 37217
OFFICE: 615.333.3233 • WWW.ELI-LLC.COM
ENGINEERS • SURVEYORS • INFRASTRUCTURE • ENVIRONMENTAL


© 2016 ENERGY LAND & INFRASTRUCTURE, LLC, ALL RIGHTS RESERVED


LOCKWOOD GLEN PUD SUBDIVISION

DEVELOPMENT PLAN
REVISION #1
CITY OF FRANKLIN PROJECT NO. 6120
FRANKLIN, TENNESSEE

| Rev. | Date | Revision Description |
|---|---|---|
| 1 | 5/4/16 | Per City of Franklin Comments |

LARRY C. WALLACE
REGISTERED ENGINEER
5478
AMERICA
STATE OF TENNESSEE

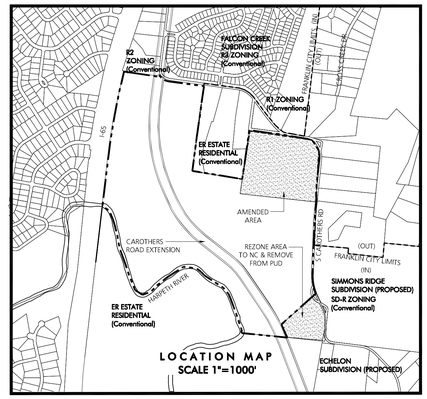
| | |
|---|---|
| Issue Date: | 11 April 2016 |
| ELI Project No: | 14-11-1102.4 |
| Drafted By: | RDP |
| Checked By: | LCW |

Sheet Title:

REVISED BOUNDARY DESCRIPTION

Sheet No.

C 0.4




## SITE DATA

| | |
|---|---|
| SUBDIVISION/DEVELOPMENT | LOCKWOOD GLEN PUD SUBDIVISION |
| EXISTING ZONING/ CHARACTER AREA OVERLAY | SD-R - McEWEN AREA 6 |
| OTHER APPLICABLE OVERLAYS | FLOODWAY FRINGE OVERLAY (FFO)<br>FLOODWAY OVERLAY DISTRICT (FWO) |
| DEVELOPMENT STANDARD | CONVENTIONAL |
| (MINERAL RIGHTS FOR THIS PROPERTY ARE HELD BY OWNER OF RECORD.) | |
| ACREAGE OF SITE (PER THIS SECTION ONLY) | +/- 32.93 ACRES |
| EXISTING TREE CANOPY (PER THIS SECTION ONLY) | +/- 9.48 ACRES (29% OF SITE) |

**PRE-DEVELOPMENT STORMWATER NARRATIVE**

SECTION 12 OF THE LOCKWOOD GLEN PUD SUBDIVISION IS APPROXIMATELY 28 ACRES. THE SITE IS IN THE NORTHEASTERN CORNER OF THE SUBDIVISION AND IS BOUNDED BY CAROTHERS ROAD TO THE NORTH AND EAST. THE PROPERTY IS MOSTLY GRASSED WITH SOME CLUSTERED TREES. THERE ARE SEVERAL EXISTING STRUCTURES WITH DRIVEWAY ON DIFFERENT PORTIONS OF THE SITE THAT WILL BE REMOVED DURING DEVELOPMENT.

THE PREDOMINANT SOILS IN THE AREA ACCORDING TO THE AVAILABLE NRSC SOIL RESOURCE REPORT FOR WILLIAMSON COUNTY, TENNESSEE ARE ROCKLAND (RC); STIVERSVILLE SILT LOAM, 5 TO 12 PERCENT SLOPES, ERODED (STC2); TALBOTT VERY ROCKY SOILS, 2 TO 15 PERCENT SLOPES (TVD); INMAN SILTY CLAY LOAM, 12 TO 20 PERCENT SLOPES, SEVERELY ERODED (IND3) AND STIVERSVILLE CLAY LOAM, 12 TO 20 PERCENT SLOPES, SEVERELY ERODED (SRD3).

THE SITE HAS BEEN DIVIDED INTO THREE (3) DRAINAGE BASINS. BASIN 1 DRAINS SOUTHWARDLY TO AN EXISTING 24" PIPE CONSTRUCTED AS PART OF SECTION 3 OF LOCKWOOD GLEN, BASIN 2 DRAINS TOWARD THE EAST TO AN EXISTING ELLIPTICAL CMP UNDER CAROTHERS ROAD. BASIN 3 DRAINS TO THE ROADSIDE DITCH ALONG THE SOUTH SIDE OF CAROTHERS ROAD. RUNOFF FROM EACH OF THESE BASINS IS CONVEYED PRIMARILY VIA SHEET FLOW AND SHALLOW CONCENTRATED FLOW. THERE IS AN EXISTING FARM IN BASIN 1 THAT WILL BE MODIFIED AND CONVERTED INTO A DETENTION POND DURING CONSTRUCTION. THERE ARE NO EXISTING WATER QUALITY BMP'S TO TREAT RUNOFF FROM THE EXISTING SITE. GRADING & DRAINAGE DATA CHARTS HAVE BEEN PREPARED AND ARE SHOWN FOR EACH BASIN.

**SPECIMEN TREES**

| | | | |
|---|---|---|---|
| 1 | 24" | OAK | Poor |
| 2 | 24" | OAK | Fair |
| 3 | 24" | OAK | Fair |
| 4 | 24" | OAK | Fair |
| 5 | 24" | ASH | Fair |
| 6 | 26" | CEDAR | Good |
| 7 | 36" | BO DOCK | Poor |
| 8 | 30" | HACKBERRY | Good |
| 9 | 24" | HACKBERRY | Poor |
| 10 | 24" | HACKBERRY | Good |
| 11 | 24" | OAK | Poor |
| 12 | 30" | LOCUST | Good |
| 13 | 27" | HACKBERRY | Poor |
| 14 | 27" | HACKBERRY | Good |
| 15 | 28" | CEDAR | Fair |
| 16 | 27" | HACKBERRY | Good |
| 10581 | 53" | HACKBERRY | Poor |
| 10586 | 43" | OAK | Good |
| 10727 | 32" | SNAG | Poor |
| 12109 | 36" | MAPLE | Fair |
| 12115 | 26" | ELM | Fair |
| 12118 | 40" | OAK | Poor |
| 12238 | 26" | SYCAMORE | Fair |
| 12260 | 25" | HACKBERRY | Fair |
| 12310 | 29" | HACKBERRY | Poor |
| 12311 | 25" | HACKBERRY | Fair |
| 12319 | 28" | CEDAR | Good |
| 12321 | 26" | HACKBERRY | Good |
| 12339 | 29" | HACKBERRY | Fair |
| 12344 | 36" | HACKBERRY | Poor |
| 12345 | 29" | HACKBERRY | Good |
| 12364 | 36" | SASSAFRAS | Poor |
| 12388 | 36" | HACKBERRY | Fair |
| 12410 | 30" | WILLOW | Good |
| 12431 | 48" | BO DOCK | Fair |
| 12432 | 31" | HACKBERRY | Fair |
| 12433 | 27" | BO DOCK | Good |
| 12501 | 29" | SYCAMORE | Poor |
| 12526 | 34" | HACKBERRY | Good |
| 12528 | 30" | HACKBERRY | Fair |
| 12598 | 24" | SASSAFRAS | Fair |
| 12632 | 24" | HACKBERRY | Fair |
| 12633 | 28" | HACKBERRY | Fair |
| 12713 | 29" | OAK | Good |

**SOILS LEGEND**

| | |
|---|---|
| ArB2 | Armour Silt Loam, 2 To 5 Percent Slopes, Eroded |
| AtC2 | Armour Silty Clay Loam, 5 to 12 Percent Slopes, Eroded |
| AtC3 | Armour Silty Clay Loam, 5 to 12 Percent Slopes, Severely Eroded |
| CaA | Captina Silt Loam, Phosphatic, 0 to 2 Percent Slopes |
| CaB2 | Captina Silt Loam, Phosphatic, 2 to 5 Percent Slopes, Eroded |
| HeB2 | Hampshire-Colbert Silt Loams, 2 to 5 Percent Slopes, Eroded |
| HeC2 | Hampshire-Colbert Silt Loams, 5 to 12 Percent Slopes, Eroded |
| HeD2 | Hampshire-Colbert Silt Loams, 12 to 20 Percent Slopes, Eroded |
| HhC3 | Hampshire-Colbert Silty Clay Loams, 5 to 12 Percent Slopes, Severely Eroded |
| HoC3 | Hicks Silty Clay Loams, 5 to 12 Percent Slopes, Severely Eroded |
| Hu | Huntington Silt Loam, Phosphatic |
| InD3 | Inman Silty Clay Loam, 12 to 20 Percent Slopes, Severely Eroded |
| Lp | Lindside Silt Loam, Phosphatic |
| Rc | Rockland |
| Se | Sequatchie Loam, Phosphatic |
| StB2 | Stiversville Silt Loam, 2 to 5 Percent Slopes, Eroded |
| StC2 | Stiversville Silt Loam, 5 to 12 Percent Slopes, Eroded |
| StD2 | Stiversville Silt Loam, 12 to 20 Percent Slopes, Eroded |
| StD3 | Stiversville Silt Loam, 12 to 20 Percent Slopes, Severely Eroded |
| TvD | Talbott Very Rocky Soils, 2 to 15 Percent Slopes |

NOTES:
1. DEVELOPER TO RETAIN ALL MINERAL RIGHTS.
2. STRUCTURES CURRENTLY EXIST ON SITE - SEE PLAN
3. THERE ARE NO HISTORIC STRUCTURES WITHIN 500' OF THE SITE

LEGEND
- EXISTING TREE CANOPY
- PRE-DEVELOPMENT BASINS

EXISTING SLOPES
- 14% - 19%
- 20% AND GREATER


ENGINEERING PROVIDED BY:
MICHAEL RAY
ENERGY LAND & INFRASTRUCTURE, LLC
1420 DONELSON PIKE, STE A-12
NASHVILLE, TN. 37217
(615) 360-8440
michael.ray@eli-llc.com

APPLICANT:
JOHN HAAS
EDGE
210 12TH AVE. SOUTH
SUITE 202
NASHVILLE TN, 37203
(615) 250-8154
jhaas@edgela.com

DEVELOPER:
KHRIS PASCARELLA
CRESCENT LOCKWOOD, LLC
205 POWELL AVENUE
BRENTWOOD, TN 37027
(615) 312-8242
kpascarella@pearlstreetpartners.com


0' 30' 60' 120' NORTH


EDGE
PLANNING LANDSCAPE ARCHITECTURE URBAN DESIGN
210 Twelfth Avenue South
Suite 202
Nashville, Tennessee 37203
P 615-250-8154 F 615-250-8155

ENERGY LAND & INFRASTRUCTURE
1420 DONELSON PIKE, SUITE A12 • NASHVILLE, TN 37217
OFFICE 615-383-6300 • WWW.ELI-LLC.COM
ENGINEERING • SURVEYING • INFRASTRUCTURE • ENVIRONMENTAL


CONSULTANTS

SEAL

JOHN DAVID HAAS, JR.
REGISTERED
LANDSCAPE ARCHITECT
STATE OF TENNESSEE
TENNESSEE NO. 574
LANDSCAPE ARCHITECT
05/05/16

PROJECT TITLE

LOCKWOOD GLEN PUD SUBDIVISION
DEVELOPMENT PLAN REVISION #1
C.O.F. #6120
FRANKLIN, TN

CLIENT

CRESCENT LOCKWOOD LLC.
FRANKLIN, TN.

| | |
|---|---|
| PROJECT NO. | 6120 |
| Date | 04/11/16 |
| Revisions | |
| 05/05/16 | COF COMMENTS |

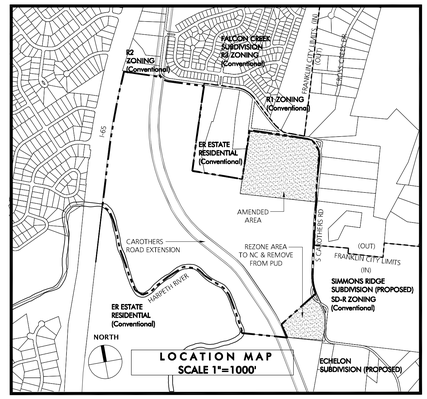
Sheet Title

EXISTING CONDITIONS PLAN

Sheet Number

C 1.0

| Lot # | Sq. Ft. | Acres |
|---|---|---|
| 1 | 9326.35 | 0.21 |
| 2 | 9304.81 | 0.21 |
| 3 | 9313.83 | 0.21 |
| 4 | 9322.85 | 0.21 |
| 5 | 9331.87 | 0.21 |
| 6 | 9340.89 | 0.21 |
| 7 | 10118.94 | 0.23 |
| 8 | 9124.33 | 0.21 |
| 9 | 9045.00 | 0.21 |
| 10 | 9045.00 | 0.21 |
| 11 | 9045.00 | 0.21 |
| 12 | 9045.00 | 0.21 |
| 13 | 9045.00 | 0.21 |
| 14 | 9061.19 | 0.21 |
| 15 | 7006.03 | 0.16 |
| 16 | 6500.00 | 0.15 |
| 17 | 6500.00 | 0.15 |
| 18 | 6500.00 | 0.15 |
| 19 | 6984.08 | 0.16 |
| 20 | 7864.03 | 0.18 |
| 21 | 7864.03 | 0.18 |
| 22 | 6838.17 | 0.16 |
| 23 | 13390.81 | 0.31 |
| 24 | 15775.25 | 0.36 |
| 25 | 15625.90 | 0.36 |
| 26 | 7172.24 | 0.16 |
| 27 | 6500.00 | 0.15 |
| 28 | 6500.00 | 0.15 |
| 29 | 7405.32 | 0.17 |
| 30 | 9269.13 | 0.21 |
| 31 | 7834.27 | 0.18 |
| 32 | 9222.76 | 0.21 |
| 33 | 9351.33 | 0.21 |
| 34 | 11874.61 | 0.27 |
| 35 | 9287.89 | 0.21 |
| 36 | 8465.74 | 0.19 |
| 37 | 16946.98 | 0.39 |
| 38 | 12683.90 | 0.29 |
| 39 | 12186.46 | 0.28 |
| 40 | 17831.47 | 0.41 |
| 41 | 9032.68 | 0.21 |
| 42 | 6500.01 | 0.15 |
| 43 | 7112.24 | 0.16 |
| 44 | 10043.59 | 0.23 |
| 45 | 9380.02 | 0.22 |
| 46 | 9380.02 | 0.22 |
| 47 | 9380.02 | 0.22 |
| 48 | 11000.61 | 0.25 |
| 49 | 20344.80 | 0.47 |
| 50 | 16200.41 | 0.37 |
| 51 | 16200.70 | 0.37 |
| 52 | 18539.90 | 0.43 |
| 53 | 21676.84 | 0.50 |
| 54 | 40282.15 | 0.92 |
| 55 | 23433.76 | 0.54 |
| 56 | 10351.30 | 0.24 |
| 57 | 9414.12 | 0.22 |
| 58 | 9384.13 | 0.22 |
| 59 | 9375.90 | 0.22 |
| 60 | 9349.71 | 0.21 |
| 61 | 9385.57 | 0.22 |
| 62 | 10008.99 | 0.23 |
| 63 | 9393.01 | 0.22 |
| 64 | 9380.00 | 0.22 |
| 65 | 9380.00 | 0.22 |
| 66 | 9380.00 | 0.22 |
| 67 | 9380.00 | 0.22 |
| 68 | 13188.46 | 0.30 |
| 69 | 11273.19 | 0.26 |
| 70 | 10486.01 | 0.24 |
| 71 | 13124.37 | 0.30 |
| 72 | 10745.25 | 0.25 |
| 73 | 9380.54 | 0.22 |
| 74 | 14322.65 | 0.33 |
| 75 | 12303.29 | 0.28 |
| 76 | 10863.66 | 0.25 |
| 77 | 9380.00 | 0.22 |
| 78 | 9392.43 | 0.22 |
| 79 | 14661.55 | 0.34 |




## SITE DATA

| | |
|---|---|
| SUBDIVISION/DEVELOPMENT | LOCKWOOD GLEN PUD SUBDIVISION - REVISION #1 |
| EXISTING ZONING/ CHARACTER AREA OVERLAY | SD-R - McEWEN AREA 6 |
| OTHER APPLICABLE OVERLAYS | FLOODWAY FRINGE OVERLAY (FFO)<br>FLOODWAY OVERLAY DISTRICT (FWO) |
| DEVELOPMENT STANDARD | CONVENTIONAL |

(MINERAL RIGHTS FOR THIS PROPERTY ARE HELD BY OWNER OF RECORD.)

| | |
|---|---|
| ACREAGE OF SITE (PER THIS SECTION ONLY) | +/- 32.93 ACRES |
| *EXISTING TREE CANOPY (PER THIS SECTION ONLY) | +/- 9.48 ACRES (29% OF SITE) |

*NOTE: THIS SECTION IS NOT SUBJECT TO TREE CANOPY REQUIREMENTS

| | |
|---|---|
| TOTAL UNITS SHOWN (THIS SECTION ONLY) | 79 |

TYPICAL ARCHITECTURAL STANDARDS:

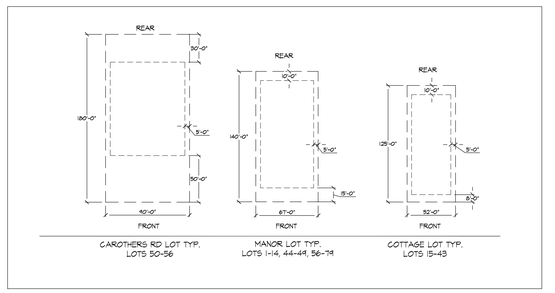
PROPOSED HEIGHT OF BUILDINGS: 1-3 STORIES
PROPOSED SQUARE FOOTAGE OF BUILDINGS: +/- 1,100 - +/- 4,500 SF.
(SEE SHEET A-1.00 FOR ARCHITECTURAL ELEVATIONS)

GENERAL LIGHTING STANDARDS

THIS SECTION WILL IMPLEMENT THE APPROVED LIGHTING FIXTURES AS CURRENTLY FOUND THROUGHOUT THE DEVELOPMENT.

SPECIMEN TREES

SEE EXISTING CONDITIONS PLAN (C-1.0) FOR SPECIMEN TREE CHART




NOTES:
1. DEVELOPER TO RETAIN ALL MINERAL RIGHTS.
2. STRUCTURES CURRENTLY EXIST ON SITE - SEE PLAN
3. THERE ARE NO HISTORIC STRUCTURES WITHIN 500' OF THE SITE

0' 30' 60' 120' NORTH

ENGINEERING PROVIDED BY:
MICHAEL RAY
ENERGY LAND & INFRASTRUCTURE, LLC
1420 DONELSON PIKE, STE A-12
NASHVILLE, TN. 37217
(615) 360-8440
michael.ray@eli-llc.com

DEVELOPER:
KHRIS PASCARELLA
CRESCENT LOCKWOOD, LLC
205 POWELL AVENUE
BRENTWOOD, TN 37027
(615) 312-8242
kpascarella@pearlstreetpartners.com

APPLICANT:
JOHN HAAS
EDGE
210 12TH AVE. SOUTH
SUITE 202
NASHVILLE TN, 37203
(615) 250-8154
jhaas@edgela.com

EDGE
PLANNING LANDSCAPE ARCHITECTURE URBAN DESIGN
210 Twelfth Avenue South
Suite 202
Nashville, Tennessee 37203
P 615-250-8154 F 615-250-8155

ENERGY LAND & INFRASTRUCTURE
1420 DONELSON PIKE, SUITE A12 • NASHVILLE, TN 37217
OFFICE 615-383-6300 • WWW.ELI-LLC.COM
ENGINEERING • SURVEYING • INFRASTRUCTURE • ENVIRONMENTAL
© 2016 ENERGY LAND & INFRASTRUCTURE, LLC. ALL RIGHTS RESERVED

CONSULTANTS

SEAL
JOHN DAVID HAAS, JR.
REGISTERED
LANDSCAPE ARCHITECT
TENNESSEE NO. 674
LANDSCAPE ARCHITECT
05/05/16

PROJECT TITLE
LOCKWOOD GLEN PUD SUBDIVISION
DEVELOPMENT PLAN REVISION #1
C.O.F. #6120
FRANKLIN, TN

CLIENT
CRESCENT LOCKWOOD LLC.
FRANKLIN, TN.

PROJECT NO. 6120
Date 04/11/16
Revisions
05/05/16 COF COMMENTS

Sheet Title
DEVELOPMENT PLAN

Sheet Number
C 2.0

## Grading & Drainage General Notes

1. Grading Permit is required for any project disturbing more than 10,000 sf, adding more than 5,000 sf of impervious surface or for any site grading requiring stockpiling of material.
2. The Developer shall provide the necessary labor and supervision required to support field testing by the independent testing firm and inspections by City officials at no cost to the City. Test reports of field testing if applicable shall be submitted directly to the Street Department. Defects disclosed by tests shall be rectified.
3. An authorized representative of the City shall make a final inspection of the project after completion to determine acceptability of the work and for release of performance bonds if required. Before this final inspection can be made, the Engineer responsible for the project shall certify in writing to the City Engineer that the work has been completed in accordance with approved plans and specifications.
4. Drainage facilities including, but not limited to, culverts, detention basins and ditches, as well as the roadway sub-grade, base stone and binder & surface coarse shall be inspected, tested and given approval at each stage of installation prior to proceeding to the next stage of construction. Final construction inspection for approval and acceptance of streets and drainage systems will not be granted until all work has been completed in accordance with the approved plans.
5. Locating and coordination for the relocation of existing utilities is the responsibility of the contractor. Tennessee's One-Call and the City of Franklin utility location service shall be utilized in addition to coordination with local utility owners. The contractor shall at all times protect existing utilities and will be responsible for costs due to damage caused to any utility lines.

**POST-DEV STORMWATER NARRATIVE**

Section 12 of the Lockwood Glen PUD Subdivision is approximately 28 acres. The site has been divided into three (3) drainage basins. Basin 1 drains southwardly to an existing 24" pipe constructed as part of Section 3 of Lockwood Glen. Runoff from this basin will be collected in grass swales and a subsurface drainage network and conveyed to a level 1 bio-retention basin for water quality and then a dry detention pond to ensure that the post development runoff leaving the site does not exceed the pre development runoff. Basin 2 drains toward the east to an existing elliptical CMP under Carothers Road. Runoff from this basin will be collected in grass swales and a subsurface drainage network and conveyed to a level 1 infiltration trench for water quality treatment. Basin 3 drains to the roadside ditch along the south side of Carothers Road. Runoff from this basin will be collected in grass swales and a subsurface drainage network and conveyed to a level 1 bio-retetnion basin for water quality and then a dry detention basin to ensure tat the pose development runoff leaving the site does not exceed the pre development runoff. Grading & Drainage Data Charts have been prepared and are shown for each basin.

**POST-DEV STORMWATER IMPACTS**

The post development runoff rate leaving this site will not exceed the pre-development runoff rate.

**Hydrologic Determination / Delineation**

Hydrologic determinations and delineations will be completed prior to site plan submittal. The layout will be revised and appropriate buffers will be added as necessary.

N

TN STATE PLANE CORD., ZONE5301, FIPZONE 4100;
NAD83 DATUM
GRAPHIC SCALE (IN FEET)
100 0 50 100 200
1 inch = 100 ft.


EDGE
PLANNING | LANDSCAPE ARCHITECTURE | URBAN DESIGN
210 Twelfth Avenue South
Suite 202
Nashville, Tennessee 37203
P 615-250-8154
F 615-250-8155

ENERGY LAND & INFRASTRUCTURE
1420 DONELSON PIKE, SUITE A12 • NASHVILLE, TN 37217
OFFICE: 615-383-6700 • WWW.ELI-LLC.COM
ENGINEERS • SURVEYORS • INFRASTRUCTURE • ENVIRONMENTAL

© 2024 ENERGY LAND & INFRASTRUCTURE, LLC. ALL RIGHTS RESERVED

# LOCKWOOD GLEN PUD SUBDIVISION
## DEVELOPMENT PLAN
## REVISION #1
CITY OF FRANKLIN PROJECT NO. 6120
FRANKLIN, TENNESSEE

| Rev. | Date | Revision Description |
|---|---|---|
| 1 | 5/4/16 | Per City of Franklin Comments |

LARRY C. WALLACE
REGISTERED ENGINEER
5-4-16
STATE OF TENNESSEE

| | |
|---|---|
| Issue Date: | 11 April 2016 |
| ELI Project No: | 14-11-1102.4 |
| Drafted By: | RDP |
| Checked By: | LCW |

Sheet Title:
OVERALL GRADING & DRAINAGE PLAN

Sheet No.
C 3.0

**Grading & Drainage General Notes**

1. Grading Permit is required for any project disturbing more than 10,000 sf, adding more than 5,000 sf of impervious surface or for any site grading requiring stockpiling of material.
2. The Developer shall provide the necessary labor and supervision required to support field testing by the independent testing firm and inspections by City officials at no cost to the City. Test reports of field testing if applicable shall be submitted directly to the Street Department. Defects disclosed by tests shall be rectified.
3. An authorized representative of the City shall make a final inspection of the project after completion to determine acceptability of the work and for release of performance bonds if required. Before this final inspection can be made, the Engineer responsible for the project shall certify in writing to the City Engineer that the work has been completed in accordance with approved plans and specifications.
4. Drainage facilities including, but not limited to, culverts, detention basins and ditches, as well as the roadway sub-grade, base stone and binder & surface coarse shall be inspected, tested and given approval at each stage of installation prior to proceeding to the next stage of construction. Final construction inspection for approval and acceptance of streets and drainage systems will not be granted until all work has been completed in accordance with the approved plans.
5. Locating and coordination for the relocation of existing utilities is the responsibility of the contractor. Tennessee's One-Call and the City of Franklin utility location service shall be utilized in addition to coordination with local utility owners. The contractor shall at all times protect existing utilities and will be responsible for costs due to damage caused to any utility lines.

**Lockwood Glen Section 12 R.O.W. & Access Data Chart**

Daily Trip Generation: N/A
Peak Hour Trip Generation: N/A
Traffic Impact Study Required: no
Circulation Plan Required: no

**Design Parameters**

Franklin Transportation Street Technical Standards Edition: 2014
Design Vehicle: Passenger Cars, Single-Unit Trucks (SU-30) and Conventional School Busses using one lane ; Combination trucks (WB-50) using full with
Design Speed / Posted Speed: 20 mph
Stopping Sight Distance: 115 ft
Intersection/Driveway Sight Distance: 125

**Horizontal Alignment**

Min. Centerline Radius: 70 ft
Min. Tangent Between Curves/Intersections: 0
Min. Centerline Arc Length:

**Vertical Alignment**

Min. / Max. Centerline Grade: 1% Min. / 10% Max.
Max. Approach Centerline Grade: 5% Max.
Crest / Sag Curve K-Value: 7 / 17

**Access Management**

Min. Distance Between Intersection: 200'
Min. Distance Between high volume/alleys & Intersections: 150 ft
Min. Distance Between driveway & Intersections: 50 ft
Driveway Width (two-way): 10-20
Driveway Approach Street Configuration: Radius Return

**Roadway Network Narrative**

Residents will enter and leave the site via the existing road network in Lockwood Glen to on of the two connections to Carothers Road or one of the two connections to Carothers Parkway.

**Roadway Impact Statement**

The traffic generated by this section would be consistent with the typical traffic generated by 79* single family detached residential homes.

**Refuse Collection & Service Areas**

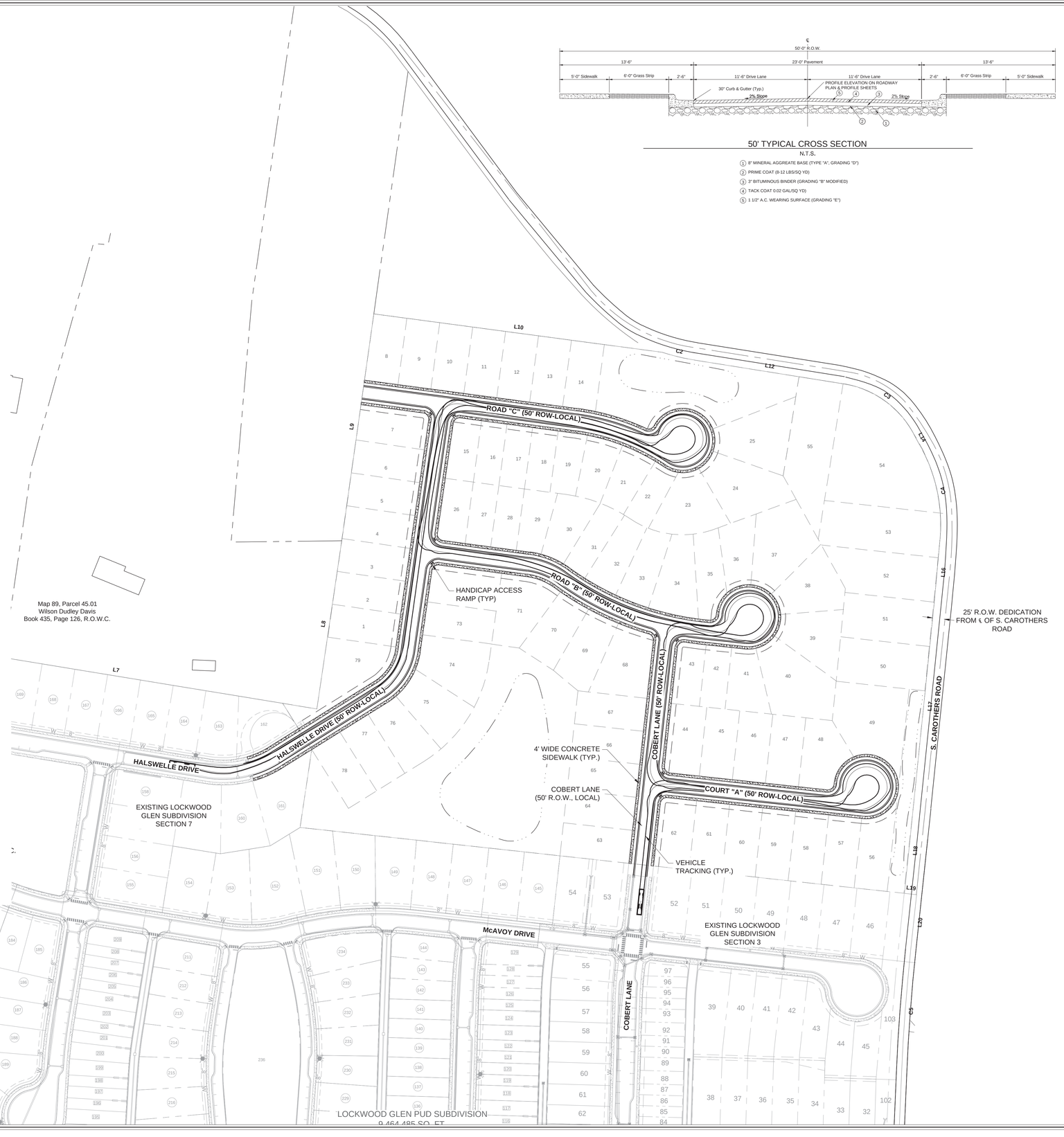
Rollaway bins will be utilized for refuse collection




50' TYPICAL CROSS SECTION

N.T.S.

1. 8" MINERAL AGGREATE BASE (TYPE "A", GRADING "D")
2. PRIME COAT (8-12 LBS/SQ YD)
3. 3" BITUMINOUS BINDER (GRADING "B" MODIFIED)
4. TACK COAT 0.02 GAL/SQ YD)
5. 1 1/2" A.C. WEARING SURFACE (GRADING "E")




N

TN STATE PLANE CORD., ZONE5301, FIPZONE 4100;
NAD83 DATUM
GRAPHIC SCALE (IN FEET)
100 0 50 100 200
1 inch = 100 ft.

EDGE
PLANNING | LANDSCAPE ARCHITECTURE | URBAN DESIGN
210 Twelfth Avenue South
Suite 202
Nashville, Tennessee 37203
P 615-250-8154
F 615-250-8155

ENERGY LAND & INFRASTRUCTURE
1420 DONELSON PIKE, SUITE A12 • NASHVILLE, TN 37217
OFFICE 615-383-6700 • WWW.ELI-LLC.COM
ENGINEERS • SURVEYORS • INFRASTRUCTURE • ENVIRONMENTAL

© 2016 ENERGY LAND & INFRASTRUCTURE, LLC. ALL RIGHTS RESERVED

# LOCKWOOD GLEN PUD SUBDIVISION
## DEVELOPMENT PLAN
## REVISION #1
CITY OF FRANKLIN PROJECT NO. 6120
FRANKLIN, TENNESSEE

| Rev. | Date | Revision Description |
|---|---|---|
| 1 | 5/4/16 | Per City of Franklin Comments |

LARRY C. WALLACE
REGISTERED ENGINEER
5-4-16
STATE OF TENNESSEE

| | |
|---|---|
| Issue Date: | 11 April 2016 |
| ELI Project No: | 14-11-1102.4 |
| Drafted By: | RDP |
| Checked By: | LCW |

Sheet Title:
OVERALL ROW & ACCESS PLAN

Sheet No.
C 4.0

**Water & Sewer General Notes**

1. All persons who undertake the construction of water, sewer and/or reclaimed water lines located in, or affecting services provided by the City of Franklin shall comply with the requirements and regulations set forth in the "General Requirements & Technical Specifications, Water Management Department, City of Franklin, Tennessee" latest edition, along with any amendments, additions, or alteration that may thereafter be adopted by the board of mayor and aldermen by resolution.
2. Contractor shall obtain Water & Sewer Infrastructure Installation Permit prior to scheduling required Pre-Construction Site Meeting. Contractor shall complete the Pre- Construction Site Meeting prior to commencing with construction.
3. Contractor shall obtain and keep all of the following items on the jobsite at all times during construction:
   a. Approved, Stamped and Signed Water and/or Sewer Plans
   b. Water & Sewer Infrastructure Installation Permit, with all steps completed and signed by appropriate City employees.
   c. Copy of approved availability request response letter.
   d. A copy of all approved Cut Sheets.
4. Acceptance of City of Franklin public water infrastructure, sanitary sewer infrastructure and/or reclaimed water infrastructure shall become the responsibility of the City of Franklin, TN following approval from the City of Franklin Inspectors and acceptance by the Franklin Municipal Planning Commission. The Acceptance date shall be based on the day maintenance sureties are established by the Franklin Municipal Planning Commission.
5. Prior to the acceptance of City of Franklin public water infrastructure, sanitary sewer infrastructure and/or reclaimed water infrastructure the contractor shall be required to submit as-built drawings to the Planning and Sustainability Department.
6. All off-site work within the public right-of-way shall require an approved traffic control plan which complies with the MUTCD. No off-site excavation may be undertaken in any street, road, alley or right-of-way of any utility or temporary construction easement of the City of Franklin by any entity unless 72-hour notice has been given to the City of Franklin Traffic Operations Center. The contractor shall have an approved traffic control plan onsite during construction.
7. Any damages caused to existing utilities during construction shall, at his own expense, be replaced or repaired to original condition and quality, as approved by the owner and representative of the appropriate utility company, by the Contractor.

**Water & Sewer Data Chart**

Development Type: Single Family Residenctial
Unit Flow in GPD: 350 GPD
Number of Units: 79 (Single Family Residences)
Flow in GPD: 27,650 GPD

**Utility Network Narrative**

Existing utilities in the previous sections of Lockwood Glen will be extended to serve Section 12.

**Utility Impact Statement**

The anticipated demand for water and sewer is 27,650 GPD based on a 350 GPD unit flow and 79 single family homes. There are no relcaimed water lines in the vicinity.

**Utility Providers**

**Electric**
MTEMC
Gary Osburn
(615) 595-4677

**Natural Gas**
Atmos
(615) 771-8300

**Sewer**
City of Franklin Water & Sewer

**Water**
Milcrofton Utility District
Mike Jones
(615) 794-5947 ext 24

N

TN STATE PLANE CORD., ZONE5301, FIPZONE 4100; NAD83 DATUM
GRAPHIC SCALE (IN FEET)
100 0 50 100 200
1 inch = 100 ft.


EDGE
PLANNING LANDSCAPE ARCHITECTURE URBAN DESIGN
210 Twelfth Avenue South
Suite 202
Nashville, Tennessee 37203
P 615-250-8154
F 615-250-8155

ENERGY LAND & INFRASTRUCTURE
1420 DONELSON PIKE, SUITE A12 • NASHVILLE, TN 37217
OFFICE 615-383-6300 • WWW.ELI-LLC.COM
ENGINEERS • SURVEYORS • INFRASTRUCTURE • ENVIRONMENTAL


© 2004 ENERGY LAND & INFRASTRUCTURE, LLC. ALL RIGHTS RESERVED

# LOCKWOOD GLEN PUD SUBDIVISION

## DEVELOPMENT PLAN REVISION #1

CITY OF FRANKLIN PROJECT NO. 6120
FRANKLIN, TENNESSEE

| Rev. | Date | Revision Description |
|---|---|---|
| 1 | 5/4/16 | Per City of Franklin Comments |

LARRY C. WALLACE
REGISTERED ENGINEER
COMMERCE
No. 108137
STATE OF TENNESSEE
5-4-16

| | |
|---|---|
| Issue Date: | 11 April 2016 |
| ELI Project No: | 14-11-1102.4 |
| Drafted By: | RDP |
| Checked By: | LCW |

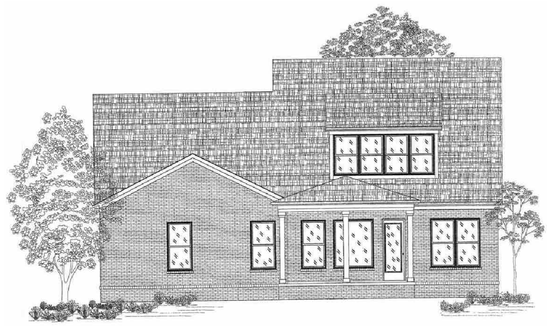
Sheet Title:

OVERALL UTILITY PLAN

Sheet No.

C 5.0

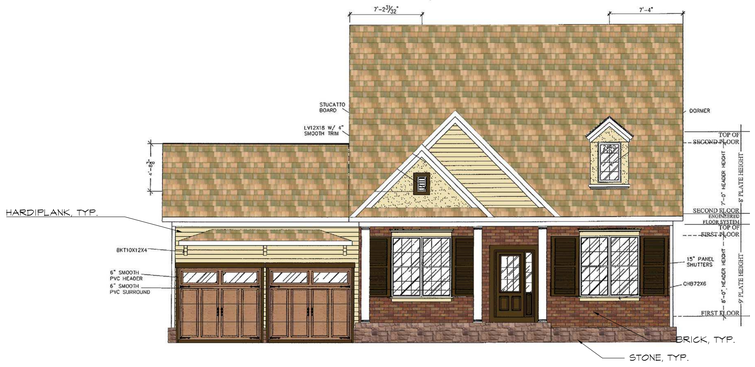
RIGHT SIDE ELEVATION, TYP.
(WITH SIDE FACING R.O.W.)



LEFT SIDE ELEVATION, TYP.

## 1 TYPICAL MANOR HOME ELEVATION

NTS




## 2 TYPICAL COTTAGE HOME ELEVATION

NTS

TYPICAL COTTAGE HOME STREET FACING ELEVATION

**ARCHITECTURAL INTENT:**
THE HOMES IN LOCKWOOD GLEN WILL BE OF AN EARLY 20TH CENTURY SOUTHERN VERNACULAR.

TYPICAL ARCHITECTURE NOTES:

1.THESE ELEVATIONS HAVE BEEN DESIGNED TO MEET THE REQUIREMENTS OF THE CITY OF FRANKLIN'S ARCHITECTURAL DESIGN STANDARDS AND THE APPROVAL OF THE PLANNING COMMISSION / CITY OF FRANKLIN. CHANGES SHALL NOT BE MADE TO THE APPROVED ELEVATIONS UNLESS APPROVED BY EITHER THE BUILDING AND NEIGHBORHOOD SERVICES DIRECTOR OR THE PLANNING COMMISSION.

2. THESE ELEVATIONS ARE A SAMPLING OF THE PROPOSED HOME ELEVATIONS. THE APPLICANT ANTICIPATES MULTIPLE VARIATIONS OF MATERIALS OF EACH ELEVATION PROVIDED. MATERIALS AND COLORS ARE SUBJECT TO FINAL APPROVAL BY THE CITY OF FRANKLIN.

3. FINISHED FLOOR ELEVATION (FFE) SHALL BE A MINIMUM 18" ABOVE FINISH GRADE PER CITY OF FRANKLIN REQUIREMENTS.

4. PER THE CITY OF FRANKLIN ARCHITECTURAL DESIGN STANDARDS, PRIMARY FACADE MATERIALS SHALL NOT CHANGE AT OUTSIDE CORNERS AND SHALL CONTINUE ALONG ANY SIDE FACADE VISIBLE FROM A STREET RIGHT-OF-WAY, HOWEVER, MATERIALS MAY CHANGE WHERE SIDE OR REAR WINGS MEET THE MAIN BODY OF THE DWELLING.

5. FRONT LOAD GARAGE DOORS SHALL ADHERE TO STANDARDS SET FORTH IN SECTION 5.3.5(2) OF THE FRANKLIN ZONING ORDINANCE.

6. GARAGES ON CORNER LOTS WITH SIDES VISIBLE FROM A STREET RIGHT-OF-WAY SHALL INCLUDE ARCHITECTURAL DETAILS AND WINDOWS THAT MIMIC THE FEATURES OF THE LIVING PORTION OF THE BUILDING THEY SERVE.

7. ALL ARCHITECTURAL STYLES CAN BE BUILT AS FRONT LOAD, SIDE LOAD OR REAR LOAD BUILDING ELEVATIONS.

8. WHERE CORNER LOTS EXIST, NO STREET FACING FACADE SHALL HAVE A BLANK WALL.

9. FRONT LOADED GARAGES SHALL BE SET BACK A MINIMUM OF 10' FROM THE FRONT FACADE OF THE HOME.

10. ALL EXPOSED FOUNDATION WALLS SHALL BE CLAD IN MASONRY MATERIAL.

TYPICAL ARCHITECTURAL STANDARDS:

PROPOSED HEIGHT OF BUILDINGS: 1-3 STORIES

PROPOSED SQUARE FOOTAGE OF BUILDINGS: +/- 1,100 - +/- 4,500 SF.

EXTERIOR MATERIALS:
1. BRICK VENEER
2. STONE VENEER
3. SIDING VENEER
4. HARDIPLANK

**NOTE:

I John D. Haas Jr., licensed Tennessee Landscape Architect #574 certify that the architectural elevations as depicted on sheet A 1.00 in the Lockwood Glen PUD subdivisions accurately reflect design intent. I am qualified to commit that the elevations have been designed to meet the requirements of the City of Franklin architectural design standards. The elevations depicted were not developed by me or anyone members of our firm and were provided by the builders who will be providing construction documents as required at the building permit stage.

EDGE
PLANNING | LANDSCAPE ARCHITECTURE | URBAN DESIGN
210 Twelfth Avenue South
Suite 202
Nashville, Tennessee 37203
P 615-250-8154 F 615-250-8155

ENERGY LAND & INFRASTRUCTURE
1420 DONELSON PIKE, SUITE A8 • NASHVILLE, TN 37217
OFFICE 615-383-6300 • WWW.ELI-LLC.COM
ENGINEERS • SURVEYORS • INFRASTRUCTURE • ENVIRONMENTAL
© 2016 ENERGY LAND & INFRASTRUCTURE, LLC. ALL RIGHTS RESERVED

CONSULTANTS

SEAL

JOHN DAVID HAAS JR.
REGISTERED
LANDSCAPE ARCHITECT
STATE OF TENNESSEE
TENNESSEE NO. 574
LANDSCAPE ARCHITECT
05/05/16

PROJECT TITLE

LOCKWOOD GLEN PUD SUBDIVISION
DEVELOPMENT PLAN REVISION #1
C.O.F. #6120
FRANKLIN, TN

CLIENT

CRESCENT
LOCKWOOD LLC.
FRANKLIN, TN.

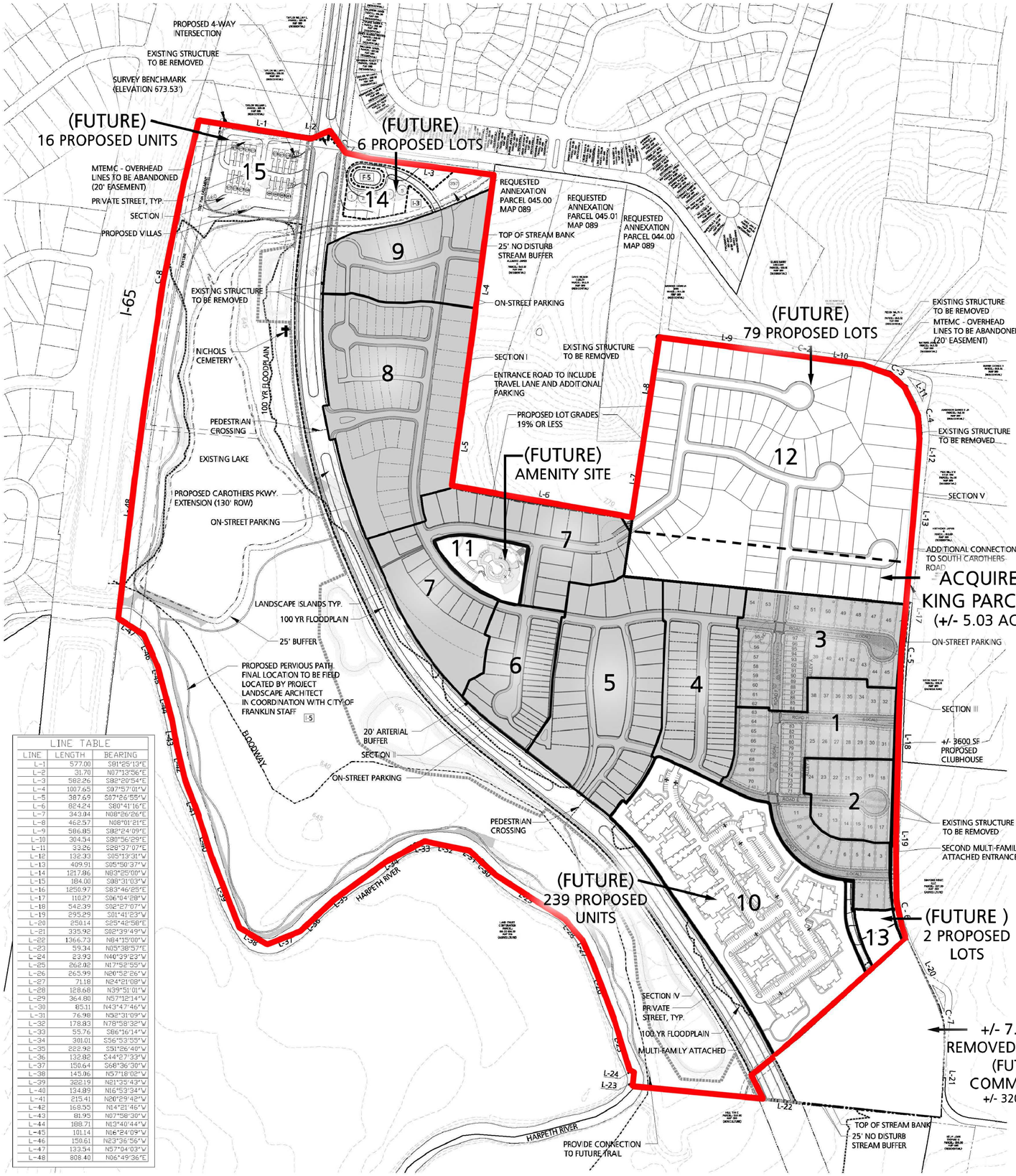
PROJECT NO. 6120
Date 04/11/16
Revisions
05/05/16 COF COMMENTS

Sheet Title

ARCHITECTURAL ELEVATIONS

Sheet Number

A 1.00




| LINE TABLE | | |
|---|---|---|
| LINE | LENGTH | BEARING |
| L-1 | 577.00 | S81°25'13"E |
| L-2 | 31.70 | N07°13'56"E |
| L-3 | 582.26 | S82°20'54"E |
| L-4 | 1007.65 | S07°57'01"W |
| L-5 | 387.69 | S67°26'55"W |
| L-6 | 824.24 | S80°41'16"E |
| L-7 | 343.04 | N08°26'26"E |
| L-8 | 462.57 | N08°01'21"E |
| L-9 | 586.85 | S82°24'09"E |
| L-10 | 304.54 | S80°56'29"E |
| L-11 | 33.26 | S29°37'07"E |
| L-12 | 192.33 | S05°13'31"W |
| L-13 | 409.91 | S05°50'37"W |
| L-14 | 1217.86 | N83°25'00"W |
| L-15 | 184.00 | S08°31'03"W |
| L-16 | 1250.97 | S83°46'25"E |
| L-17 | 110.27 | S06°04'28"W |
| L-18 | 542.39 | S82°27'07"E |
| L-19 | 295.29 | S01°41'23"W |
| L-20 | 250.14 | S25°42'58"E |
| L-21 | 335.92 | S02°39'49"W |
| L-22 | 1366.73 | N84°15'00"W |
| L-23 | 59.34 | N05°38'57"E |
| L-24 | 23.93 | N40°29'23"W |
| L-25 | 262.02 | N17°52'55"W |
| L-26 | 265.99 | N20°52'26"W |
| L-27 | 71.18 | N24°21'08"W |
| L-28 | 128.68 | N39°51'01"W |
| L-29 | 364.80 | N57°12'14"W |
| L-30 | 85.11 | N43°47'46"W |
| L-31 | 76.98 | N52°31'09"W |
| L-32 | 178.83 | N78°58'32"W |
| L-33 | 55.76 | S86°16'14"W |
| L-34 | 301.01 | S56°53'55"W |
| L-35 | 222.92 | S31°26'40"W |
| L-36 | 132.82 | S44°27'33"W |
| L-37 | 150.64 | S68°36'30"W |
| L-38 | 145.06 | N57°18'02"W |
| L-39 | 322.19 | N21°35'43"W |
| L-40 | 134.89 | N16°53'34"W |
| L-41 | 215.41 | N20°29'42"W |
| L-42 | 168.95 | N14°21'46"W |
| L-43 | 81.95 | N07°58'30"W |
| L-44 | 188.71 | N13°40'44"W |
| L-45 | 101.14 | N16°24'09"W |
| L-46 | 150.61 | N23°36'56"W |
| L-47 | 133.54 | N57°04'03"W |
| L-48 | 808.40 | N06°49'36"E |

LEGEND

EXISTING CONTOURS
PROPOSED CONTOURS
SLOPES 14-19%
SLOPES +20%
SECTION LINE
OPEN SPACE AREAS

0' 100' 200' 400'
NORTH
NOT TO SCALE

## SITE DATA (PER APPROVED CONCEPT PLAN)

THIS SITE IS FOUND IN THE CITY OF FRANKLIN, WILLIAMSON COUNTY, TENNESSEE
MAP 89, PARCELS 43.01, 46, 47 & 48.

| | |
|---|---|
| GROSS SITE AREA: | ±220.90 AC. |
| EXISTING ZONING: | LR-LOW RESIDENTIAL |
| EXISTING LAND USE: | AGRICULTURAL |
| PROPOSED LAND USE: | RESIDENTIAL (PR) |
| PROPOSED ZONING: | PR - PLANNED RESIDENTIAL (PR 2.82) |
| TOTAL PROPOSED DWELLING UNITS: | 240 MULTI-FAMILY ATTACHED<br>384 SINGLE FAMILY LOT<br>(STREET ACCESS 147)<br>(ALLEY ACCESS 221)<br>(PRIVATE ACCESS 16)<br>624 TOTAL UNITS |

| NET DENSITY: | |
|---|---|
| GROSS ACREAGE | ± 220.90 AC |
| FLOODPLAIN | (-) ± 73.61 AC |
| TVA EASEMENT | (-) ± 5.17 AC |
| PROPOSED R.O.W. DEDICATION | (-) ± 14.76 AC SOUTH CAROTHERS PKWY. EXTENSION |
| OPEN SPACE: | (-) ± 20.53 AC |
| | ± 106.83 AC |
| PROPOSED NET DENSITY: | 5.84 NET DU/A |
| PROPOSED GROSS DENSITY: | 2.82 DU/A |

## REVISED SITE DATA

| | |
|---|---|
| CURRENT LOCKWOOD GLEN SITE AREA | 220.90 AC |
| PROPOSED COMMERCIAL AREA | - 7.35 AC |
| LOCKWOOD GLEN RESIDENTIAL AREA | 213.55 AC |
| KING PARCEL ADDITION | + 5.03 AC |
| TOTAL LOCKWOOD GLEN RESIDENTIAL AREA | 218.58 AC |
| PROPOSED SITE DENSITY | 2.92 |
| TOTAL UNITS PROPOSED | 638 UNITS |
| TOTAL UNITS UNDER REVIEW OR APPROVED THROUGH SITE PLAN | 533 |
| TOTAL REMAINING UNITS | 105 |

## LOCKWOOD GLEN - RESIDENTIAL LAND USE DATA - DEVELOPMENT PLAN REVISION #1

| DEVELOPMENT | SITE PLAN SUBMITTED | APPROVAL DATE | PREVIOUS PR ZONED ACRES | TOTAL SD-R ZONED ACRES PER PUD REVISION 04/11/16 | APPROVED DWELLING UNITS | TOTAL DWELLING UNITS PER PUD REVISION 04/11/16 | APPROVED REMAINING ACRES | TOTAL REMAINING SD-R ZONED ACRES PER PUD REVISION 04/11/16 | APPROVED REMAINING DWELLINGS | TOTAL REMAINING DWELLING UNITS PER PUD REVISION 04/11/16 |
|---|---|---|---|---|---|---|---|---|---|---|
| CONCEPT PLAN | N/A | SEPT. 2008 | *220.90 | **** 218.58 | 624 | 638 (+14) | *220.90 | **** 218.58 | 624 | 638 (+14) |
| SECTION 1 | X | MAY 2013 | **9.80 | **9.80 | 46 | 46 | 211.10 | 208.78 | 578 | 592 |
| SECTION 2 | X | MAY 2013 | 3.00 | 3.00 | 13 | 13 | 208.1 | 205.78 | 565 | 579 |
| SECTION 3 | X | MAY 2013 | 7.20 | 7.20 | 38 | 38 | 200.9 | 198.58 | 527 | 541 |
| SECTION 4 | X | APRIL 2014 | 6.59 | 6.59 | 44 | 44 | 194.31 | 191.99 | 483 | 497 |
| SECTION 5 | X | APRIL 2014 | 10.56 | 10.56 | 27 | 27 | 183.75 | 181.43 | 456 | 470 |
| SECTION 6 | X | APRIL 2014 | 4.03 | 4.03 | 26 | 26 | 179.72 | 177.40 | 430 | 444 |
| SECTION 7 | X | APRIL 2014 | 12.62 | 12.62 | 28 | 28 | 167.1 | 164.78 | 402 | 416 |
| SECTION 8 | X | JAN. 2016 | 12.35 | 12.35 | 50 | 50 | 154.75 | 152.43 | 352 | 366 |
| SECTION 9 | X | TBD | 5.63 | 5.63 | 21 | 21 | 149.12 | 146.80 | 331 | 345 |
| SECTION 10 | X | TBD | 15.56 | 15.56 | 239 | 239 | 133.56 | 131.24 | 92 | 106 |
| SECTION 11 | X | TBD | 1.88 | 1.88 | 0 | 0 | ***133.56 | ***131.24 | 92 | 106 |
| SECTION 12 | | ----- | 27.90 | 32.93 | 51 | 79 | 105.66 | 98.31 | 41 | 27 |
| SECTION 13 | | ----- | 8.36 | *****1.01 | 10 | 2 | 97.30 | 97.30 | 31 | 25 |
| SECTION 14 | | ----- | 3.81 | 3.81 | 6 | 6 | 93.49 | 93.49 | 25 | 19 |
| SECTION 15 | | ----- | 4.41 | 4.41 | 16 | 16 | 89.08 | 89.08 | 9 | 3 |

* TOTAL SITE AREA FROM SURVEY = 220.90 AC
** INCLUDES 0.78 ACRES CAROTHERS ROAD R.O.W. DEDICATION

*** SECTION 11 IS THE SITE PLAN SUBMITTAL OF THE AMENITY CENTER - THIS ACREAGE IS INCLUDED IN SECTION 7
**** REVISED ACREAGE PER ACQUISITION OF +/- 5.35 ACRES AND THE REMOVAL OF +/- 7.35 ACRES TO NC ZONING
***** SECTION 13 - +/- 7.35 ACRES REZONED TO NEIGHBORHOOD COMMERCIAL (NC)

SEE SHEET C-0.4 "REVISED PUD BOUNDARY" FOR REVISED DEVELOPMENT PROPERTY, BOUNDARY CALLS, AND LEGAL DESCRIPTION

LEGEND

SECTIONS WITH SITE PLAN APPROVAL
REVISED LOCKWOOD GLEN PUD AREA

SURVEY PROVIDED BY:
WILLIAM M. KEEL
FISHER & ARNOLD, INC.
1420 DONELSON PIKE, SUITE A12
NASHVILLE TN 37217
mkee@fisherarnold.com
(615) 383-6300

APPLICANT:
JOHN HAAS
EDGE PLANNING, LANDSCAPE ARCHITECTURE & GRAPHIC DESIGN
210 12TH AVENUE SOUTH, SUITE 202
NASHVILLE TN 37203
jhaas@edge.a.com
(615) 250-8154

DEVELOPER:
KHRIS PASCARELLA
SOUTH CAROTHERS PARTNERS, LLC
205 POWELL PLACE
BRENTWOOD, TN 37027
kpascarella@pearlstreetpartners.com
(615) 312-8242

EDGE
PLANNING · LANDSCAPE ARCHITECTURE · URBAN DESIGN
210 Twelfth Avenue South
Suite 202
Nashville, Tennessee 37203
P 615-250-8154 F 615-250-8155

ENERGY LAND & INFRASTRUCTURE
1420 DONELSON PIKE, SUITE A12 · NASHVILLE, TN 37217
OFFICE 615-383-6300 · WWW.ELI-LLC.COM
ENGINEERS · SURVEYORS · INFRASTRUCTURE · ENVIRONMENTAL
© 2016 EDGE PLANNING + LANDSCAPE ARCHITECTURE, LLC. ALL RIGHTS RESERVED

CONSULTANTS

SEAL

PROJECT TITLE
LOCKWOOD GLEN PUD SUBDIVISION
DEVELOPMENT PLAN REVISION #1
C.O.F. #6120
FRANKLIN, TN

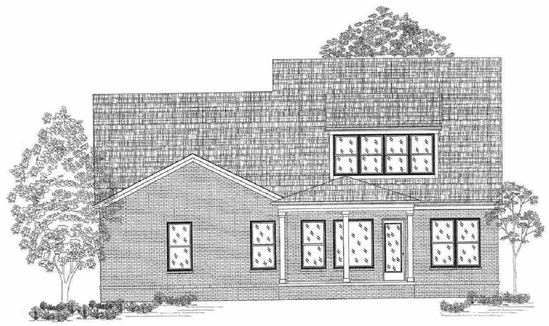
CLIENT
CRESCENT LOCKWOOD LLC.
FRANKLIN, TN.

PROJECT NO. 6120
Date 04/11/16
Revisions
05/05/16 COF COMMENTS

Sheet Title
WORKING CONCEPT PLAN

Sheet Number
C 0.2

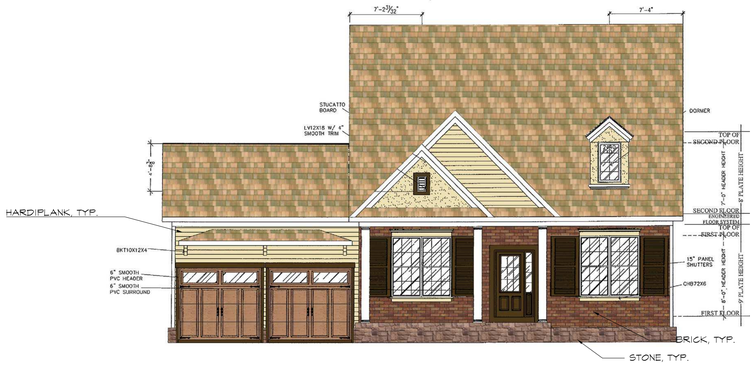
RIGHT SIDE ELEVATION, TYP.
(WITH SIDE FACING R.O.W.)



LEFT SIDE ELEVATION, TYP.

## 1 TYPICAL MANOR HOME ELEVATION

NTS




## 2 TYPICAL COTTAGE HOME ELEVATION

NTS

TYPICAL COTTAGE HOME STREET FACING ELEVATION

**ARCHITECTURAL INTENT:**
THE HOMES IN LOCKWOOD GLEN WILL BE OF AN EARLY 20TH CENTURY SOUTHERN VERNACULAR.

TYPICAL ARCHITECTURE NOTES:

1.THESE ELEVATIONS HAVE BEEN DESIGNED TO MEET THE REQUIREMENTS OF THE CITY OF FRANKLIN'S ARCHITECTURAL DESIGN STANDARDS AND THE APPROVAL OF THE PLANNING COMMISSION / CITY OF FRANKLIN. CHANGES SHALL NOT BE MADE TO THE APPROVED ELEVATIONS UNLESS APPROVED BY EITHER THE BUILDING AND NEIGHBORHOOD SERVICES DIRECTOR OR THE PLANNING COMMISSION.

2. THESE ELEVATIONS ARE A SAMPLING OF THE PROPOSED HOME ELEVATIONS. THE APPLICANT ANTICIPATES MULTIPLE VARIATIONS OF MATERIALS OF EACH ELEVATION PROVIDED. MATERIALS AND COLORS ARE SUBJECT TO FINAL APPROVAL BY THE CITY OF FRANKLIN.

3. FINISHED FLOOR ELEVATION (FFE) SHALL BE A MINIMUM 18" ABOVE FINISH GRADE PER CITY OF FRANKLIN REQUIREMENTS.

4. PER THE CITY OF FRANKLIN ARCHITECTURAL DESIGN STANDARDS, PRIMARY FACADE MATERIALS SHALL NOT CHANGE AT OUTSIDE CORNERS AND SHALL CONTINUE ALONG ANY SIDE FACADE VISIBLE FROM A STREET RIGHT-OF-WAY, HOWEVER, MATERIALS MAY CHANGE WHERE SIDE OR REAR WINGS MEET THE MAIN BODY OF THE DWELLING.

5. FRONT LOAD GARAGE DOORS SHALL ADHERE TO STANDARDS SET FORTH IN SECTION 5.3.5(2) OF THE FRANKLIN ZONING ORDINANCE.

6. GARAGES ON CORNER LOTS WITH SIDES VISIBLE FROM A STREET RIGHT-OF-WAY SHALL INCLUDE ARCHITECTURAL DETAILS AND WINDOWS THAT MIMIC THE FEATURES OF THE LIVING PORTION OF THE BUILDING THEY SERVE.

7. ALL ARCHITECTURAL STYLES CAN BE BUILT AS FRONT LOAD, SIDE LOAD OR REAR LOAD BUILDING ELEVATIONS.

8. WHERE CORNER LOTS EXIST, NO STREET FACING FACADE SHALL HAVE A BLANK WALL.

9. FRONT LOADED GARAGES SHALL BE SET BACK A MINIMUM OF 10' FROM THE FRONT FACADE OF THE HOME.

10. ALL EXPOSED FOUNDATION WALLS SHALL BE CLAD IN MASONRY MATERIAL.

TYPICAL ARCHITECTURAL STANDARDS:

PROPOSED HEIGHT OF BUILDINGS: 1-3 STORIES

PROPOSED SQUARE FOOTAGE OF BUILDINGS: +/- 1,100 - +/- 4,500 SF.

EXTERIOR MATERIALS:
1. BRICK VENEER
2. STONE VENEER
3. SIDING VENEER
4. HARDIPLANK

**NOTE:

I John D. Haas Jr., licensed Tennessee Landscape Architect #574 certify that the architectural elevations as depicted on sheet A 1.00 in the Lockwood Glen PUD subdivisions accurately reflect design intent. I am qualified to commit that the elevations have been designed to meet the requirements of the City of Franklin architectural design standards. The elevations depicted were not developed by me or anyone members of our firm and were provided by the builders who will be providing construction documents as required at the building permit stage.

EDGE
PLANNING | LANDSCAPE ARCHITECTURE | URBAN DESIGN
210 Twelfth Avenue South
Suite 202
Nashville, Tennessee 37203
P 615-250-8154 F 615-250-8155

ENERGY LAND & INFRASTRUCTURE
1420 DONELSON PIKE, SUITE A8 • NASHVILLE, TN 37217
OFFICE 615-383-6300 • WWW.ELI-LLC.COM
ENGINEERS • SURVEYORS • INFRASTRUCTURE • ENVIRONMENTAL
© 2016 ENERGY LAND & INFRASTRUCTURE, LLC. ALL RIGHTS RESERVED

CONSULTANTS

SEAL

JOHN DAVID HAAS JR.
REGISTERED
LANDSCAPE ARCHITECT
STATE OF TENNESSEE
TENNESSEE NO. 574
LANDSCAPE ARCHITECT
05/05/16

PROJECT TITLE

LOCKWOOD GLEN PUD SUBDIVISION
DEVELOPMENT PLAN REVISION #1
C.O.F. #6120
FRANKLIN, TN

CLIENT

CRESCENT
LOCKWOOD LLC.
FRANKLIN, TN.

PROJECT NO. 6120
Date 04/11/16
Revisions
05/05/16 COF COMMENTS

Sheet Title

ARCHITECTURAL ELEVATIONS

Sheet Number

A 1.00

EDGE PLANNING
LANDSCAPE ARCHITECTURE
URBAN DESIGN

Monday June 6th

To: Eric Stuckey, City Administrator & Members of the Board of Mayor and Alderman

Concerning Projects:
COF # 6120 Lockwood Glen Development Plan Revision #1
COF # 6121 Lockwood Glen – King Parcel Rezoning
COF # 6122 Lockwood Glen – Neighborhood Commercial Rezoning

**Re: Request to move BOMA 2nd Reading & Public Hearing Date**

The applicant respectfully requests to move the date of the City of Franklin's Board of Mayor and Alderman's 2nd Reading/Public Hearing for the projects listed above.

The applicant requests that the Approval schedule be amended as follows:

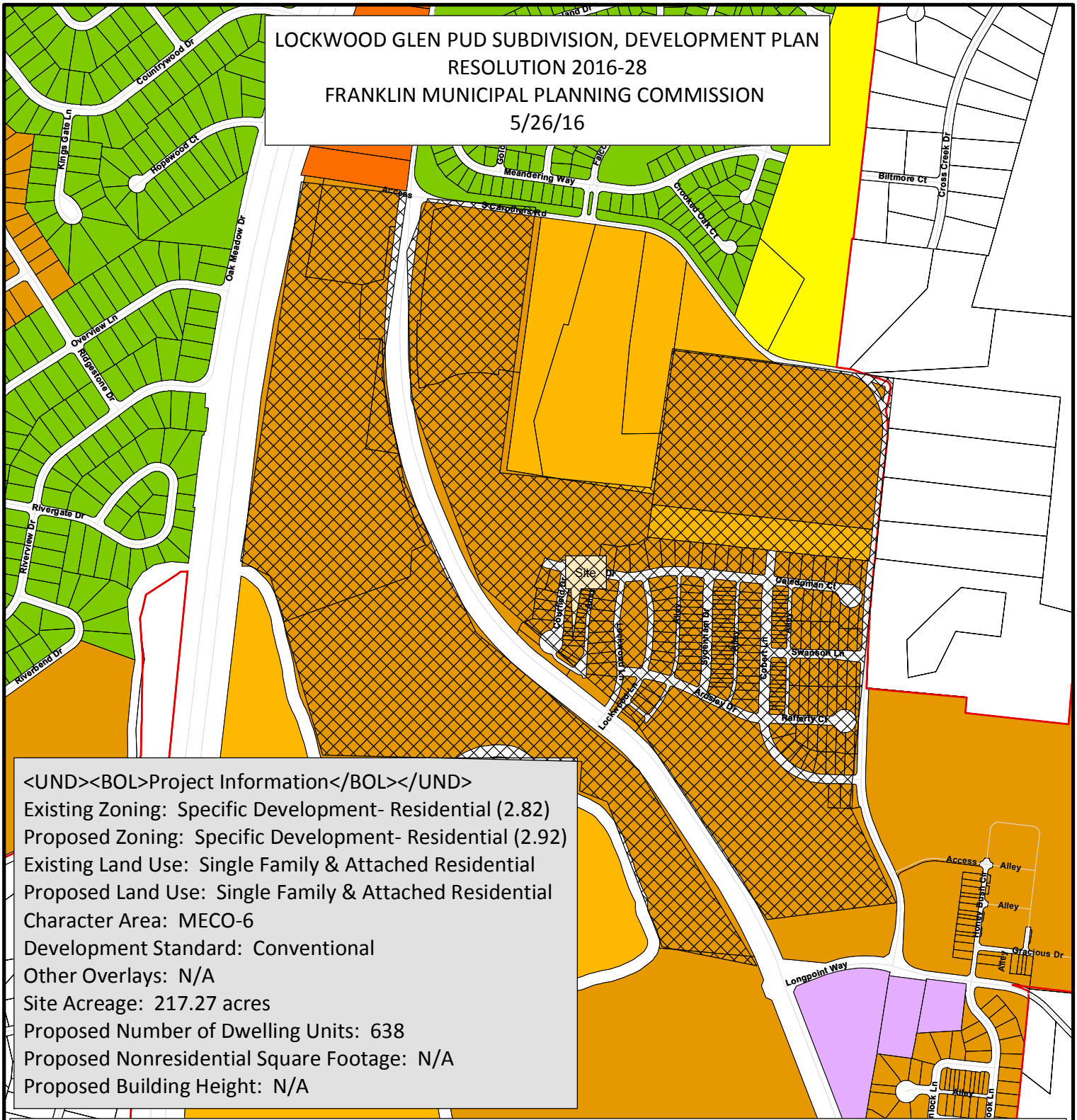
8/23 BOMA – 2nd Reading & Public Hearing
9/13 BOMA – 3rd & Final Reading

Thank you for your consideration.
Please contact me if you have any questions.

Clint Genoble
Associate
EDGE Planning, Landscape Architecture & Urban Design

210 TWELFTH AVENUE SOUTH, SUITE 202 NASHVILLE, TENNESSEE 37203
615.250.8154 phone 615.250.8155 fax www.edgela.com

# LOCKWOOD GLEN PUD SUBDIVISION, DEVELOPMENT PLAN
# RESOLUTION 2016-28
# FRANKLIN MUNICIPAL PLANNING COMMISSION
# 5/26/16




<UND><BOL>Project Information</BOL></UND>
Existing Zoning: Specific Development- Residential (2.82)
Proposed Zoning: Specific Development- Residential (2.92)
Existing Land Use: Single Family & Attached Residential
Proposed Land Use: Single Family & Attached Residential
Character Area: MECO-6
Development Standard: Conventional
Other Overlays: N/A
Site Acreage: 217.27 acres
Proposed Number of Dwelling Units: 638
Proposed Nonresidential Square Footage: N/A
Proposed Building Height: N/A

- AG Agricultural District
- ER Estate Residential
- R-1 Residential District
- R-2 Residential District
- R-3 Residential District
- R-6 Residential District
- RM-10 Attached 10 Residential District
- RM-15 Attached 15 Residential District
- RM-20 Attached 20 Residential District
- SD-R Specific Development-Residential
- SD-X Specific Development-Variety
- OR Office Residential District
- GO General Office District
- CC Central Commercial District
- NC Neighborhood Commercial District
- GC General Commercial District
- LI Light Industrial District
- HI Heavy Industrial District
- CI Civic and Institutional District

N

0 250 500 1,000
Feet

This map was created by the Franklin Planning Department.
It was compiled from the most authentic information available.
The City is not responsible for any errors or omissions contained hereon.
All data and materials (c) copyright 2016. All rights reserved.

**ORDINANCE 2016-20**

**TO BE ENTITLED, "AN ORDINANCE TO REZONE 8.68 ACRES FROM SPECIFIC DEVELOPMENT-RESIDENTIAL - SD-R (2.82) DISTRICT TO NC – NEIGHBORHOOD COMMERCIAL DISTRICT FOR THE PROPERTY LOCATED SOUTH OF SOUTH CAROTHERS AND EAST OF CAROTHERS PARKWAY."**

**WHEREAS,** the City of Franklin, Tennessee, encourages responsible growth and the sensible transition of land uses and densities; and

**WHEREAS**, the Neighborhood Commercial district provides zoning for land uses compatible with both the Franklin Land Use Plan and surrounding development; and

**WHEREAS,** the zoning has been reviewed and approved by BOMA after a public hearing and a recommendation by the Franklin Municipal Planning Commission.

**NOW THEREFORE BE IT ORDAINED BY THE BOARD OF MAYOR AND ALDERMEN OF THE CITY OF FRANKLIN, TENNESSEE, AS FOLLOWS:**

**SECTION I.** That the following described property shall be, and is hereby, rezoned from its present zoning classification of Specific Development-Residential 2.82 District to Neighborhood Commercial District:

PREMISES CONSIDERED

| Map-Parcel | Acres |
|---|---|
| 089-4801 | 8.68 |
| Total | 8.68 |

PROPERTY DESCRIPTION

LAND SITUATED IN THE 9TH CIVIL DISTRICT AND THE 14TH CIVIL DISTRICT OF WILLIAMSON COUNTY, TENNESSEE, CURRENTLY KNOWN AS A PORTION OF THE LANDS OWNED BY CRESCENT LOCKWOOD, LLC., OF RECORD IN RECORD BOOK 6121, PAGE 973, IN THE REGISTER'S OFFICE OF WILLIAMSON COUNTY, TENNESSEE (R.O.W.C., TN.), AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS;

BEGINNING AT AN IRON ROD (OLD), HAVING COORDINATES OF N: 566195.25, E: 1726636.69, , BEING THE SOUTHEAST CORNER OF HEREIN DESCRIBED PROPERTY; THENCE, ALONG THE SOUTH PROPERTY LINE OF HEREIN DESCRIBED PROPERTY, N 84°15'00" W, FOR A DISTANCE OF 640.80' TO AN IRON ROD (OLD); THENCE, ALONG WITH REMAINING LANDS OWNED BY AFOREMENTIONED CRESCENT LOCKWOOD, LLC., WITH A CURVE TO THE LEFT, WITH AN ARC LENGTH OF 237.93', A RADIUS OF 2,929.79', WITH A CHORD BEARING OF N 24°23'35" W, AND A CHORD LENGTH OF 237.87' TO AN IRON ROD (OLD); THENCE, ALONG WITH REMAINING OF LANDS OWNED BY CRESCENT LOCKWOOD, LLC., N 48°22'44" E, FOR A DISTANCE OF 166.16' TO AN IRON ROD (OLD); THENCE, N 49°03'53" E, FOR A DISTANCE OF 196.32' TO AN IRON ROD (OLD); THENCE, N 47°37'03" E, PASSING AN IRON ROD (OLD) AT 249.50', FOR A TOTAL DISTANCE OF 418.85' TO A POINT IN THE CENTERLINE OF CAROTHERS ROAD; THENCE, ALONG SAID CENTERLINE, WITH A CURVE TO THE LEFT, HAVING AN ARC LENGTH OF 55.92', A RADIUS OF 700.00', WITH A CHORD BEARING OF S 23°25'39" E, AND CHORD LENGTH OF 55.88' TO A POINT; THENCE, S 25°42'58" E, FOR A DISTANCE OF 250.14' TO A POINT, THENCE, ALONG A CURVE TO THE RIGHT, HAVING AN ARC LENGTH OF 195.89', A RADIUS OF 395.49', WITH A CHORD BEARING OF S 11°31'35" E, AND CHORD LENGTH OF 193.90' TO A POINT; THENCE, S 02°39'49" W, FOR A DISTANCE OF 335.92' TO THE POINT OF BEGINNING. CONTAINING 378,160.7 SQ. FT, OR 8.68 ACRES, ACCORDING TO A SURVEY MADE BY FISHER ARNOLD, DATED JUNE, 2009.

**SECTION II.** That the attached Location Map shall serve the purpose of further delimiting the geographical boundaries as described by this Ordinance.

**SECTION III.** BE IT FINALLY ORDAINED by the Board of Mayor and Aldermen of the City of Franklin, Tennessee, that this Ordinance shall take effect from and after its passage on third and final reading, the health, safety, and welfare of the citizens requiring it.

**ATTEST:**

By: _____
**Eric Stuckey**
City Administrator/Recorder

**CITY OF FRANKLIN, TENNESSEE:**

By: _____
**Dr. Ken Moore**
Mayor

Approved as to form by:

_____
Kristen L. Corn
Assistant City Attorney

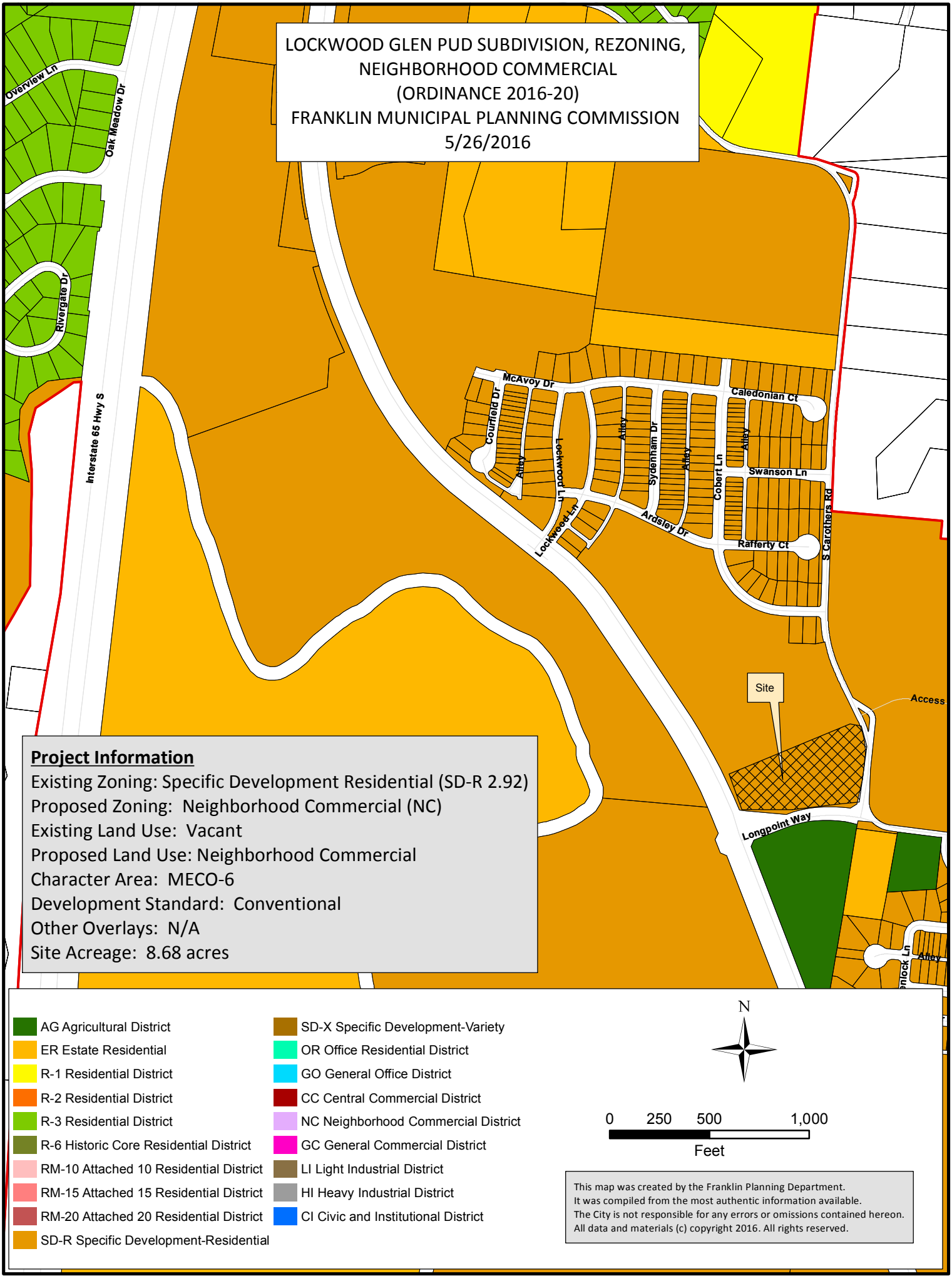
PLANNING COMMISSION RECOMMENDED: _____

PASSED FIRST READING: _____

PUBLIC HEARING HELD: _____

PASSED SECOND READING: _____

PASSED THIRD READING: _____


LOCKWOOD GLEN PUD SUBDIVISION, REZONING, NEIGHBORHOOD COMMERCIAL
(ORDINANCE 2016-20)
FRANKLIN MUNICIPAL PLANNING COMMISSION
5/26/2016
Overview Ln
Oak Meadow Dr
Rivergate Dr
Interstate 65 Hwy S
McAvoy Dr
Caledonian Ct
Courfield Dr
Alley
Lockwood Ln
Sydenham Dr
Cobert Ln
Swanson Ln
Ardsley Dr
Rafferty Ct
S Carothers Rd
Site
Access
Longpoint Way
Project Information
Existing Zoning: Specific Development Residential (SD-R 2.92)
Proposed Zoning: Neighborhood Commercial (NC)
Existing Land Use: Vacant
Proposed Land Use: Neighborhood Commercial
Character Area: MECO-6
Development Standard: Conventional
Other Overlays: N/A
Site Acreage: 8.68 acres
AG Agricultural District
ER Estate Residential
R-1 Residential District
R-2 Residential District
R-3 Residential District
R-6 Historic Core Residential District
RM-10 Attached 10 Residential District
RM-15 Attached 15 Residential District
RM-20 Attached 20 Residential District
SD-R Specific Development-Residential
SD-X Specific Development-Variety
OR Office Residential District
GO General Office District
CC Central Commercial District
NC Neighborhood Commercial District
GC General Commercial District
LI Light Industrial District
HI Heavy Industrial District
CI Civic and Institutional District
N
0 250 500 1,000
Feet
This map was created by the Franklin Planning Department.
It was compiled from the most authentic information available.
The City is not responsible for any errors or omissions contained hereon.
All data and materials (c) copyright 2016. All rights reserved.

| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L1 | 577.00 | S81° 25' 13"E |
| L2 | 31.70 | N7° 13' 56"E |
| L4 | 582.26 | S82° 20' 54"E |
| L5 | 1007.65 | S7° 57' 01"W |
| L6 | 387.69 | S7° 26' 55"W |
| L7 | 824.24 | S80° 41' 16"E |
| L8 | 343.04 | N8° 26' 26"E |
| L9 | 462.57 | N8° 01' 21"E |
| L10 | 586.85 | S82° 24' 09"E |
| L12 | 304.54 | S80° 56' 29"E |
| L14 | 33.26 | S28° 37' 07"E |
| L16 | 132.33 | S5° 13' 31"W |
| L17 | 409.91 | S5° 50' 37"W |
| L18 | 176.27 | S5° 50' 37"W |
| L19 | 24.60 | S83° 46' 25"E |
| L20 | 110.27 | S6° 04' 28"W |
| L22 | 542.39 | S2° 27' 07"W |

| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L23 | 295.29 | S1° 41' 23"W |
| L25 | 169.35 | S47° 37' 03"W |
| L26 | 249.50 | S47° 37' 03"W |
| L27 | 196.32 | S49° 03' 53"W |
| L28 | 166.16 | S48° 22' 44"W |
| L30 | 725.93 | N84° 15' 00"W |
| L31 | 59.34 | N5° 38' 57"E |
| L32 | 23.93 | N40° 39' 23"W |
| L33 | 262.02 | N17° 52' 55"W |
| L34 | 265.99 | N20° 52' 26"W |
| L35 | 71.18 | N24° 21' 08"W |
| L36 | 128.68 | N39° 51' 01"W |
| L37 | 364.80 | N57° 12' 14"W |
| L38 | 85.11 | N43° 47' 46"W |
| L39 | 76.98 | N52° 31' 09"W |
| L40 | 178.83 | N78° 58' 32"W |
| L41 | 55.76 | S86° 16' 14"W |

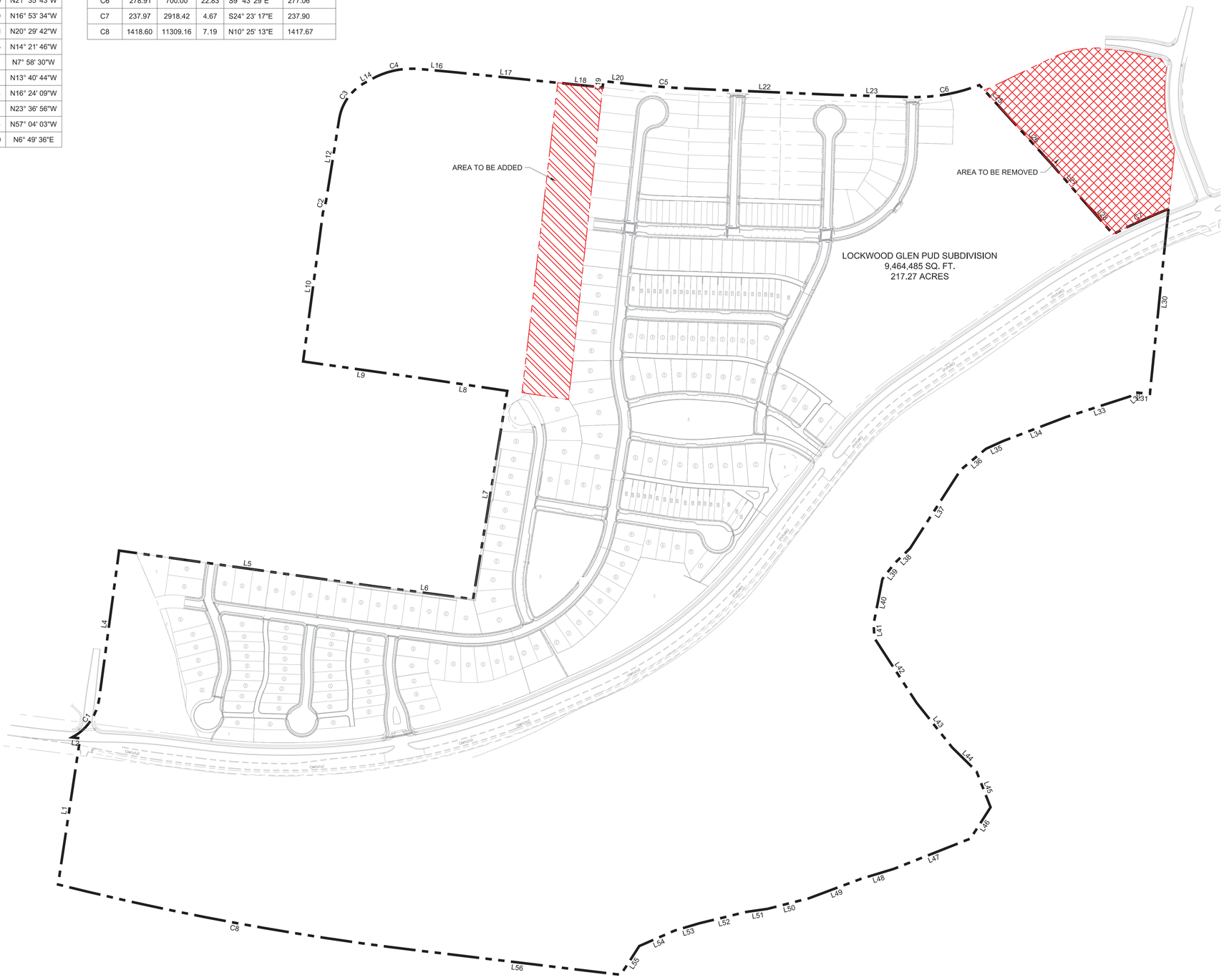
| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L42 | 301.01 | S56° 53' 55"W |
| L43 | 222.92 | S51° 26' 40"W |
| L44 | 132.82 | S44° 27' 33"W |
| L45 | 150.64 | S68° 36' 30"W |
| L46 | 145.06 | N57° 18' 02"W |
| L47 | 322.19 | N21° 35' 43"W |
| L48 | 134.89 | N16° 53' 34"W |
| L49 | 215.41 | N20° 29' 42"W |
| L50 | 168.55 | N14° 21' 46"W |
| L51 | 81.95 | N7° 58' 30"W |
| L52 | 188.71 | N13° 40' 44"W |
| L53 | 101.14 | N16° 24' 09"W |
| L54 | 150.61 | N23° 36' 56"W |
| L55 | 133.54 | N57° 04' 03"W |
| L56 | 808.40 | N6° 49' 36"E |

| Curve Table | | | | | |
|---|---|---|---|---|---|
| Curve # | Length | Radius | Delta | Chord Direction | Chord Length |
| C1 | 192.68 | 202.54 | 54.51 | S55° 05' 41"E | 185.50 |
| C2 | 66.85 | 432.00 | 8.87 | S76° 30' 31"E | 66.78 |
| C3 | 178.08 | 195.00 | 52.32 | S54° 46' 48"E | 171.95 |
| C4 | 191.97 | 325.00 | 33.84 | S11° 41' 48"E | 189.19 |
| C5 | 249.92 | 3953.11 | 3.62 | S4° 15' 48"W | 249.88 |
| C6 | 278.91 | 700.00 | 22.83 | S9° 43' 29"E | 277.06 |
| C7 | 237.97 | 2918.42 | 4.67 | S24° 23' 17"E | 237.90 |
| C8 | 1418.60 | 11309.16 | 7.19 | N10° 25' 13"E | 1417.67 |

**Property Description**

Land situated in the 9th Civil District and the 14th Civil District of Williamson County, Tennessee, being a portion of the properties conveyed to Lockwood Family LP by Dorris R. Lockwood, of record in Deed book 1777, Page 759, and Deed book 1777, Page 761, and a portion of the property conveyed to Lockwood Construction Company by Anthony B. Jamison, of record in Deed book 656, Page 650, in the Register's Office of Williamson County, Tennessee (R.O.W.C., TN.), and being more particularly described as follows;

**Beginning** at a concrete Right of Way monument in the easterly margin of Interstate 65, being the northwest corner of the Crescent Lockwood, LLC. property of record in Book 6362, Page 691, R.O.W.C.; thence leaving said Interstate 65 margin, S 81°25'13" E, for a distance of 577.00' to an iron rod (old); thence, N 07°13'56" E, for a distance of 31.70' to an iron rod in the southwest margin of Carothers Road; thence, with a curve to the left, with an arc length of 192.68', a radius of 202.54', with a chord bearing of S 55°05'41" E, and a chord length of 185.50' to an iron rod (old); thence, S 82°20'54" E, for a distance of 582.26' to an iron rod (old); thence, leaving said margin, along the west property line of Alligood, Deed Book 1202, Page 845 (R.O.W.C., TN.) S 07°57'01" W, for a distance of 1007.65' to an iron rod (old); thence, S 07°26'55" W, for a distance of 387.69' to an iron rod (old); thence, along the south property lines of above mentioned Alligood, and Davis property of record in Deed Book 435, Page 126 (R.O.W.C., TN.) S 80°41'16" E, for a distance of 824.24' to an iron rod (old); thence, along east property line of said Davis property, N 08°26'26" E, for a distance of 343.04' to an iron rod (old); thence, along east property line of the Strain property of record in Record Book 5632, Page 184 (R.O.W.C., TN.) N 08°01'21" E, for a distance of 462.57' to an iron rod (old) in the center of an old road bed; thence, along said center of old road, S 82°24'09" E, for a distance of 586.85' to an iron rod (old) in the southerly margin of Carothers Road; thence, along said margin for the next seven (7) calls, with a curve to the left, with an arc length of 66.85', with a radius of 432.00', with a chord bearing of S 76°30'31" E, and chord length of 66.78' to an iron rod (old); thence, S 80°56'29" E, for a distance of 304.54' to an iron rod (old); thence, with a curve to the right, with an arc length of 178.08', a radius of 195.00', with a chord bearing of S 54°46'48" E, and chord length of 171.95' to an iron rod (old); thence, S 28°37'07" E, for a distance of 33.26' to an iron rod (old); thence, with a curve to the right, with an arc length of 191.97', a radius of 325.00', with a chord bearing of S 11°41'48" E, and chord length of 189.19'; thence, S 05°13'31" W, for a distance of 132.33'; thence, S 05°50'37" W, passing an iron rod (old) at a distance of 409.91' for a total distance of 586.18' to an iron rod (set); thence, S 05°50'37" W, for a distance of 409.91' to an iron rod (old); thence, S 83°46'25" E, for a distance of 24.60' to a point in the centerline of said Carothers Road; thence, along said centerline for the next six (6) calls, S 06°04'28" W, for a distance of 110.27' to a point; thence, with a curve to the left, with an arc length of 249.92', a radius of 3953.11', a chord bearing of S 04°15'48" W, and chord length of 249.88' to a point; thence, S 02°27'07" W, for a distance of 542.39' to a point; thence, S 01°41'23" W, for a distance of 295.29' to a point; thence, with a curve to the left with an arc length of 278.90', with a radius of 700.00', with a chord bearing of S 09°43'29" E, and chord length of 277.10' to a point; thence, leaving said centerline, S 47°37'03" W, passing an iron rod (old) at 125.09', an iron rod (old) at additional 249.50', for a total distance of 418.85'; thence, S 49°03'53" W, a distance of 196.32' to an iron rod (old); thence, S 48°22'44" W, passing an iron rod (old) at a distance of 93.57', for a total distance of 166.16' to an iron rod (old); thence, with a curve to the right, with an arc length of 237.93', a radius of 2,929.79', with a chord bearing of S 24°23'35" E, and chord length of 237.87' to an iron rod (old); thence, N 84°15'00" W, for a distance of 725.92' to a point in the center of the Harpeth River, passing a witness rod at top of bank at a distance of 665.34'; thence, along said centerline of river for the next twenty-five (25) calls, N 05°38'57" E, a distance of 59.34' to a point; thence, N 40°39'23" W, for a distance of 23.93' to a point; thence, N 17°52'55" W, for a distance of 262.02' to a point; thence, N 20°52'26" W, for a distance of 265.99' to a point; thence, N 24°21'08" W, for a distance of 71.18' to a point; thence, N 39°51'01" W, for a distance of 128.68' to a point; thence, N 57°12'14" W, for a distance of 364.80' to a point; thence, N 43°47'46" W, for a distance of 85.11' to a point; thence, N 52°31'09" W, for a distance of 76.98' to a point; thence, N 78°58'32" W, for a distance of 178.83' to a point; thence, S 86°16'14" W, for a distance of 55.76' to a point; thence, S 56°53'55" W, for a distance of 301.01' to a point; thence, S 51°26'40" W, for a distance of 222.92' to a point; thence, S 44°27'33" W, for a distance of 132.82' to a point; thence, S 68°36'30" W, for a distance of 150.64' to a point; thence, N 57°18'02" W, for a distance of 145.06' to a point; thence, N 21°35'43" W, for a distance of 322.19' to a point; thence, N 16°53'34" W, for a distance of 134.89' to a point; thence, N 20°29'42" W, for a distance of 215.41' to a point; thence, N 14°21'46" W, for a distance of 168.55' to a point; thence, N 07°58'30" W, for a distance of 81.95' to a point; thence, N 13°40'44" W, for a distance of 188.71' to a point; thence, N 16°24'09" W, for a distance of 101.14' to a point; thence, N 23°36'56" W, for a distance of 150.61' to a point; thence, N 57°04'03" W, for a distance of 133.54' to a point; thence, along above mentioned east margin of Interstate 65, N 06°49'36" E, passing a witness rod (old) at a distance of 200.00', for a total distance of 808.40' to an iron rod (old); thence, with a curve to the right, with an arc length of 1418.60', a radius of 11309.16', with a chord bearing of N 10°25'13" E, and chord length of 1417.67' to the **Point of Beginning**. Containing 9,464,484.9 Sq. Ft. or 217.27 Acres. According to a survey made by Fisher Arnold, dated June, 2009.




TN STATE PLANE CORD., ZONE5301, FIPZONE 4100;
NAD83 DATUM
GRAPHIC SCALE (IN FEET)
200 0 100 200 400
1 inch = 200 ft.

EDGE
PLANNING | LANDSCAPE ARCHITECTURE | URBAN DESIGN
210 Twelfth Avenue South
Suite 202
Nashville, Tennessee 37203
P 615-250-8154
F 615-250-8155

ENERGY LAND & INFRASTRUCTURE
1420 DONELSON PIKE, SUITE A12 • NASHVILLE, TN 37217
OFFICE 615.333.0325 • WWW.ELI-LLC.COM
ENGINEERS • SURVEYORS • INFRASTRUCTURE • ENVIRONMENTAL

© 2024 ENERGY LAND & INFRASTRUCTURE, LLC. ALL RIGHTS RESERVED

# NEIGHBORHOOD COMMERCIAL REZONING

CITY OF FRANKLIN PROJECT NO. 6122
FRANKLIN, TENNESSEE

| Rev. | Date | Revision Description |
|---|---|---|
| 1 | 5/4/16 | Per City of Franklin Comments |

LARRY C. WALLACE
REGISTERED ENGINEER
5-4-16
AGRICULTURAL & BIOSYSTEMS
STATE OF TENNESSEE

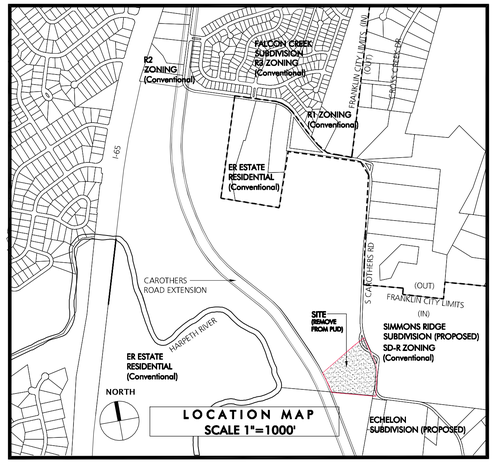
| | |
|---|---|
| Issue Date: | 11 April 2016 |
| ELI Project No: | 14-11-1102.4 |
| Drafted By: | RDP |
| Checked By: | LCW |

Sheet Title:

REVISED BOUNDARY DESCRIPTION

Sheet No.

C 0.4




SITE DATA

| | |
|---|---|
| SITE AREA | +/- 8.68 ACRES |
| MAP & PARCEL NUMBER | MAP 89, PARCEL 48.01 |
| ADDRESS | SOUTH CAROTHERS RD. |
| EXISTING ZONING | SD-R 2.82 |
| PROPOSED ZONING | NC (NEIGHBORHOOD COMMERCIAL) |
| CHARACTER AREA | MCEWEN |
| SPECIAL AREA | 6 |
| DEVELOPMENT STANDARD | CONVENTIONAL |
| EXISTING LAND USE | RESIDENTIAL DISTRICT |
| PROPOSED LAND USE | NEIGHBORHOOD COMMERCIAL |

*NOTE: NO EXISTING BUILDINGS ARE ON SITE

**ACREAGE OF SITE** **+/- 8.68 ACRES**

**EXISTING TREE CANOPY (PER THIS SECTION ONLY)** **+/- 0.33 ACRES (4% OF SITE)**

PROPERTY DESCRIPTION

LAND SITUATED IN THE 9TH CIVIL DISTRICT AND THE 14TH CIVIL DISTRICT OF WILLIAMSON COUNTY, TENNESSEE, CURRENTLY KNOWN AS A PORTION OF THE LANDS OWNED BY CRESCENT LOCKWOOD, LLC., OF RECORD IN RECORD BOOK 6121, PAGE 973, IN THE REGISTER'S OFFICE OF WILLIAMSON COUNTY, TENNESSEE (R.O.W.C., TN.), AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS;

**BEGINNING** AT AN IRON ROD (OLD), HAVING COORDINATES OF N: 566195.25, E: 1726636.69, , BEING THE SOUTHEAST CORNER OF HEREIN DESCRIBED PROPERTY; THENCE, ALONG THE SOUTH PROPERTY LINE OF HEREIN DESCRIBED PROPERTY, N 84°15'00" W, FOR A DISTANCE OF 640.80' TO AN IRON ROD (OLD); THENCE, ALONG WITH REMAINING LANDS OWNED BY AFOREMENTIONED CRESCENT LOCKWOOD, LLC., WITH A CURVE TO THE LEFT, WITH AN ARC LENGTH OF 237.93', A RADIUS OF 2,929.79', WITH A CHORD BEARING OF N 24°23'35" W, AND A CHORD LENGTH OF 237.87' TO AN IRON ROD (OLD); THENCE, ALONG WITH REMAINING OF LANDS OWNED BY CRESCENT LOCKWOOD, LLC., N 48°22'44" E, FOR A DISTANCE OF 166.16' TO AN IRON ROD (OLD); THENCE, N 49°03'53" E, FOR A DISTANCE OF 196.32' TO AN IRON ROD (OLD); THENCE, N 47°37'03" E, PASSING AN IRON ROD (OLD) AT 249.50', FOR A TOTAL DISTANCE OF 418.85' TO A POINT IN THE CENTERLINE OF CAROTHERS ROAD; THENCE, ALONG SAID CENTERLINE, WITH A CURVE TO THE LEFT, HAVING AN ARC LENGTH OF 55.92', A RADIUS OF 700.00', WITH A CHORD BEARING OF S 23°25'39" E, AND CHORD LENGTH OF 55.88' TO A POINT; THENCE, S 25°42'58" E, FOR A DISTANCE OF 250.14' TO A POINT, THENCE, ALONG A CURVE TO THE RIGHT, HAVING AN ARC LENGTH OF 195.89', A RADIUS OF 395.49', WITH A CHORD BEARING OF S 11°31'35" E, AND CHORD LENGTH OF 193.90' TO A POINT; THENCE, S 02°39'49" W, FOR A DISTANCE OF 335.92' TO THE **POINT OF BEGINNING**. CONTAINING 378,160.7 SQ. FT. OR 8.68 ACRES. ACCORDING TO A SURVEY MADE BY FISHER ARNOLD, DATED JUNE, 2009.


DEVELOPER:
KHRIS PASCARELLA
CRESCENT LOCKWOOD, LLC
205 POWELL AVENUE
BRENTWOOD, TN 37027
(615) 312-8242
kpascarella@pearlstreetpartners.com

APPLICANT:
JOHN HAAS
EDGE
210 12TH AVE. SOUTH
SUITE 202
NASHVILLE TN, 37203
(615) 250-8154
jhaas@edgela.com


0' 25' 50' 100'

NORTH

CONSULTANTS


EDGE
PLANNING LANDSCAPE ARCHITECTURE GRAPHIC DESIGN
210 Twelfth Avenue South
Suite 202
Nashville, Tennessee 37203
P 615-250-8154
F 615-250-8155


SEAL

JOHN DAVID HAAS, JR.
REGISTERED
LANDSCAPE ARCHITECT
TENNESSEE NO. 574
05/05/16

PROJECT TITLE

NEIGHBORHOOD COMMERCIAL
REZONING
C.O.F. #6122
FRANKLIN, TN

CLIENT

CRESCENT
LOCKWOOD LLC.
FRANKLIN, TN.

| | |
|---|---|
| PROJECT NO. | 6122 |
| Date | 04/11/16 |
| Revisions | |
| 05/05/16 | COF COMMENTS |

Sheet Title

REZONING
SHEET

Sheet Number

R-1.0

EDGE PLANNING
LANDSCAPE ARCHITECTURE
URBAN DESIGN

Monday June 6th

To: Eric Stuckey, City Administrator & Members of the Board of Mayor and Alderman

Concerning Projects:
COF # 6120 Lockwood Glen Development Plan Revision #1
COF # 6121 Lockwood Glen – King Parcel Rezoning
COF # 6122 Lockwood Glen – Neighborhood Commercial Rezoning

**Re: Request to move BOMA 2nd Reading & Public Hearing Date**

The applicant respectfully requests to move the date of the City of Franklin's Board of Mayor and Alderman's 2nd Reading/Public Hearing for the projects listed above.

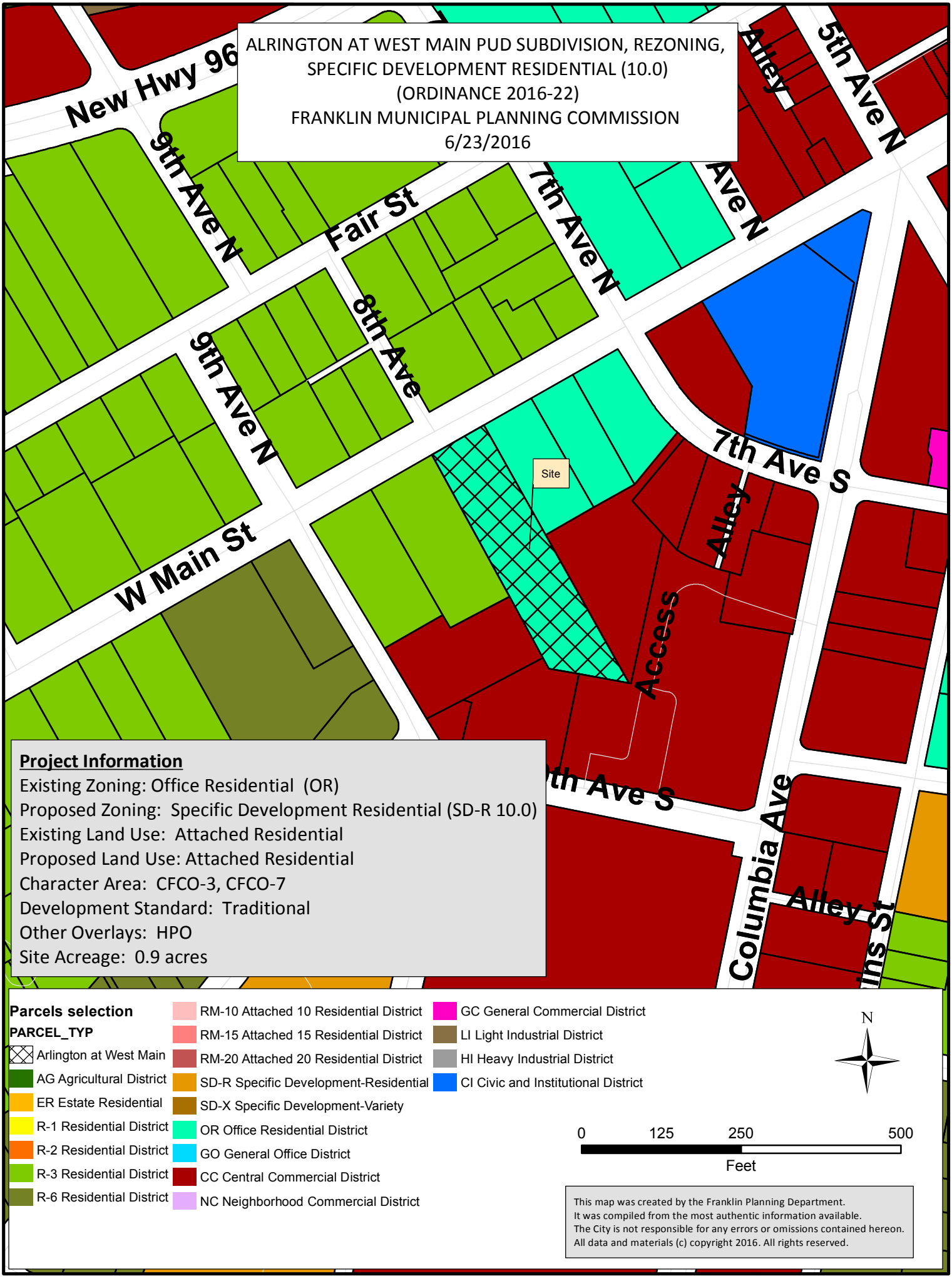
The applicant requests that the Approval schedule be amended as follows:

8/23 BOMA – 2nd Reading & Public Hearing
9/13 BOMA – 3rd & Final Reading

Thank you for your consideration.
Please contact me if you have any questions.

Clint Genoble
Associate
EDGE Planning, Landscape Architecture & Urban Design

210 TWELFTH AVENUE SOUTH, SUITE 202 NASHVILLE, TENNESSEE 37203
615.250.8154 phone 615.250.8155 fax www.edgela.com


ALRINGTON AT WEST MAIN PUD SUBDIVISION, REZONING,
SPECIFIC DEVELOPMENT RESIDENTIAL (10.0)
(ORDINANCE 2016-22)
FRANKLIN MUNICIPAL PLANNING COMMISSION
6/23/2016
New Hwy 96
9th Ave N
Fair St
7th Ave N
Alley
5th Ave N
Ave N
8th Ave
9th Ave N
Site
7th Ave S
Alley
W Main St
Access
th Ave S
Columbia Ave
Alley
St
Project Information
Existing Zoning: Office Residential (OR)
Proposed Zoning: Specific Development Residential (SD-R 10.0)
Existing Land Use: Attached Residential
Proposed Land Use: Attached Residential
Character Area: CFCO-3, CFCO-7
Development Standard: Traditional
Other Overlays: HPO
Site Acreage: 0.9 acres
Parcels selection
PARCEL_TYP
Arlington at West Main
AG Agricultural District
ER Estate Residential
R-1 Residential District
R-2 Residential District
R-3 Residential District
R-6 Residential District
RM-10 Attached 10 Residential District
RM-15 Attached 15 Residential District
RM-20 Attached 20 Residential District
SD-R Specific Development-Residential
SD-X Specific Development-Variety
OR Office Residential District
GO General Office District
CC Central Commercial District
NC Neighborhood Commercial District
GC General Commercial District
LI Light Industrial District
HI Heavy Industrial District
CI Civic and Institutional District
N
0
125
250
500
Feet
This map was created by the Franklin Planning Department.
It was compiled from the most authentic information available.
The City is not responsible for any errors or omissions contained hereon.
All data and materials (c) copyright 2016. All rights reserved.

STUDIOEIGHTDESIGN
MATT TAYLOR • ARCHITECT

2 June 2016

Brad Baumgartner
Planner
Department of Planning and Sustainability
City of Franklin, TN
615-550-6733

# The Arlington at West Main (COF #6147)

S8D Project No. 1512.00

PUD Rezoning Resubmittal –
Response to Staff Comments on Initial Submittal

Dear Brad:

Thank you for all of your guidance thus far through the Rezoning submittal process.

As required, below is a list of the comments received from the City of Franklin Departmental Review on the initial PUD submittal made on May 9, 2016 and the corresponding responses.

## Engineering Rezoning Checklist

1. **C. Submittal Components** *(Lance Fittro, City of Franklin, 05/20/16 02:23 PM, 1 – Rezonings)*

   ***Comment:*** *If not already completed, applicant shall submit a request for water and sewer availability.*

   **Response:** Water & Sewer availability have been requested with Franklin.

## Planning – General Comments

2. **Project Number** *(Brad Baumgartner, City of Franklin, 05/23/16 08:18 AM, 1 – Rezonings)*

   ***Comment:*** *Applicant shall state project number 6147 on all future correspondence.*

   **Response:** Project #6147 is shown on the plans and shall be listed on all future correspondence.

3. **Zoning** *(Brad Baumgartner, City of Franklin, 05/23/16 08:19 AM, 1 – Rezonings)*

   ***Comment:*** *Include the residential density as part of the SD-R zoning. Example (SD-R X.XX)*

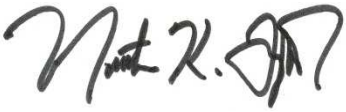
   **Response:** The residential density of SD-R 10.00 is shown on the plans.

714 Eighth Avenue South • Nashville, Tennessee 37203
voice (615) 250.8150 • fax (615) 250.8151 • s8-design.com

We appreciate the opportunity to resubmit our development plan to the City of Franklin. We look forward to continue working with the City in creating a project that we will all be proud of for years to come.

If you have any questions please call.

Sincerely,



Matthew K. Taylor, RA

MKT / ark

Attachments: DRT Corrections Notice Letter, Revised Drawings

xc: D9 :: Bernie Butler & Brian Schiedemeyer
S8D :: ARK, File

Z:\Projects\1512-00_D9 – 725 West Main\Correspondence\Memos - Faxes - Letters - Tel Records\1512-00_ltr_15-06-02_PUD Resubmittal.doc

# The Arlington at West Main

## SD-R Rezone

### COF Project # 6147

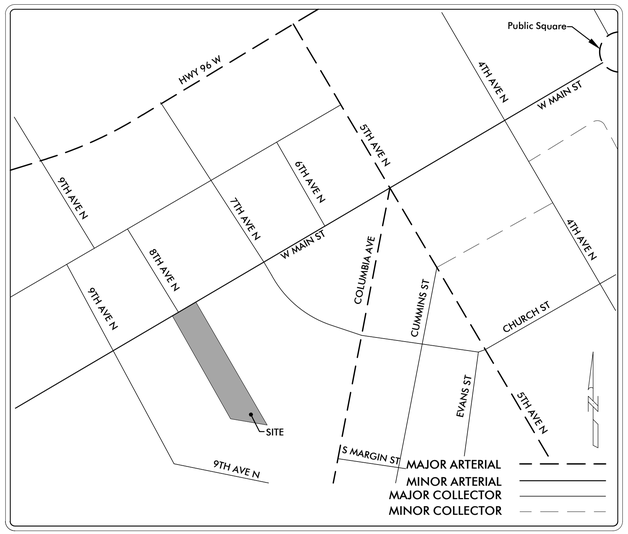
725 West Main Street

Being Parcel 22 on Tax Map 78C, Group J

Franklin, Williamson County, Tennessee

TOTAL AREA = 0.9 ACRES

Date: May 9, 2016




LOCATION MAP
N.T.S.

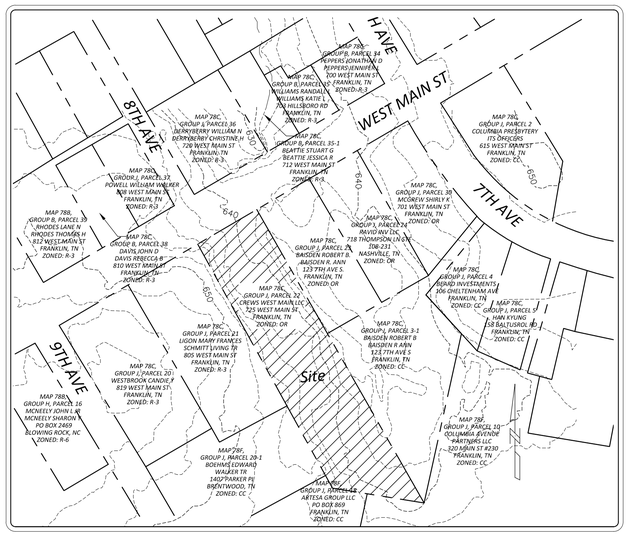
## Site Data

| | |
|---|---|
| PROJECT NAME: | The Arlington at West Main |
| CITY OF FRANKLIN PROJECT # | 6147 |
| ACREAGE OF SITE/PROJECT AREA: | 39,108 S.F. / 0.9 AC |
| SUBDIVISION: | Plan of Hincheyville Subdivision |
| LOT NUMBER: | 6 |
| ADDRESS: | 725 West Main Street |
| CITY: | Franklin |
| COUNTY: | Williamson County |
| STATE: | Tennessee |
| ALDERMANIC WARD: | 4 |
| EXISTING ZONING & CHARACTER OV: | Office Residential / CFCO -3, CFCO-7 |
| PROPOSED ZONING: | SD-R 10.00 |
| OTHER APPLICABLE OVERLAYS: | HPO/Downtown Franklin Local Historic District |
| APPLICABLE DEVELPMENT STANDARDS: | Traditional (Downtown Core) |
| HISTORIC BUILDINGS WITHIN 500': | St. Paul's Episcopal Church (700') |
| LAND USE: | 9 Multi-Family Units |
| DENSITY: | 10 Unit/Acre |
| MINIMUM REQUIRED SETBACK LINES: | |
| FRONT AND STREET: | 15' |
| SIDE YARD: | 5' |
| REAR YARD: | 5' |
| BUILDING FOOTPRINT: | Existing - 3,240 SF |
| | Proposed - 16,311 SF |
| BUILDING SQUARE FOOTAGE: | Existing - 7,476 SF |
| | Proposed - 30,738 SF |
| BUILDING HEIGHT: | 2 Stories Proposed |
| *PARKING REQUIREMENTS: | 6 Units x 3 Bedrooms= 6 x 3 Spaces= 18 Spaces<br>3 Units x 2 Bedrooms= 3 x 2.5 Spaces= 7.5 Spaces |
| | Proposed Parking 26 Spaces |
| MINIMUM LANDSCAPE SURFACE | 0.1 of Total Site |

## Sheet Schedule


**C0.0 Notes & Project Standards**

**C1.0 Overall Existing Conditions Plan**


VICINITY MAP
SCALE: 1" = 100'

### Electric Service
Middle Tennessee Electric
Membership Corporation
2156 Edward Curd Lane
Franklin, Tennessee 37067
615.794.1102

### Gas Service
Piedmont Natural Gas
www.piedmontng.com

### Water Service
City of Franklin Water and Sewer
124 Lumber Dr.
Franklin, Tennessee 37064
615.794.4554

### Sewer Service
City of Franklin Water and Sewer
124 Lumber Dr.
Franklin, Tennessee 37064
615.794.4554

### Utility Location
Tennessee One-Call
800.351.1111

### Property Information
725 West Main St.
Franklin, TN 37064
Tax Map 78C Group J, Parcel 22
Zoned: OR

### Owner
Crews West Main, LLC
131 Third Avenue North
Franklin, TN 37064
Contact: Charles Crews

### Developer
Bernie Butler
D9 Development, LLC
131 Third Avenue North
Franklin, TN 37064
615.419.6933
berniebutler@d9development.com


### Civil Engineer
Dale & Associates (Adam Seger, PE)
516 Heather Place
Nashville, Tennessee 37204
615.297.5166
Contact: Adam Seger
adam@daleandassociates.net

### Survey Provided by
Wilson and Associates, P.C.
108 Beasley Drive
Franklin, TN 37064
615.794.2275

### Architect
Studio 8 Design
714 Eighth Avenue South
Nashville, TN 37203
615.250.8150
Contact: Anna Ruth Kimbrough
arkimbrough@s8-design.com

### Landscape Architect
Design Studio
908 High Point Ridge
Franklin, TN 37069
615.218.8118
Contact: Jason Goddard
jgoddard@designstudioplan.com


## Site Description

The Arlington at West Main site is located within the Office Residential zoning district and within the CFCO-3 and CFCO-7 character area and HPO overlay areas. The development scope includes demolition of the existing apartment buildings currently located on the property and the construction of high-end multi-family units to be named The Arlington at West Main. We are planning to construct and entirely new and modern building that is more in keeping with the updated fabric of downtown Franklin and in compliance with the traditional, downtown core development standards, the CFCO-3 and CFCO-7 character area design standards, and the HPO overlay design guidelines. The future use will achieve this with the installment of these high end condominiums. Stairs and elevators providing access to all floors and outside porches and sitting areas will be built. The building will also have a driveway with a garage entrance to underground parking.

# Notes & Project Standards


Dale & Associates
Consulting Civil Engineering
Land Planning & Zoning
Landscape Architecture
Surveying
516 Heather Place
Nashville, Tennessee 37204
(615) 297-5166


Drawing Date:
May 9, 2016

Revisions:
5/24/2016
DRT comments

The Arlington at West Main
SDR Rezone
Being Parcel 22 on Tax Map 78C, Group J
725 West Main St.
Franklin, Williamson County, Tennessee

ADAM JOSEPH SEGER
REGISTERED
AGRICULTURAL ENGINEER
COMMERCE
STATE OF TENNESSEE
5/9/16

PERMITS:

D&A Project #15153
The Arlington at West Main

C0.0

Sheet 1 of 2

## Electric Service
Middle Tennessee Electric
Membership Corporation
2156 Edward Curd Lane
Franklin, Tennessee 37067
615.794.1102

## Gas Service
Piedmont Natural Gas
www.piedmontng.com

## Water Service
City of Franklin Water and Sewer
124 Lumber Dr.
Franklin, Tennessee 37064
615.794.4554

## Sewer Service
City of Franklin Water and Sewer
124 Lumber Dr.
Franklin, Tennessee 37064
615.794.4554

## Property Information
725 West Main Street
Franklin, TN 37064
Tax Map 78C Group J, Parcel 22
Zoned: OR

## Owner
Crews West Main ,LLC
131 Third Avenue North
Franklin, TN 37064

## Developer
Bernie Butler
D9 Development, LLC
131 Third Avenue North
Franklin, TN 37064
615.419.6933

## Civil Engineer
Dale & Associates (Adam Seger, PE)
516 Heather Place
Nashville, Tennessee 37204
615.297.5166

## Survey Provided by
Wilson and Associates, P.C.
108 Beasley Drive
Franklin, TN 37064
615.794.2275

## Floodnote
A Portion of This Property does Lie Within a Flood Hazard Area as Depicted on the Preliminary Flood Insurance Rate Maps (FIRM) Number 47187C0211G. Dated August 29, 2014

## Grading and Drainage Data Chart
- Site Area: 39,108 SF
- Impervious Area: 11,558 SF Existing, 20,400 SF Proposed
- Disturbed Area on Site (within PUD): 32,292 SF

## Water and Sewer Data Chart
- Facility Type: Multifamily Units
- Total Flow in GPD: 3,000 GPD

## Adjacent Fire Hydrant Flow Test Results
Below is a summary of Hydrant Flow Test Results from Existing Hydrants located along West Main Street to the Northeast intersection of 7th Avenue and Northwest corner of the Site. The Flowing Hydrant is at the North East Intersection of Public Square and East Main Street, while the residual hydrant is at the North East corner of East main and 2nd Avenue.

Static Pressure = 85 psi
Residual Pressure = 75 psi
Flow at Residual = 1087 gpm
Calc. Flow @ 20 psi = 3623 gpm

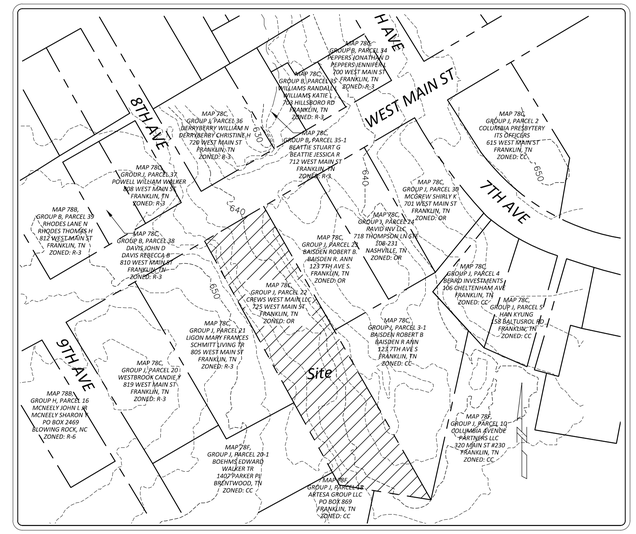
Results of the Fire Flow Model utilizing the above field data:
Ex. Fire Hydrant: 3623 gpm @ 20 psi Min Zone Pressure

SCALE: 1" = 30'
NAD83 Datum

No Mineral Rights are Held by Parties Outside of the property owner

## LEGEND

| | |
|---|---|
| EXISTING IRON ROD | ○ |
| IRON ROD SET | ● |
| EXISTING CONCRETE MONUMENT | □ |
| CONCRETE MONUMENT SET | ■ |
| STORMWATER AREA DRAIN | |
| STORMWATER MANHOLE | |
| STORMWATER INLET | |
| SEWER MANHOLE | |
| SEWER CLEANOUT | |
| WATER VALVE | |
| FIRE HYDRANT | |
| BOLLARD | ● |
| STREET LIGHT | |
| ELECTRIC BOX | |
| TELEPHONE PEDESTAL | |
| MINIMUM BUILDING SETBACK LINE | M.B.S.L. |
| PUBLIC UTILITY/ACCESS ESMT | P.U.A.E. |
| CONCRETE SURFACE | |

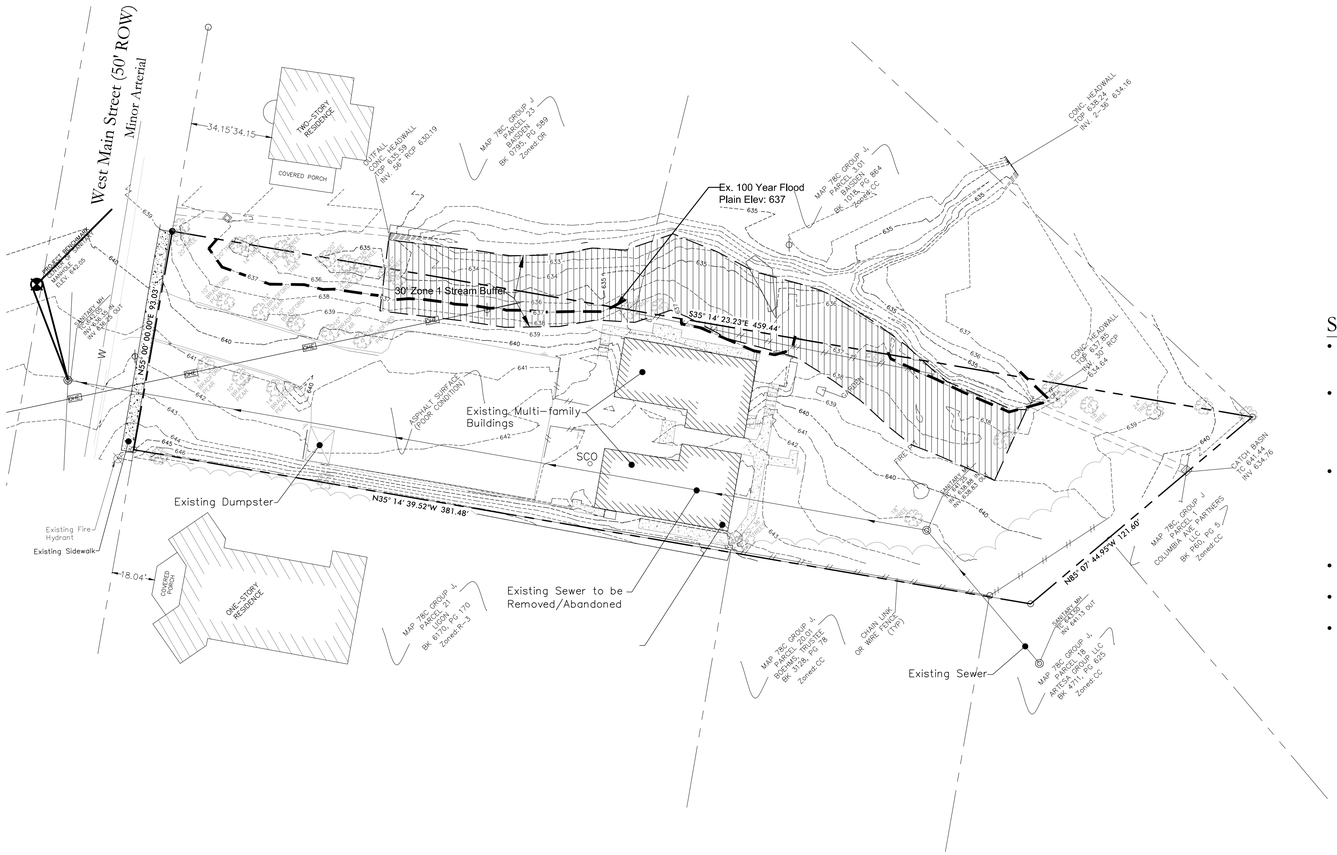



VICINITY MAP
SCALE: 1" = 100'

## Legal Description
Commencing from a point of the north westerly most corner of the property conveyed to Crews West Main, L.L.C. Property is also recorded as Parcel 22, on Tax Map 78C, Group J with the Register's Office of Williamson County, Tennessee, and being more particularly described according to a survey by Wilson & Associates, P.C. dated 8-7-15 as follows:

Thence N 55°00'00.00" E a distance of 93.03 feet to a point, thence S 35°14'23.23" E a distance of 459.44' E to a point, thence N 85°07'44.95" W a distance of 121.60' to a point, thence N 35°14'39.52" W a distance of 381.48' to the POINT OF BEGINNING, containing 39,108 square feet or 0.9 acres of land, more or less.

## Statement of Impacts
- Water and Sewer will both be provided by the City of Franklin Water and Sewer Department, the anticipated maximum domestic flow demand for this development is 3,000 GPD.
- Increased runoff is anticipated on existing storm infrastructure, therefore stormwater structures for treatment and detention are proposed and a stormwater management plan is required. Footprint of proposed improvements to site is greater than 10,000 SF of disturbed area with increase in impervious surface greater than 5,000 SF (Final ISR Forthcoming)
- The site will have its main access off of West Main St. (Minor Arterial), approximately 250' West of the intersection with 7th Ave. S. (Major Collector). Peak Traffic Flows shown below (Based on ITE Trip Generation Handbook, 8th Edition):
  AM In = 1 Trip/hr PM In = 3 Trips/hr
  AM Out = 4 Trips/hr PM Out = 2 Trips/hr
  The Trips shown above would have a negligible impact to the existing streets.
- Site is located approximately 2,500' from the nearest Fire Department, and 700' from the nearest police department.
- The Site will be served by a Fire Sprinkler System, and is within 10' of the nearest fire Hydrant west the northwest corner of the property. Fire Flow information is provided.
- Refuse/Sanitation collection facilities will be located within the parking garage of the proposed development and will be collected via private waste management service.


West Main Street (50' ROW)
Minor Arterial
TWO-STORY RESIDENCE
COVERED PORCH
OUT FALL CONC. HEADWALL INV. 634.19 RCP
MAP 78C, GROUP J PARCEL 23 BASDEN D'ANN PO 589 Zoned:OR
CONC. HEADWALL TOP 638.24 INV. 634.16
Ex. 100 Year Flood Plain Elev: 637
30' Zone 1 Stream Buffer
N55° 00' 00.00"E 93.03'
S35° 14' 23.23"E 459.44'
N85° 07' 44.95"W 121.60'
N35° 14' 39.52"W 381.48'
Existing Multi-family Buildings
SCO
ASPHALT SURFACE (POOR CONDITION)
Existing Dumpster
Existing Fire Hydrant
Existing Sidewalk
Existing Sewer to be Removed/Abandoned
Existing Sewer
SANITARY MH RIM 645.03 INV. 634.65
SANITARY MH RIM 644.13 INV. 634.13 OUT
SANITARY MH RIM 644.13 INV. 634.13
STORM INLET RIM 644.88 INV. 640.88
STORM INLET RIM 644.88 INV. 640.88
STORM INLET RIM 644.88 INV. 640.88

**ORDINANCE 2016-22**

**TO BE ENTITLED, "CONSIDERATION OF ORDINANCE TO REZONE 0.90 ACRES FROM OFFICE RESIDENTIAL – OR DISTRICT TO SPECIFIC DEVELOPMENT – RESIDENTIAL SD-R (10.0) DISTRICT FOR THE PROPERTY LOCATED AT 725 WEST MAIN STREET."**

**WHEREAS,** the City of Franklin, Tennessee, encourages responsible growth and the sensible transition of land uses and densities; and

**WHEREAS**, the Specific Development-Residential district provides zoning for land uses compatible with both the Franklin Land Use Plan and surrounding development; and

**WHEREAS,** the Board of Mayor and Aldermen (BOMA) of the City of Franklin, Tennessee, adopted Resolution 2016-32 approving a Plan Unit Development (PUD) Development Plan as required by the Franklin Zoning Ordinance; and

**WHEREAS,** the zoning has been reviewed and approved by BOMA after a public hearing and a recommendation by the Franklin Municipal Planning Commission.

**NOW THEREFORE BE IT ORDAINED BY THE BOARD OF MAYOR AND ALDERMEN OF THE CITY OF FRANKLIN, TENNESSEE, AS FOLLOWS:**

**SECTION I.** That the following described property shall be, and is hereby, rezoned from its present zoning classification of Office Residential – OR District to Specific Development SD-R (10.0) District:

PREMISES CONSIDERED

| Map-Parcel | Acres |
|---|---|
| 078C J 022.00 | 0.90 |
| Total | 0.90 |

Commencing from a point of the north westerly most corner of the property conveyed to Crews West Main, L.L.C. Property is also recorded as Parcel 22, on Tax Map 78C, Group J with the Register's Office of Williamson County, Tennessee, and being more particularly described according to a survey by Wilson & Associates, P.C. dated 8-7-15 as follows: Thence N 55°00'00.00" E a distance of 93.03 feet to a point, thence S 35°14'23.23" E a distance of 459.44' E to a point, thence N 85°07'44.95" W a distance of 121.60' to a point, thence N 35°14'39.52" W a distance of 381.48' to the POINT OF BEGINNING, containing 39,108 square feet or 0.9 acres of land, more or less.

**SECTION II.** That the attached Location Map shall serve the purpose of further delimiting the geographical boundaries as described by this Ordinance.

**SECTION III.** BE IT FINALLY ORDAINED by the Board of Mayor and Aldermen of the City of Franklin, Tennessee, that this Ordinance shall take effect from and after its passage on third and final reading, the health, safety, and welfare of the citizens requiring it.

**ATTEST:**

By: _____
**Eric Stuckey**
City Administrator/Recorder

**CITY OF FRANKLIN, TENNESSEE:**

By: _____
**Dr. Ken Moore**
Mayor

Approved as to form by:

_____
Shauna R. Billingsley
City Attorney

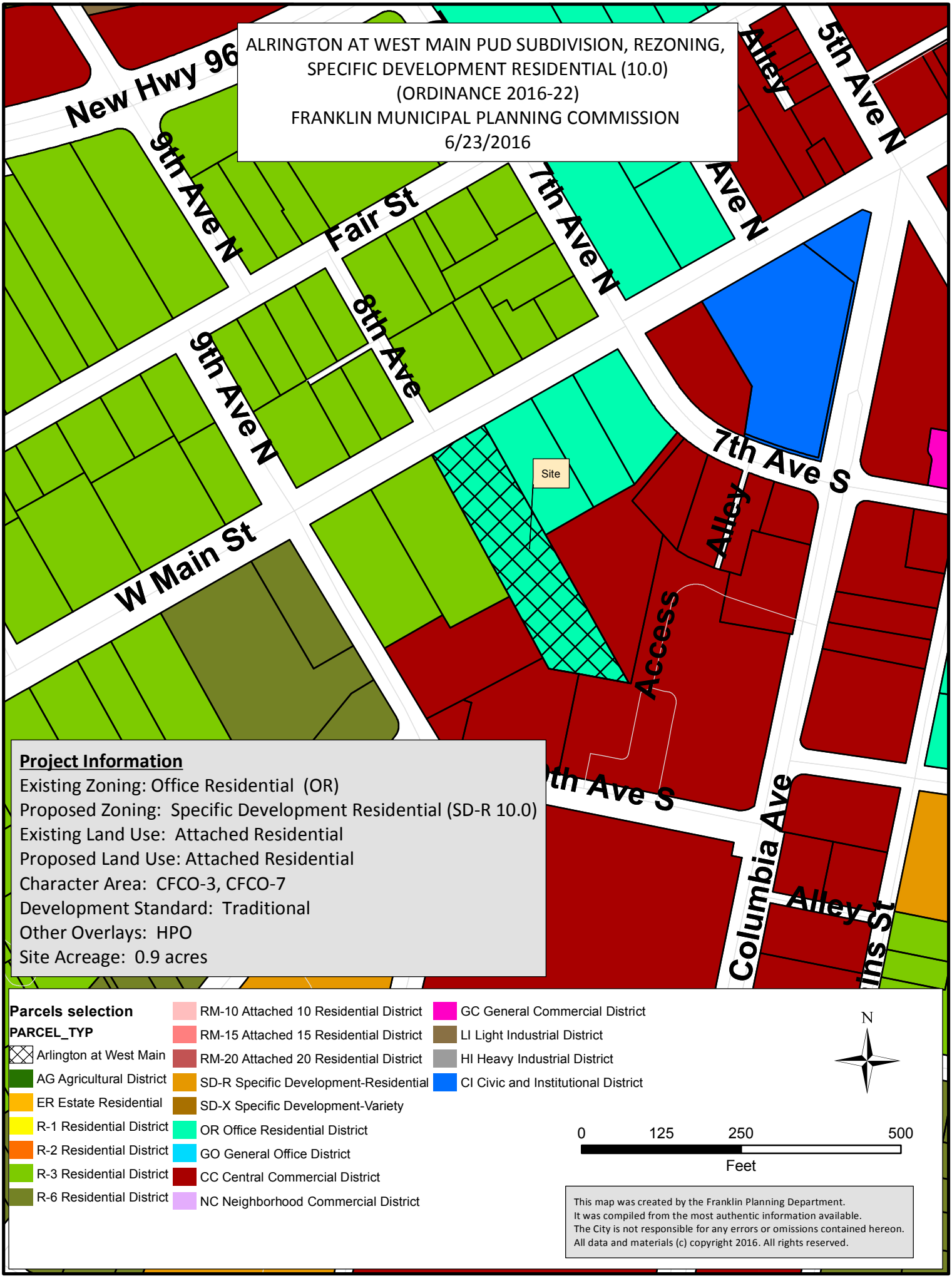
PLANNING COMMISSION RECOMMENDED: _____

PASSED FIRST READING: _____

PUBLIC HEARING HELD: _____

PASSED SECOND READING: _____

PASSED THIRD READING: _____


ALRINGTON AT WEST MAIN PUD SUBDIVISION, REZONING,
SPECIFIC DEVELOPMENT RESIDENTIAL (10.0)
(ORDINANCE 2016-22)
FRANKLIN MUNICIPAL PLANNING COMMISSION
6/23/2016
New Hwy 96
9th Ave N
Fair St
7th Ave N
Alley
5th Ave N
Ave N
8th Ave
9th Ave N
Site
7th Ave S
Alley
W Main St
Access
th Ave S
Columbia Ave
Alley
St
Project Information
Existing Zoning: Office Residential (OR)
Proposed Zoning: Specific Development Residential (SD-R 10.0)
Existing Land Use: Attached Residential
Proposed Land Use: Attached Residential
Character Area: CFCO-3, CFCO-7
Development Standard: Traditional
Other Overlays: HPO
Site Acreage: 0.9 acres
Parcels selection
PARCEL_TYP
Arlington at West Main
AG Agricultural District
ER Estate Residential
R-1 Residential District
R-2 Residential District
R-3 Residential District
R-6 Residential District
RM-10 Attached 10 Residential District
RM-15 Attached 15 Residential District
RM-20 Attached 20 Residential District
SD-R Specific Development-Residential
SD-X Specific Development-Variety
OR Office Residential District
GO General Office District
CC Central Commercial District
NC Neighborhood Commercial District
GC General Commercial District
LI Light Industrial District
HI Heavy Industrial District
CI Civic and Institutional District
N
0
125
250
500
Feet
This map was created by the Franklin Planning Department.
It was compiled from the most authentic information available.
The City is not responsible for any errors or omissions contained hereon.
All data and materials (c) copyright 2016. All rights reserved.

**COF no: 6148**

**CONDITIONS OF APPROVAL:**

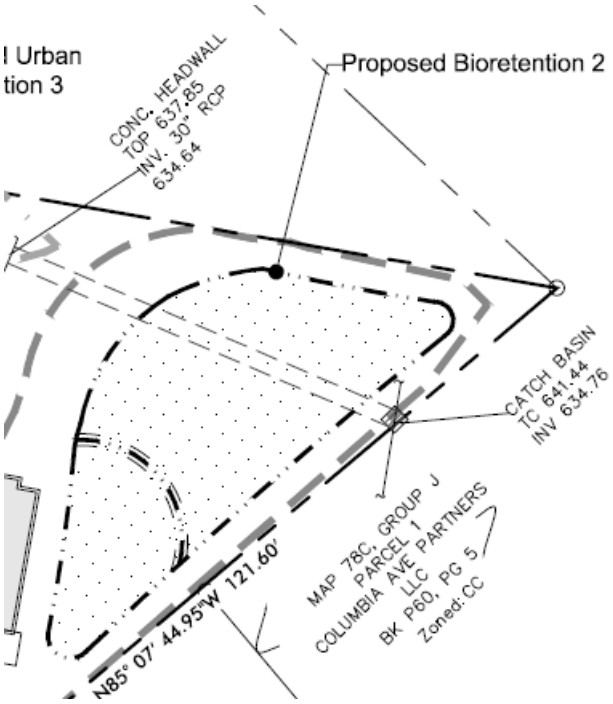
## Engineering - PUD Plan Checklist

### General Comments

#### 1. H. Stormwater Management Plan

- This is an advisory comment to be addressed at Site Plan:

Applicant shall be aware that, due to the location of the underlying existing stormwater infrastructure, Bioretention Area 2 shall be designed as two cells, with the portion underlain by the existing storm pipe not counting towards the water quality volume. Unless the existing storm pipe is to be replaced, care will need to be exercised in the design and construction of this area to ensure that the pipe and pipe bedding are not undermined in the course of excavating and constructing the bioretention area.




## Preservation/HZC

### General Comments

#### 2. COA Conditions of Approval

- The Historic Zoning Commission (HZC) approved demolition of the existing structure at its May 9, 2016 meeting.

The HZC also approved a partial COA for the project at its May 9, 2016 meeting. The partial COA is limited to height (34 feet to roof ridge), massing, scale, and setbacks. The recessed portion of the front façade is approved to be 9 feet recessed from the plane of the front façade and 19 feet recessed from the edge of the front porch. The recessed portion of the front façade is approved to align with the setback of the existing building on the neighboring lot to the left.

Building materials and façade design elements have not been considered for a COA at this time. These elements will require issuance of a COA prior to or concurrently with Site Plan review.

The Partial COA approval is contingent upon approval of the applicant's rezoning request.

- An application for a full COA will be submitted concurrently with Site Plan Review

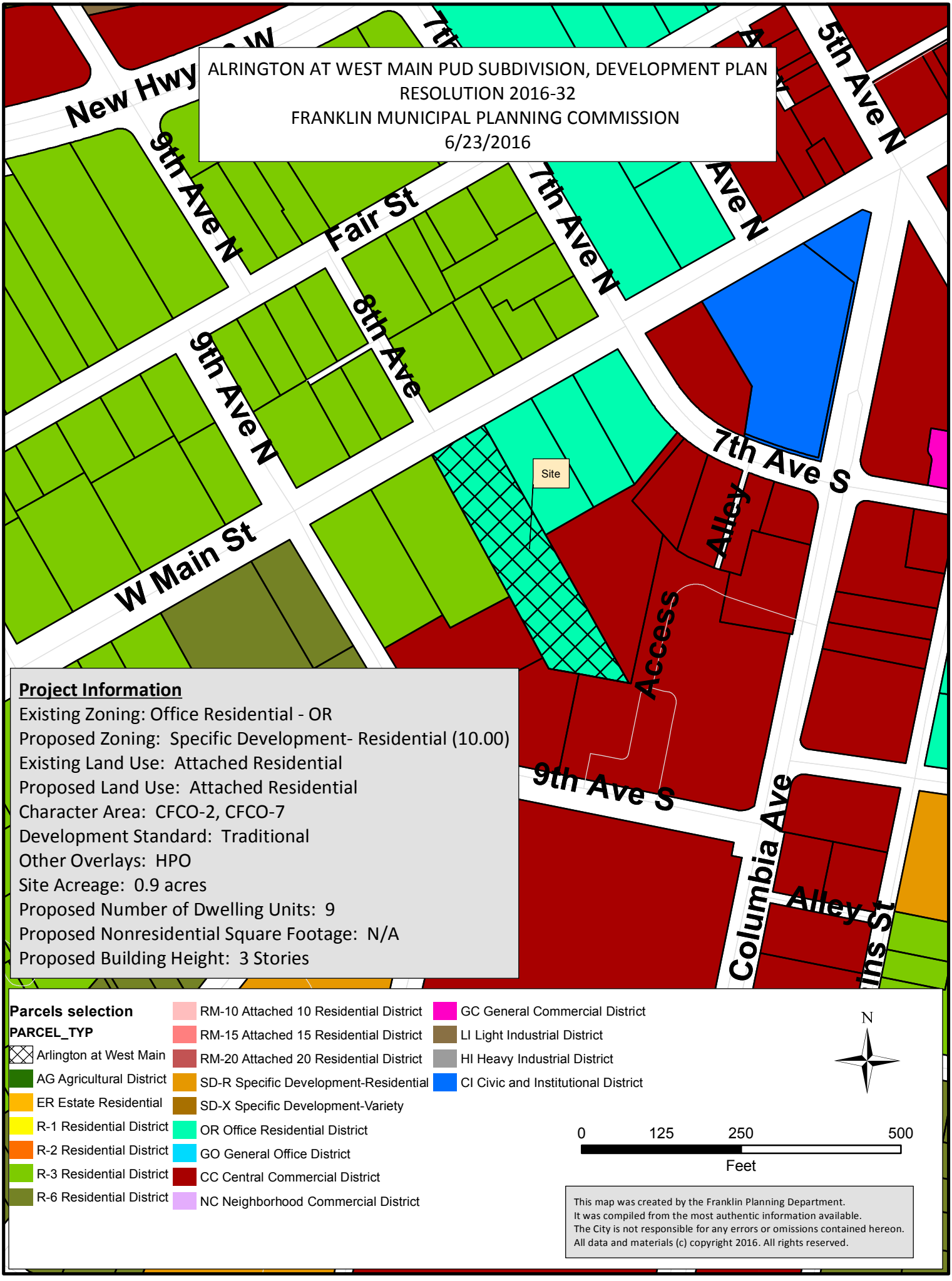
## Zoning

### General Comments

#### 3. FFE

- What is the proposed FFE of the parking garage?
- the proposed FFE for the parking garage is 636.0 and is labeled on the plans.
- Project information and consideration:

Please refer to FEMA Technical Bulletin 6-93 for information regarding below-grade parking requirements. This will be an important reference for this project.


ALRINGTON AT WEST MAIN PUD SUBDIVISION, DEVELOPMENT PLAN
RESOLUTION 2016-32
FRANKLIN MUNICIPAL PLANNING COMMISSION
6/23/2016
New Hwy
9th Ave N
Fair St
7th Ave N
8th Ave
5th Ave N
Site
7th Ave S
Alley
W Main St
Access
9th Ave S
Columbia Ave
Alley St
Project Information
Existing Zoning: Office Residential - OR
Proposed Zoning: Specific Development- Residential (10.00)
Existing Land Use: Attached Residential
Proposed Land Use: Attached Residential
Character Area: CFCO-2, CFCO-7
Development Standard: Traditional
Other Overlays: HPO
Site Acreage: 0.9 acres
Proposed Number of Dwelling Units: 9
Proposed Nonresidential Square Footage: N/A
Proposed Building Height: 3 Stories
Parcels selection
PARCEL_TYP
Arlington at West Main
AG Agricultural District
ER Estate Residential
R-1 Residential District
R-2 Residential District
R-3 Residential District
R-6 Residential District
RM-10 Attached 10 Residential District
RM-15 Attached 15 Residential District
RM-20 Attached 20 Residential District
SD-R Specific Development-Residential
SD-X Specific Development-Variety
OR Office Residential District
GO General Office District
CC Central Commercial District
NC Neighborhood Commercial District
GC General Commercial District
LI Light Industrial District
HI Heavy Industrial District
CI Civic and Institutional District
N
0
125
250
500
Feet
This map was created by the Franklin Planning Department.
It was compiled from the most authentic information available.
The City is not responsible for any errors or omissions contained hereon.
All data and materials (c) copyright 2016. All rights reserved.

# The Arlington at West Main

## A PUD Subdivision

**COF Project # 6148**

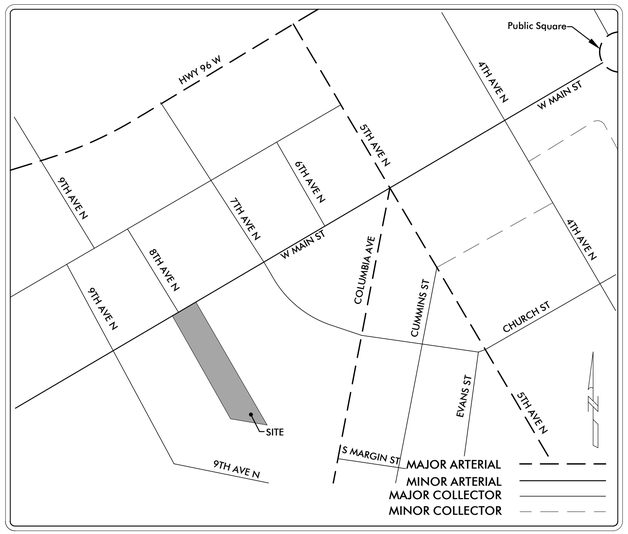
725 West Main Street

Being Parcel 22 on Tax Map 78C, Group J

Franklin, Williamson County, Tennessee

TOTAL AREA = 0.9 ACRES
= 39,108 S.F.

Date: May 9, 2016



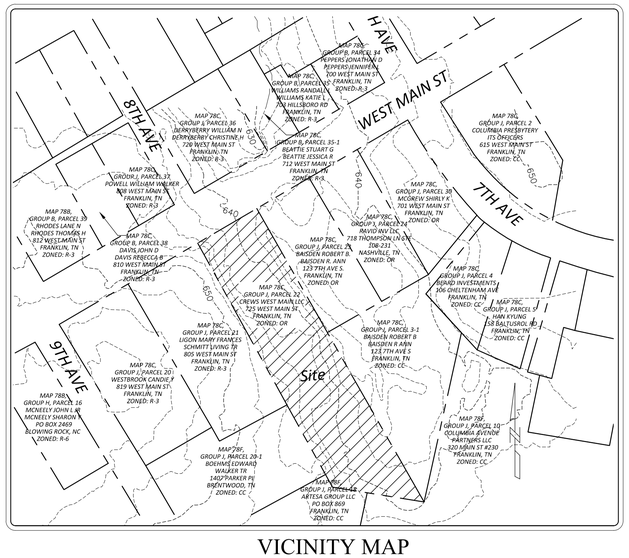

LOCATION MAP
N.T.S.

## Sheet Schedule


**C0.0 Notes & Project Standards**
**C1.0 Overall Existing Conditions Plan**
**C2.0 Overall Development Plan**
**C3.0 Overall Grading and Drainage Plan**
**C4.0 Overall Utility/ROW and Access Plan**
**A1.0 Preliminary Building Floor Plans**
**A3.0 Conceptual Building Elevations and Renderings**
**A3.1 Conceptual Building Elevations and Renderings**


## Site Data

| | |
|---|---|
| PROJECT NAME: | The Arlington at West Main |
| CITY OF FRANKLIN PROJECT # | 6148 |
| ACREAGE OF SITE/PROJECT AREA: | 39,108 S.F. / 0.9 AC |
| SUBDIVISION: | Plan of Hincheyville Subdivision |
| LOT NUMBER: | 6 |
| ADDRESS: | 725 West Main Street |
| CITY: | Franklin |
| COUNTY: | Williamson County |
| STATE: | Tennessee |
| ALDERMANIC WARD: | 4 |
| EXISTING ZONING & CHARACTER OV: | Office Residential / CFCO -3, CFCO-7 |
| PROPOSED ZONING: | SD-R 10.00 |
| OTHER APPLICABLE OVERLAYS: | HPO/Downtown Franklin Local Historic District |
| APPLICABLE DEVELPMENT STANDARDS: | Traditional (Downtown Core) |
| HISTORIC BUILDINGS WITHIN 500': | St. Paul's Episcopal Church (700') |
| LAND USE: | 9 Multi-Family Units |
| DENSITY: | 10 Unit/Acre |
| MINIMUM REQUIRED SETBACK LINES: | |
| FRONT AND STREET: | 15' |
| SIDE YARD: | 5' |
| REAR YARD: | 5' |
| BUILDING FOOTPRINT: | Existing - 3,240 SF |
| | Proposed - 16,311 SF |
| BUILDING SQUARE FOOTAGE: | Existing - 7,476 SF |
| | Proposed - 30,738 SF |
| BUILDING HEIGHT: | 2 Stories Proposed |
| *PARKING REQUIREMENTS: | 6 Units x 3 Bedrooms= 6 x 3 Spaces= 18 Spaces<br>3 Units x 2 Bedrooms= 3 x 2.5 Spaces= 7.5 Spaces<br>Proposed Parking 26 Spaces |
| MINIMUM LANDSCAPE SURFACE | 0.1 of Total Site |




VICINITY MAP
SCALE: 1" = 100'

### Electric Service
Middle Tennessee Electric
Membership Corporation
2156 Edward Curd Lane
Franklin, Tennessee 37067
615.794.1102

### Gas Service
Piedmont Natural Gas
www.piedmontng.com

### Water Service
City of Franklin Water and Sewer
124 Lumber Dr.
Franklin, Tennessee 37064
615.794.4554

### Sewer Service
City of Franklin Water and Sewer
124 Lumber Dr.
Franklin, Tennessee 37064
615.794.4554

### Utility Location
Tennessee One-Call
800.351.1111

### Property Information
725 West Main St.
Franklin, TN 37064
Tax Map 78C Group J, Parcel 22
Zoned: OR

### Owner
Crews West Main, LLC
131 Third Avenue North
Franklin, TN 37064
Contact: Charles Crews

### Developer
Bernie Butler
D9 Development, LLC
131 Third Avenue North
Franklin, TN 37064
615.419.6933
berniebutler@d9development.com

### Civil Engineer
Dale & Associates (Adam Seger, PE)
516 Heather Place
Nashville, Tennessee 37204
615.297.5166
Contact: Adam Seger
adam@daleandassociates.net

### Survey Provided by
Wilson and Associates, P.C.
108 Beasley Drive
Franklin, TN 37064
615.794.2275

### Architect
Studio 8 Design
714 Eighth Avenue South
Nashville, TN 37203
615.250.8150
Contact: Anna Ruth Kimbrough
arkimbrough@s8-design.com

### Landscape Architect
Design Studio
908 High Point Ridge
Franklin, TN 37069
615.218.8118
Contact: Jason Goddard
jgoddard@designstudioplan.com

### Site Description

The Arlington at West Main site is located within the Office Residential zoning district and within the CFCO-3 and CFCO-7 character area and HPO overlay areas. The development scope includes demolition of the existing apartment buildings currently located on the property and the construction of high-end multi-family units to be named The Arlington at West Main. We are planning to construct and entirely new and modern building that is more in keeping with the updated fabric of downtown Franklin and in compliance with the traditional, downtown core development standards, the CFCO-3 and CFCO-7 character area design standards, and the HPO overlay design guidelines. The future use will achieve this with the installment of these high end condominiums. Stairs and elevators providing access to all floors and outside porches and sitting areas will be built. The building will also have a driveway with a garage entrance to underground parking.

# Notes & Project Standards

**Drawing Date:**
May 9, 2016

**Revisions:**
5/24/2016
DRT comments

The Arlington at West Main
A PUD Subdivision
Being Parcel 22 on Tax Map 78C, Group J
725 West Main St.
Franklin, Williamson County, Tennessee

ADAM JOSEPH SEGER
REGISTERED ENGINEER
AGRICULTURE
COMMERCE
STATE OF TENNESSEE
5/9/16

**PERMITS:**

Dale & Associates
Consulting Civil Engineering
Land Planning & Zoning
Landscape Architecture
Surveying
516 Heather Place
Nashville, Tennessee 37204
(615) 297-5166

D&A Project #15153
The Arlington at West Main

**C0.0**

Sheet 1 of 5

## Electric Service
Middle Tennessee Electric
Membership Corporation
2156 Edward Curd Lane
Franklin, Tennessee 37067
615.794.1102

## Gas Service
Piedmont Natural Gas
www.piedmontng.com

## Water Service
City of Franklin Water and Sewer
124 Lumber Dr.
Franklin, Tennessee 37064
615.794.4554

## Sewer Service
City of Franklin Water and Sewer
124 Lumber Dr.
Franklin, Tennessee 37064
615.794.4554

## Property Information
725 West Main Street
Franklin, TN 37064
Tax Map 78C Group J, Parcel 22
Zoned: OR

## Owner
Crews West Main ,LLC
131 Third Avenue North
Franklin, TN 37064

## Developer
Bernie Butler
D9 Development, LLC
131 Third Avenue North
Franklin, TN 37064
615.419.6933

## Civil Engineer
Dale & Associates (Adam Seger, PE)
516 Heather Place
Nashville, Tennessee 37204
615.297.5166

## Survey Provided by
Wilson and Associates, P.C.
108 Beasley Drive
Franklin, TN 37064
615.794.2275

## Floodnote
A Portion of This Property does Lie Within a Flood Hazard Area as Depicted on the Preliminary Flood Insurance Rate Maps (FIRM) Number 47187C0211G. Dated August 29, 2014

30 0 30 60 90

SCALE: 1" = 30'

NAD83 Datum

No Mineral Rights are Held by Parties Outside of the property owner

## LEGEND

| | |
|---|---|
| EXISTING IRON ROD | ○ |
| IRON ROD SET | ● |
| EXISTING CONCRETE MONUMENT | □ |
| CONCRETE MONUMENT SET | ■ |
| STORMWATER AREA DRAIN | |
| STORMWATER MANHOLE | |
| STORMWATER INLET | |
| SEWER MANHOLE | |
| SEWER CLEANOUT | |
| WATER VALVE | |
| FIRE HYDRANT | |
| BOLLARD | ● |
| STREET LIGHT | |
| ELECTRIC BOX | |
| TELEPHONE PEDESTAL | |
| MINIMUM BUILDING SETBACK LINE | M.B.S.L. |
| PUBLIC UTILITY/ACCESS ESMT | P.U.A.E. |
| CONCRETE SURFACE | |

Tree to be Removed
Tree to Remain

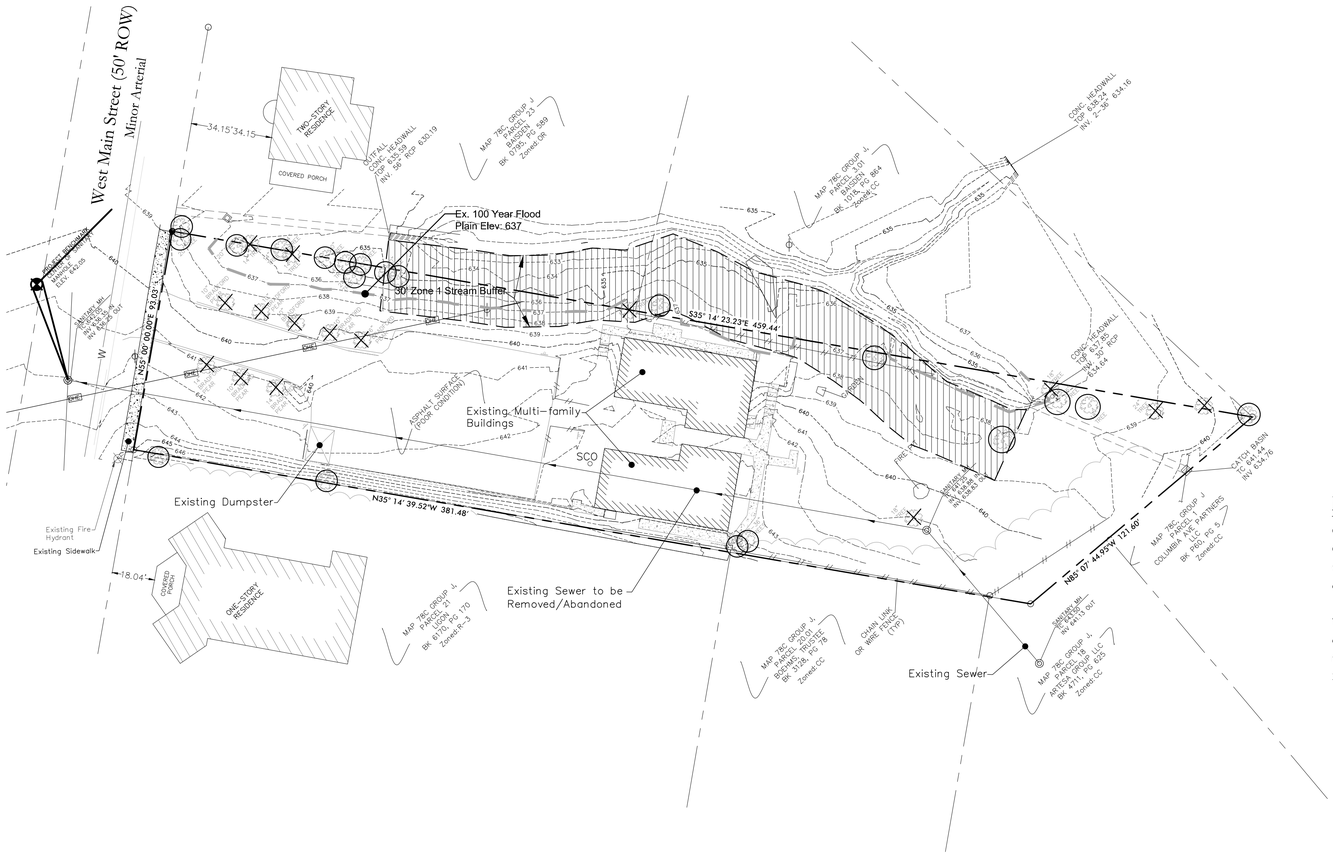
## Stormwater Narrative:

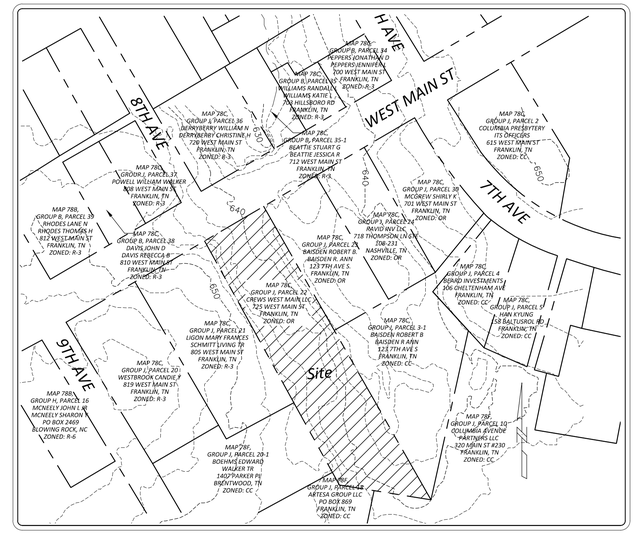
The existing site is approximately 0.9 acres of office residential zoned property within the Downtown Core of Franklin, TN. The site consists of pervious surfaces and impervious surfaces. Impervious Surfaces include an existing building, paved parking and dumpster pad, and concrete walks for pedestrian traffic. The vegetation and pervious surface that exists on the site is in the form trees and turf. The soil profile for the site consists of Egam Silt Loam (Eg), which is a Type 'C' Soil, and Captina Silt Loam (CaC2), which is a Type 'D' soil, per the NRCS Soil Maps.

Topography for most of the site is fairly flat ranging from 0-6% in slopes, and steeper slopes run along the northeast property line. Existing stormwater runoff sheet flows then concentrates where it is then conveyed to a stream, which drains offsite. This site has a 100 year flood plain elevation of 637' which crosses into the site in three different small areas. Also, there is a 30' stream buffer that is offset from the existing stream offsite and crosses into the property.

## Grading and Drainage Data Chart

- Site Area: 39,108 SF
- Impervious Area: 11,558 SF Existing, 20,400 SF Proposed




VICINITY MAP
SCALE: 1" = 100'

## Site Data

| | |
|---|---|
| **PROJECT NAME:** | **The Arlington at West Main** |
| **CITY OF FRANKLIN PROJECT #** | **6148** |
| **SUBDIVISION:** | **Plan of Hincheyville Subdivsion** |
| **LOT NUMBER:** | **6** |
| **ADDRESS:** | **725 West Main Street** |
| **CITY:** | **Franklin** |
| **COUNTY:** | **Williamson County** |
| **STATE:** | **Tennessee** |
| **ALDERMANIC WARD:** | **4** |
| **EXISTING ZONING & CHARACTER OV:** | **Office Residential / CFCO -3, CFCO-7** |
| **PROPOSED ZONING:** | **SD-R 10.00** |
| **OTHER APPLICABLE OVERLAYS:** | **HPO/Downtown Franklin Local Historic District** |
| **APPLICABLE DEVELPMENT STANDARDS:** | **Traditional (Downtown Core)** |
| **ACREAGE OF SITE/PROJECT AREA:** | **39,108 S.F. / 0.9 AC** |

| | |
|---|---|
| **MINIMUM REQUIRED SETBACK LINES:** | |
| **FRONT AND STREET:** | **15'** |
| **SIDE YARD:** | **5'** |
| **REAR YARD:** | **5'** |
| **BUILDING FOOTPRINT:** | **Existing - 3,240 SF** |
| **BUILDING SQUARE FOOTAGE:** | **Existing - 7,476 SF** |
| **MINIMUM LANDSCAPE SURFACE** | **0.1 of Total Site** |

## Legal Description

Commencing from a point of the north westerly most corner of the property conveyed to Crews West Main, L.L.C. Property is also recorded as Parcel 22, on Tax Map 78C, Group J with the Register's Office of Williamson County, Tennessee, and being more particularly described according to a survey by Wilson & Associates, P.C. dated 8-7-15 as follows:

Thence N 55°00'00.00" E a distance of 93.03 feet to a point, thence S 35°14'23.23" E a distance of 459.44' E to a point, thence N 85°07'44.95" W a distance of 121.60' to a point, thence N 35°14'39.52" W a distance of 381.48' to the POINT OF BEGINNING, containing 39,108 square feet or 0.9 acres of land, more or less.

TENNESSEE ONE CALL SYSTEM, INC. TN 811 TWX - 1-811 STOP - CALL BEFORE YOU DIG!

# Overall Existing Conditions Plan

Dale & Associates
Consulting Civil Engineering
Land Planning & Zoning
Landscape Architecture
Surveying
516 Heather Place
Nashville, Tennessee 37204
(615) 297-5166

**Drawing Date:**
May 9, 2016

**Revisions:**
5/24/2016
DRT comments

# The Arlington at West Main

A PUD Subdivision
Being Parcel 22 on Tax Map 78C, Group J
725 West Main St.
Franklin, Williamson County, Tennessee

ADAM JOSEPH SEGER — REGISTERED AGRICULTURAL ENGINEER — STATE OF TENNESSEE — 5/9/16

**PERMITS:**

D&A Project #15153
The Arlington at West Main
**C1.0**
Sheet 2 of 5

## Electric Service
Middle Tennessee Electric
Membership Corporation
2156 Edward Curd Lane
Franklin, Tennessee 37067
615.794.1102

## Gas Service
Piedmont Natural Gas
www.piedmontng.com

## Water Service
City of Franklin Water and Sewer
124 Lumber Dr.
Franklin, Tennessee 37064
615.794.4554

## Sewer Service
City of Franklin Water and Sewer
124 Lumber Dr.
Franklin, Tennessee 37064
615.794.4554

## Property Information
725 West Main Street
Franklin, TN 37064
Tax Map 78C Group J, Parcel 22
Zoned: OR

## Owner
Crews West Main ,LLC
131 Third Avenue North
Franklin, TN 37064

## Developer
Bernie Butler
D9 Development, LLC
131 Third Avenue North
Franklin, TN 37064
615.419.6933

## Civil Engineer
Dale & Associates (Adam Seger, PE)
516 Heather Place
Nashville, Tennessee 37204
615.297.5166

## Survey Provided by
Wilson and Associates, P.C.
108 Beasley Drive
Franklin, TN 37064
615.794.2275

## Floodnote
A Portion of This Property does Lie Within a Flood Hazard Area as Depicted on the Preliminary Flood Insurance Rate Maps (FIRM) Number 47187C0211G. Dated August 29, 2014

## Grading and Drainage Data Chart
- Site Area: 39,108 SF
- Impervious Area: 11,558 SF Existing, 20,400 SF Proposed
- Disturbed Area on Site (within PUD): 32,292 SF

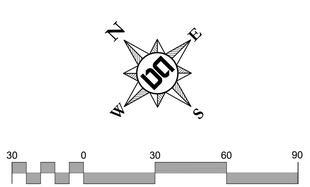
## Water and Sewer Data Chart
- Facility Type: Multifamily Units
- Total Flow in GPD: 3,000 GPD

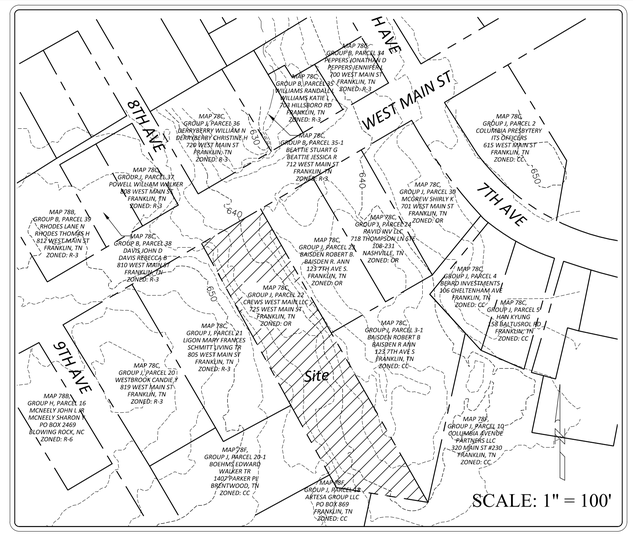
## Historic Property Information
This site is a Historic property within the Hincheyville National Register Historic District. Nearby historic properties include:
- St. Paul's Episcopal Church - Located approximately 700' Northeast at 510 West Main St.

## Adjacent Fire Hydrant Flow Test Results
Below is a summary of Hydrant Flow Test Results from Existing Hydrants located along West Main Street to the Northeast intersection of 7th Avenue and Northwest corner of the Site. The Flowing Hydrant is at the North East Intersection of 7th Avenue and West Main Street, while the residual hydrant is at the Northwest corner of the site.

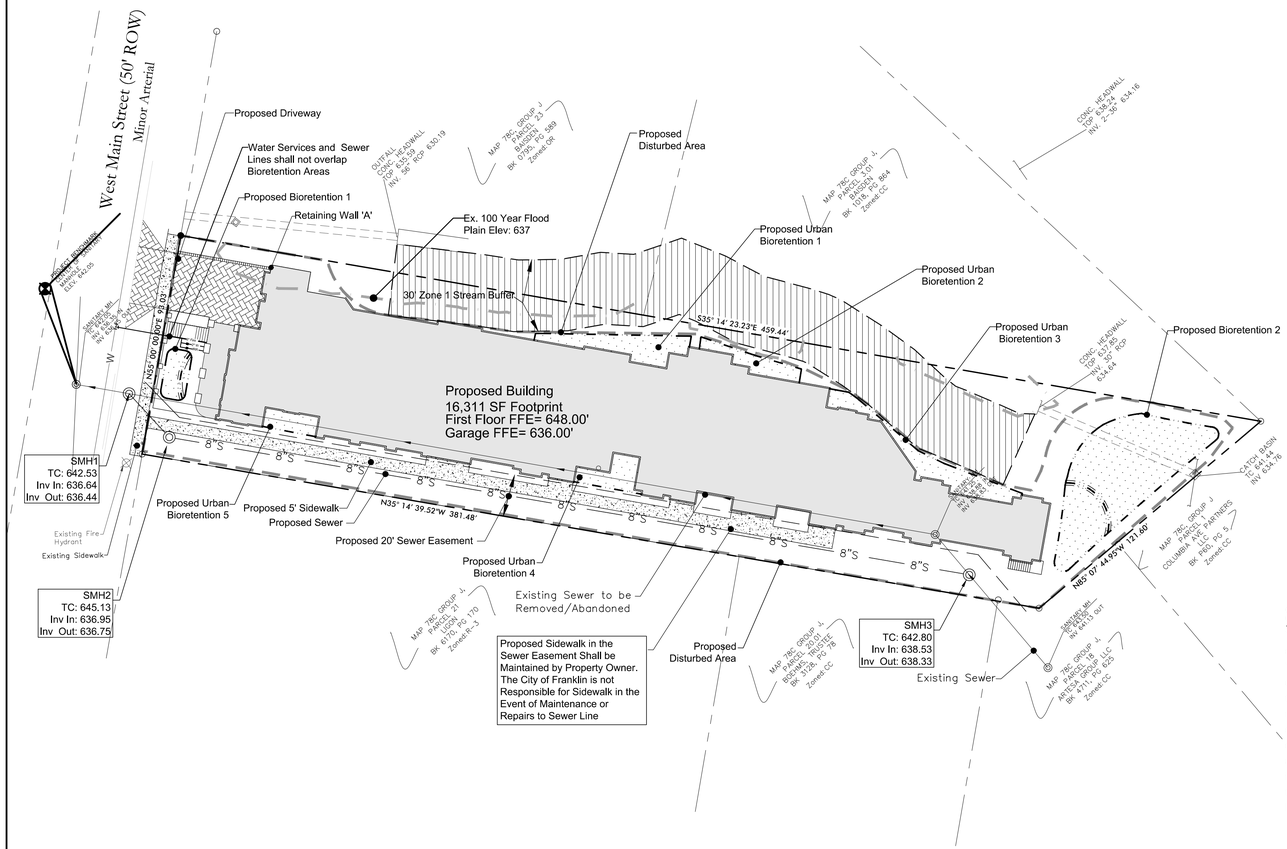
Static Pressure = 85 psi
Residual Pressure = 75 psi
Flow at Residual = 1087 gpm
Calc. Flow @ 20 psi = 3623 gpm

Results of the Fire Flow Model utilizing the above field data:
Ex. Fire Hydrant: 3623 gpm @ 20 psi Min Zone Pressure




VICINITY MAP




## General Notes
1. Utility Connections:
   - A new water tap is proposed to be utilized and an all new service line will be installed off the proposed tap as well as a RPBP located inside the building. New sewer tap is proposed to be utilized with new pipe to be installed from clean out.
2. Parking for this development shall be provided by a structured parking lot underneath the building.
3. Lighting:
   - The lighting of the building will include the Code required building mounted emergency egress lighting as well as building illumination in keeping with the requirements set forth in Section 5.11 of the Franklin Zoning Ordinance. An exterior lighting plan and fixture cutsheets are not yet available as the design is not at that level of development.

## Site Data

| | |
|---|---|
| **PROJECT NAME:** | **The Arlington at West Main** |
| **CITY OF FRANKLIN PROJECT #** | **6148** |
| **SUBDIVISION:** | **Plan of Hincheyville Subdivsion** |
| **LOT NUMBER:** | **6** |
| **ADDRESS:** | **725 West Main Street** |
| **CITY:** | **Franklin** |
| **COUNTY:** | **Williamson County** |
| **STATE:** | **Tennessee** |
| **ALDERMANIC WARD:** | **4** |
| **EXISTING ZONING & CHARACTER OV:** | **Office Residential / CFCO -3, CFCO-7** |
| **PROPOSED ZONING:** | **SD-R 10.00** |
| **OTHER APPLICABLE OVERLAYS:** | **HPO/Downtown Franklin Local Historic District** |
| **APPLICABLE DEVELPMENT STANDARDS:** | **Traditional (Downtown Core)** |
| **ACREAGE OF SITE/PROJECT AREA:** | **39,108 S.F. / 0.9 AC** |
| **MINIMUM REQUIRED SETBACK LINES:** | |
| **FRONT AND STREET:** | **15'** |
| **SIDE YARD:** | **5'** |
| **REAR YARD:** | **5'** |
| **BUILDING COVERAGE:** | **78.6% Proposed / 80% Allowed** |
| **BUILDING HEIGHT:** | **2 Stories Proposed** |
| **BUILDING FOOTPRINT:** | **Existing - 3,240 SF** |
| | **Proposed - 16,311 SF** |
| **BUILDING SQUARE FOOTAGE:** | **Existing - 7,476 SF** |
| | **Proposed - 30,738 SF** |
| ***PARKING REQUIREMENTS:** | **6 Units x 3 Bedrooms= 6 x 3 Spaces= 18 Spaces**<br>**3 Units x 2 Bedrooms= 3 x 2.5 Spaces= 7.5 Spaces** |
| | **Proposed Parking 26 Spaces** |
| **MINIMUM LANDSCAPE SURFACE** | **0.1 of Total Site / Min 0.1 Proposed** |

## Site Description
The Arlington at West Main site is located within the Office Residential zoning district and within the CFCO-3 and CFCO-7 character area and HPO overlay areas. The development scope includes demolition of the existing apartment buildings currently located on the property and the construction of high-end multi-family units to be named The Arlington at West Main. We are planning to construct and entirely new and modern building that is more in keeping with the updated fabric of downtown Franklin and in compliance with the traditional, downtown core development standards, the CFCO-3 and CFCO-7 character area design standards, and the HPO overlay design guidelines. The future use will achieve this with the installment of these high end condominiums. Stairs and elevators providing access to all floors and outside porches and sitting areas will be built. The building will also have a driveway with a garage entrance to underground parking.

## Statement of Impacts
- Water and Sewer will both be provided by the City of Franklin Water and Sewer Department, the anticipated maximum domestic flow demand for this development is 3,000 GPD.
- Increased runoff is anticipated on existing storm infrastructure, therefore stormwater structures for treatment and detention are proposed and a stormwater management plan is required. Footprint of proposed improvements to site is greater than 10,000 SF of disturbed area with increase in impervious surface greater than 5,000 SF (Final ISR Forthcoming)
- The site will have its main access off of West Main St. (Minor Arterial), approximately 250' West of the intersection with 7th Ave. S. (Major Collector). Peak Traffic Flows shown below (Based on ITE Trip Generation Handbook, 8th Edition):
  AM In = 1 Trip/hr PM In = 3 Trips/hr
  AM Out = 4 Trips/hr PM Out = 2 Trips/hr
  The Trips shown above would have a negligible impact to the existing streets.
- Site is located approximately 2,500' from the nearest Fire Department, and 700' from the nearest police department.
- The Site will be served by a Fire Sprinkler System, and is within 10' of the nearest fire Hydrant west the northwest corner of the property. Fire Flow information is provided.

# Overall Development Plan

**Drawing Date:**
May 9, 2016

**Revisions:**
5/24/2016
DRT comments

# The Arlington at West Main
A PUD Subdivision
Being Parcel 22 on Tax Map 78C, Group J
725 West Main St.
Franklin, Williamson County, Tennessee

ADAM JOSEPH SEGER — LICENSED PROFESSIONAL ENGINEER — AGRICULTURE, COMMERCE — STATE OF TENNESSEE — 5/9/16

**PERMITS:**

TENNESSEE ONE CALL SYSTEM, INC. 1-800-351-1111 — IT'S THE LAW — STOP - CALL BEFORE YOU DIG!


Dale & Associates
Consulting Civil Engineering
Land Planning & Zoning
Landscape Architecture
Surveying
516 Heather Place
Nashville, Tennessee 37204
(615) 297-5166


D&A Project #15153
The Arlington at West Main

**C2.0**

Sheet 3 of 5

**Electric Service**
Middle Tennessee Electric
Membership Corporation
2156 Edward Curd Lane
Franklin, Tennessee 37067
615.794.1102

**Gas Service**
Piedmont Natural Gas
www.piedmontng.com

**Water Service**
City of Franklin Water and Sewer
124 Lumber Dr.
Franklin, Tennessee 37064
615.794.4554

**Sewer Service**
City of Franklin Water and Sewer
124 Lumber Dr.
Franklin, Tennessee 37064
615.794.4554

**Property Information**
725 West Main Street
Franklin, TN 37064
Tax Map 78C Group J, Parcel 22
Zoned: OR

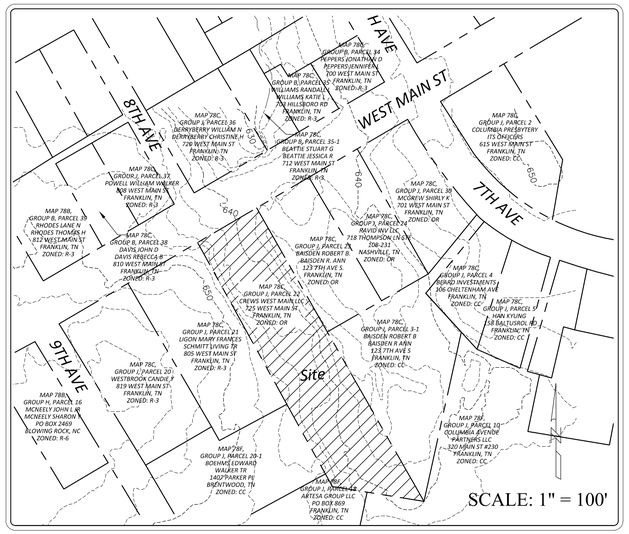
**Owner**
Crews West Main ,LLC
131 Third Avenue North
Franklin, TN 37064

**Developer**
Bernie Butler
D9 Development, LLC
131 Third Avenue North
Franklin, TN 37064
615.419.6933

**Civil Engineer**
Dale & Associates (Adam Seger, PE)
516 Heather Place
Nashville, Tennessee 37204
615.297.5166

**Survey Provided by**
Wilson and Associates, P.C.
108 Beasley Drive
Franklin, TN 37064
615.794.2275

**Floodnote**
A Portion of This Property does Lie Within a Flood Hazard Area as Depicted on the Preliminary Flood Insurance Rate Maps (FIRM) Number 47187C0211G. Dated August 29, 2014



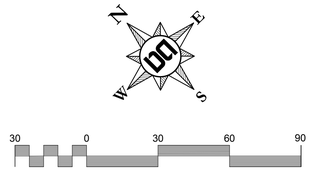

VICINITY MAP

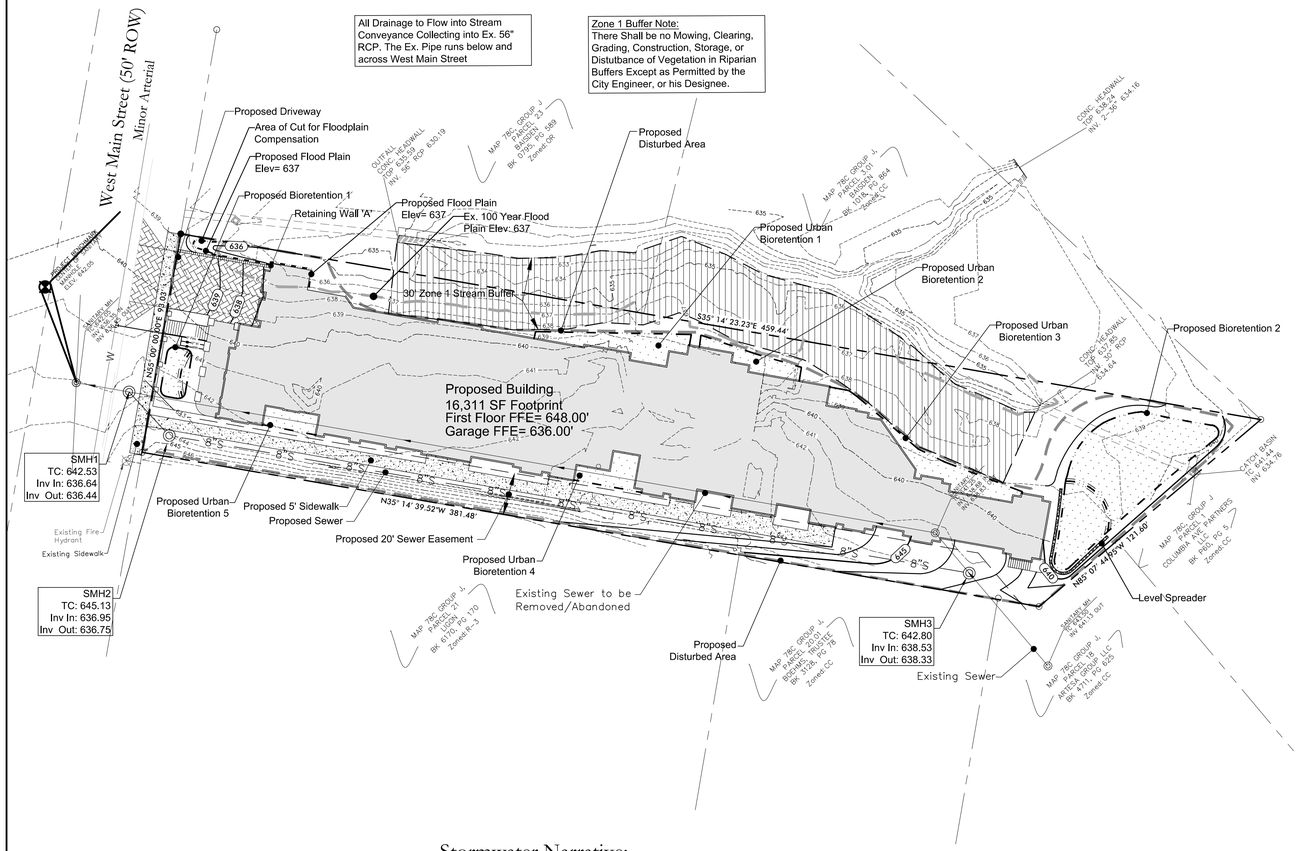
## Floodplain Cut/Fill

- Value of Fill: 104.76 Cu Ft./ 3.88 Cu Yd
- Value of Cut: 119.34 Cu Ft./ 4.42 Cu Yd.

WALL 'A' ELEVATIONS

| | TOP OF WALL | GRADE at BOTTOM OF WALL | HEIGHT | LENGTH |
|---|---|---|---|---|
| A1 | 639.5 | 639.3 | 0.2' | 20' |
| A2 | 639.5 | 637 | 2.5' | 20' |
| A3 | 638 | 636 | 2' | |




## Grading & Drainage General Notes

1. Grading Permit is required for any project disturbing more than 10,000 sf, adding more than 5,000 sf of impervious surface or for any site grading requiring stockpiling of material.

2. The Developer shall provide the necessary labor and supervision required to support field testing by the independent testing firm and inspections by City officials at no cost to the City. Test reports of field testing if applicable shall be submitted directly to the Street Department. Defects disclosed by tests shall be rectified.

3. An authorized representative of the City shall make a final inspection of the project after completion to determine acceptability of the work and for release of performance bonds if required. Before this final inspection can be made, the Engineer responsible for the project shall certify in writing to the City Engineer that the work has been completed in accordance with approved plans and specifications.

4. Drainage facilities including, but not limited to, culverts, detention basins and ditches, as well as the roadway sub-grade, base stone and binder & surface coarse shall be inspected, tested and given approval at each stage of installation prior to proceeding to the next stage of construction. Final construction inspection for approval and acceptance of streets and drainage systems will not be granted until all work has been completed in accordance with the approved plans.

5. Locating and coordination for the relocation of existing utilities is the responsibility of the contractor. Tennessee's One-Call and the City of Franklin utility location service shall be utilized in addition to coordination with local utility owners. The contractor shall at all times protect existing utilities and will be responsible for costs due to damage caused to any utility lines.

## Grading and Drainage Data Chart

- Site Area: 39,108 SF
- Impervious Area: 11,558 SF Existing, 20,400 SF Proposed
- Disturbed Area on Site (within PUD): 32,292 SF

## Statement of Impacts

- Increased runoff is anticipated on existing storm infrastructure, therefore stormwater structures for treatment and detention are proposed and a stormwater management plan is required. Footprint of proposed improvements to site is greater than 10,000 SF of disturbed area with increase in impervious surface greater than 5,000 SF (Final ISR Forthcoming)

## Site Data

| | |
|---|---|
| **PROJECT NAME:** | The Arlington at West Main |
| **CITY OF FRANKLIN PROJECT #** | 6148 |
| **SUBDIVISION:** | Plan of Hincheyville Subdivsion |
| **LOT NUMBER:** | 6 |
| **ADDRESS:** | 725 West Main Street |
| **CITY:** | Franklin |
| **COUNTY:** | Williamson County |
| **STATE:** | Tennessee |
| **ALDERMANIC WARD:** | 4 |
| **EXISTING ZONING & CHARACTER OV:** | Office Residential / CFCO -3, CFCO-7 |
| **PROPOSED ZONING:** | SD-R 10.00 |
| **OTHER APPLICABLE OVERLAYS:** | HPO/Downtown Franklin Local Historic District |
| **APPLICABLE DEVELPMENT STANDARDS:** | Traditional (Downtown Core) |
| **ACREAGE OF SITE/PROJECT AREA:** | 39,108 S.F. / 0.9 AC |
| **MINIMUM REQUIRED SETBACK LINES:** | |
| **FRONT AND STREET:** | 15' |
| **SIDE YARD:** | 5' |
| **REAR YARD:** | 5' |
| **BUILDING COVERAGE:** | 78.6% Proposed / 80% Allowed |
| **BUILDING HEIGHT:** | 2 Stories Proposed |
| **BUILDING FOOTPRINT:** | Existing - 3,240 SF |
| | Proposed - 16,311 SF |
| **BUILDING SQUARE FOOTAGE:** | Existing - 7,476 SF |
| | Proposed - 30,738 SF |
| ***PARKING REQUIREMENTS:** | 6 Units x 3 Bedrooms= 6 x 3 Spaces= 18 Spaces<br>3 Units x 2 Bedrooms= 3 x 2.5 Spaces= 7.5 Spaces |
| | Proposed Parking 26 Spaces |
| **MINIMUM LANDSCAPE SURFACE** | 0.1 of Total Site / Min 0.1 Proposed |

## Stormwater Narrative:

The existing site is approximately 0.9 acres of office residential zoned property within the Downtown Core of Franklin, TN. The site consists of pervious surfaces and impervious surfaces. Impervious Surfaces include an existing building, paved parking and dumpster pad, and concrete walks for pedestrian traffic. The vegetation and pervious surface that exists on the site is in the form trees and turf. The soil profile for the site consists of Egam Silt Loam (Eg), which is a Type 'C' Soil, and Captina Silt Loam (CaC2), which is a Type 'D' soil, per the NRCS Soil Maps.

Topography for most of the site is fairly flat ranging from 0-6% in slopes, and steeper slopes run along the northeast property line. Existing stormwater runoff sheet flows then concentrates where it is then conveyed to a stream, which drains offsite. This site has a 100 year flood plain elevation of 637' which crosses into the site in three different small areas. Also, there is a 30' stream buffer that is offset from the existing stream offsite and crosses into the property.

As proposed, stormwater runoff will be conveyed into the stream using LID storm treatment and detention. The majority of roof drains will discharge directly into urban bioretention structures and one bioretention structure. The rest of the building and southwest area of he site will drain into a large bioretention structure, while the rest of the site to the northeast will be bypassed. It should also be noted that an increase of greater than 5,000 SF of Impervious surface is proposed for the development of this site, as well as greater than 10,000 SF of disturbance. This requires the development to obtain a Stormwater Permit and Grading Permit as well as having to comply with Peak Runoff Control - Runoff Reduction Requirements as stated in the City of Frankling Stormwater Management Ordinance Sec. 23-102.

# Overall Grading and Drainage Plan

**Drawing Date:**
May 9, 2016

**Revisions:**
5/24/2016
DRT comments

# The Arlington at West Main

A PUD Subdivision
Being Parcel 22 on Tax Map 78C, Group J
725 West Main St.
Franklin, Williamson County, Tennessee

ADAM JOSEPH SEGER — LICENSED PROFESSIONAL ENGINEER — AGRICULTURE — COMMERCE — STATE OF TENNESSEE
5/9/16

**PERMITS:**

TENNESSEE ONE CALL SYSTEM, INC. 1-800-351-1111 STOP! CALL BEFORE YOU DIG!


Dale & Associates
Consulting Civil Engineering
Land Planning & Zoning
Landscape Architecture
Surveying
516 Heather Place
Nashville, Tennessee 37204
(615) 297-5166


D&A Project #15153
The Arlington at West Main

**C3.0**
Sheet 4 of 5

**Electric Service**
Middle Tennessee Electric
Membership Corporation
2156 Edward Curd Lane
Franklin, Tennessee 37067
615.794.1102

**Gas Service**
Piedmont Natural Gas
www.piedmontng.com

**Water Service**
City of Franklin Water and Sewer
124 Lumber Dr.
Franklin, Tennessee 37064
615.794.4554

**Sewer Service**
City of Franklin Water and Sewer
124 Lumber Dr.
Franklin, Tennessee 37064
615.794.4554

**Property Information**
725 West Main Street
Franklin, TN 37064
Tax Map 78C Group J, Parcel 22
Zoned: OR

**Owner**
Crews West Main ,LLC
131 Third Avenue North
Franklin, TN 37064

**Developer**
Bernie Butler
D9 Development, LLC
131 Third Avenue North
Franklin, TN 37064
615.419.6933

**Civil Engineer**
Dale & Associates (Adam Seger, PE)
516 Heather Place
Nashville, Tennessee 37204
615.297.5166

**Survey Provided by**
Wilson and Associates, P.C.
108 Beasley Drive
Franklin, TN 37064
615.794.2275

**Floodnote**
A Portion of This Property does Lie Within a Flood Hazard Area as Depicted on the Preliminary Flood Insurance Rate Maps (FIRM) Number 47187C0211G. Dated August 29, 2014

## General Notes

1. Utility Connections:
- Existing water tap to remain and be utilized, however, an all new service line will be installed off the existing tap as well as an RPBP inside the building. Existing sewer tap to remain and be utilized, new pipe to be installed from clean out

## Water and Sewer Data Chart

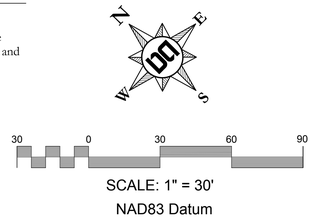
- Facility Type: 9 Multifamily Units
- Total Flow in GPD: 3,000 GPD

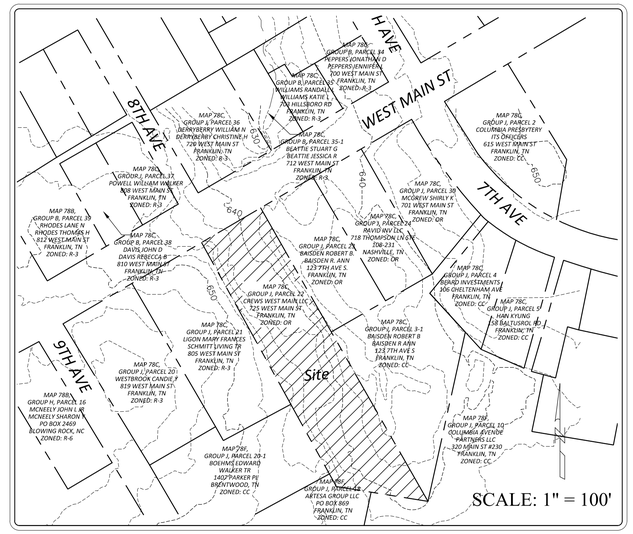
## Adjacent Fire Hydrant Flow Test Results

Below is a summary of Hydrant Flow Test Results from Existing Hydrants located along West Main Street to the Northeast intersection of 7th Avenue and Northwest corner of the Site. The Flowing Hydrant is at the North East Intersection of 7th Avenue and West Main Street, while the residual hydrant is at the Northwest corner of the site.

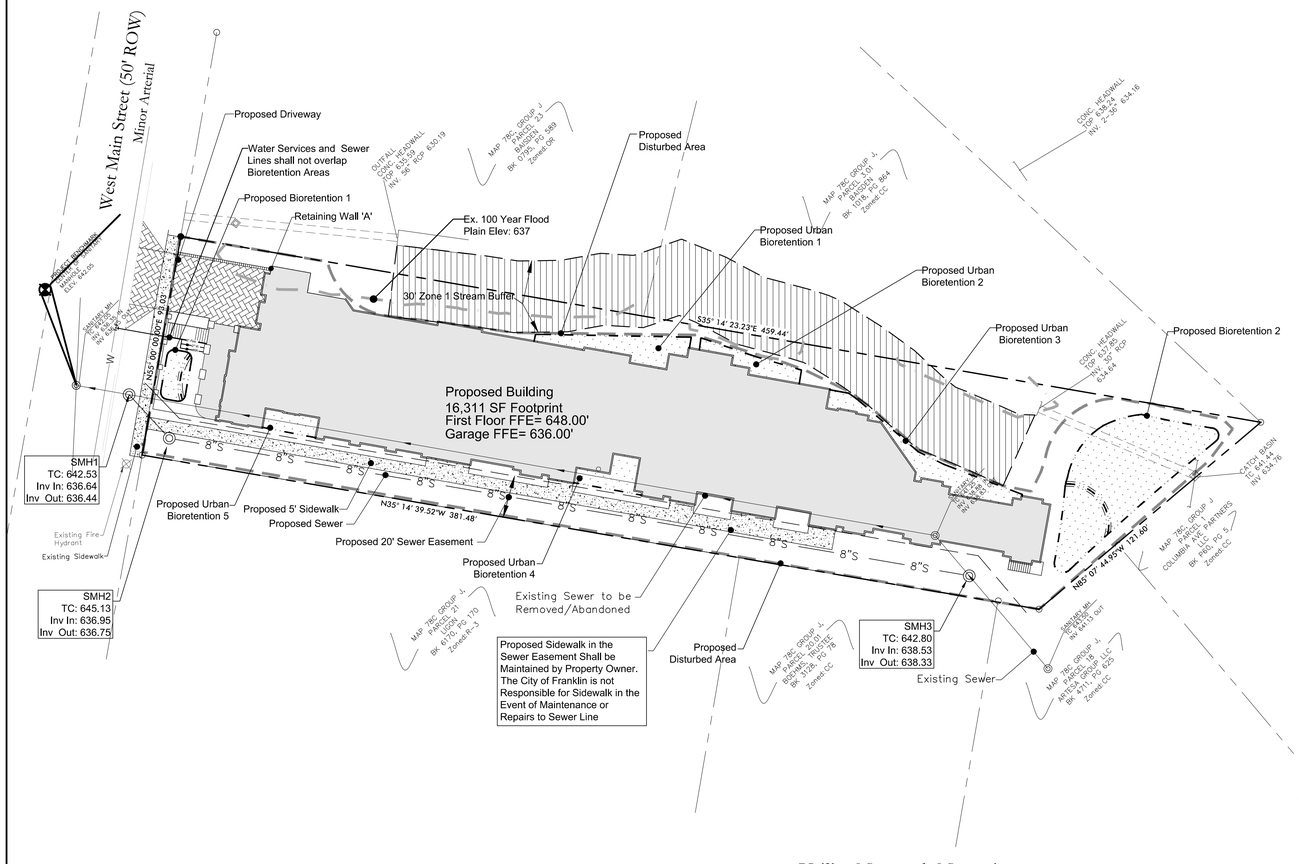
Static Pressure = 85 psi
Residual Pressure = 75 psi
Flow at Residual = 1087 gpm
Calc. Flow @ 20 psi = 3623 gpm

Results of the Fire Flow Model utilizing the above field data:
Ex. Fire Hydrant: 3623 gpm @ 20 psi Min Zone Pressure




VICINITY MAP




## Utility Network Narrative

Water, Fire, and Irrigation will be connections tapped from the existing water line along the West Main Street ROW. Existing Sewer Infrastructure onsite will be removed and replaced with a new Sewer Line connection with inverts connected to existing manholes located offsite to the southwest and located at the project benchmark on West Main Street. The new Sewer Easement will extend along the southwest boundary line and offset 20' to the edge of the proposed building.

## ROW & Access General Notes

1. Prior to beginning any construction, the Developer and/or Contractor, shall obtain all necessary permits as required by law. Such permits may include, but are not limited to, those required by State of Tennessee, Williamson County and other City of Franklin agencies.
2. All off-site work within the public right-ofway shall require an approved traffic control plan which complies with the MUTCD. No off-site excavation may be undertaken in any street, road, alley or right-of-way of any utility or temporary construction easement of the City of Franklin by any entity unless 72-hour notice has been given to the City of Franklin Traffic Operations Center. The contractor shall have an approved traffic control plan onsite during construction.
3. Construction materials shall be fully tested in accordance with the designations and requirements within the referenced "TDOT Standard Specifications" sections, unless otherwise noted within the "Standard Specifications" section of the City of Franklin Transportation & Street Technical Standards.
4. An authorized representative of the City shall make a final inspection of the project after completion to determine acceptability of the work and for release of performance bonds if required. Before this final inspection can be made, the Engineer responsible for the project shall certify in writing to the City Engineer that the work has been completed in accordance with approved plans and specifications.
5. Locating and coordination for the relocation of existing utilities is the responsibility of the contractor. Tennessee's One-Call and the City of Franklin utility location service shall be utilized in addition to coordination with local utility owners. The contractor shall at all times protect existing utilities and will be responsible for costs due to damage caused to any utility lines.
6. All temporary striping shall conform to "Standard Specifications for Road and Bridge Construction," published by TDOT, the latest revision except as herein amended. When approved, temporary striping shall be required prior to the opening of a street for travel where pavement and/or permanent striping cannot be completed due to weather and/or time constraints.
7. Thermoplastic pavement markings should be used on all public and private City street projects. Thermoplastic traffic striping and pavement markings shall conform to Section 716.03 "Thermoplastic Pavement Markings", of the Tennessee Department of Transportation Specifications (TDOT), and to the City of Franklin Transportation & Street Technical Standards.

## Water & Sewer General Notes

1. All persons who undertake the construction of water, sewer and/or reclaimed water lines located in, or affecting services provided by the City of Franklin shall comply with the requirements and regulations set forth in the "General Requirements & Technical Specifications, Water Management Department, City of Franklin, Tennessee" latest edition, along with any amendments, additions, or alteration that may thereafter be adopted by the board of mayor and aldermen by resolution.
2. Contractor shall obtain Water & Sewer Infrastructure Installation Permit prior to scheduling required Pre-Construction Site Meeting. Contractor shall complete the PreConstruction Site Meeting prior to commencing with construction.
3. Contractor shall obtain and keep all of the following items on the jobsite at all times during construction:
   a. Approved, Stamped and Signed Water and/or Sewer Plans
   b. Water & Sewer Infrastructure Installation Permit, with all steps completed and signed by appropriate City employees.
   c. Copy of approved availability request response letter.
   d. A copy of all approved Cut Sheets.
4. Acceptance of City of Franklin public water infrastructure, sanitary sewer infrastructure and/or reclaimed water infrastructure shall become the responsibility of the City of Franklin, TN following approval from the City of Franklin Inspectors and acceptance by the Franklin Municipal Planning Commission. The Acceptance date shall be based on the day maintenance sureties are established by the Franklin Municipal Planning Commission.
5. Prior to the acceptance of City of Franklin public water infrastructure, sanitary sewer infrastructure and/or reclaimed water infrastructure the contractor shall be required to submit as-built drawings to the Planning and Sustainability Department.
6. All off-site work within the public right-of-way shall require an approved traffic control plan which complies with the MUTCD. No off-site excavation may be undertaken in any street, road, alley or right-of-way of any utility or temporary construction easement of the City of Franklin by any entity unless 72-hour notice has been given to the City of Franklin Traffic Operations Center. The contractor shall have an approved traffic control plan onsite during construction.
7. Any damages caused to existing utilities during construction shall, at his own expense, be replaced or repaired to original condition and quality, as approved by the owner and representative of the appropriate utility company, by the Contractor.

## Site Data

| | |
|---|---|
| **PROJECT NAME:** | **The Arlington at West Main** |
| **CITY OF FRANKLIN PROJECT #** | **6148** |
| **SUBDIVISION:** | **Plan of Hincheyville Subdivsion** |
| **LOT NUMBER:** | **6** |
| **ADDRESS:** | **725 West Main Street** |
| **CITY:** | **Franklin** |
| **COUNTY:** | **Williamson County** |
| **STATE:** | **Tennessee** |
| **ALDERMANIC WARD:** | **4** |
| **EXISTING ZONING & CHARACTER OV:** | **Office Residential / CFCO -3, CFCO-7** |
| **PROPOSED ZONING:** | **SD-R 10.00** |
| **OTHER APPLICABLE OVERLAYS:** | **HPO/Downtown Franklin Local Historic District** |
| **APPLICABLE DEVELPMENT STANDARDS:** | **Traditional (Downtown Core)** |
| **ACREAGE OF SITE/PROJECT AREA:** | **39,108 S.F. / 0.9 AC** |
| **MINIMUM REQUIRED SETBACK LINES:** | |
| **FRONT AND STREET:** | **15'** |
| **SIDE YARD:** | **5'** |
| **REAR YARD:** | **5'** |
| **BUILDING COVERAGE:** | **78.6% Proposed / 80% Allowed** |
| **BUILDING HEIGHT:** | **2 Stories Proposed** |
| **BUILDING FOOTPRINT:** | **Existing - 3,240 SF** |
| | **Proposed - 16,311 SF** |
| **BUILDING SQUARE FOOTAGE:** | **Existing - 7,476 SF** |
| | **Proposed - 30,738 SF** |
| ***PARKING REQUIREMENTS:** | **6 Units x 3 Bedrooms= 6 x 3 Spaces= 18 Spaces**<br>**3 Units x 2 Bedrooms= 3 x 2.5 Spaces= 7.5 Spaces** |
| | **Proposed Parking 26 Spaces** |
| **MINIMUM LANDSCAPE SURFACE** | **0.1 of Total Site / Min 0.1 Proposed** |

## Statement of Impacts

- Water and Sewer will both be provided by the City of Franklin Water and Sewer Department, the anticipated maximum domestic flow demand for this development is 3,000 GPD.
- The site will have its main access off of West Main St. (Minor Arterial), approximately 250' West of the intersection with 7th Ave. S. (Major Collector). Peak Traffic Flows shown below (Based on ITE Trip Generation Handbook, 8th Edition):
  AM In = 1 Trip/hr PM In = 3 Trips/hr
  AM Out = 4 Trips/hr PM Out = 2 Trips/hr
  The Trips shown above would have a negligible impact to the existing streets.
- Site is located approximately 2,500' from the nearest Fire Department, and 700' from the nearest police department.
- The Site will be served by a Fire Sprinkler System, and is within 10' of the nearest fire Hydrant west the northwest corner of the property. Fire Flow information is provided.

# Overall Utility/ROW & Access Plan

**Drawing Date:**
May 9, 2016

**Revisions:**
5/24/2016
DRT comments

# The Arlington at West Main
## A PUD Subdivision
Being Parcel 22 on Tax Map 78C, Group J
725 West Main St.
Franklin, Williamson County, Tennessee

ADAM JOSEPH SEGER — 5/9/16

**PERMITS:**

TENNESSEE ONE CALL SYSTEM, INC. 1-800-351-1111 STOP! CALL BEFORE YOU DIG!

Dale & Associates
Consulting Civil Engineering
Land Planning & Zoning
Landscape Architecture
Surveying
516 Heather Place
Nashville, Tennessee 37204
(615) 297-5166

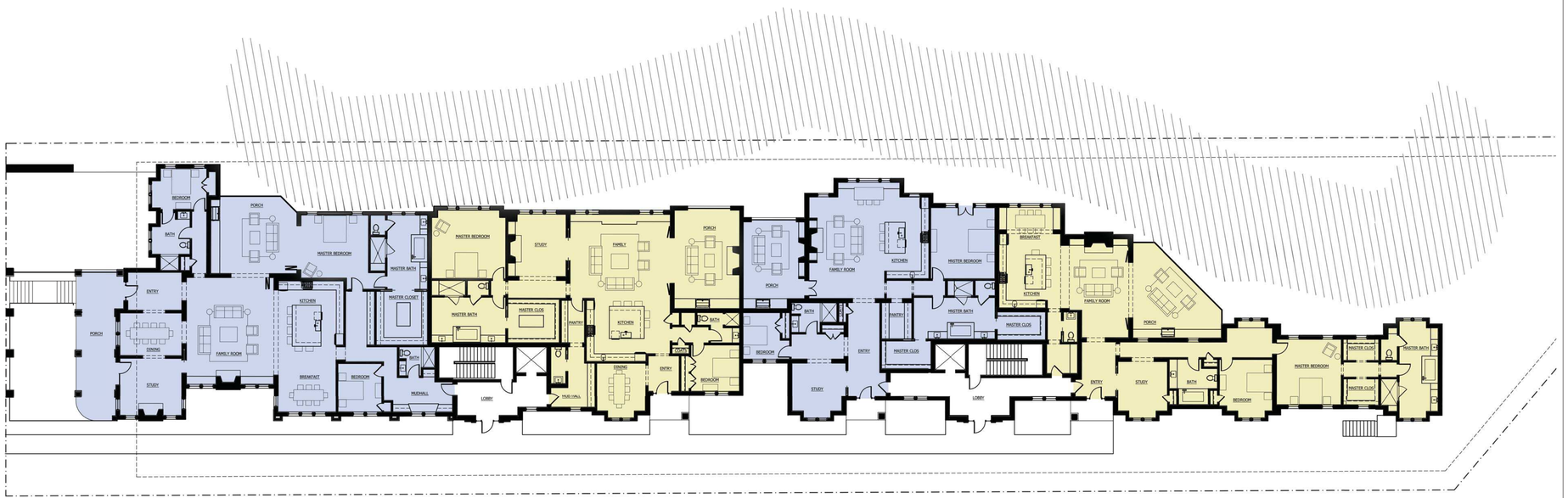
D&A Project #15153
The Arlington at West Main
**C4.0**
Sheet 5 of 5

## SECOND FLOOR
1/16” = 1’ - 0”

| | |
|---|---|
| HEATED AND COOLED | 14058 |
| OUTDOOR | 1565 |
| TOTAL | 15623 |

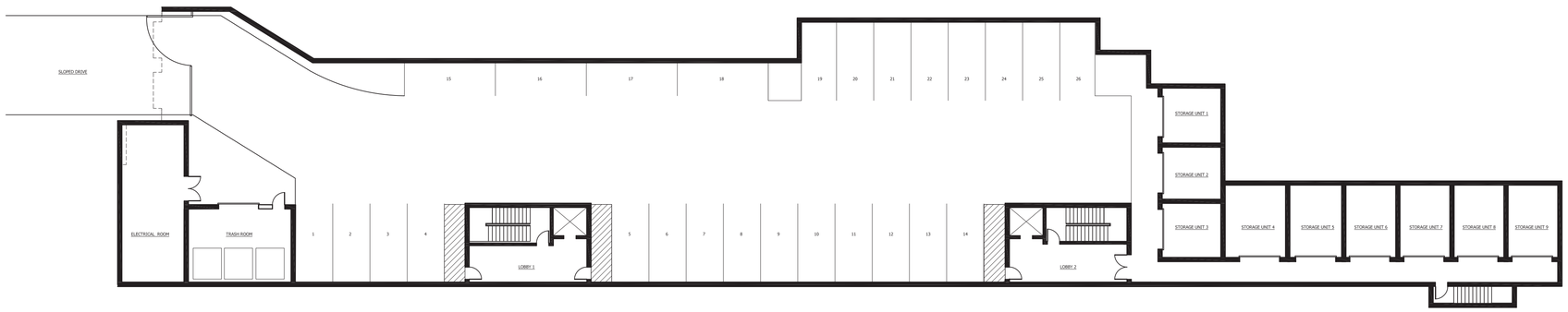
## FIRST FLOOR
1/16” = 1’ - 0”

| | |
|---|---|
| HEATED AND COOLED | 13497 |
| OUTDOOR | 2126 |
| TOTAL | 15623 |




## PARKING PLAN
1/16” = 1’ - 0”

| | |
|---|---|
| TOTAL | 18234 |




# THE ARLINGTON AT WEST MAIN

## PUD Development Plan

Resubmittal

8

725 West Main Street, Franklin, TN 37064


STUDIOEIGHTDESIGN
MATT TAYLOR•ARCHITECT


*Owner:*

CREWS WEST MAIN, LLC
131 THIRD AVENUE NORTH
FRANKLIN, TENNESSEE
37064

*Manager:*

D9HP VENTURES, LLC
131 THIRD AVENUE NORTH
FRANKLIN, TENNESSEE
37064

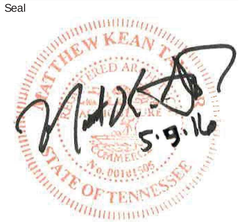
COF # 6148
JOB # 1512.00

Issues and Revisions

| | |
|---|---|
| PUD Initial Submittal | 09 May 2016 |
| PUD Resubmittal | 02 June 2016 |

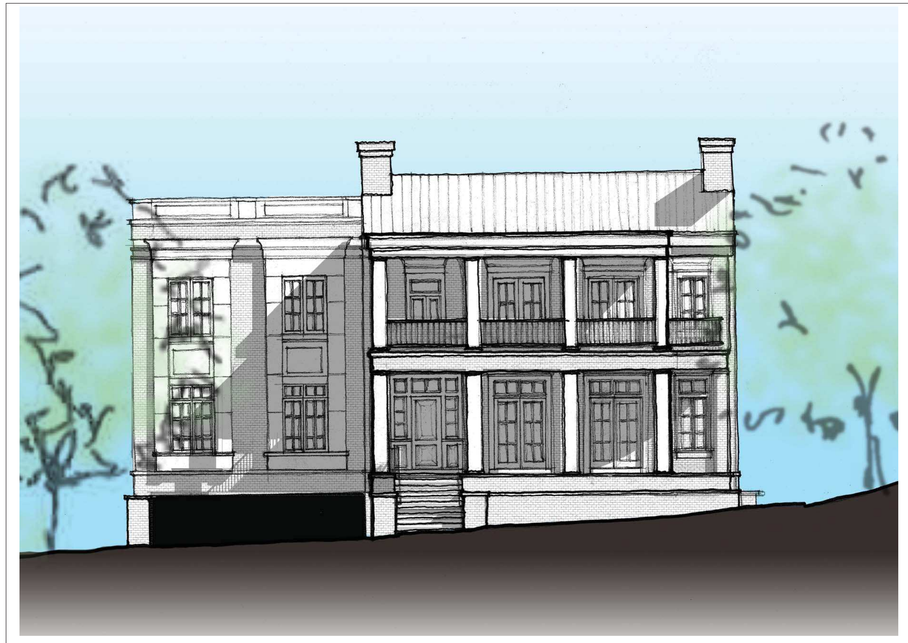

© 2016 Studio Eight Design :: Matt Taylor, Architect, pllc
Drawings, written material and design concepts shall not be used or reproduced in whole or part in any form or format without prior written consent of Studio Eight Design :: Matt Taylor, Architect, pllc.


Seal

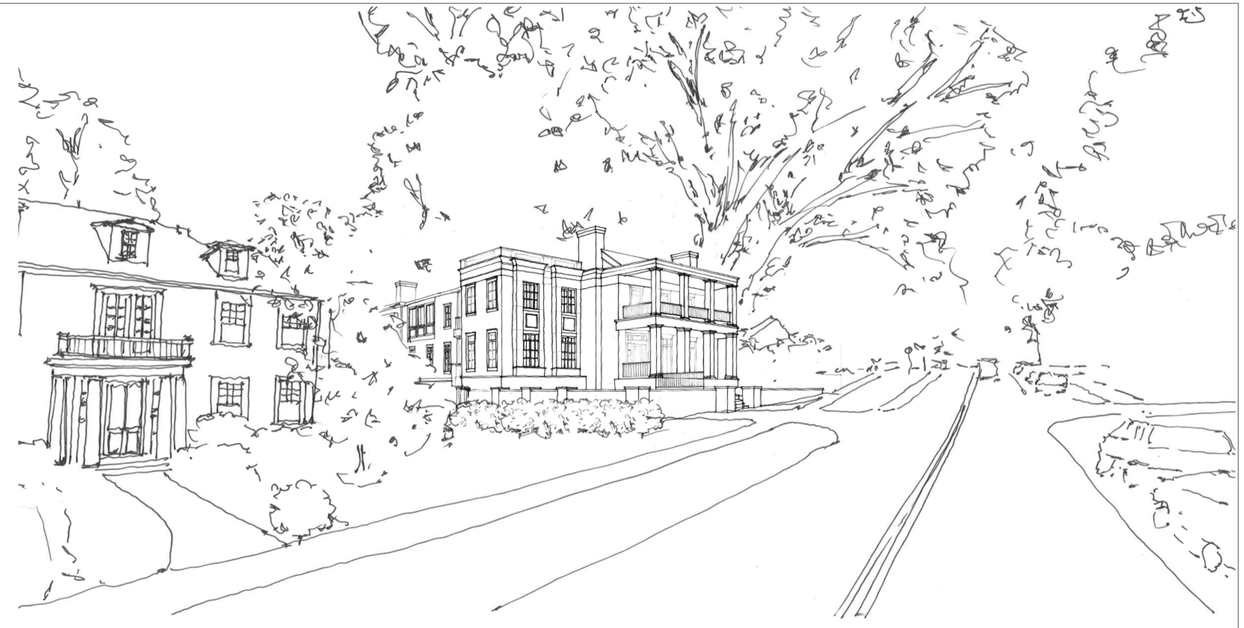



Preliminary Building Floor Plans

A1.0



Front Elevation



Perspective From Downtown

Street View Sketch of Proposed Design

# THE ARLINGTON AT WEST MAIN

## PUD Development Plan

Resubmittal

8


725 West Main Street, Franklin, TN 37064

STUDIOEIGHTDESIGN
MATT TAYLOR•ARCHITECT


*Owner:*

CREWS WEST MAIN, LLC
131 THIRD AVENUE NORTH
FRANKLIN, TENNESSEE
37064

*Manager:*

D9HP VENTURES, LLC
131 THIRD AVENUE NORTH
FRANKLIN, TENNESSEE
37064

COF # 6148
JOB # 1512.00

Issues and Revisions

| | |
|---|---|
| PUD Initial Submittal | 09 May 2016 |
| PUD Resubmittal | 02 June 2016 |


© 2016 Studio Eight Design :: Matt Taylor, Architect, pllc
Drawings, written material and design concepts shall not be used or reproduced in whole or part in any form or format without prior written consent of Studio Eight Design :: Matt Taylor, Architect, pllc.


Seal

Conceptual Building Elevations and Renderings

A3.0

Front Elevation with Extended Context

Side Elevation

# THE ARLINGTON AT WEST MAIN

## PUD Development Plan

Rersubmittal

8


725 West Main Street, Franklin, TN 37064

STUDIOEIGHTDESIGN
MATT TAYLOR•ARCHITECT


*Owner:*

CREWS WEST MAIN, LLC
131 THIRD AVENUE NORTH
FRANKLIN, TENNESSEE
37064

*Manager:*

D9HP VENTURES, LLC
131 THIRD AVENUE NORTH
FRANKLIN, TENNESSEE
37064

COF # 6148

JOB # 1512.00

Issues and Revisions

| | |
|---|---|
| PUD Initial Submittal | 09 May 2016 |
| PUD Resubmittal | 02 June 2016 |


© 2016 Studio Eight Design :: Matt Taylor, Architect, pllc
Drawings, written material and design concepts shall not be used or reproduced in whole or part in any form or format without prior written consent of Studio Eight Design :: Matt Taylor, Architect, pllc.


Seal

Conceptual Building
Elevations and Renderings

A3.1

# RESOLUTION 2016-32

## TO BE ENTITLED, "A RESOLUTION APPROVING A DEVELOPMENT PLAN FOR THE ARLINGTON AT WEST MAIN PUD SUBDIVISION, FOR THE PROPERTY LOCATED AT 725 WEST MAIN STREET."

**WHEREAS,** the Planned Unit Development (PUD) process is a review procedure that is intended to encourage innovative land planning and design and avoid the monotony sometimes associated with large developments by:

(a) Reducing or eliminating the inflexibility that sometimes results from strict application of zoning standards that were designed primarily for individual lots;

(b) Allowing greater freedom in selecting the means to provide access, light, open space, and design amenities;

(c) Encouraging a sensitive design that respects the surrounding established land use character and natural or man-made features of the site including, but not limited to, trees, historic features, streams, hillsides, and floodplains;

(d) Promoting quality design and environmentally sensitive development by allowing development to take advantage of special site characteristics, locations, and land uses; and

(e) Allowing deviations from certain zoning standards that would otherwise apply if not contrary to the general spirit and intent of this ordinance; and

**WHEREAS**, the PUD process requires the approval of a Development Plan that is reviewed and approved by the Board of Mayor and Aldermen (BOMA), after a public hearing and a recommendation by the Franklin Municipal Planning Commission (FMPC); and

**WHEREAS**, in accordance with the provisions of *Tennessee Code Annotated* § 13-4-310, as amended, and subject to the exceptions set forth in said statute, the approval of the Development Plan by the BOMA will initiate a vesting period during which the development standards adopted by the City and in effect on the date of approval shall remain the standards applicable to the approved Development Plan.

**NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF MAYOR AND ALDERMEN OF THE CITY OF FRANKLIN, TENNESSEE, AS FOLLOWS:**

**SECTION I.** That the legal description of the property included in the Development Plan, as amended, is as follows:

PREMISES CONSIDERED

| Map-Parcel | Acres |
|---|---|
| 078C J 022.00 | 0.90 |
| Total | 0.90 |

Commencing from a point of the north westerly most corner of the property conveyed to Crews West Main, L.L.C. Property is also recorded as Parcel 22, on Tax Map 78C, Group J with the Register's Office of Williamson County, Tennessee, and being more particularly described according to a survey by Wilson & Associates, P.C. dated 8-7-15 as follows: Thence N 55°00'00.00" E a distance of 93.03 feet to a point, thence S 35°14'23.23" E a distance of 459.44' E to a point, thence N 85°07'44.95" W a distance of 121.60' to a point, thence N 35°14'39.52" W a distance of 381.48' to the POINT OF BEGINNING, containing 39,108 square feet or 0.90 acres of land, more or less.



Law Dept. approved 06.15.16

**SECTION II:** That the attached Location Map and Development Plan shall serve the purpose of further delimiting the geographical boundaries as described by this Resolution.

**SECTION III:** That the overall entitlements for The Arlington at West Main PUD Subdivision are as follows:

| Entitlements | Arlington at West Main |
|---|---|
| Base Zone District | Specific Development Residential- 10.0 |
| Character Area Overlay | CFCO-3, CFCO-7 |
| Other Zoning Overlays | HPO |
| Development Standard | Traditional |
| Number of Dwelling Units | 9 |
| Number of Phases in Development | 1 |

**SECTION IV:** That the Development Plan, the exhibits accompanying the Development Plan, and all conditions and restrictions placed upon the Development Plan by the Franklin Municipal Planning Commission and this Board shall be made a part of this Resolution as though copied verbatim herein, and that a permanent record of the Development Plan, the exhibits accompanying the Development Plan, and all such conditions and restrictions shall be kept in the Franklin Planning and Sustainability Department.

**SECTION V.** That this Resolution shall take effect from and after its passage on its first and final reading, the health, safety, and welfare of the citizens requiring it.

_____
**Eric S. Stuckey**
City Administrator

_____
**Dr. Ken Moore**
Mayor

Approved as to form by:

_____
Shauna R. Billingsley
City Attorney

PREAPPLICATION CONFERENCE: _____

BOMA/FMPC JOINT CONCEPTUAL WORKSHOP: _____

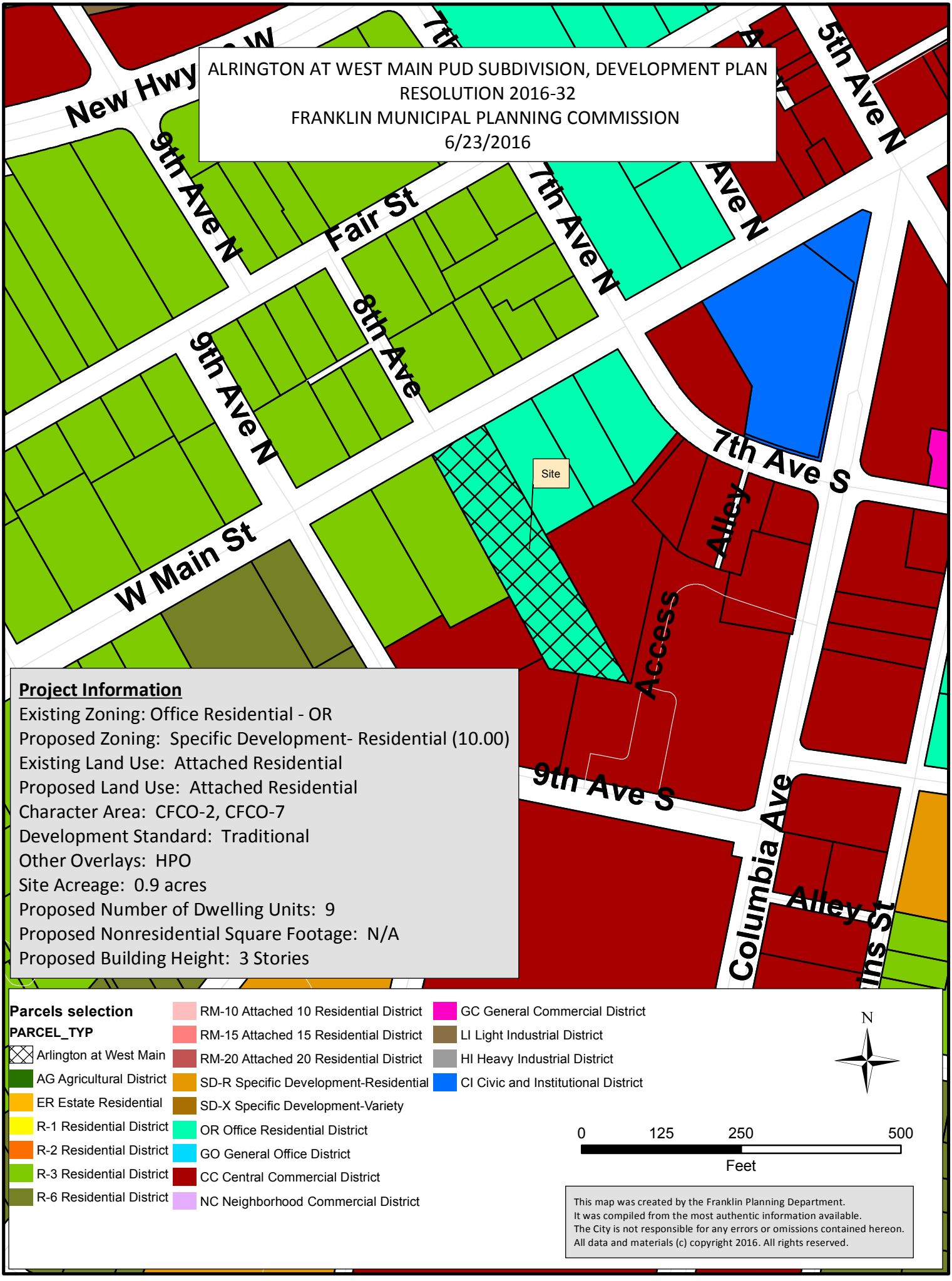
NEIGHBORHOOD MEETING: _____

PLANNING COMMISSION RECOMMENDED APPROVAL: _____

PUBLIC HEARING AND BOMA APPROVAL: _____



Law Dept. approved 06.15.16


ALRINGTON AT WEST MAIN PUD SUBDIVISION, DEVELOPMENT PLAN
RESOLUTION 2016-32
FRANKLIN MUNICIPAL PLANNING COMMISSION
6/23/2016
New Hwy
9th Ave N
Fair St
7th Ave N
8th Ave
5th Ave N
Site
7th Ave S
Alley
W Main St
Access
9th Ave S
Columbia Ave
Alley St
Project Information
Existing Zoning: Office Residential - OR
Proposed Zoning: Specific Development- Residential (10.00)
Existing Land Use: Attached Residential
Proposed Land Use: Attached Residential
Character Area: CFCO-2, CFCO-7
Development Standard: Traditional
Other Overlays: HPO
Site Acreage: 0.9 acres
Proposed Number of Dwelling Units: 9
Proposed Nonresidential Square Footage: N/A
Proposed Building Height: 3 Stories
Parcels selection
PARCEL_TYP
Arlington at West Main
AG Agricultural District
ER Estate Residential
R-1 Residential District
R-2 Residential District
R-3 Residential District
R-6 Residential District
RM-10 Attached 10 Residential District
RM-15 Attached 15 Residential District
RM-20 Attached 20 Residential District
SD-R Specific Development-Residential
SD-X Specific Development-Variety
OR Office Residential District
GO General Office District
CC Central Commercial District
NC Neighborhood Commercial District
GC General Commercial District
LI Light Industrial District
HI Heavy Industrial District
CI Civic and Institutional District
N
0
125
250
500
Feet
This map was created by the Franklin Planning Department.
It was compiled from the most authentic information available.
The City is not responsible for any errors or omissions contained hereon.
All data and materials (c) copyright 2016. All rights reserved.

# Downtown Parking Capacity & Management Study

July 12, 2016

HISTORIC FRANKLIN TENNESSEE

VOLKERT

WALKER PARKING CONSULTANTS

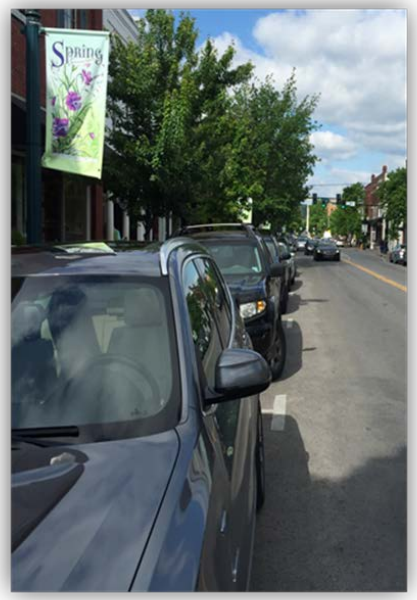
# Today's Agenda

- Who?
- Why?
- Where?
- Process?
- Q & A

# Who?

VOLKERT

WALKER
PARKING CONSULTANTS



# Why?

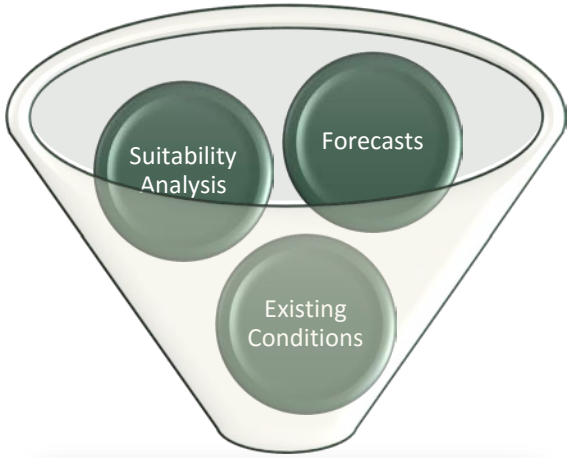
- Provide the City, Businesses, Shoppers, Diners, Workers, Churches, Tourists, and Citizens with:
  - Clear understanding of the existing parking infrastructure.
  - Recommendations on parking infrastructure needs & strategies to manage & operate.

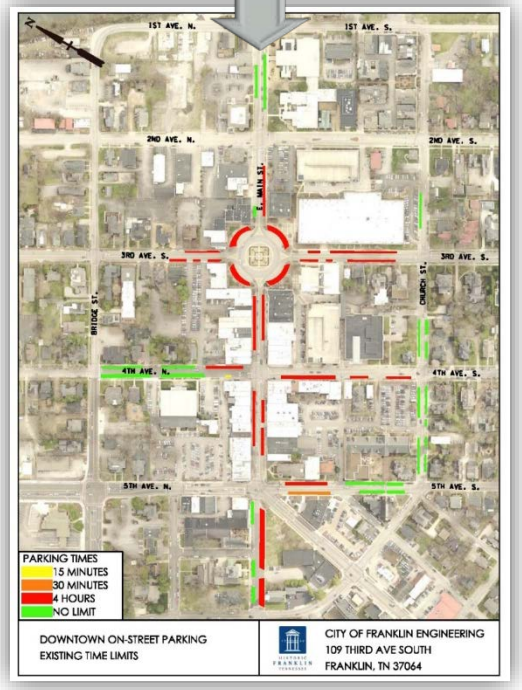
# Where?

Harlinsdale Park
The Factory
"The Hill Property"
Bicentennial Park
City Hall
2nd Ave Garage
4th Ave Garage
Franklin Police Headquaters
Pinkerton Park
Williamson
Del Rio Pike
Lancaster Dr
Old Liberty Pike
Daniels Dr
Franklin Rd
Magnolia Dr
Mt Hope St
Glass St
Green St
Bridge St
N Margin St
2nd Ave N
E Main St
1st Ave S
9th Ave N
7th Ave S
S Margin St
4th Ave S
Acton St
Cummins St
Evans St
Natchez St
Murfreesboro Rd
Eddy Ln
31
96
246
6

# Process?

- Stakeholder & Community Involvement
- Existing Conditions Evaluation
- Demand Analysis
- Access & Circulation Issues
- Future Conditions Evaluation
- Parking Best Management Strategies
- Recommendations & Documentation



# Questions?

Thank you for your time!

**CITY OF FRANKLIN, TENNESSEE**
**PROFESSIONAL SERVICES AGREEMENT**
**COF Contract No. 2016-0230**

THIS PROFESSIONAL SERVICES AGREEMENT ("Agreement") is by and between the City of Franklin, Tennessee, hereinafter referenced as City, and **VOLKERT, INC.** hereinafter referenced as Consultant, who mutually agree as follows:

**DECLARATIONS**. City desires to retain Consultant to provide engineering, related technical, and other services in connection with City's project hereinafter referenced as Project. The Project is described as follows:

**DOWNTOWN PARKING CAPACITY AND MANAGEMENT STUDY**

1. SCOPE OF SERVICES. Consultant shall provide engineering and related technical services for the Project in accordance with the Scope of Services (Services) as found in Attachment A which shall be considered as an integral part hereof.

2. Consultant shall submit as a part of Attachment A an individual Fee Schedule and a Completion Schedule for the Project based on the detailed Scope of Services.

3. In event of a conflict between this Agreement and the attached document(s), this Agreement shall supersede conflicting terms and conditions.

4. Consultant shall be paid on a monthly basis for work performed, based on the Fee Schedule, as contained in Attachment A in the Not-to-Exceed Amount of **One Hundred Eighty-Three Thousand Nine Hundred and No/100 Dollars ($183,900.00)**.

**The Board of Mayor and Aldermen Approved this Agreement on the _____ Day of _____ 201__.**

# TERMS AND CONDITIONS FOR PROFESSIONAL SERVICES

**ARTICLE 1. SERVICES.** Consultant will:

1.1 Act for City in a professional manner, using that degree of care and skill ordinarily exercised by and consistent with standards of competent consultants using the standards in the industry:

1.2 Consider all reports to be confidential and distribute copies of the same only to those persons specifically designated by the City.

1.3 Perform all services under the general direction of a senior professional employee, licensed and/or registered in the State of Tennessee, when appropriate.

1.4 Designate, in writing, the sole Project representative to coordinate with City the Services to be provided, including all contact information.

1.5 Unless provided for in the Project Scope of Services (Attachment A), Consultant shall perform all Services with his own forces (employees). Should sub-consultants be proposed to be used in the Project, a listing of said sub-consultants with Services to be performed shall be provided. After approval of this Agreement, no substitute for sub-consultants shall be allowed unless approved by City.

1.6 Retain pertinent records relating to the services performed for a period of seven (7) years following the completion of the work; during this period the records shall be available for review by City at all reasonable times.

**ARTICLE 2. CITY'S RESPONSIBILITIES.** City, or its authorized representative, will:

2.1 Provide Consultant with all information regarding the Project, which is available to, or reasonably obtainable by, the City.

2.2 Furnish right-of-entry onto the Project site for Consultant's necessary field studies and surveys. Consultant will endeavor to restore the site to its original condition and shall remain solely liable for all damages, costs and expenses, including reasonable attorneys' fees, for failure to make such restoration.

2.3 Designate, in writing, the sole Project representative to coordinate with and direct the Consultant, including all contact information.

2.4 Guarantee to Consultant that it has the legal capacity to enter into this contract and that sufficient monies are available to fund Consultant's compensation.

**ARTICLE 3. GENERAL CONDITIONS.**

3.1 Consultant, by the performance of services covered hereunder, does not in any way assume, abridge or abrogate any of those duties, responsibilities or authorities customarily vested in other professionals or agencies participating in the Project.

3.2 Consultant shall be responsible for the acts or omissions of any party involved in concurrent or subsequent phases of the Project acting upon written instruction issued by the Consultant.

3.3 Neither City nor Consultant may assign or transfer its duties or interest in this Agreement without written consent of the other party.

3.4 ALLOCATION OF RISK AND LIABILITY; GENERAL. Considering the potential liabilities that may exist during the performance of the services of this Agreement, the relative benefits and risks of the Project, and the Consultant's fee for the services rendered, and in consideration of the promises contained in this Agreement, the City and the Consultant agree to allocate and limit such liabilities in accordance with this Article.

3.5 INDEMNIFICATION. Consultant agrees to indemnify and hold City harmless from and against legal liability for all judgments, losses, damages, and expenses to the extent such judgments, losses, damages, or expenses are caused by Consultant's negligent act, error or omission in the performance of the services of this Agreement. In the event judgments, losses, damages, or expenses are caused by the joint or concurrent negligence of Consultant and City, they shall be borne by each party in proportion to its own negligence.

3.5.1 SURVIVAL. The terms and conditions of this paragraph shall survive completion of this services agreement.

3.6 LIMITATIONS OF RESPONSIBILITY. Consultant shall not be responsible for (a) construction means, methods, techniques, sequences, procedures, or safety precautions and programs in connection with the Project unless specifically undertaken in Attachment A, Scope of Services ; (b) the failure of any contractor, subcontractor, Consultant, or other Project participant, not under contract to Consultant, to fulfill contractual responsibilities to City or to comply with federal, state, or local laws, regulations, and codes; or (c) procuring permits, certificates, and licenses required for any construction unless such procurement responsibilities are specifically assigned to Consultant in Attachment A, Scope of Services.

**ARTICLE 4. TERMINATION BY THE CITY.** The City may terminate this Agreement in accordance with the following terms and conditions:

4.1 Termination for Convenience. The City may, when in the interests of the City, terminate performance under this Agreement with the Consultant, in whole or in part, for the convenience of the City. The City shall give written notice of such termination to the Consultant specifying when termination becomes effective. The Consultant shall incur no further obligations in connection with the work so terminated, other than warranties and guarantees for completed work and installed equipment, and the Consultant shall stop work when such termination becomes

effective. The Consultant shall also terminate outstanding orders and subcontracts for the affected work. The Consultant shall settle the liabilities and claims arising out of the termination of subcontracts and orders. The City may direct the Consultant to assign the Consultant's right, title and interest under termination orders or subcontracts to the City or its designee. The Consultant shall transfer title and deliver to the City such completed or partially completed work and materials, equipment, parts, fixtures, information and Contract rights as the Consultant has in its possession or control. When terminated for convenience, the Consultant shall be compensated as follows:

(1) The Consultant shall submit a termination claim to the City specifying the amounts due because of the termination for convenience together with costs, pricing or other data required by the City. If the Consultant fails to file a termination claim within one (1) year from the effective date of termination, the City shall pay the Consultant the amount the City deems the Consultant is due.

(2) The City and the Consultant may agree to the compensation, if any, due to the Consultant hereunder.

(3) Absent agreement to the amount due to the Consultant, the City shall pay the Consultant the following amounts:

(a) Contract costs for labor, materials, equipment and other services accepted under this Agreement;

(b) Reasonable costs incurred in preparing to perform and in performing the terminated portion of the work, and in terminating the Consultant's performance, plus a fair and reasonable allowance for direct job site overhead and earned profit thereon (such profit shall not include anticipated profit or consequential damages); provided however, that if it reasonably appears that the Consultant would have not profited or would have sustained a loss if the entire Agreement would have been completed, no profit shall be allowed or included and the amount of compensation shall be reduced to reflect the anticipated rate of loss, if any.

The total sum to be paid the Consultant under this Section shall not exceed the total Agreement Price, as properly adjusted, reduced by the amount of payments otherwise made, and shall in no event include duplication of payment.

4.2 Termination for Cause. If the Consultant does not perform the work, or any part thereof, in a timely manner, supply adequate labor, supervisory personnel or proper equipment or materials, or if it fails to timely discharge its obligations for labor, equipment and materials, or proceeds to disobey applicable law, or otherwise commits a violation of a material provision of this Agreement, then the City, in addition to any other rights it may have against the Consultant or others, may terminate the performance of the Consultant, in whole or in part at the City's sole option, and assume possession of the Project Plans and materials and may complete the work.

In such case, the Consultant shall not be paid further until the work is complete. After Completion has been achieved, if any portion of the Contract Price, as it may be modified hereunder, remains after the cost to the City of completing the work, including all costs and expenses of every nature incurred, has been deducted by the City, such remainder shall belong to the Consultant. Otherwise, the Consultant shall pay and make whole the City for such cost. This obligation for payment shall survive the termination of the Agreement.

In the event the employment of the Consultant is terminated by the City for cause pursuant to this Section and it is subsequently determined by a Court of competent jurisdiction that such termination was without cause, such termination shall thereupon be deemed a Termination for Convenience under this Section and the provisions of Section 4.1 shall apply.

4.3 Termination for Non-Appropriation. The City may also terminate this Agreement, in whole or in part, for non-appropriation of sufficient funds to complete or partially complete the Project, regardless of the source of such funds, and such termination shall be on the terms of Section 4.1.

4.4 The City's rights under this Section shall be in addition to those contained elsewhere herein or provided by law.

**ARTICLE 5. SCOPE OF SERVICES.** Consultant shall provide the Services as described in Attachment A, Scope of Services.

5.1 By mutual agreement, this Agreement and scope can be amended by the parties. The scope and fee for any additional tasks or services under such amendment shall be mutually negotiated and agreed to in writing prior to beginning such additional tasks or services.

5.2 ENVIRONMENTAL RESPONSIBILITY.

Where drilling/sampling services are involved, the samples obtained from the Project site are the property of the City. Should any of these samples be recognized by the Consultant to be contaminated, the City shall remove them from the Consultant's custody and transport them to a disposal site, all in accordance with applicable government statutes, ordinances, and regulations. For all other samples, the Consultant shall retain them for a sixty (60)-day period following the submission of the drilling/sampling report unless the City directs otherwise; thereafter, the Consultant shall discard the samples in accordance with all federal, state and local laws.

**ARTICLE 6. SCHEDULE.**

6.1 TIME OF THE ESSENCE. The parties agree that time is of the essence with respect to the parties' performance of all provisions of the Agreement.

6.2 Before executing this Agreement, the Consultant shall have prepared and submitted for approval to the City a Completion Schedule for the Project with milestones for the various stages (tasks) of the Services as outlined in the Scope of Services. The Consultant shall submit and obtain the City's approval for any proposed changes to the logic, durations, sequences, or timing of tasks as approved in the Completion Schedule.

6.3 FORCE MAJEURE. Neither party will be liable to the other for any delay or failure to perform any of the services or obligations set forth in this Agreement due to causes beyond its reasonable control, and performance times will be considered extended for a period of time equivalent to the time lost because of such delay plus a reasonable period of time to allow the parties to recommence performance of their respective obligations hereunder. Should a circumstance of force majeure last more than ninety (90) days, either party may by written notice to the other terminate this Agreement. The term "force majeure" as used herein shall mean the following: acts of God; strikes, lockouts or other industrial disturbances; acts of public enemies; orders or restraints of any kind of the government of the United States or of the State or any of their departments, agencies or officials, or any civil or military authority; insurrections, riots, landslides, earthquakes, fires, storms, tornadoes, droughts, floods, explosions, breakage or accident to

machinery, transmission pipes or canals; or any other cause or event not reasonably within the control of either party.

6.4 Should City request changes in the scope, extent, or character of the Project, the fee and the time of performance of Consultant's Services as indicated in Attachment A shall be adjusted equitably.

## ARTICLE 7. USE OF DOCUMENTS, DATA.

7.1 All Documents, including, but not limited to, reports, drawings, specifications, and computer software prepared by Consultant pursuant to this Agreement are instruments of service in respect to the Project. Consultant shall retain an ownership and property interest therein (including the right of reuse at the discretion of the Consultant) whether or not the Project is completed.

7.1.1 USE OF DATA SYSTEMS: Ownership, property interests and proprietary rights in data systems used by Consultant do not extend to the data created by or supplied to Consultant by the City; all rights to that data (including derivative or hidden data such as metadata) shall vest solely in City at the moment of creation.

7.1.2 DISCLOSURE OF DOCUMENTS/DATA. City may be required to disclose documents or data under state or federal law. City shall notify Consultant if a request for data or documents has been made and shall give Consultant a reasonable opportunity under the circumstances to respond to the request by redacting proprietary or other confidential information. Consultant waives any right to confidentiality of any document, e-mail or file it fails to clearly mark on each page as confidential or proprietary. In exchange, Consultant agrees to indemnify, defend, and hold harmless City for any claims by third parties relating thereto or arising out of (i) the City's failure to disclose such documents or information required to be disclosed by law, or (ii) the City's release of documents as a result of City's reliance upon Consultant representation that materials supplied by Consultant (in full or redacted form) do not contain trade secrets or proprietary information, provided that the City impleads Consultant and Consultant assumes control over that claim.

7.2 By execution of this Agreement, Consultant and his sub-consultant(s) grant the City a royalty-free, perpetual, irrevocable, and assignable license to use any and all intellectual property interest Consultant or his sub-consultant(s) possess to any drawings, details, specifications, documents, and other information created before each of their first involvement with the Project and subsequently incorporated into the Project's documents. City-furnished data that may be relied upon by Consultant is limited to the printed copies that are delivered to the

Consultant pursuant to Article 2 of this Agreement. Any copyrighted electronic files furnished by City shall be used by Consultant only for the Project as described herein. City's posting or publication of such documents created by Consultant for City shall constitute fair use and shall not constitute an infringement of Consultant's copyright, if any.

7.3 Documents that may be relied upon by City are limited to the printed copies (also known as hard copies) that are signed or sealed by the Consultant. Files in electronic media format of text, data, graphics, or of other types that are furnished by Consultant to City are only for convenience of City, unless the delivery of the Project in electronic media format has been dictated in Attachment A, Scope of Services. Any conclusion or information obtained or derived from electronic files provided for convenience will be at the user's sole risk.

7.4 Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within sixty (60) days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the party delivering the electronic files. Unless stated otherwise herein, Consultant shall not be responsible to maintain documents stored in electronic media format after acceptance by City.

7.5 When transferring documents in electronic media format, Consultant makes no representations as to long term compatibility, usability, or readability, of documents resulting from the use of software application packages, operating systems, or computer hardware differing from that as required of, and used by, Consultant at the beginning of this Project.

7.6 City may make and retain copies of Documents for information and reference in connection with use on the Project by the City, or his authorized representative. Such Documents are not intended or represented to be suitable for reuse by City or others on extensions of the Project or on any other project. Any such reuse or modifications without written verification or adaptation by Consultant, as appropriate for the specific purpose intended, will be at City's sole risk and without liability or legal exposure to the Consultant or to Consultant's sub-consultants.

7.7 If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

7.8 Any verification or adaptation of the Documents for extensions of the Project or for any other project will entitle Consultant to further compensation at rates to be agreed upon by City and Consultant.

## ARTICLE 8. INSURANCE.

8.1 During the performance of the Services under this Agreement, Consultant shall maintain the following minimum insurance:

a) General Liability Insurance with a combined single limit of $1,000,000 per occurrence and $2,000,000 annual aggregate.

b) Automobile Liability Insurance with a combined single limit of $1,000,000 for each person and $1,000,000 for each accident.

c) Workers' Compensation Insurance Coverage A in accordance with statutory requirements and Coverage B, Employer's Liability Insurance, with a limit of $500,000 for each occurrence.

d) Professional Liability Insurance with a limit of $1,000,000 annual aggregate.

8.2 Consultant shall add the City an additional insured on all policies unless otherwise prohibited.

8.3 Consultant shall, upon execution of this Agreement, furnish City certificates of insurance, which shall include a provision that such insurance shall not be canceled without at least thirty (30) days' written notice to City.

8.4 No insurance, of whatever kind or type is to be considered as in any way limiting other parties' responsibility for damages resulting from their activities in the execution of the Project. City agrees to include, or cause to be included, in the Project's construction contract, such requirements for insurance coverage and performance bonds by the Project's construction contractor as City deems adequate to indemnify City, Consultant, and other concerned parties against claims for damages and to insure compliance of work performance and materials with Project requirements.

## ARTICLE 9. PAYMENT.

9.1 City will pay Consultant for services and expenses in accordance with the Fee Schedule proposal submitted for the Project as part of the Scope of Services. Consultant's invoices will be presented at the completion of the work or monthly and will be payable upon receipt. Payment is due upon presentation of invoice and is past due thirty (30) days from invoice date. City shall give prompt written notice of any disputed amount and shall pay the remaining amount.

9.2 Consultant shall be paid in full for all services under this Agreement, including City authorized overruns of the Project budget or unforeseen need for Consultant's services exceeding the original Scope of Services.

9.3 TRAVEL; EXPENSES

City shall reimburse reasonable expenses, including travel and meals, when specified in the Scope of Services, but only in accordance with the City's Travel and Expense Policy and Procedures Manual. The maximum amount will be applied as of the date of travel and as listed

in the per diem reimbursement rates on the "CONUS" website developed by the United States General Services Administration, located at www.gsa.gov [click on 'per diem rates' under the 'etools' category].

## ARTICLE 10. MISCELLANEOUS PROVISIONS

10.1 EQUAL EMPLOYMENT OPPORTUNITY. In connection with this Agreement and the Project, City and Consultant shall not discriminate against any employee or applicant for employment because of race, color, sex, national origin, disability or marital status. City and Consultant will take affirmative action to ensure that the contractor used for the Project does not discriminate against any employee and employees are treated during employment without regard to their race, age, religion, color, gender, national origin, disability or marital status. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination, rates of pay or other forms of compensation; and selection for training, including apprenticeship.

10.1.1 Consultant shall insert the foregoing provision in all contracts relating to this Project.

10.2 TITLE VI – CIVIL RIGHTS ACT OF 1964. City and Consultant shall comply with all the requirements imposed by Title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d), 49 C.F.R., Part 21, and related statutes and regulations.

10.2.1 Consultant shall insert the foregoing provision in all contracts relating to this Project.

10.3 NO THIRD PARTY RIGHTS CREATED. City and Consultant each binds itself and its successors, executors, administrators, permitted assigns, legal representatives and, in the case of a partnership, its partners, to the other party to this Agreement and to their successors, executors, administrators, permitted assigns, legal representatives and partners of such other party in respect to all provisions of this Agreement. The Services provided for in this Agreement are for the sole use and benefit of City and Consultant. Nothing in this Agreement shall be construed to give any rights or benefits to anyone other than City and Consultant.

10.4 WARRANTIES/LIMITATION OF LIABILITY/WAIVER. City reserves all rights afforded to local governments under law for all general and implied warranties. City does not waive any rights it may have to all remedies provided by law and therefore any attempt by Consultant to limit its liability shall be void and unenforceable.

## ARTICLE 11. EXTENT OF AGREEMENT:

11.1 APPLICABLE LAW/CHOICE OF FORUM AND VENUE. This Agreement is made under and will be construed in accordance with the laws of the State of Tennessee without giving effect to that state's choice of law rules. The parties' choice of forum and venue shall be exclusively in the courts of Williamson County, Tennessee. Any provision of this Agreement held to violate a law or regulation shall be deemed void, and all remaining provisions shall continue in force.

11.2 ENTIRE AGREEMENT. This Agreement, including these terms and conditions, represent the entire Agreement between City and Consultant for this Project and supersedes all prior negotiations, representations or agreements, written or oral. This Agreement may be amended only by written instrument signed by City and Consultant.

## ARTICLE 12. DISPUTE RESOLUTION, BREACH.

12.1 If a dispute should arise relating to the performance of or payment for the Services under this Agreement, the aggrieved party shall notify the other party of the dispute within a reasonable time after such dispute arises. During the pendency of any dispute, the parties shall continue diligently to fulfill their respective obligations hereunder. No arbitration or mediation shall be required as a condition precedent to filing any legal claim arising out of or relating to this Agreement. No arbitration or mediation shall be binding.

12.2 BREACH. Upon deliberate breach of the Agreement by either party, the non-breaching party shall be entitled to terminate the Agreement with notice, with all of the remedies it would have in the event of termination, and may also have such other remedies as it may be entitled to in law or in equity.

## ARTICLE 13. SURVIVAL.

The provisions contained in this Professional Services Agreement shall survive the completion of or any termination of the Agreement, contract or other document to which it may accompany or incorporate by reference or which subsequently may be modified, unless expressly excepted from this Article upon consent of both parties.

BY: _____
Consultant's Signature
TITLE: _____
Date: _____

BY: _____
Dr. Ken Moore
Mayor
Date: _____

Approved as to Form;

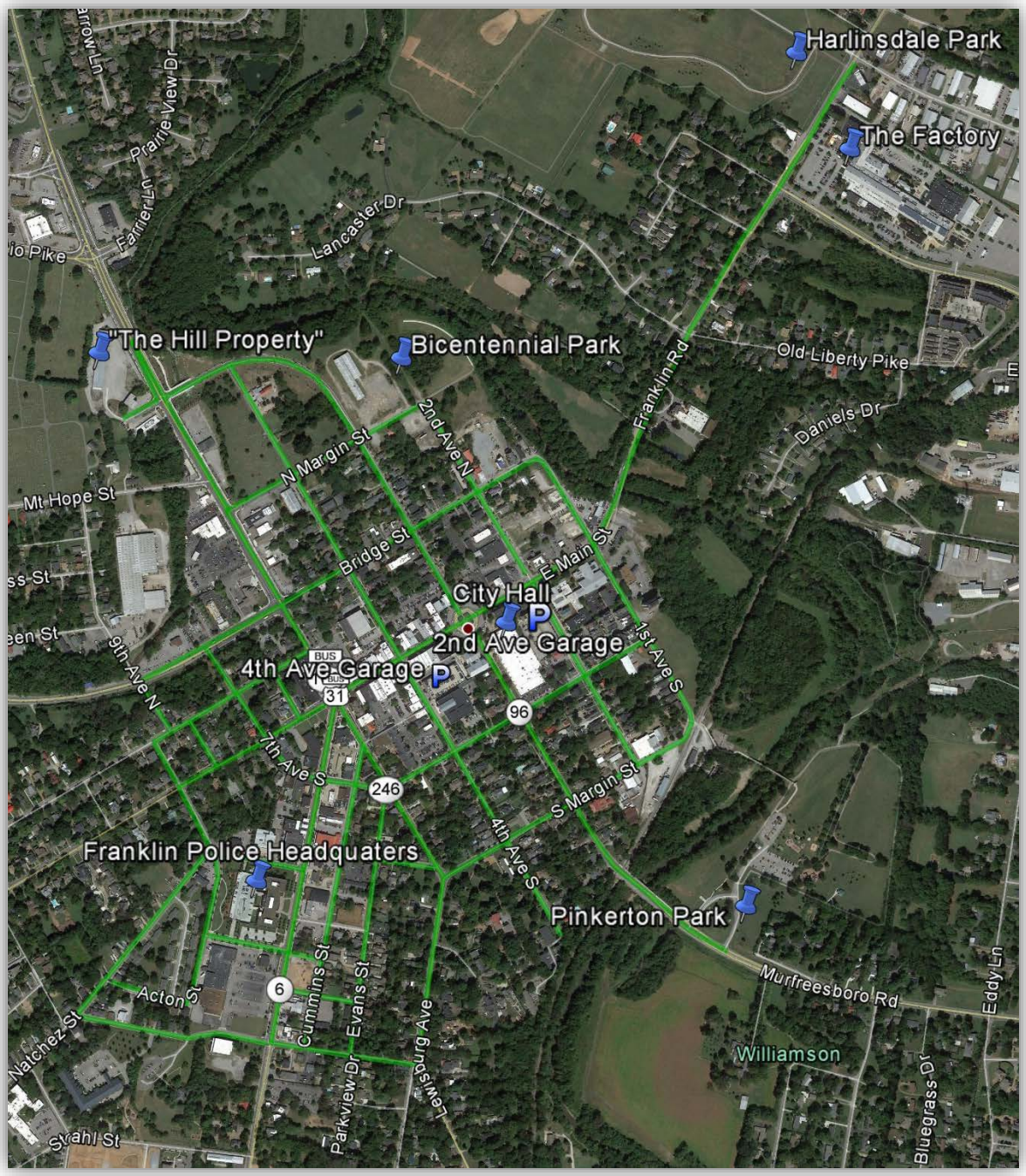
_____
Kristen L. Corn, Assistant City Attorney

VOLKERT

# Project Approach for a Downtown Parking Capacity and Management Study

## APPROACH TO THE PROJECT

In order to develop a Downtown Parking Capacity and Management Study, the Volkert Team, comprised of Volkert and Walker Parking Consultants, will complete the tasks outlined below. The Study Area for this project is identified in the following map, with green outlined streets indicating the area to be studied. Generally, the study area is bounded by the Harpeth River to the east, intersection of Hillsboro Road and 3rd Avenue N. (Bicentennial Park) to the north, 9th Avenue to the west and Fowlkes Street to the south.



**Task 1: Project Management**

In order to successfully manage the project in terms of scope, schedule, and budget, the Volkert Team will follow its internal project management plan that includes the following:

- Project Management Plan
- Project Schedule
- Quality Assurance Plan

In addition, the Volkert Team will provide the following as deliverables:

- Master Project Schedule;
- List of Key Stakeholders - to be identified through discussions with City Staff. Potential stakeholders include downtown business owners/Downtown Merchants Association, Downtown Neighborhood Association, Heritage Foundation, property owners/representatives, public safety officials , churches, etc.;
- Detailed data and information needs checklist; and
- Monthly progress reports.

**Task 2: Stakeholder and Community Involvement**

The Volkert Team recognizes that stakeholder and community involvement will be a significant component in development of the Downtown Parking Capacity and Management Study. To facilitate and encourage participation, members from the Volkert Team will prepare a presentation and materials for and attend:

- Four Stakeholder/Community Input meetings (stakeholders to be identified as part of Task 1);
- One public meeting;
- Four Board of Mayor and Alderman Worksession; and
- One Board of Mayor and Alderman meeting.

**Task 3: Existing Conditions/Demand Analysis/Circulation Issues**

The Volkert Team will conduct an inventory of all on and off-street public parking spaces and facilities, utilizing a combination of field reconnaissance and GIS data. In addition, the Volkert Team will inventory private parking lots (assuming access will be granted by private property owners) that are determined by City staff to have a significant impact on parking inventory and operations in the study area. This inventory will include the total number of spaces, number of restricted spaces (handicapped, time limited, permitted, etc.) and cost (if any). Where necessary, parking that is unstriped, will be counted by adding striping via GIS and aerial photography to insure we get the most accurate count possible. In addition, the Volkert Team will inventory public and private loading zones (assuming access will be granted by private property owners) that are determined by City Staff to have an impact on traffic operations within the study area. All inventory data will be calculated and summarized on a block by block basis.

Once the inventory is established, Volkert will conduct an occupancy study of parking facilities to determine the peak occupancy of each facility. Corridors and areas with high concentrations of both public and private parking will be selected for study in consultation with City Staff. Of particular importance to this task is the parking turnover and duration analysis for the study area. This will be done utilizing license plate inventory. Once completed, a GIS dataset for parking and occupancy rates will be developed for use throughout the project.

The Volkert Team will review policies and procedures associated with the existing parking and transportation operations within the study area. This will include an analysis of the existing mix and distribution of both public and private parking facilities, including proposed/ongoing developments that include parking facilities (Harpeth Square, Franklin Synergy, etc.). We will also develop an assessment of the parking facilities and key parking areas with regard to layout, access, circulation, lighting, safety, and pedestrian/transit connectivity which often affect the utilization of a parking facility.

**Task 4: Evaluation of Future Conditions**

The Volkert Team will review the City's Land Use Plan for the study area and work with City Staff to identify known planned developments within the study area that could influence parking. Based on the Existing Conditions task and the ULI Shared Parking manual, future horizon years will be developed (e.g. 5yr, 10yr, and 20yr) in coordination with City Staff, and parking demand for those years will be forecast. Based on these parking forecasts compared to the existing parking inventory, existing surface lot expansions, new structure parking facility, and on-street parking needs will be determined.

Next, we will utilize the data from the Parking Forecasts (including known planned developments in the study area and development guidance from the City's Land Use Plan) and Existing Conditions Task to conduct an analysis of preferred locations for new parking spaces or structure(s). This will result in an understanding of preferred locations for parking, as it relates to activity centers and the distance to those centers. In addition, we will review existing and proposed future transit routes for potential parking demand needs and location relative to available parking. Based on this analysis, the Volkert Team will conduct a parking facility suitability analysis that is geared toward identifying potential locations for parking facilities. This will include existing vacant parcels, parcels with redevelopment opportunities, and/or expansion of existing parking facilities. Also, during the location analysis, the Volkert Team will evaluate roadway network access and impacts to the immediate network surrounding the location.

Once the parking needs and desired locations are determined, the Volkert Team will prepare a parking location plan in GIS format for the recommended new parking facilities (both on-street and structure parking) and will include an estimate of the new parking space availability/inventory. This will include a pavement marking and striping plan for newly identified on-street parking locations and recommendations for improving loading zones that cause operational issues as identified in Task 3. Also, potential off-site modifications/improvements (roadway lanes, turn restrictions, etc.) will be identified and shown schematically.

As the last step in Task 4, we will develop a planning level opinion of probable cost for the new parking strategy (new parking structure(s), on-street parking, off-site modifications/improvements, etc.). The opinion of probable costs will include property acquisition costs (if applicable), engineering and design costs, and construction costs.

**Task 5: Parking Management Strategies**

At the onset of Task 5, the Volkert Team will conduct a best practices review for parking solutions that have been used in other comparable cities to identify best practices and solutions that might apply to the City of Franklin. This review will include the following:

1) Evaluate current parking management in off-street parking areas (ex. parking time limits, meter vs. ticket, etc.).
2) Identify available funding options and strategies, including an evaluation of their applicability to Franklin, benefits, and limitations.
3) Evaluate cash-in-lieu of parking policies and potential fee structure, for businesses/developments.
4) Evaluate paid parking vs. free parking options and the impact of paid parking on local businesses.
5) Evaluate Zoning Parking Standards and the regulatory impacts of Zoning on development and redevelopment.

Upon completion of the best practices review, we will review the City's existing parking policies and regulations within the Municipal Code and Zoning Ordinance pertaining to facility uses, user restrictions (time of day, time limits, etc.), etc. Based on this analysis and the best practices review, recommended strategies will be developed. The strategies will be identified with the intention to create a parking infrastructure that will most effectively serve the varying users – everyday citizens, tourists, students, shoppers, employees, etc. As part of this process, user and

stakeholder input will be sought to determine the existing perceived deficiencies in the parking systems and to gauge the acceptance of potential changes to the current practices.

As a final element in Task 5, the Volkert Team will review best practices from other cities to provide the City of Franklin with a comprehensive understanding of Parking Authority best practices. As part of the best practices review, we will provide to the City recommended steps to enact, create, and operate a Parking Authority, if it is determined to be a viable option. In addition, the Volkert Team will provide the City with a financial analysis to identify potential revenue generation and costs to assist the City in determining the feasibility of establishing a Parking Authority.

**Task 6: Recommendations and Documentation**

The Volkert Team will consolidate the process and findings of the Study in a single document for delivery to the City of Franklin. The Plan will include all documentation and graphics from Tasks 2 through 5, as well as an implementation strategy that identifies short, mid, and long term phased improvements. We will provide the City a .pdf document; 10 bound printed copies; one unbound, original, and reproducible copy; and all GIS data/layers for future use by City staff. In addition, the Volkert Team will present the plan to the Board of Mayor and Alderman.

**Schedule**

The Volkert Team will complete the services described above within 12 months of notice to proceed.

**Fee**

The Volkert Team will complete this scope of services outlined herein as an hourly not-to-exceed fee of $183,900, based on Volkert's Hourly Rate Schedule as shown below and Walker Parking Consultants Standard Billing Rates. The breakdown of fee by task is as follows:

| TASK | FEE BY TASK |
|---|---|
| Task 1: Project Management | $12,100.00 |
| Task 2: Stakeholder & Community Involvement | $30,950.00 |
| Task 3: Existing Conditions/Demand Analysis/Circulation | $25,400.00 |
| Task 4: Evaluation of Future Conditions | $55,650.00 |
| Task 5: Parking Management Strategies | $44,700.00 |
| Task 6: Recommendations & Documentation | $15,100.00 |
| **TOTAL** | **$183,900.00** |

Hourly Rate Schedule

| | |
|---|---|
| $255.00 | Principal |
| $188.00 | Project Manager |
| $117.00 | Asst. PM |
| $188.00 | Senior Engineer |
| $150.00 | Engineer |
| $86.00 | Junior Engineer |
| $188.00 | Senior Planner |
| $117.00 | Staff Planner |
| $105.00 | Technician |
| $82.00 | Administrative |

# DOCUMENT CHECKLIST

PLEASE EXECUTE TWO (2) ORIGINALS OF ALL DOCUMENTS
**NO FRONT AND BACK COPIES, PLEASE**

RETURN ALL ORIGINALS TO:
U.S. BANCORP GOVERNMENT LEASING AND FINANCE, INC.
LISA ALBRECHT
950 17TH STREET, 7TH FLOOR
DENVER, CO 80202
303-585-4077

- **Property Schedule No. 3** - This document must be executed in the presence of a witness/attestor. The attesting witness does not have to be a notary, just present at the time of execution.
- **Property Description and Payment Schedule – Exhibit 1**
- **Lessee's Counsel's Opinion – Exhibit 2**. This exhibit will need to be executed by your attorney, dated and placed on their letterhead. Your attorney will likely want to review the agreement prior to executing this opinion.
- **Lessee's General and Incumbency Certificate – Exhibit 3**. - Include in your return package a copy of the board minutes or resolution for our files
- **Payment of Proceeds Instructions – Exhibit 4**. – Intentionally Omitted
- **Acceptance Certificate – Exhibit 5**. – Intentionally Omitted
- **Bank Qualification and Arbitrage Rebate – Exhibit 6.**
- **Insurance Authorization and Verification** – To be filled out by the Lessee and sent to your insurance carrier. A valid insurance certificate, or self-insurance letter if the Lessee self-insures, is required prior to funding.
- **Notification of Tax Treatment**
- **Form 8038-G** – Blank form and instructions provided to Lessee. Please consult your CPA, local legal or bond counsel to fill out.
- **Vehicle Titling Memo**
- **Escrow Agreement** – This document needs to be executed by the Executing Official defined in the Lessee's Certificate – Exhibit 3.
    - **Investment Direction Letter – Exhibit 1.** This document needs to be executed by the Executing Official.
    - **Schedule of Fees – Exhibit 2.**
    - **Requisition Request – Exhibit 3.** This document should be retained by Lessee and utilized to request disbursements from the escrow account. Please make copies and fill out as many as are needed.
    - **Final Acceptance Certificate - Exhibit 4.** This document should be retained by Lessee and provided to Lessor once all the proceeds have been disbursed from the escrow account.
    - **Class Action Negative Consent Letter – Exhibit 6.**
    - **IRS Form W-9.** This document should be retained by Lessee and submitted with the Requisition Request(s) for each vendor being paid. Please make copies and fill out as many as are needed.

# Property Schedule No. 3

## Master Tax-Exempt Lease/Purchase Agreement

This **Property Schedule No. 3** is entered into as of the Commencement Date set forth below, pursuant to that certain Master Tax-Exempt Lease/Purchase Agreement (the "Master Agreement"), dated as of August 01, 2012, between U.S. Bancorp Government Leasing and Finance, Inc., and City of Franklin.

**1.** Interpretation. The terms and conditions of the Master Agreement are incorporated herein by reference as if fully set forth herein. Reference is made to the Master Agreement for all representations, covenants and warranties made by Lessee in the execution of this Property Schedule, unless specifically set forth herein. In the event of a conflict between the provisions of the Master Agreement and the provisions of this Property Schedule, the provisions of this Property Schedule shall control. All capitalized terms not otherwise defined herein shall have the meanings provided in the Master Agreement.

**2.** Commencement Date. The Commencement Date for this Property Schedule is July 01, 2016.

**3.** Property Description and Payment Schedule. The Property subject to this Property Schedule is described in Exhibit 1 hereto. Lessee shall not remove such property from the locations set forth therein without giving prior written notice to Lessor. The Lease Payment Schedule for this Property Schedule is set forth in Exhibit 1.

**4.** Opinion. The Opinion of Lessee's Counsel is attached as Exhibit 2.

**5.** Lessee's Certificate. The Lessee's Certificate is attached as Exhibit 3.

**6.** Proceeds. Exhibit 4 has been intentionally omitted.

**7.** Acceptance Certificate. Exhibit 5 has been intentionally omitted.

**8.** Additional Purchase Option Provisions. In addition to the Purchase Option provisions set forth in the Master Agreement, Lease Payments payable under this Property Schedule shall be subject to prepayment in whole at any time by payment of the applicable Termination Amount set forth in Exhibit 1 (Payment Schedule) and payment of all accrued and unpaid interest through the date of prepayment.

**9.** Private Activity Issue. Lessee understands that among other things, in order to maintain the exclusion of the interest component of Lease Payments from gross income for federal income tax purposes, it must limit and restrict the rights private businesses (including, for this purpose, the federal government and its agencies and organizations described in the Code § 501(c)(3)) have to use the Property. Each of these requirements will be applied beginning on the later of the Commencement Date or date each portion of the Property is placed in service and will continue to apply until earlier of the end of the economic useful life of the Property or the date the Agreement or any tax-exempt obligation issued to refund the Property Schedule is retired (the "Measurement Period").

Lessee will comply with the requirements of Section 141 of the Code and the regulations thereunder which provide restrictions on special legal rights that users other than Lessee or a state or local government or an agency or instrumentality of a state or a local government (an "Eligible User") may have to use the Property. For this purpose, special legal rights may arise from a management or service agreement, lease, research agreement or other arrangement providing any entity except an Eligible User the right to use the Property. Any use of the Property by a user other than an Eligible User is referred to herein as **"**Non-Qualified Use".

Throughout the Measurement Period, all of the Property is expected to be owned by Lessee. Throughout the Measurement Period, Lessee will not permit the Non-Qualified Use of the Property to exceed 10%.

**10.** Bank Qualification and Arbitrage Rebate. Attached as Exhibit 6.

**11.** Expiration. Lessor, at its sole determination, may choose not to accept this Property Schedule if the fully executed, original Master Agreement (including this Property Schedule and all ancillary documents) is not received by Lessor at its place of business by July 31, 2016.

IN WITNESS WHEREOF, Lessor and Lessee have caused this Property Schedule to be executed in their names by their duly authorized representatives as of the Commencement Date above.

| **Lessor: U.S. Bancorp Government Leasing and Finance, Inc.** |
|---|
| By: |
| Name: |
| Title: |

| **Lessee: City of Franklin** |
|---|
| By: |
| Name: |
| Title: |

| Attest: |
|---|
| By |
| Name: |
| Title: |

# EXHIBIT 1

## Property Description and Payment Schedule

Re: **Property Schedule No. 3** to Master Tax-Exempt Lease/Purchase Agreement between U.S. Bancorp Government Leasing and Finance, Inc. and City of Franklin.

PROPERTY IS AS FOLLOWS: The Property as more fully described in Exhibit A incorporated herein by reference and attached hereto.

PROPERTY LOCATION:

_____
Address

_____
City, State Zip Code

USE: Vehicles and Equipment - This use is essential to the proper, efficient and economic functioning of Lessee or to the services that Lessee provides; and Lessee has immediate need for and expects to make immediate use of substantially all of the Property, which need is not temporary or expected to diminish in the foreseeable future.

Lease Payment Schedule

**Total Principal Amount:** $2,250,000.00

| Payment No. | Due Date | Lease Payment | Principal Portion | Interest Portion | Termination Amount (After Making Payment for said Due Date) |
|---|---|---|---|---|---|
| 1 | 1-Oct-2016 | 191,466.00 | 184,187.25 | 7,278.75 | N.A. |
| 2 | 1-Jan-2017 | 191,466.00 | 184,783.10 | 6,682.90 | N.A. |
| 3 | 1-Apr-2017 | 191,466.00 | 185,380.87 | 6,085.13 | N.A. |
| 4 | 1-Jul-2017 | 191,466.00 | 185,980.58 | 5,485.42 | 1,554,958.25 |
| 5 | 1-Oct-2017 | 191,466.00 | 186,582.22 | 4,883.78 | 1,362,778.56 |
| 6 | 1-Jan-2018 | 191,466.00 | 187,185.82 | 4,280.18 | 1,169,977.17 |
| 7 | 1-Apr-2018 | 191,466.00 | 187,791.36 | 3,674.64 | 976,552.06 |
| 8 | 1-Jul-2018 | 191,466.00 | 188,398.87 | 3,067.13 | 782,501.23 |
| 9 | 1-Oct-2018 | 191,466.00 | 189,008.34 | 2,457.66 | 587,822.64 |
| 10 | 1-Jan-2019 | 191,466.00 | 189,619.78 | 1,846.22 | 392,514.26 |
| 11 | 1-Apr-2019 | 191,466.00 | 190,233.20 | 1,232.80 | 196,574.06 |
| 12 | 1-Jul-2019 | 191,466.00 | 190,848.61 | 617.39 | 0.00 |
| | **TOTALS** | **2,297,592.00** | **2,250,000.00** | **47,592.00** | |

**Interest Rate:** 1.294%

| **Lessee: City of Franklin** |
|---|
| By: |
| Name: |
| Title: |

# EXHIBIT A

## Property Description

| Vehicles | | |
|---|---|---|
| Parks | Heavy Duty Truck | 1 |
| Police | Marked Patrol Units | 12 |
| Police | Unmarked Units | 3 |
| Streets | Pick-Up Truck | 1 |
| Streets | Utility Truck | 1 |
| Streets | Pick-Up Truck | 1 |
| BNS | Vehicle Replacement | 1 |
| IT | Vehicle Replacement | 1 |
| Water&Sewer | One-Call Vehicles | 4 |
| **Equipment/Software** | | |
| Streets | Multi Deck Unit (Carothers) | 1 |
| Steets | Single Axle Dump | 1 |
| IT | DR Hardware | Misc. |
| IT | Data Domain | Misc. |
| IT | Kuhl Cisco License | Misc. |
| IT | FireEye Email Security | Misc. |
| SES | Replace 134.REL with 20-yard rear load (REL) truck | 1 |
| Water | Sanitary Sewer Vaccum Equipment | 1 |
| Water | CCTV Inspection Equipment | 1 |

VIN#s to be determined.

# EXHIBIT 2

# Lessee's Counsel's Opinion

[To be provided on letterhead of Lessee's counsel.]

July 01, 2016

U.S. Bancorp Government Leasing and Finance, Inc.
13010 SW 68th Parkway, Suite 100
Portland, OR 97223

City of Franklin
109 Third Avenue South
Franklin, Tennessee 37064
Attention: Russell Truell, CFO

RE: Property Schedule No. 3 to Master Tax-Exempt Lease/Purchase Agreement between U.S. Bancorp Government Leasing and Finance, Inc. and City of Franklin.

Ladies and Gentlemen:

We have acted as special counsel to City of Franklin ("Lessee"), in connection with the Master Tax-Exempt Lease/Purchase Agreement, dated as of August 01, 2012 (the "Master Agreement"), between City of Franklin, as lessee, and U.S. Bancorp Government Leasing and Finance, Inc. as lessor (“Lessor”), and the execution of Property Schedule No. 3 (the "Property Schedule") pursuant to the Master Agreement. We have examined the law and such certified proceedings and other papers as we deem necessary to render this opinion.

All capitalized terms not otherwise defined herein shall have the meanings provided in the Master Agreement and Property Schedule.

As to questions of fact material to our opinion, we have relied upon the representations of Lessee in the Master Agreement and the Property Schedule and in the certified proceedings and other certifications of public officials furnished to us without undertaking to verify the same by independent investigation.

Based upon the foregoing, we are of the opinion that, under existing law:

1. Lessee is a public body corporate and politic, duly organized and existing under the laws of the State, and has a substantial amount of one or more of the following sovereign powers: (a) the power to tax, (b) the power of eminent domain, and (c) the police power.

2. Lessee has all requisite power and authority to enter into the Master Agreement and the Property Schedule and to perform its obligations thereunder.

3. The execution, delivery and performance of the Master Agreement and the Property Schedule by Lessee has been duly authorized by all necessary action on the part of Lessee.

4. All proceedings of Lessee and its governing body relating to the authorization and approval of the Master Agreement and the Property Schedule, the execution thereof and the transactions contemplated thereby have been conducted in accordance with all applicable open meeting laws and all other applicable state and federal laws.

5. Lessee has acquired or has arranged for the acquisition of the Property subject to the Property Schedule, and has entered into the Master Agreement and the Property Schedule, in compliance with all applicable public bidding laws.

6. Lessee has obtained all consents and approvals of other governmental authorities or agencies which may be required for the execution, delivery and performance by Lessee of the Master Agreement and the Property Schedule.

7. The Master Agreement and the Property Schedule have been duly executed and delivered by Lessee and constitute legal, valid and binding obligations of Lessee, enforceable against Lessee in accordance with the terms thereof, except insofar as the enforcement thereof may be limited by any applicable bankruptcy, insolvency, moratorium, reorganization or other laws of equitable principles of general application, or of application to municipalities or political subdivisions such as the Lessee, affecting remedies or creditors' rights generally, and to the exercise of judicial discretion in appropriate cases.

8. As of the date hereof, based on such inquiry and investigation as we have deemed sufficient, no litigation is pending, (or, to our knowledge, threatened) against Lessee in any court (a) seeking to restrain or enjoin the delivery of the Master Agreement or the Property Schedule or of other agreements similar to the Master Agreement; (b) questioning the authority of Lessee to execute the Master Agreement or the Property Schedule, or the validity of the Master Agreement or the Property Schedule, or the payment of principal of or interest on, the Property Schedule; (c) questioning the constitutionality of any statute, or the validity of any proceedings, authorizing the execution of the Master Agreement and the Property Schedule; or (d) affecting the provisions made for the payment of or security for the Master Agreement and the Property Schedule.

This opinion may be relied upon by Lessor, its successors and assigns, and any other legal counsel who provides an opinion with respect to the Property Schedule.

Very truly yours,

By: _____

Dated: _____

EXHIBIT 3

Lessee's General and Incumbency Certificate

---

# GENERAL CERTIFICATE

Re: **Property Schedule No.** 3 to Master Tax-Exempt Lease Purchase Agreement between U.S. Bancorp Government Leasing and Finance, Inc. and City of Franklin.

The undersigned, being the duly elected, qualified and acting _____of City of Franklin ("Lessee") does hereby certify, as of July 01, 2016, as follows:

**1.** Lessee did, at a meeting of the governing body of the Lessee, by resolution or ordinance duly enacted, in accordance with all requirements of law, approve and authorize the execution and delivery of the above-referenced Property Schedule (the "Property Schedule") and the Master Tax-Exempt Lease Purchase Agreement (the "Master Agreement") by the undersigned.

**2.** The meeting(s) of the governing body of the Lessee at which the Master Agreement and the Property Schedule were approved and authorized to be executed was duly called, regularly convened and attended throughout by the requisite quorum of the members thereof, and the enactment approving the Master Agreement and the Property Schedule and authorizing the execution thereof has not been altered or rescinded. All meetings of the governing body of Lessee relating to the authorization and delivery of Master Agreement and the Property Schedule have been: (a) held within the geographic boundaries of the Lessee; (b) open to the public, allowing all people to attend; (c) conducted in accordance with internal procedures of the governing body; and (d) conducted in accordance with the charter of the Lessee, if any, and the laws of the State.

**3.** No event or condition that constitutes, or with the giving of notice or the lapse of time or both would constitute, an Event of Default or a Nonappropriation Event (as such terms are defined in the Master Agreement) exists at the date hereof with respect to this Property Schedule or any other Property Schedules under the Master Agreement.

**4.** The acquisition of all of the Property under the Property Schedule has been duly authorized by the governing body of Lessee.

**5.** Lessee has, in accordance with the requirements of law, fully budgeted and appropriated sufficient funds for the current budget year to make the Lease Payments scheduled to come due during the current budget year under the Property Schedule and to meet its other obligations for the current budget year and such funds have not been expended for other purposes.

**6.** As of the date hereof, no litigation is pending, (or, to my knowledge, threatened) against Lessee in any court (a) seeking to restrain or enjoin the delivery of the Master Agreement or the Property Schedule or of other agreements similar to the Master Agreement; (b) questioning the authority of Lessee to execute the Master Agreement or the Property Schedule, or the validity of the Master Agreement or the Property Schedule, or the payment of principal of or interest on, the Property Schedule; (c) questioning the constitutionality of any statute, or the validity of any proceedings, authorizing the execution of the Master Agreement and the Property Schedule; or (d) affecting the provisions made for the payment of or security for the Master Agreement and the Property Schedule.

IN WITNESS WHEREOF, the undersigned has executed this Certificate as of July 01, 2016

City of Franklin

By: _____

Print Name: _____

Print Title: _____

**SIGNER MUST BE THE AUTHORIZED INDIVIDUAL EXECUTING THE DOCUMENTS.**

# INCUMBENCY CERTIFICATE

Re: **Property Schedule No. 3** dated as of July 01, 2016 to the Master Tax-Exempt Lease/Purchase Agreement dated as of August 01, 2012 between U.S. Bancorp Government Leasing and Finance, Inc. and City of Franklin.

The undersigned, being the duly elected, qualified and acting Secretary or Clerk of City of Franklin ("Lessee") does hereby certify, as of July 01, 2016, as follows:

As of the date of the meeting(s) of the governing body of the Lessee at which the above-referenced Master Agreement and the Property Schedule were approved and authorized to be executed, and as of the date hereof, the below-named representative of the Lessee held and holds the office set forth below, and the signature set forth below is his/her true and correct signature.

_____ _____

(Signature of Person to Execute Lease/Purchase Agreement) (Print Name and Title)

IN WITNESS WHEREOF, the undersigned has executed this Certificate as of July 01, 2016

City of Franklin

By: _____

Print Name: _____

Print Title: _____

**SIGNER MUST NOT BE THE SAME AS THE EXECUTING OFFICIAL SHOWN ABOVE.**

EXHIBIT 4

# Payment of Proceeds Instructions

Intentionally Omitted

# EXHIBIT 5

# Acceptance Certificate

---

Intentionally Omitted

# EXHIBIT 6

# Bank Qualification And Arbitrage Rebate

U.S. Bancorp Government Leasing and Finance, Inc.
13010 SW 68th Parkway, Suite 100
Portland, OR 97223

Re: **Property Schedule No. 3** to Master Tax-Exempt Lease/Purchase Agreement between U.S. Bancorp Government Leasing and Finance, Inc. and City of Franklin

**Bank Qualified Tax-Exempt Obligation under Section 265**

**Check One:**

_____ Lessee hereby designates this Property Schedule as a "qualified tax-exempt obligation" as defined in Section 265(b)(3)(B) of the Code. Lessee reasonably anticipates issuing tax-exempt obligations (excluding private activity bonds other than qualified 501(c)(3) bonds and including all tax-exempt obligations of subordinate entities of the Lessee) during the calendar year in which the Commencement Date of this Property Schedule falls, in an amount not exceeding $10,000,000.

or

_____ Not applicable.

**Arbitrage Rebate**

Eighteen Month Exception: Pursuant to Treasury Regulations Section 1.148-7(d), the gross proceeds of this Property Schedule will be expended for the governmental purposes for which this Property Schedule was entered into, as follows: at least 15% within six months after the Commencement Date, at least 60% within 12 months after the Commencement Date, and 100% within 18 months after the Commencement Date. If Lessee is unable to comply with Section 1.148-7(d) of the Treasury Regulations, Lessee shall compute rebatable arbitrage on this Agreement and pay rebatable arbitrage to the United States at least once every five years, and within 60 days after payment of the final Lease Payment due under this Agreement.

***Consult tax counsel if there is any chance that the Eighteen Month Exception will not be met.***

| **Lessee: City of Franklin** |
|---|
| By: |
| Name: |
| Title: |

## Language for UCC Financing Statements

## Property Schedule No. 3

SECURED PARTY: U.S. Bancorp Government Leasing and Finance, Inc.

DEBTOR: City of Franklin

This financing statement covers all of Debtor's right, title and interest, whether now owned or hereafter acquired, in and to the equipment leased to Debtor under Property Schedule No. 3 dated July 01, 2016 to that certain Master Tax-Exempt Lease/Purchase Agreement dated as of August 01, 2012, in each case between Debtor, as Lessee, and Secured Party, as Lessor, together with all accessions, substitutions and replacements thereto and therefore, and proceeds (cash and non-cash), including, without limitation, insurance proceeds, thereof, including without limiting, all equipment described on Exhibit A attached hereto and made a part hereof.

Debtor has no right to dispose of the equipment.

# INSURANCE AUTHORIZATION AND VERIFICATION

**Date: July 01, 2016** **Property Schedule No: 3**

**To: City of Franklin (the "Lessee")**

**From: U.S. Bancorp Government Leasing and Finance, Inc. (the "Lessor")**
**1310 Madrid Street**
**Marshall, MN 56258**
**Attn: Lisa Albrecht**

**TO THE LESSEE:** In connection with the above-referenced Property Schedule, Lessor requires proof in the form of this document, executed by both Lessee* and Lessee's agent, that Lessee's insurable interest in the financed property (the "Property") meets Lessor's requirements as follows, with coverage including, but not limited to, fire, extended coverage, vandalism, and theft:

**LESSOR, AND ITS SUCCESSORS AND ASSIGNS, shall be covered as both ADDITIONAL INSURED and LENDER'S LOSS PAYEE with regard to all equipment financed or leased by policy holder through or from Lessor. All such insurance shall contain a provision to the effect that such insurance shall not be canceled or modified without first giving written notice thereof to Lessor and Lessee at least thirty (30) days in advance of such cancellation or modification.**

**Lessee must carry GENERAL LIABILITY (and/or, for vehicles, Automobile Liability) in the amount of no less than $1,000,000.00 (one million dollars).**

**Lessee must carry PROPERTY Insurance (or, for vehicles, Physical Damage Insurance) in an amount no less than the 'Insurable Value' $2,250,000.00, with deductibles no more than $10,000.00.**

**Lessee: Please execute this form and return with your document package.* Lessor will fax this form to your insurance agency for endorsement. In lieu of agent endorsement, Lessee's agency may submit insurance certificates demonstrating compliance with all requirements. Should you have any questions, please contact Lisa Albrecht at 303-585-4077.

**By signing, Lessee authorizes the Agent named below: 1) to complete and return this form as indicated; and 2) to endorse the policy and subsequent renewals to reflect the required coverage as outlined above.**

Agency/Agent: _____/_____
Address: _____
_____
_____/_____
Phone/Fax: _____
E-Mail

**City of Franklin**
**By:** _____
**Print Name:**_____
**Title:** _____

---

**TO THE AGENT:** ***In lieu of providing a certificate, please execute this form in the space below and promptly fax it to Lessor at 303-585-4732. This fully endorsed form shall serve as proof that Lessee's insurance meets the above requirements.***

**Agent hereby verifies that the above requirements have been met in regard to the Property listed below.**

Print Name Of Agency:
**X**_____

By: **X**_____
(Agent's Signature)
Print Name: **X**_____ Date: **X**_____

---

**Insurable Value: $2,250,000.00**

**ATTACHED: PROPERTY DESCRIPTION FOR PROPERTY SCHEDULE NO.: 3**

# Notification of Tax Treatment to Tax-Exempt Lease/Purchase Agreement

This **Notification of Tax Treatment** is pursuant to the Master Tax-Exempt Lease/Purchase Agreement dated as of August 01, 2012 and the related Property Schedule No. 3 dated July 01, 2016, between Lessor and Lessee (the "Agreement").

_____ Lessee agrees that this Property Schedule SHOULD be subject to sales/use taxes

_X_____ Lessee agrees that this Property Schedule should NOT be subject to sales/use taxes and Lessee has previously provided their tax-exemption certificate with this document package

_____ Lessee agrees that this Property Schedule should NOT be subject to sales/use taxes and no tax-exemption certificate is issued to us by the State

_____ Lessee agrees that this Property Schedule is a taxable transaction and subject to any/all taxes

_____ Lessee agrees that this Property Schedule is subject to sales/use taxes and will pay those taxes directly to the State or Vendor

IN WITNESS WHEREOF, Lessee has caused this Notification of Tax Treatment to be executed by their duly authorized representative.

| **Lessee: City of Franklin** |
| --- |
| By: |
| Name: |
| Title: |

# Instructions for Form 8038-G

(Rev. September 2011)

**Information Return for Tax-Exempt Governmental Obligations**

Department of the Treasury
**Internal Revenue Service**

Section references are to the Internal Revenue Code unless otherwise noted.

## General Instructions

### Purpose of Form

Form 8038-G is used by issuers of tax-exempt governmental obligations to provide the IRS with the information required by section 149(e) and to monitor the requirements of sections 141 through 150.

### Who Must File

| IF the issue price (line 21, column (b)) is... | THEN, for tax-exempt governmental obligations issued after December 31, 1986, issuers must file... |
|---|---|
| $100,000 or more | A **separate** Form 8038-G for **each** issue |
| Less than $100,000 | Form 8038-GC, Information Return for Small Tax-Exempt Governmental Bond Issues, Leases, and Installment Sales |

CAUTION *For all build America bonds and recovery zone economic development bonds use Form 8038-B, Information Return for Build America Bonds and Recovery Zone Economic Development Bonds. For tax credit bonds and specified tax credit bonds use Form 8038-TC, Information Return for Tax Credit Bonds and Specified Tax Credit Bonds.*

### When To File

File Form 8038-G on or before the 15th day of the 2nd calendar month after the close of the calendar quarter in which the bond is issued. Form 8038-G may not be filed before the issue date and must be completed based on the facts as of the issue date.

**Late filing.** An issuer may be granted an extension of time to file Form 8038-G under Section 3 of Rev. Proc. 2002-48, 2002-37 I.R.B. 531, if it is determined that the failure to file timely is not due to willful neglect. Type or print at the top of the form "Request for Relief under section 3 of Rev. Proc. 2002-48" and attach a letter explaining why Form 8038-G was not submitted to the IRS on time. Also indicate whether the bond issue in question is under examination by the IRS. Do not submit copies of the trust indenture or other bond documents. See *Where To File* next.

### Where To File

File Form 8038-G, and any attachments, with the Department of the Treasury, Internal Revenue Service Center, Ogden, UT 84201.

**Private delivery services.** You can use certain private delivery services designated by the IRS to meet the "timely mailing as timely filing/paying" rule for tax returns and payments. These private delivery services include only the following:

- DHL Express (DHL): DHL Same Day Service.
- Federal Express (FedEx): FedEx Priority Overnight, FedEx Standard Overnight, FedEx 2Day, FedEx International Priority, and FedEx International First.
- United Parcel Service (UPS): UPS Next Day Air, UPS Next Day Air Saver, UPS 2nd Day Air, UPS 2nd Day Air A.M., UPS Worldwide Express Plus, and UPS Worldwide Express.

The private delivery service can tell you how to get written proof of the mailing date.

### Other Forms That May Be Required

For rebating arbitrage (or paying a penalty in lieu of arbitrage rebate) to the Federal government, use Form 8038-T, Arbitrage Rebate, Yield Reduction and Penalty in Lieu of Arbitrage Rebate.

For private activity bonds, use Form 8038, Information Return for Tax-Exempt Private Activity Bond Issues.

For build America bonds (Direct Pay), build America bonds (Tax Credit), and recovery zone economic development bonds, complete Form 8038-B, Information Return for Build America Bonds and Recovery Zone Economic Development Bonds.

For qualified forestry conservation bonds, new clean renewable energy bonds, qualified energy conservation bonds, qualified zone academy bonds, qualified school construction bonds, clean renewable energy bonds, Midwestern tax credit bonds, and all other qualified tax credit bonds (except build America bonds), file Form 8038-TC, Information Return for Tax Credit Bonds and Specified Tax Credit Bonds.

### Rounding to Whole Dollars

You may show amounts on this return as whole dollars. To do so, drop amounts less than 50 cents and increase amounts from 50 cents through 99 cents to the next higher dollar.

### Questions on Filing Form 8038-G

For specific questions on how to file Form 8038-G send an email to the IRS at ***TaxExemptBondQuestions@irs.gov*** and put "Form 8038-G Question" in the subject line. In the email include a description of your question, a return email address, the name of a contact person, and a telephone number.

### Definitions

**Tax-exempt obligation.** This is any obligation, including a bond, installment purchase agreement, or financial lease, on which the interest is excluded from income under section 103.

**Tax-exempt governmental obligation.** A tax-exempt obligation that is not a private activity bond (see below) is a tax-exempt governmental obligation. This includes a bond issued by a qualified volunteer fire department under section 150(e).

**Private activity bond.** This includes an obligation issued as part of an issue in which:

- More than 10% of the proceeds are to be used for any private activity business use, **and**
- More than 10% of the payment of principal or interest of the issue is **either (a)** secured by an interest in property to be used for a private business use (or payments for such property) **or (b)** to be derived from payments for property (or borrowed money) used for a private business use.

It also includes a bond, the proceeds of which **(a)** are to be used directly or indirectly to make or finance loans (other than loans described in section 141(c)(2)) to persons other than governmental units and **(b)** exceeds the lesser of 5% of the proceeds **or** $5 million.

**Issue price.** The issue price of obligations is generally determined under Regulations section 1.148-1(b). Thus, when issued for cash, the issue price is the first price at which a substantial amount of the obligations are sold to the public. To determine the issue price of an obligation issued for property, see sections 1273 and 1274 and the related regulations.

**Issue.** Generally, obligations are treated as part of the same issue if they are issued by the same issuer, on the same date, and in a single transaction, or a series of related transactions. However, obligations issued during the same calendar year **(a)** under a loan agreement under which amounts are to be advanced periodically (a "draw-down loan") or **(b)** with a term not exceeding 270 days, may be treated as part of the same issue if the obligations are equally and ratably secured under a single indenture or loan agreement and are issued under a common financing arrangement (for example, under the same official statement periodically updated to reflect changing factual circumstances). Also, for obligations issued under a draw-down loan that meet the requirements of the preceding sentence, obligations issued during different calendar years may be treated as part of the same issue if all of the amounts to be advanced under the draw-down loan are reasonably expected to be advanced within 3 years of the date of issue of the first obligation. Likewise, obligations (other than private activity bonds) issued under a single agreement that is in the form of a lease or installment sale may be treated as part of the same issue if all of the property covered by that agreement is reasonably expected to be delivered within 3 years of the date of issue of the first obligation.

**Arbitrage rebate.** Generally, interest on a state or local bond is not tax-exempt unless the issuer of the bond rebates to the United States arbitrage profits earned from investing proceeds of the bond in higher yielding nonpurpose investments. See section 148(f).

**Construction issue.** This is an issue of tax-exempt bonds that meets both of the following conditions:

1. At least 75% of the available construction proceeds are to be used for construction expenditures with respect to property to be owned by a governmental unit or a section 501(c)(3) organization, **and**
2. All the bonds that are part of the issue are qualified 501(c)(3) bonds, bonds that are not private activity bonds, or private activity bonds issued to finance property to be owned by a governmental unit or a section 501(c)(3) organization.

In lieu of rebating any arbitrage that may be owed to the United States, the issuer of a construction issue may make an irrevocable election to pay a penalty. The penalty is equal to 1½% of the amount of construction proceeds that do not meet certain spending requirements. See section 148(f)(4)(C) and the Instructions for Form 8038-T.

# Specific Instructions

## Part I—Reporting Authority

**Amended return.** An issuer may file an amended return to change or add to the information reported on a previously filed return for the same date of issue. If you are filing to correct errors or change a previously filed return, check the *Amended Return* box in the heading of the form.

The amended return must provide all the information reported on the original return, in addition to the new or corrected information. Attach an explanation of the reason for the amended return and write across the top, "Amended Return Explanation." Failure to attach an explanation may result in a delay in processing the form.

**Line 1.** The issuer's name is the name of the entity issuing the obligations, not the name of the entity receiving the benefit of the financing. For a lease or installment sale, the issuer is the lessee or the purchaser.

**Line 2.** An issuer that does not have an employer identification number (EIN) should apply for one on Form SS-4, Application for Employer Identification Number. You can get this form on the IRS website at IRS.gov or by calling 1-800-TAX-FORM (1-800-829-3676). You may receive an EIN by telephone by following the instructions for Form SS-4.

**Line 3a.** If the issuer wishes to authorize a person other than an officer or other employee of the issuer (including a legal representative or paid preparer) to communicate with the IRS and whom the IRS may contact about this return (including in writing or by telephone), enter the name of such person here. The person listed in line 3a must be an individual. Do not enter the name and title of an officer or other employee of the issuer here (use line 10a for that purpose).

**Note.** By authorizing a person other than an authorized officer or other employee of the issuer to communicate with the IRS and whom the IRS may contact about this return, the issuer authorizes the IRS to communicate directly with the individual entered on line 3a and consents to disclose the issuer's return information to that individual, as necessary, to process this return.

**Lines 4 and 6.** If you listed an individual on line 3a to communicate with the IRS and whom the IRS may contact about this return, enter the number and street (or P.O. box if mail is not delivered to street address), city, town, or post office, state, and ZIP code of that person. Otherwise, enter the issuer's number and street (or P.O. box if mail is not delivered to street address), city, town, or post office, state, and ZIP code.

**Note.** The address entered on lines 4 and 6 is the address the IRS will use for all written communications regarding the processing of this return, including any notices.

**Line 5.** This line is for IRS use only. Do not make any entries in this box.

**Line 7.** The date of issue is generally the date on which the issuer physically exchanges the bonds that are part of the issue for the underwriter's (or other purchaser's) funds. For a lease or installment sale, enter the date interest starts to accrue in a MM/DD/YYYY format.

**Line 8.** If there is no name of the issue, please provide other identification of the issue.

**Line 9.** Enter the CUSIP (Committee on Uniform Securities Identification Procedures) number of the bond with the latest maturity. If the issue does not have a CUSIP number, write "None."

**Line 10a.** Enter the name and title of the officer or other employee of the issuer whom the IRS may call for more information. If the issuer wishes to designate a person other than an officer or other employee of the issuer (including a legal representative or paid preparer) whom the IRS may call for more information about the return, enter the name, title, and telephone number of such person on lines 3a and 3b.

*Complete lines 10a and 10b even if you complete lines 3a and 3b.*

## Part II—Type of Issue

*Elections referred to in Part II are made on the original bond documents, not on this form.*

Identify the type of obligations issued by entering the corresponding issue price (see *Issue price* under *Definitions* earlier). Attach a schedule listing names and EINs of organizations that are to use proceeds of these obligations, if different from those of the issuer, include a brief summary of the use and indicate whether or not such user is a governmental or nongovernmental entity.

**Line 18.** Enter a description of the issue in the space provided.

**Line 19.** If the obligations are short-term tax anticipation notes or warrants (TANs) or short-term revenue anticipation notes or warrants (RANs), check box 19a. If the obligations are short-term bond anticipation notes (BANs), issued with the expectation that they will be refunded with the proceeds of long-term bonds at some future date, check box 19b. Do not check both boxes.

**Line 20.** Check this box if property other than cash is exchanged for the obligation, for example, acquiring a police car, a fire truck, or telephone equipment through a series of monthly payments. (This type of obligation is sometimes referred to as a "municipal lease.") Also check this box if real property is directly acquired in exchange for an obligation to make periodic payments of interest and principal. **Do not** check this box if the proceeds of the obligation are received in the form of cash, even if the term "lease" is used in the title of the issue.

## Part III—Description of Obligations

**Line 21.** For column (a), the final maturity date is the last date the issuer must redeem the entire issue.

For column (b), see *Issue price* under *Definitions* earlier.

For column (c), the stated redemption price at maturity of the entire issue is the sum of the stated redemption prices at maturity of each bond issued as part of the issue. For a lease or installment sale, write "N/A" in column (c).

For column (d), the weighted average maturity is the sum of the products of the issue price of each maturity and the number of years to maturity (determined separately for each maturity and by taking into account mandatory redemptions), divided by the issue price of the entire issue (from line 21, column (b)). For a lease or installment sale, enter instead the total number of years the lease or installment sale will be outstanding.

For column (e), the yield, as defined in section 148(h), is the discount rate that, when used to compute the present value of all payments of principal and interest to be paid on the obligation, produces an amount equal to the purchase price, including accrued interest. See Regulations section 1.148-4 for specific rules to compute the yield on an issue. If the issue is a variable rate issue, write "VR" as the yield of the issue. For other than variable rate issues, carry the yield out to four decimal places (for example, 5.3125%). If the issue is a lease or installment sale, enter the effective rate of interest being paid.

## Part IV—Uses of Proceeds of Bond Issue

For a lease or installment sale, write "N/A" in the space to the right of the title for Part IV.

**Line 22.** Enter the amount of proceeds that will be used to pay interest from the date the bonds are dated to the date of issue.

**Line 24.** Enter the amount of the proceeds that will be used to pay bond issuance costs, including fees for trustees and bond counsel. If no bond proceeds will be used to pay bond issuance costs, enter zero. Do not leave this line blank.

**Line 25.** Enter the amount of the proceeds that will be used to pay fees for credit enhancement that are taken into account in determining the yield on the issue for purposes of section 148(h) (for example, bond insurance premiums and certain fees for letters of credit).

**Line 26.** Enter the amount of proceeds that will be allocated to such a fund.

**Line 27.** Enter the amount of the proceeds that will be used to pay principal, interest, or call premium on any other issue of bonds within 90 days of the date of issue.

**Line 28.** Enter the amount of the proceeds that will be used to pay principal, interest, or call premium on any other issue of bonds after 90 days of the date of issue, including proceeds that will be used to fund an escrow account for this purpose.

## Part V—Description of Refunded Bonds

Complete this part only if the bonds are to be used to refund a prior issue of tax-exempt bonds. For a lease or installment sale, write "N/A" in the space to the right of the title for Part V.

**Lines 31 and 32.** The remaining weighted average maturity is determined without regard to the refunding. The weighted average maturity is determined in the same manner as on line 21, column (d).

**Line 34.** If more than a single issue of bonds will be refunded, enter the date of issue of each issue. Enter the date in an MM/DD/YYYY format.

## Part VI—Miscellaneous

**Line 35.** An allocation of volume cap is required if the nonqualified amount for the issue is more than $15 million but is not more than the amount that would cause the issue to be private activity bonds.

**Line 36.** If any portion of the gross proceeds of the issue is or will be invested in a guaranteed investment contract (GIC), as defined in Regulations section 1.148-1(b), enter the amount of the gross proceeds so invested, as well as the final maturity date of the GIC and the name of the provider of such contract.

**Line 37.** Enter the amount of the proceeds of this issue used to make a loan to another governmental unit, the interest of which is tax-exempt.

**Line 38.** If the issue is a loan of proceeds from another tax-exempt issue, check the box and enter the date of issue, EIN, and name of issuer of the master pool obligation.

**Line 40.** Check this box if the issue is a construction issue and an irrevocable election to pay a penalty in lieu of arbitrage rebate has been made on or before the date the bonds were issued. The penalty is payable with a Form 8038-T for each 6-month period after the date the bonds are issued. Do not make any payment of penalty in lieu of arbitrage rebate with this form. See Rev. Proc. 92-22, 1992-1 C.B. 736 for rules regarding the "election document."

**Line 41a.** Check this box if the issuer has identified a hedge on its books and records according to Regulations sections 1.148-4(h)(2)(viii) and 1.148-4(h)(5) that permit an issuer of tax-exempt bonds to identify a hedge for it to be included in yield calculations for computing arbitrage.

**Line 42.** In determining if the issuer has super-integrated a hedge, apply the rules of Regulations section 1.148-4(h)(4). If the hedge is super-integrated, check the box.

**Line 43.** If the issuer takes a "deliberate action" after the issue date that causes the conditions of the private business tests or the private loan financing test to be met, then such issue is also an issue of private activity bonds. Regulations section 1.141-2(d)(3) defines a deliberate action as any action taken by the issuer that is within its control regardless of whether there is intent to violate such tests. Regulations section 1.141-12 explains the conditions to taking remedial action that prevent an action that causes an issue to meet the private business tests or private loan financing test from being treated as a deliberate action. Check the box if the issuer has established written procedures to ensure timely remedial action for all nonqualified bonds according to Regulations section 1.141-12 or other remedial actions authorized by the Commissioner under Regulations section 1.141-12(h).

**Line 44.** Check the box if the issuer has established written procedures to monitor compliance with the arbitrage, yield restriction, and rebate requirements of section 148.

**Line 45a.** Check the box if some part of the proceeds was used to reimburse expenditures. Figure and then enter the amount of proceeds that are used to reimburse the issuer for amounts paid for a qualified purpose prior to the issuance of the bonds. See Regulations section 1.150-2.

**Line 45b.** An issuer must adopt an official intent to reimburse itself for preissuance expenditures within 60 days after payment of the original expenditure unless excepted by Regulations section 1.150-2(f). Enter the date the official intent was adopted. See Regulations section 1.150-2(e) for more information about official intent.

## Signature and Consent

An authorized representative of the issuer must sign Form 8038-G and any applicable certification. Also print the name and title of the person signing Form 8038-G. The authorized representative of the issuer signing this form must have the authority to consent to the disclosure of the issuer's return information, as necessary to process this return, to the person(s) that have been designated in Form 8038-G.

**Note.** If the issuer in Part 1, lines 3a and 3b authorizes the IRS to communicate (including in writing and by telephone) with a person other than an officer or other employee of the issuer, by signing this form, the issuer's authorized representative consents to the disclosure of the issuer's return information, as necessary to process this return, to such person.

## Paid Preparer

If an authorized officer of the issuer filled in this return, the paid preparer's space should remain blank. Anyone who prepares the return but does not charge the organization should not sign the return. Certain others who prepare the

return should not sign. For example, a regular, full-time employee of the issuer, such as a clerk, secretary, etc., should not sign.

Generally, anyone who is paid to prepare a return must sign it and fill in the other blanks in the *Paid Preparer Use Only* area of the return.

The paid preparer must:

- Sign the return in the space provided for the preparer's signature (a facsimile signature is acceptable),
- Enter the preparer information, and
- Give a copy of the return to the issuer.

**Paperwork Reduction Act Notice.** We ask for the information on this form to carry out the Internal Revenue laws of the United States. You are required to give us the information. We need it to ensure that you are complying with these laws.

You are not required to provide the information requested on a form that is subject to the Paperwork Reduction Act unless the form displays a valid OMB control number. Books or records relating to a form or its instructions must be retained as long as their contents may become material in the administration of any Internal Revenue law. Generally, tax returns and return information are confidential, as required by section 6103.

The time needed to complete and file this form varies depending on individual circumstances. The estimated average time is:

| | |
|---|---|
| **Learning about the law or the form** . . . . . | 2 hr., 41 min. |
| **Preparing, copying, assembling, and sending the form to the IRS** . . . . . | 3 hr., 3 min. |

If you have comments concerning the accuracy of these time estimates or suggestions for making this form simpler, we would be happy to hear from you. You can write to the Internal Revenue Service, Tax Products Coordinating Committee, SE:W:CAR:MP:T:M:S, 1111 Constitution Ave. NW, IR-6526, Washington, DC 20224. **Do not** send the form to this office. Instead, see *Where To File*.

Form **8038-G**
(Rev. September 2011)
Department of the Treasury
Internal Revenue Service

# Information Return for Tax-Exempt Governmental Obligations

▶ **Under Internal Revenue Code section 149(e)**
▶ **See separate instructions.**
**Caution:** *If the issue price is under $100,000, use Form 8038-GC.*

OMB No. 1545-0720

## Part I Reporting Authority

If **Amended Return**, check here ▶ ☐

| | | | |
|---|---|---|---|
| **1** Issuer's name | | **2** Issuer's employer identification number (EIN) | |
| **3a** Name of person (other than issuer) with whom the IRS may communicate about this return (see instructions) | | **3b** Telephone number of other person shown on 3a | |
| **4** Number and street (or P.O. box if mail is not delivered to street address) | Room/suite | **5** Report number *(For IRS Use Only)* | 3 |
| **6** City, town, or post office, state, and ZIP code | | **7** Date of issue | |
| **8** Name of issue | | **9** CUSIP number | |
| **10a** Name and title of officer or other employee of the issuer whom the IRS may call for more information (see instructions) | | **10b** Telephone number of officer or other employee shown on 10a | |

## Part II Type of Issue (enter the issue price). See the instructions and attach schedule.

| | | | |
|---|---|---|---|
| **11** | Education | **11** | |
| **12** | Health and hospital | **12** | |
| **13** | Transportation | **13** | |
| **14** | Public safety | **14** | |
| **15** | Environment (including sewage bonds) | **15** | |
| **16** | Housing | **16** | |
| **17** | Utilities | **17** | |
| **18** | Other. Describe ▶ | **18** | |
| **19** | If obligations are TANs or RANs, check only box 19a ▶ ☐<br>If obligations are BANs, check only box 19b ▶ ☐ | | |
| **20** | If obligations are in the form of a lease or installment sale, check box ▶ ☐ | | |

## Part III Description of Obligations. Complete for the entire issue for which this form is being filed.

| | (a) Final maturity date | (b) Issue price | (c) Stated redemption price at maturity | (d) Weighted average maturity | (e) Yield |
|---|---|---|---|---|---|
| **21** | | $ | $ | years | % |

## Part IV Uses of Proceeds of Bond Issue (including underwriters' discount)

| | | | | | |
|---|---|---|---|---|---|
| **22** | Proceeds used for accrued interest | | | **22** | |
| **23** | Issue price of entire issue (enter amount from line 21, column (b)) | | | **23** | |
| **24** | Proceeds used for bond issuance costs (including underwriters' discount) | **24** | | | |
| **25** | Proceeds used for credit enhancement | **25** | | | |
| **26** | Proceeds allocated to reasonably required reserve or replacement fund | **26** | | | |
| **27** | Proceeds used to currently refund prior issues | **27** | | | |
| **28** | Proceeds used to advance refund prior issues | **28** | | | |
| **29** | Total (add lines 24 through 28) | | | **29** | |
| **30** | Nonrefunding proceeds of the issue (subtract line 29 from line 23 and enter amount here) | | | **30** | |

## Part V Description of Refunded Bonds. Complete this part only for refunding bonds.

| | | |
|---|---|---|
| **31** | Enter the remaining weighted average maturity of the bonds to be currently refunded ▶ | years |
| **32** | Enter the remaining weighted average maturity of the bonds to be advance refunded ▶ | years |
| **33** | Enter the last date on which the refunded bonds will be called (MM/DD/YYYY) ▶ | |
| **34** | Enter the date(s) the refunded bonds were issued ▶ (MM/DD/YYYY) | |

## Part VI Miscellaneous

| | | | | |
|---|---|---|---|---|
| 35 | Enter the amount of the state volume cap allocated to the issue under section 141(b)(5) . . . . | 35 | | |
| 36a | Enter the amount of gross proceeds invested or to be invested in a guaranteed investment contract (GIC) (see instructions) . . . . . | 36a | | |
| b | Enter the final maturity date of the GIC ▶ _____ | | | |
| c | Enter the name of the GIC provider ▶ _____ | | | |
| 37 | Pooled financings: Enter the amount of the proceeds of this issue that are to be used to make loans to other governmental units . . . . . | 37 | | |

38a If this issue is a loan made from the proceeds of another tax-exempt issue, check box ▶ ☐ and enter the following information:

b Enter the date of the master pool obligation ▶ _____

c Enter the EIN of the issuer of the master pool obligation ▶ _____

d Enter the name of the issuer of the master pool obligation ▶ _____

39 If the issuer has designated the issue under section 265(b)(3)(B)(i)(III) (small issuer exception), check box . . . . ▶ ☐

40 If the issuer has elected to pay a penalty in lieu of arbitrage rebate, check box . . . . . ▶ ☐

41a If the issuer has identified a hedge, check here ▶ ☐ and enter the following information:

b Name of hedge provider ▶ _____

c Type of hedge ▶ _____

d Term of hedge ▶ _____

42 If the issuer has superintegrated the hedge, check box . . . . . ▶ ☐

43 If the issuer has established written procedures to ensure that all nonqualified bonds of this issue are remediated according to the requirements under the Code and Regulations (see instructions), check box . . . . . ▶ ☐

44 If the issuer has established written procedures to monitor the requirements of section 148, check box . . . . . ▶ ☐

45a If some portion of the proceeds was used to reimburse expenditures, check here ▶ ☐ and enter the amount of reimbursement . . . . . ▶ _____

b Enter the date the official intent was adopted ▶ _____

**Signature and Consent**

Under penalties of perjury, I declare that I have examined this return and accompanying schedules and statements, and to the best of my knowledge and belief, they are true, correct, and complete. I further declare that I consent to the IRS's disclosure of the issuer's return information, as necessary to process this return, to the person that I have authorized above.

| Signature of issuer's authorized representative | Date | Type or print name and title |
|---|---|---|
| | | |

**Paid Preparer Use Only**

| Print/Type preparer's name | Preparer's signature | Date | Check ☐ if self-employed | PTIN |
|---|---|---|---|---|
| | | | | |

| Firm's name ▶ | Firm's EIN ▶ |
|---|---|
| Firm's address ▶ | Phone no. |

# VEHICLE TITLING ADDENDUM

Master Tax-Exempt Lease/Purchase Agreement dated August 01, 2012 and related Property Schedule No. 3 dated July 01, 2016, between City of Franklin as Lessee and U.S. Bancorp Government Leasing and Finance, Inc. as Lessor.

1. Lessor and Lessee hereby agree to amend the above referenced Agreement to add additional terms and conditions as set forth below:

> Lessee agrees that it will provide to Lessor the original title documentation to the Equipment. Lessee shall provide such title documentation to Lessor within 15 days of Lessee's receipt of such title documentation from the appropriate titling authority. Lessee's failure to provide Lessor with title documentation to the Equipment in a timely fashion shall be deemed a condition of Default as defined in the default paragraph herein subject to remedies available to Lessor pursuant to the remedies paragraph.

2. Location: Lessor agrees that in regard to the location of the equipment, Lessee must be responsible for maintaining records showing the location of each piece of Leased equipment. Lessee will report this location to Lessor upon written request by Lessor. Failure to do so shall constitute a breach of the Agreement, which default shall be governed by the terms and conditions specified in the default and/or remedies paragraph of the Agreement.

3. Lessee will complete the physical titling of the vehicle as required by the state of Lessee's residence and guarantee U.S. Bancorp Government Leasing and Finance, Inc. that U.S. Bancorp Government Leasing and Finance, Inc. will receive the original title to the leased vehicle in a timely manner. Lessee agrees to indemnify U.S. Bancorp Government Leasing and Finance, Inc. from any damage or loss it incurs, including legal fees, due to its failure to complete its agreement herein.

**THE APPLICATION FOR TITLE MUST INCLUDE THE FOLLOWING AS 1ST LIEN HOLDER:**

**U.S. BANCORP GOVERNMENT LEASING AND FINANCE, INC.**
**1310 MADRID STREET**
**MARSHALL, MN 56258**

By signing this Addendum, Lessee acknowledges the above changes to the Agreement and authorizes Lessor to make such changes. In all other respects the terms and conditions of the Agreement remain in full force and effect.

| **Lessor: U.S. Bancorp Government Leasing and Finance, Inc.** |
|---|
| By: |
| Name: |
| Title: |
| Date: |

| **Lessee: City of Franklin** |
|---|
| By: |
| Name: |
| Title: |
| Date: |

## ESCROW AGREEMENT

THIS ESCROW AGREEMENT (*"Escrow Agreement"*) is made as of July 01, 2016 by and among U.S. Bancorp Government Leasing and Finance, Inc. (*"Lessor"*), City of Franklin (*"Lessee"*) and U.S. BANK NATIONAL ASSOCIATION, as escrow agent (*"Escrow Agent"*).

Lessor and Lessee have heretofore entered into that certain Master Tax-Exempt Lease/Purchase Agreement dated as of August 01, 2012 (the *"Master Agreement"*) and a Property Schedule No. 3 thereto dated July 01, 2016 (the *"Schedule"* and, together with the terms and conditions of the Master Agreement incorporated therein, the *"Agreement"*). The Schedule contemplates that certain personal property described therein (the *"Equipment"*) is to be acquired from the vendor(s) or manufacturer(s) thereof (the *"Vendor"*). After acceptance of the Equipment by Lessee, the Equipment is to be financed by Lessor to Lessee pursuant to the terms of the Agreement.

The Master Agreement further contemplates that Lessor will deposit an amount equal to the anticipated aggregate acquisition cost of the Equipment (the *"Purchase Price"*), being $2,250,000.00, with Escrow Agent to be held in escrow and applied on the express terms set forth herein. Such deposit, together with all interest and other additions received with respect thereto (hereinafter the *"Escrow Fund"*) is to be applied to pay the Vendor its invoice cost (a portion of which may, if required, be paid prior to final acceptance of the Equipment by Lessee); and, if applicable, to reimburse Lessee for progress payments already made by it to the Vendor of the Equipment.

The parties desire to set forth the terms on which the Escrow Fund is to be created and to establish the rights and responsibilities of the parties hereto.

NOW, THEREFORE, in consideration of the sum of Ten Dollars ($10.00) in hand paid, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

1. Escrow Agent hereby agrees to serve as escrow agent upon the terms and conditions set forth herein. The moneys and investments held in the Escrow Fund are for the benefit of Lessee and Lessor, and such moneys, together with any income or interest earned thereon, shall be expended only as provided in this Escrow Agreement, and shall not be subject to levy or attachment or lien by or for the benefit of any creditor of either Lessee or Lessor. Lessor, Lessee and Escrow Agent intend that the Escrow Fund constitute an escrow account in which Lessee has no legal or equitable right, title or interest until satisfaction in full of all conditions contained herein for the disbursement of funds by the Escrow Agent therefrom. However, if the parties' intention that Lessee shall have no legal or equitable right, title or interest until all conditions for disbursement are satisfied in full is not respected in any legal proceeding, the parties hereto intend that Lessor have a security interest in the Escrow Fund, and such security interest is hereby granted by Lessee to secure payment of all sums due to Lessor under the Master Agreement. For such purpose, Escrow Agent hereby agrees to act as agent for Lessor in connection with the perfection of such security interest and agrees to note, or cause to be noted, on all books and records relating to the Escrow Fund, the Lessor's interest therein.

2. On such day as is determined to the mutual satisfaction of the parties (the *"Closing Date"*), Lessor shall deposit with Escrow Agent cash in the amount of the Purchase Price, to be held in escrow by Escrow Agent on the express terms and conditions set forth herein.

On the Closing Date, Escrow Agent agrees to accept the deposit of the Purchase Price by Lessor, and further agrees to hold the amount so deposited together with all interest and other additions received with respect thereto, as the Escrow Fund hereunder, in escrow on the express terms and conditions set forth herein.

3. Escrow Agent shall at all times segregate the Escrow Fund into an account maintained for that express purpose, which shall be clearly identified on the books and records of Escrow Agent as being held in its capacity as Escrow Agent. Securities and other negotiable instruments comprising the Escrow Fund from time to time shall be held or registered in the name of Escrow Agent (or its nominee). The Escrow Fund shall not, to the extent permitted by applicable law, be subject to levy or attachment or lien by or for the benefit of any creditor of any of the parties hereto (except with respect to the security interest therein held by Lessor).

4. The cash comprising the Escrow Fund from time to time shall be invested and reinvested by Escrow Agent in one or more investments as directed by Lessee. Absent written direction from Lessee, the cash will be invested in the U.S. Bank National Association Money Market Deposit Fund. See Exhibit 1 Investment Direction Letter. Lessee represents and warrants to Escrow Agent and Lessor that the investments selected by Lessee for investment of the Escrow Fund are permitted investments for Lessee under all applicable laws. Escrow Agent will use due diligence to collect amounts payable under a check or other instrument for the payment of money comprising the Escrow Fund and shall promptly notify Lessee and Lessor in the event of dishonor of payment under any such check or other instruments. Interest or other amounts earned and received by Escrow Agent with respect to the Escrow Fund shall be deposited in and comprise a part of the Escrow Fund. Escrow Agent shall maintain accounting records sufficient to permit calculation of the income on investments and interest earned on deposit of amounts held in the Escrow Fund. The parties acknowledge that to the extent regulations of the Comptroller of Currency or other applicable regulatory entity grant a right to receive brokerage confirmations of security transactions of the escrow, the parties waive receipt of such confirmations, to the extent permitted by law. The Escrow Agent shall furnish a statement of security transactions on its regular monthly reports. Attached as Exhibit 6 is the Class Action Negative Consent Letter to be reviewed by Lessee.

5. Upon request by Lessee and Lessor, Escrow Agent shall send monthly statements of account to Lessee and Lessor, which statements shall set forth all withdrawals from and interest earnings on the Escrow Fund as well as the investments in which the Escrow Fund is invested.

6. Escrow Agent shall take the following actions with respect to the Escrow Fund:

(a) Upon Escrow Agent's acceptance of the deposit of the Purchase Price, an amount equal to Escrow Agent's set-up fee, as set forth on Exhibit 2 hereto, shall be disbursed from the Escrow Fund to Escrow Agent in payment of such fee.

(b) Escrow Agent shall pay costs of the Equipment upon receipt of a duly executed Requisition Request (substantially in the format of Exhibit 3) signed by Lessor and Lessee. Lessor's authorized signatures are provided in Exhibit 5. Lessee's authorized signatures will be provided in Exhibit 3 of Master Lease Purchase Agreement. Escrow Agent will use best efforts to process requests for payment within one (1) business day of receipt of requisitions received prior to 2:00 p.m. Central Time. The final Requisition shall be accompanied by a duly executed Acceptance Certificate form attached as Exhibit 4 hereto.

(c) Upon receipt by Escrow Agent of written notice from Lessor that an Event of Default or an Event of Nonappropriation (if provided for under the Master Agreement) has occurred under the Agreement, all funds then on deposit in the Escrow Fund shall be paid to Lessor for application in accordance with the Master Agreement, and this Escrow Agreement shall terminate.

(d) Upon receipt by Escrow Agent of written notice from Lessor that the purchase price of the Equipment has been paid in full, Escrow Agent shall pay the funds then on deposit in the Escrow Fund to Lessor to be applied first to the next Lease Payment due under the Master Agreement, and second, to prepayment of the principal component of Lease Payments in inverse order of maturity without premium. To the extent the Agreement is not subject to prepayment, Lessor consents to such prepayment to the extent of such prepayment amount from the Escrow Fund. Upon disbursement of all amounts in the Escrow Fund, this Escrow Agreement shall terminate.

(e) This Escrow Agreement shall terminate eighteen (18) months from the date of this Escrow Agreement. It may, however, be extended by mutual consent of Lessee and Lessor in writing to Escrow Agent. All funds on deposit in the Escrow Fund at the time of termination under this paragraph, unless otherwise directed by Lessee in writing (electronic means acceptable), shall be transferred to Lessor.

7. The fees and expenses, including any legal fees, of Escrow Agent incurred in connection herewith shall be the responsibility of Lessee. The basic fees and expenses of Escrow Agent shall be as set forth on Exhibit 2 and Escrow Agent is hereby authorized to deduct such fees and expenses from the Escrow Fund as and when the same are incurred without any further authorization from Lessee or Lessor. Escrow Agent may employ

legal counsel and other experts as it deems necessary for advice in connection with its obligations hereunder. Escrow Agent waives any claim against Lessor with respect to compensation hereunder.

8. Escrow Agent shall have no liability for acting upon any written instruction presented by Lessor in connection with this Escrow Agreement, which Escrow Agent in good faith believes to be genuine. Furthermore, Escrow Agent shall not be liable for any act or omission in connection with this Escrow Agreement except for its own negligence, willful misconduct or bad faith. Escrow Agent shall not be liable for any loss or diminution in value of the Escrow Fund as a result of the investments made by Escrow Agent.

9. Escrow Agent may resign at any time by giving thirty (30) days' prior written notice to Lessor and Lessee. Lessor may at any time remove Escrow Agent as Escrow Agent under this Escrow Agreement upon written notice. Such removal or resignation shall be effective on the date set forth in the applicable notice. Upon the effective date of resignation or removal, Escrow Agent will transfer the Escrow Fund to the successor Escrow Agent selected by Lessor.

10. Lessee hereby represents, covenants and warrants that pursuant to Treasury Regulations Section 1.148-7(d), the gross proceeds of the Agreement will be expended for the governmental purposes for which the Agreement was entered into, as follows: at least 15% within six months after the Commencement Date, such date being the date of deposit of funds into the Escrow Fund, at least 60% within 12 months after the Commencement Date, and 100% within 18 months after the Commencement Date. If Lessee is unable to comply with Section 1.148-7(d) of the Treasury Regulations, Lessee shall, at its sole expense and cost, compute rebatable arbitrage on the Agreement and pay rebatable arbitrage to the United States at least once every five years, and within 60 days after payment of the final rental or Lease Payment due under the Agreement.

11. In the event of any disagreement between the undersigned or any of them, and/or any other person, resulting in adverse claims and demands being made in connection with or for any moneys involved herein or affected hereby, Escrow Agent shall be entitled at its option to refuse to comply with any such claim or demand, so long as such disagreement shall continue, and in so refusing Escrow Agent may refrain from making any delivery or other disposition of any moneys involved herein or affected hereby and in so doing Escrow Agent shall not be or become liable to the undersigned or any of them or to any person or party for its failure or refusal to comply with such conflicting or adverse demands, and Escrow Agent shall be entitled to continue so to refrain and refuse so to act until:

(a) the rights of the adverse claimants have been finally adjudicated in a court assuming and having jurisdiction of the parties and the moneys involved herein or affected hereby; or

(b) all differences shall have been adjusted by Master Agreement and Escrow Agent shall have been notified thereof in writing signed by all of the persons interested.

12. All notices (excluding billings and communications in the ordinary course of business) hereunder shall be in writing, and shall be sufficiently given and served upon the other party if delivered (a) personally, (b) by United States registered or certified mail, return receipt requested, postage prepaid, (c) by an overnight delivery by a service such as Federal Express or Express Mail from which written confirmation of overnight delivery is available, or (d) by facsimile with a confirmation copy by regular United States mail, postage prepaid, addressed to the other party at its respective address stated below the signature of such party or at such other address as such party shall from time to time designate in writing to the other party, and shall be effective from the date of mailing.

13. This Escrow Agreement shall inure to the benefit of and shall be binding upon the parties hereto and their respective successors and assigns. No rights or obligations of Escrow Agent under this Escrow Agreement may be assigned without the prior written consent of Lessor.

14. This Escrow Agreement shall be governed by and construed in accordance with the laws in the state of the Escrow Agent's location. This Escrow Agreement constitutes the entire Agreement between the parties hereto with respect to the subject matter hereof, and no waiver, consent, modification or change of terms hereof shall bind any party unless in writing signed by all parties.

15. This Escrow Agreement and any written direction may be executed in two or more counterparts, which when so executed shall constitute one and the same agreement or direction.

IN WITNESS WHEREOF, the parties hereto have caused this Escrow Agreement to be duly executed as of the day and year first above set forth.

| U.S. Bancorp Government Leasing and Finance, Inc., as Lessor |
|---|
| By: |
| Name: |
| Title: |
| Address: 13010 SW 68th Parkway, Suite 100<br>Portland, OR 97223 |

| City of Franklin, as Lessee |
|---|
| By: |
| Name: |
| Title: |
| Address: 109 Third Avenue South<br>Franklin, Tennessee 37064 |

| U.S. BANK NATIONAL ASSOCIATION, as Escrow Agent |
|---|
| By: |
| Name: |
| Title: |
| Address: U.S. Bank National Association<br>950 17th Street, 12th Floor<br>Denver, CO 80202 |

**EXHIBIT 1**

U.S. BANK NATIONAL ASSOCIATION
MONEY MARKET ACCOUNT AUTHORIZATION FORM
DESCRIPTION AND TERMS

The U.S. Bank Money Market account is a U.S. Bank National Association ("U.S. Bank") interest-bearing money market deposit account designed to meet the needs of U.S. Bank's Corporate Trust Services Escrow Group and other Corporate Trust customers of U.S. Bank. Selection of this investment includes authorization to place funds on deposit and invest with U.S. Bank.

U.S. Bank uses the daily balance method to calculate interest on this account (actual/365 or 366). This method applies a daily periodic rate to the principal balance in the account each day. Interest is accrued daily and credited monthly to the account. Interest rates are determined at U.S. Bank's discretion, and may be tiered by customer deposit amount.

The owner of the account is U.S. Bank as Agent for its trust customers. U.S. Bank's trust department performs all account deposits and withdrawals. Deposit accounts are FDIC Insured per depositor, as determined under FDIC Regulations, up to applicable FDIC limits.

U.S. BANK, WHEN ACTING AS AN INDENTURE TRUSTEE OR IN A SIMILAR CAPACITY, IS NOT REQUIRED TO REGISTER AS A MUNICIPAL ADVISOR WITH THE SECURITIES AND EXCHANGE COMMISSION FOR PURPOSES OF COMPLYING WITH THE DODD-FRANK WALL STREET REFORM & CONSUMER PROTECTION ACT. INVESTMENT ADVICE, IF NEEDED, SHOULD BE OBTAINED FROM YOUR FINANCIAL ADVISOR.

AUTOMATIC AUTHORIZATION

In the absence of specific written direction to the contrary, U.S. Bank is hereby directed to invest and reinvest proceeds and other available moneys in the U.S. Bank Money Market Account. The U.S. Bank Money Market Account is a permitted investment under the operative documents and this authorization is the permanent direction for investment of the moneys until notified in writing of alternate instructions.

City of Franklin

| | |
|---|---|
| Company Name | Signature of Authorized Directing Party |
| Trust Account Number – includes existing and future sub-accounts unless otherwise directed | Title/Date |

**EXHIBIT 2**

**Schedule of Fees for Services as**
**Escrow Agent**
**For**
**City of Franklin**
**Equipment Lease Purchase Escrow**

| | | |
|---|---|---|
| CTS01010A | **Acceptance Fee** The acceptance fee includes the administrative review of documents, initial set-up of the account, and other reasonably required services up to and including the closing. This is a one-time, non-refundable fee, payable at closing. | WAIVED |
| CTS04460 | **Escrow Agent** Annual fee for the standard escrow agent services associated with the administration of the account. Administration fees are payable in advance. | WAIVED |
| | **Direct Out of Pocket Expenses** Reimbursement of expenses associated with the performance of our duties, including but not limited to publications, legal counsel after the initial close, travel expenses and filing fees. | At Cost |
| | **Extraordinary Services** Extraordinary Services are duties or responsibilities of an unusual nature, including termination, but not provided for in the governing documents or otherwise set forth in this schedule. A reasonable charge will be assessed based on the nature of the services and the responsibility involved. At our option, these charges will be billed at a flat fee or at our hourly rate then in effect. | |

Account approval is subject to review and qualification. Fees are subject to change at our discretion and upon written notice. Fees paid in advance will not be prorated. The fees set forth above and any subsequent modifications thereof are part of your agreement. Finalization of the transaction constitutes agreement to the above fee schedule, including agreement to any subsequent changes upon proper written notice. In the event your transaction is not finalized, any related out-of-pocket expenses will be billed to you directly. Absent your written instructions to sweep or otherwise invest, all sums in your account will remain uninvested and no accrued interest or other compensation will be credited to the account. Payment of fees constitutes acceptance of the terms and conditions set forth.

**IMPORTANT INFORMATION ABOUT PROCEDURES FOR OPENING A NEW ACCOUNT:**

**To help the government fight the funding of terrorism and money laundering activities, Federal law requires all financial institutions to obtain, verify and record information that identifies each person who opens an account.**

**For a non-individual person such as a business entity, a charity, a Trust or other legal entity we will ask for documentation to verify its formation and existence as a legal entity. We may also ask to see financial statements, licenses, identification and authorization documents from individuals claiming authority to represent the entity or other relevant documentation.**

## EXHIBIT 3

## REQUISITION REQUEST

The Escrow Agent is hereby requested to pay from the Escrow Fund established and maintained under that certain Escrow Agreement dated as of July 01, 2016 (the *"Escrow Agreement"*) by and among U.S. Bancorp Government Leasing and Finance, Inc. (the *"Lessor"*), City of Franklin (the *"Lessee"*), and U.S. Bank National Association (the *"Escrow Agent"*), the amount set forth below to the named payee(s). The amount shown is due and payable under a purchase order or contract (or has been paid by and not previously reimbursed to Lessee) with respect to equipment being financed under that certain Master Tax-Exempt Lease/Purchase Agreement dated as of August 01, 2012 (the *"Master Agreement"*) and Property Schedule No. 3 thereto dated July 01, 2016 (the *"Schedule"* and, together with the terms and conditions of the Master Agreement incorporated therein, the *"Agreement"*), by and between the Lessor and the Lessee, and has not formed the basis of any prior requisition request.

| PAYEE | AMOUNT | INVOICE NO. | EQUIPMENT |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

Total requisition amount $_____

The undersigned, as Lessee under the Master Agreement, hereby certifies:

1. The items of the Equipment being acquired with the proceeds of this disbursement have been delivered and installed at the location(s) contemplated by the Master Agreement. The Lessee has conducted such inspection and/or testing of the Equipment being acquired with the proceeds of this disbursement as it deems necessary and appropriate, and such Equipment has been accepted by Lessee.

2. The costs of the Equipment to be paid from the proceeds of this disbursement have been properly incurred, are a proper charge against the Escrow Fund and have not been the basis of any previous disbursement.

3. No part of the disbursement requested hereby will be used to pay for materials not yet incorporated into the Equipment or for services not yet performed in connection therewith.

4. The Equipment is covered by insurance in the types and amounts required by the Agreement.

5. No Event of Default or Event of Nonappropriation (if applicable), as each such term is defined in the Master Agreement, and no event which with the giving of notice or lapse of time, or both, would become such an Event of Default or Event of Nonappropriation has occurred and is continuing on the date hereof.

6. If Lessee paid an invoice prior to the commencement date of the Master Agreement, and is requesting reimbursement for such payment, Lessee has satisfied the requirements for reimbursement set forth in Treas. Reg. §1.150-2.

Request Date: _____

| **Lessor: U.S. Bancorp Government Leasing and Finance, Inc.** |
|---|
| By: |
| Name: |
| Title: |

| **Lessee: City of Franklin** |
|---|
| By: |
| Name: |
| Title: |

## Exhibit 4

## Final Acceptance Certificate

U.S. Bancorp Government Leasing and Finance, Inc.
13010 SW 68th Parkway, Suite 100
Portland, OR 97223

Re: **Property Schedule No. 3** to Master Tax-Exempt Lease/Purchase Agreement between U.S. Bancorp Government Leasing and Finance, Inc. and City of Franklin

Ladies and Gentlemen:

In accordance with the above-referenced Master Tax-Exempt Lease/Purchase Agreement (the "Master Agreement"), the undersigned ("Lessee") hereby certifies and represents to, and agrees with, U.S. Bancorp Government Leasing and Finance, Inc. ("Lessor"), as follows:

(1) The Property, as such terms are defined in the above-referenced Property Schedule, has been acquired, made, delivered, installed and accepted on the date indicated below.

(2) Lessee has conducted such inspection and/or testing of the Property as it deems necessary and appropriate and hereby acknowledges that it accepts the Property for all purposes.

(3) No event or condition that constitutes, or with notice or lapse of time, or both, would constitute, an Event of Default or a Nonappropriation Event (as such terms are defined in the Master Agreement) exists at the date hereof.

Acceptance Date: _____

| **Lessee: City of Franklin** |
|---|
| By: |
| Name: |
| Title: |

**Exhibit 6**

**Class Action Negative Consent Letter**

July 01, 2016

City of Franklin
109 Third Avenue South
Franklin, Tennessee 37064

RE: USBGLF/City of Franklin - - Class Action Litigation Claims

Dear Russell Truell, CFO**:**

U.S. Bank National Association ("U.S. Bank") has established its policies and procedures relative to class action litigation claims filed on behalf of its clients' accounts. This policy may impact future claims filed by U.S. Bank on behalf of the above-referenced account. Listed below are the policies regarding class action litigation claims**:**

1. U.S. Bank will file class action litigation claims, at no charge, on behalf of open, eligible agency or custody accounts upon receipt of proper documented authorization. This notice, with your ability to opt out as further described below**,** constitutes such documented authorization.
2. U.S. Bank will not file claims for agency or custody accounts that were open during the class action period but were closed prior to receipt of any notice of the class action litigation.
3. Assuming requisite information is provided by the payor to identify the applicable account, settlement proceeds of the class action litigation will be posted within a reasonable time following receipt of such proceeds to the entitled accounts that are open at such time. If entitled accounts are closed prior to distribution and receipt of settlement proceeds, they will be remitted to entitled beneficiaries or successors of the account net of any research and filing fees. Proceeds, less any research and filing fees, will be escheated if the entitled beneficiaries or successors of the account cannot be identified /located.

If you wish U.S. Bank to continue to file class action litigation proofs of claim on behalf of your account, you do not need to take any further action. However, if you do not wish U.S. Bank to file class action proofs of claim on behalf of your account, you may notify us of this election by returning this letter with your signature and date provided below within 30 days or by filing a separate authorization letter with your Account Manager by the same date.

The authorization and understanding contained in this communication constitutes an amendment of any applicable provisions of the account document for the above-referenced account.

If you have any questions, please contact me at the below number.

Sincerely,

Kathleen Connelly
Vice President
303-585-4591

☐ No, U.S. Bank is not authorized to file class action litigation proofs of claim on behalf of the above-referenced account(s). By making this election, I acknowledge that U.S. Bank is not responsible for forwarding notices received on class action or litigation claims.

_____ _____
Authorized Signer Date

Form **W-9**
(Rev. December 2014)
Department of the Treasury
Internal Revenue Service

# Request for Taxpayer Identification Number and Certification

**Give Form to the requester. Do not send to the IRS.**

Print or type
See Specific Instructions on page 2.

1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.

2 Business name/disregarded entity name, if different from above

3 Check appropriate box for federal tax classification; check only **one** of the following seven boxes:

☐ Individual/sole proprietor or single-member LLC ☐ C Corporation ☐ S Corporation ☐ Partnership ☐ Trust/estate

☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) ▶ _____

**Note.** For a single-member LLC that is disregarded, do not check LLC; check the appropriate box in the line above for the tax classification of the single-member owner.

☐ Other (see instructions) ▶

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):

Exempt payee code (if any) _____

Exemption from FATCA reporting code (if any) _____

*(Applies to accounts maintained outside the U.S.)*

5 Address (number, street, and apt. or suite no.)

Requester's name and address (optional)

6 City, state, and ZIP code

7 List account number(s) here (optional)

## Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

**Note.** If the account is in more than one name, see the instructions for line 1 and the chart on page 4 for guidelines on whose number to enter.

**Social security number**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | – | | | – | | | | |

**or**

**Employer identification number**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | – | | | | | | | |

## Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

**Certification instructions.** You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 3.

| **Sign Here** | **Signature of U.S. person ▶** | **Date ▶** |
|---|---|---|

## General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

**Future developments.** Information about developments affecting Form W-9 (such as legislation enacted after we release it) is at *www.irs.gov/fw9*.

### Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following:

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

*If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding.* See *What is backup withholding?* on page 2.

By signing the filled-out form, you:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and
4. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct. See *What is FATCA reporting?* on page 2 for further information.

**Note.** If you are a U.S. person and a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

**Definition of a U.S. person.** For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien;
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States;
- An estate (other than a foreign estate); or
- A domestic trust (as defined in Regulations section 301.7701-7).

**Special rules for partnerships.** Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax under section 1446 on any foreign partners' share of effectively connected taxable income from such business. Further, in certain cases where a Form W-9 has not been received, the rules under section 1446 require a partnership to presume that a partner is a foreign person, and pay the section 1446 withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid section 1446 withholding on your share of partnership income.

In the cases below, the following person must give Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States:

- In the case of a disregarded entity with a U.S. owner, the U.S. owner of the disregarded entity and not the entity;
- In the case of a grantor trust with a U.S. grantor or other U.S. owner, generally, the U.S. grantor or other U.S. owner of the grantor trust and not the trust; and
- In the case of a U.S. trust (other than a grantor trust), the U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

**Foreign person.** If you are a foreign person or the U.S. branch of a foreign bank that has elected to be treated as a U.S. person, do not use Form W-9. Instead, use the appropriate Form W-8 or Form 8233 (see Publication 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

**Nonresident alien who becomes a resident alien.** Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items:

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.

2. The treaty article addressing the income.

3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.

4. The type and amount of income that qualifies for the exemption from tax.

5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

***Example.*** Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity, give the requester the appropriate completed Form W-8 or Form 8233.

## Backup Withholding

**What is backup withholding?** Persons making certain payments to you must under certain conditions withhold and pay to the IRS 28% of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, payments made in settlement of payment card and third party network transactions, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

**Payments you receive will be subject to backup withholding if:**

1. You do not furnish your TIN to the requester,

2. You do not certify your TIN when required (see the Part II instructions on page 3 for details),

3. The IRS tells the requester that you furnished an incorrect TIN,

4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or

5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See *Exempt payee code* on page 3 and the separate Instructions for the Requester of Form W-9 for more information.

Also see *Special rules for partnerships* above.

## What is FATCA reporting?

The Foreign Account Tax Compliance Act (FATCA) requires a participating foreign financial institution to report all United States account holders that are specified United States persons. Certain payees are exempt from FATCA reporting. See *Exemption from FATCA reporting code* on page 3 and the Instructions for the Requester of Form W-9 for more information.

## Updating Your Information

You must provide updated information to any person to whom you claimed to be an exempt payee if you are no longer an exempt payee and anticipate receiving reportable payments in the future from this person. For example, you may need to provide updated information if you are a C corporation that elects to be an S corporation, or if you no longer are tax exempt. In addition, you must furnish a new Form W-9 if the name or TIN changes for the account; for example, if the grantor of a grantor trust dies.

## Penalties

**Failure to furnish TIN.** If you fail to furnish your correct TIN to a requester, you are subject to a penalty of $50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

**Civil penalty for false information with respect to withholding.** If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a $500 penalty.

**Criminal penalty for falsifying information.** Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

**Misuse of TINs.** If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

# Specific Instructions

## Line 1

You must enter one of the following on this line; **do not** leave this line blank. The name should match the name on your tax return.

If this Form W-9 is for a joint account, list first, and then circle, the name of the person or entity whose number you entered in Part I of Form W-9.

a. **Individual.** Generally, enter the name shown on your tax return. If you have changed your last name without informing the Social Security Administration (SSA) of the name change, enter your first name, the last name as shown on your social security card, and your new last name.

**Note. ITIN applicant:** Enter your individual name as it was entered on your Form W-7 application, line 1a. This should also be the same as the name you entered on the Form 1040/1040A/1040EZ you filed with your application.

b. **Sole proprietor or single-member LLC.** Enter your individual name as shown on your 1040/1040A/1040EZ on line 1. You may enter your business, trade, or "doing business as" (DBA) name on line 2.

c. **Partnership, LLC that is not a single-member LLC, C Corporation, or S Corporation.** Enter the entity's name as shown on the entity's tax return on line 1 and any business, trade, or DBA name on line 2.

d. **Other entities.** Enter your name as shown on required U.S. federal tax documents on line 1. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on line 2.

e. **Disregarded entity.** For U.S. federal tax purposes, an entity that is disregarded as an entity separate from its owner is treated as a "disregarded entity." See Regulations section 301.7701-2(c)(2)(iii). Enter the owner's name on line 1. The name of the entity entered on line 1 should never be a disregarded entity. The name on line 1 should be the name shown on the income tax return on which the income should be reported. For example, if a foreign LLC that is treated as a disregarded entity for U.S. federal tax purposes has a single owner that is a U.S. person, the U.S. owner's name is required to be provided on line 1. If the direct owner of the entity is also a disregarded entity, enter the first owner that is not disregarded for federal tax purposes. Enter the disregarded entity's name on line 2, "Business name/disregarded entity name." If the owner of the disregarded entity is a foreign person, the owner must complete an appropriate Form W-8 instead of a Form W-9. This is the case even if the foreign person has a U.S. TIN.

## Line 2

If you have a business name, trade name, DBA name, or disregarded entity name, you may enter it on line 2.

## Line 3

Check the appropriate box in line 3 for the U.S. federal tax classification of the person whose name is entered on line 1. Check only one box in line 3.

**Limited Liability Company (LLC).** If the name on line 1 is an LLC treated as a partnership for U.S. federal tax purposes, check the "Limited Liability Company" box and enter "P" in the space provided. If the LLC has filed Form 8832 or 2553 to be taxed as a corporation, check the "Limited Liability Company" box and in the space provided enter "C" for C corporation or "S" for S corporation. If it is a single-member LLC that is a disregarded entity, do not check the "Limited Liability Company" box; instead check the first box in line 3 "Individual/sole proprietor or single-member LLC."

## Line 4, Exemptions

If you are exempt from backup withholding and/or FATCA reporting, enter in the appropriate space in line 4 any code(s) that may apply to you.

**Exempt payee code.**

- Generally, individuals (including sole proprietors) are not exempt from backup withholding.
- Except as provided below, corporations are exempt from backup withholding for certain payments, including interest and dividends.
- Corporations are not exempt from backup withholding for payments made in settlement of payment card or third party network transactions.
- Corporations are not exempt from backup withholding with respect to attorneys' fees or gross proceeds paid to attorneys, and corporations that provide medical or health care services are not exempt with respect to payments reportable on Form 1099-MISC.

The following codes identify payees that are exempt from backup withholding. Enter the appropriate code in the space in line 4.

1—An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2)

2—The United States or any of its agencies or instrumentalities

3—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

4—A foreign government or any of its political subdivisions, agencies, or instrumentalities

5—A corporation

6—A dealer in securities or commodities required to register in the United States, the District of Columbia, or a U.S. commonwealth or possession

7—A futures commission merchant registered with the Commodity Futures Trading Commission

8—A real estate investment trust

9—An entity registered at all times during the tax year under the Investment Company Act of 1940

10—A common trust fund operated by a bank under section 584(a)

11—A financial institution

12—A middleman known in the investment community as a nominee or custodian

13—A trust exempt from tax under section 664 or described in section 4947

The following chart shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 13.

| IF the payment is for . . . | THEN the payment is exempt for . . . |
|---|---|
| Interest and dividend payments | All exempt payees except for 7 |
| Broker transactions | Exempt payees 1 through 4 and 6 through 11 and all C corporations. S corporations must not enter an exempt payee code because they are exempt only for sales of noncovered securities acquired prior to 2012. |
| Barter exchange transactions and patronage dividends | Exempt payees 1 through 4 |
| Payments over $600 required to be reported and direct sales over $5,000[1] | Generally, exempt payees 1 through 5[2] |
| Payments made in settlement of payment card or third party network transactions | Exempt payees 1 through 4 |

[1] See Form 1099-MISC, Miscellaneous Income, and its instructions.

[2] However, the following payments made to a corporation and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, gross proceeds paid to an attorney reportable under section 6045(f), and payments for services paid by a federal executive agency.

**Exemption from FATCA reporting code.** The following codes identify payees that are exempt from reporting under FATCA. These codes apply to persons submitting this form for accounts maintained outside of the United States by certain foreign financial institutions. Therefore, if you are only submitting this form for an account you hold in the United States, you may leave this field blank. Consult with the person requesting this form if you are uncertain if the financial institution is subject to these requirements. A requester may indicate that a code is not required by providing you with a Form W-9 with "Not Applicable" (or any similar indication) written or printed on the line for a FATCA exemption code.

A—An organization exempt from tax under section 501(a) or any individual retirement plan as defined in section 7701(a)(37)

B—The United States or any of its agencies or instrumentalities

C—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

D—A corporation the stock of which is regularly traded on one or more established securities markets, as described in Regulations section 1.1472-1(c)(1)(i)

E—A corporation that is a member of the same expanded affiliated group as a corporation described in Regulations section 1.1472-1(c)(1)(i)

F—A dealer in securities, commodities, or derivative financial instruments (including notional principal contracts, futures, forwards, and options) that is registered as such under the laws of the United States or any state

G—A real estate investment trust

H—A regulated investment company as defined in section 851 or an entity registered at all times during the tax year under the Investment Company Act of 1940

I—A common trust fund as defined in section 584(a)

J—A bank as defined in section 581

K—A broker

L—A trust exempt from tax under section 664 or described in section 4947(a)(1)

M—A tax exempt trust under a section 403(b) plan or section 457(g) plan

**Note.** You may wish to consult with the financial institution requesting this form to determine whether the FATCA code and/or exempt payee code should be completed.

## Line 5

Enter your address (number, street, and apartment or suite number). This is where the requester of this Form W-9 will mail your information returns.

## Line 6

Enter your city, state, and ZIP code.

# Part I. Taxpayer Identification Number (TIN)

**Enter your TIN in the appropriate box.** If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN. However, the IRS prefers that you use your SSN.

If you are a single-member LLC that is disregarded as an entity separate from its owner (see *Limited Liability Company (LLC)* on this page), enter the owner's SSN (or EIN, if the owner has one). Do not enter the disregarded entity's EIN. If the LLC is classified as a corporation or partnership, enter the entity's EIN.

**Note.** See the chart on page 4 for further clarification of name and TIN combinations.

**How to get a TIN.** If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local SSA office or get this form online at *www.ssa.gov*. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at *www.irs.gov/businesses* and clicking on Employer Identification Number (EIN) under Starting a Business. You can get Forms W-7 and SS-4 from the IRS by visiting IRS.gov or by calling 1-800-TAX-FORM (1-800-829-3676).

If you are asked to complete Form W-9 but do not have a TIN, apply for a TIN and write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

**Note.** Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

**Caution:** *A disregarded U.S. entity that has a foreign owner must use the appropriate Form W-8.*

## Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if items 1, 4, or 5 below indicate otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). In the case of a disregarded entity, the person identified on line 1 must sign. Exempt payees, see *Exempt payee code* earlier.

**Signature requirements.** Complete the certification as indicated in items 1 through 5 below.

**1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983.** You must give your correct TIN, but you do not have to sign the certification.

**2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983.** You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

**3. Real estate transactions.** You must sign the certification. You may cross out item 2 of the certification.

**4. Other payments.** You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments made in settlement of payment card and third party network transactions, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

**5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions.** You must give your correct TIN, but you do not have to sign the certification.

## What Name and Number To Give the Requester

| For this type of account: | Give name and SSN of: |
|---|---|
| 1. Individual | The individual |
| 2. Two or more individuals (joint account) | The actual owner of the account or, if combined funds, the first individual on the account[1] |
| 3. Custodian account of a minor (Uniform Gift to Minors Act) | The minor[2] |
| 4. a. The usual revocable savings trust (grantor is also trustee)<br>b. So-called trust account that is not a legal or valid trust under state law | The grantor-trustee[1]<br>The actual owner[1] |
| 5. Sole proprietorship or disregarded entity owned by an individual | The owner[3] |
| 6. Grantor trust filing under Optional Form 1099 Filing Method 1 (see Regulations section 1.671-4(b)(2)(i)(A)) | The grantor* |
| **For this type of account:** | **Give name and EIN of:** |
| 7. Disregarded entity not owned by an individual | The owner |
| 8. A valid trust, estate, or pension trust | Legal entity[4] |
| 9. Corporation or LLC electing corporate status on Form 8832 or Form 2553 | The corporation |
| 10. Association, club, religious, charitable, educational, or other tax-exempt organization | The organization |
| 11. Partnership or multi-member LLC | The partnership |
| 12. A broker or registered nominee | The broker or nominee |
| 13. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments | The public entity |
| 14. Grantor trust filing under the Form 1041 Filing Method or the Optional Form 1099 Filing Method 2 (see Regulations section 1.671-4(b)(2)(i)(B)) | The trust |

[1] List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

[2] Circle the minor's name and furnish the minor's SSN.

[3] You must show your individual name and you may also enter your business or DBA name on the "Business name/disregarded entity" name line. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

[4] List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see *Special rules for partnerships* on page 2.

*Note. Grantor also must provide a Form W-9 to trustee of trust.

**Note.** If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

## Secure Your Tax Records from Identity Theft

Identity theft occurs when someone uses your personal information such as your name, SSN, or other identifying information, without your permission, to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax preparer.

If your tax records are affected by identity theft and you receive a notice from the IRS, respond right away to the name and phone number printed on the IRS notice or letter.

If your tax records are not currently affected by identity theft but you think you are at risk due to a lost or stolen purse or wallet, questionable credit card activity or credit report, contact the IRS Identity Theft Hotline at 1-800-908-4490 or submit Form 14039.

For more information, see Publication 4535, Identity Theft Prevention and Victim Assistance.

Victims of identity theft who are experiencing economic harm or a system problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 1-877-777-4778 or TTY/TDD 1-800-829-4059.

**Protect yourself from suspicious emails or phishing schemes.** Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to *phishing@irs.gov*. You may also report misuse of the IRS name, logo, or other IRS property to the Treasury Inspector General for Tax Administration (TIGTA) at 1-800-366-4484. You can forward suspicious emails to the Federal Trade Commission at: *spam@uce.gov* or contact them at *www.ftc.gov/idtheft* or 1-877-IDTHEFT (1-877-438-4338).

Visit IRS.gov to learn more about identity theft and how to reduce your risk.

## Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons (including federal agencies) who are required to file information returns with the IRS to report interest, dividends, or certain other income paid to you; mortgage interest you paid; the acquisition or abandonment of secured property; the cancellation of debt; or contributions you made to an IRA, Archer MSA, or HSA. The person collecting this form uses the information on the form to file information returns with the IRS, reporting the above information. Routine uses of this information include giving it to the Department of Justice for civil and criminal litigation and to cities, states, the District of Columbia, and U.S. commonwealths and possessions for use in administering their laws. The information also may be disclosed to other countries under a treaty, to federal and state agencies to enforce civil and criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism. You must provide your TIN whether or not you are required to file a tax return. Under section 3406, payers must generally withhold a percentage of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to the payer. Certain penalties may also apply for providing false or fraudulent information.

**RESOLUTION 2016-37**

**A RESOLUTION APPROVING AN ADDITIONAL SCHEDULE OF EQUIPMENT UNDER A MASTER LEASE AGREEMENT WITH U S BANK FOR THE LEASING OF CAPITAL EQUIPMENT**

**WHEREAS**, the Board of Mayor & Aldermen has adopted an operating budget for the fiscal year 2016-2017; and

**WHEREAS**, the budget calls for purchase of certain capital equipment items that are well suited to being funded by means of a lease/purchase agreement; and

**WHEREAS**, the City's Finance Department issued a request for proposal from banking and financial firms to provide lease pricing information; and

**WHEREAS,** on June 8, 2016, interest rate proposals were received by the City and by Public Financial Management, the City's financial advisor; and

**WHEREAS**, a review of those proposals indicate that the most cost-effective quote was provided by U S Bank; and

**WHEREAS**, a master lease agreement with U S Bank was previously adopted by the Board of Mayor & Aldermen and a Schedule of Property #3 is needed to execute purchases under the lease.

**NOW THEREFORE, BE IT RESOLVED** by the Board of Mayor and Aldermen of the City of Franklin, Tennessee, that Schedule 3 to the master lease agreement (Contract 2012-0123) with U S Bank is approved subject to final review of the City Attorney and the City Administrator, and the Mayor and City Administrator are hereby authorized to sign the Schedule of Property and any other pertinent exhibits to the contract, as equipment and capital items are ordered and delivered throughout the budget year and until the acquisition fund is exhausted.

**IT IS SO RESOLVED AND DONE** on this 12th day of July, 2016.

**ATTEST:** **CITY OF FRANKLIN, TENNESSEE**

**By: _____** **By: _____**

**ERIC S. STUCKEY**
**City Administrator**

**Dr. Ken Moore**
**Mayor**

**Approved as to Form:**

**By: _____**
**Shauna R. Billingsley**
**City Attorney**

Law Dept. approved 06.30.16

# Franklin*Forward* – A Vision for 2033

## City's Mission:

"Franklin will continually strive to be a community of choice for individuals, families, and businesses to grow and prosper through an excellent quality of life supported by exceptional, responsive, and cost-effective City services."

## Strategic Plan Themes:

**I. A Safe, Clean, and Livable City**

a. Franklin will have safe neighborhoods supported by high-quality police, fire, and emergency services as well as effective code enforcement.
b. Franklin will enhance the value and character of our community through progressive and responsive development and neighborhood services.
c. Franklin will provide high-quality water and wastewater treatment services that will meet the needs of our growing community.
d. Franklin will be a model for environmental quality and a sustainable city.
e. Franklin will be a leader in residential recycling efforts.

**II. An Effective and Fiscally Sound City Government Providing High Quality Service**

a. The citizens of Franklin will be benefactors to City services that reflect efficiency while preserving the personal touch and engagement they have come to expect in our community.
b. Franklin government will seek diversification and efficiencies of revenue sources to find its aspirations.
c. The City of Franklin will have a talented, diverse, and engaged workforce.

**III. Quality Life Experiences**

a. Preserving dynamic, diverse, engaged neighborhoods: Franklin will be a place that offers a high quality of life for all citizens who choose to live and work here.
b. Franklin will facilitate the development and maintenance of housing options that meet the needs of people desiring to live and work in our community.
c. Meeting transportation needs: Franklin will have a diverse transportation network that promotes, provides, and supports safe and efficient mobility choices for all, including driving, public transit, walking, and biking.
d. Creating desirable life experiences: Franklin will continue to be a destination to live and work that ranks among the best in the nation.

**IV. Sustainable Growth and Economic Prosperity**

a. Franklin will strategically manage its growth and the value of its assets.
b. Franklin will pursue growth and development that embraces its historic context and encourages revenue generation.
c. Franklin will expand and retain business and job opportunities within the community as well as the country.

# Capital Improvement Program (CIP) – Project Scoring Criteria

## I. A Safe, Clean, and Livable City

1. Contributes to Health, Safety and Welfare
   *(Choose One)*
   A. Eliminates a KNOWN hazard
   B. Eliminates a POTENTIAL hazard
   C. Materially contributes
   D. Minimally contributes
   E. No impact

2. Implications of Project Deferral
   *(Choose One)*
   A. Deferral will create unsafe conditions and/or cause noticeable disruptions to level of service
   B. Deferral will NOT create unsafe conditions and/or cause noticeable disruptions to level of service

3. Environmental Impact
   *(Choose One)*
   A. Positive Impact
   B. Little or no impact
   C. Detrimental impact

## II. An Effective and Fiscally Sound City Government Providing High Quality Service

1. Will Project Upgrade Facilities?
   *(Choose One)*
   A. Rehabilitates/upgrades existing facility
   B. Replaces existing facility
   C. New facility

2. Project's Expected Useful Life
   *(Choose One)*
   A. Greater than 20 years
   B. 10 to 20 years
   C. 4 to 10 years
   D. 3 years or Less

3. Service Area of Project
   *(Choose One)*
   A. Regional
   B. City-wide
   C. Large Portion of City
   D. Several Neighborhoods
   E. One Neighborhood

4. Availability of Federal/State Funding
   *(Choose One)*
   A. Guaranteed state/federal funding
   B. High potential for state/federal funding
   C. Limited potential for state/federal funding
   D. No potential for state/federal funding

5. Impact on Annual Operations Budget
   *(Choose One)*
   A. Reduce cost
   B. Cost neutral
   C. Increase cost

6. Capital Costs
   *(Choose One)*
   A. Under $100,000
   B. $100,000 - $1,000,000
   C. $1,000,000 - $5,000,000
   D. Over $5,000,000

7. Public Perception
   *(Choose One)*
   A. Overwhelming public support
   B. Supported by small but vocal minority
   C. BOMA and/or staff identified priority

**III. Quality Life Experiences**

1. Historic/Sensitive Area Preservation
   *(Choose One)*
   A. Enhances Historic/Sensitive Area
   B. No Significant Impact
   C. Detrimental to Historic/Sensitive Area

2. Equality
   *(Choose One)*
   A. Delivers new service or facility to underserved population
   B. Enhances existing service or facility to underserved population
   C. No impact to underserved population

# Capital Improvement Program (CIP) – Project Scoring Criteria

## IV. Sustainable Growth and Economic Prosperity

1. Revitalization and Balanced Growth
   *(Choose One)*
   A. Positive impact to identified distressed area AND complies with Land Use Plan
   B. Project scale supported by Land Use Plan
   C. Neutral impact on area

2. Economic Impact
   *(Choose One)*
   A. Positive effect on local economy
   B. Little or no effect on local economy
   C. Adverse effect on local economy

## V. Technical Requirements

1. Project Readiness
   *(Choose One)*
   A. Likely to be completed within the requested budget and schedule
   B. Possible budget or schedule problems
   C. Probably budget or schedule problems

2. Critical City Objective
   *(Choose One)*
   A. Project is consistent with adopted City polices and plans (i.e. Master Plan, Major Thoroughfare Plan, Basin Plan, etc.)
   B. Project is consistent with recent BOMA direction and decisions
   C. No policy/plan in place

3. Prior Investment by the City
   *(Choose One)*
   A. Significant investment by City to meet legal obligation
   B. Significant investment by City in the last 5 years
   C. Moderate investment by the City
   D. New project; no prior investment

# Capital Investment Program (CIP) – FY 2017 thru 2026

Facilities (Emergency Services & General Services)

| ★★★★ (4-Star) Projects | | |
|---|---|---|
| Fire Station 7 (Goose Creek Area) | FD16001 | Active |
| New City Hall | FM16001 | Active |

| ★★★ (3-Star) Projects |
|---|
| None |

| ★★ (2-Star) Projects |
|---|
| None |

| ★ (1-Star) Projects |
|---|
| None |

# Capital Investment Program (CIP) – FY 2017 thru 2026

Parks & Recreation

| ★★★★ (4-Star) Projects | | |
|---|---|---|
| Bicentennial Park Schematic Design & Construction | PK16020 | Active |
| Main Barn Restoration (Harlinsdale) | PK16002 | Pending |
| East/Southeast Multipurpose Park | PK16014 | Pending |
| Hayes Home Restoration (Harlinsdale) | PK16001 | Pending |
| Eastern Flank Circle (Loop Road) Repair | PK16018 | Pending |

| ★★★ (3-Star) Projects | | |
|---|---|---|
| Greenway (Aspen Grove to Mack Hatcher) | PK16011 | Pending |
| Jim Warren Park Renovations | PK16008 | Pending |
| Greenway (Pinkerton to Bicentennial) | PK16012 | Pending |
| Greenway & Bridge (Harlinsdale to Fulton Greer) | PK16013 | Pending |

| ★★ (2-Star) Projects | | |
|---|---|---|
| Lockwood Glen Park | PK16016 | Pending |
| North Barn Restoration (Harlinsdale) | PK16004 | Pending |
| Worker House I & II (Harlinsdale) | PK16006 | Pending |
| Harlinsdale Farm Interurban Trail Connection | PK16019 | Pending |
| Harlinsdale Visitor Center & Museum | PK16005 | Pending |

| ★ (1-Star) Projects | | |
|---|---|---|
| North Pavilion & Restroom Facility (Harlinsdale) | PK16007 | Pending |
| Maintenance Building Restoration (Harlinsdale) | PK16003 | Pending |
| Liberty Park Improvements | PK16009 | Pending |
| Greenway (Lewisburg to I-65/Harpeth River) | PK16017 | Pending |
| Splash Pad | PK16010 | Pending |

# Capital Investment Program (CIP) – FY 2017 thru 2026

*Public Utilities – Operational Priorities*

| ★★★★ (4-Star) Projects - Water | | |
|---|---|---|
| James and Avondale Infrastructure Improvements | WM16024 | Active |
| Old Carters Creek Pike Water Line Replacement | WM16003 | Active |
| Bobby Drive Water Line Replacement | WM16010 | Active |
| West End Circle Infrastructure Improvements | WM16041 | Pending |
| 16” Water Line Long Lane Connector | WM16001 | Pending |
| Thompson Alley Infrastructure Improvements | WM16039 | Pending |
| Adams Street Infrastructure Improvements | WM16005 | Pending |
| Franklin Road Improvements & Streetscape | ST16009 | Active |
| West Main Infrastructure Improvements | WM16042 | Pending |

| ★★★★ (4-Star) Projects - Wastewater | | |
|---|---|---|
| Spencer Creek Sanitary Sewer Replacement | WM16038 | Active |
| Sewer Interceptor Point Repair Projects | WM16043 | Pending |
| James and Avondale Infrastructure Improvements | WM16024 | Active |
| Forrest Crossing Force Main (No. 1) Replacement | WM16016 | Pending |
| West End Circle Infrastructure Improvements | WM16041 | Pending |
| Thompson Alley Infrastructure Improvements | WM16039 | Pending |
| Frazier Drive Sanitary Sewer Rehabilitation | WM16019 | Pending |
| Adams Street Infrastructure Improvements | WM16005 | Pending |

# Capital Investment Program (CIP) – FY 2017 thru 2026

*Public Utilities – Operational Priorities*

| ★★★ (3-Star) Projects - Water | | |
|---|---|---|
| Water Line from Fourth Ave S to Berry Circle | WM16018 | Pending |
| Church Street Infrastructure Improvements | WM16012 | Pending |
| S. Margin Infrastructure Improvements | ST16018 | Pending |
| Gist Street Infrastructure Improvements | WM16020 | Pending |
| Old Hillsboro Road Water Line | WM16032 | Pending |
| Murfreesboro Road Water Line Replacement | WM16030 | Pending |
| Eastview Circle Infrastructure Improvements | WM16014 | Pending |
| Beta Drive Extension | ST16010 | Pending |

| ★★★ (3-Star) Projects - Wastewater | | |
|---|---|---|
| Evans Street Sewer Improvements | WM16015 | Pending |
| Holiday Court Lift Station Rehabilitation | WM16023 | Pending |
| West Main Infrastructure Improvements | WM16042 | Pending |
| Franklin Road Improvements & Streetscape | ST16009 | Active |
| New Hope Academy Sewer Line Replacement | WM16033 | Pending |
| Church Street Infrastructure Improvements | WM16012 | Pending |
| Berry Circle Sanitary Sewer Line Rehabilitation | WM16009 | Pending |
| Mallory/N Royal Oaks & Liberty Intersection Imp. | ST16011 | Pending |

# Capital Investment Program (CIP) – FY 2017 thru 2026

*Public Utilities – Operational Priorities*

| ★★ (2-Star) Projects - Water | | |
|---|---|---|
| Glass Lane Water Line Replacement | WM16021 | Pending |
| Forrest Street Infrastructure Improvements | WM16017 | Pending |
| Lewisburg Pike Water Line Replacement | WM16026 | Pending |
| Alicia Drive Water Line Replacement | WM16007 | Pending |
| Battle Avenue Infrastructure Improvements | WM16008 | Pending |
| Buckworth Infrastructure Improvements | WM16011 | Pending |
| N Royals Oaks Blvd (Alexander Plaza to Liberty Pk) | ST16019 | Pending |
| Grassland Tank Demolition | WM16013 | Pending |

| ★★ (2-Star) Projects - Wastewater | | |
|---|---|---|
| S. Margin Infrastructure Improvements | ST16018 | Pending |
| Gist Street Infrastructure Improvements | WM16020 | Pending |
| East McEwen Drive Improvements – Phase 4 | ST16007 | Active |
| Beta Drive Extension | ST16010 | Pending |
| Eastview Circle Infrastructure Improvements | WM16014 | Pending |
| South Prong Sanitary Sewer Replacement | WM16037 | Pending |
| Forrest Street Infrastructure Improvements | WM16017 | Pending |

# Capital Investment Program (CIP) – FY 2017 thru 2026

*Public Utilities – Operational Priorities*

| ★ (1-Star) Projects - Water | | |
|---|---|---|
| Highway 96W Water Line Replacement | WM16040 | Pending |
| Manley Lane Dead End Removal | WM16028 | Pending |
| Liberty Pike Water Line Replacement | WM16027 | Pending |
| Long Lane/Old Peytonsville Rd Connector at I-65 | ST16017 | Active |
| Scruggs Avenue Water Line Replacement | WM16036 | Pending |
| Morning Side Drive Water Line Replacement | WM16029 | Pending |
| Carothers Parkway Widening (Falcon Creek to SR-96) | ST16015 | Pending |
| Westview Apt. Water Line Replacement (510 96W) | WM16022 | Pending |

| ★ (1-Star) Projects - Wastewater | | |
|---|---|---|
| Battle Avenue Infrastructure Improvements | WM16008 | Pending |
| N Royals Oaks Blvd (Alexander Plaza to Liberty Pk) | ST16019 | Pending |
| Sanitary Sewer Rehab Btwn Strahl & W. Fowlkes | WM16034 | Pending |
| Buckworth Infrastructure Improvements | WM16011 | Pending |
| Long Lane/Old Peytonsville Rd Connector at I-65 | ST16017 | Active |
| Carothers Parkway Widening (Falcon Creek to SR-96) | ST16015 | Pending |
| Jordan Road Improvements | ST16006 | Active |

# Capital Investment Program (CIP) – FY 2017 thru 2026

Stormwater

| ★★★★ (4-Star) Projects | | |
|---|---|---|
| Harpeth River Bank Stabilization at WRF | SW16006 | Active |

| ★★★ (3-Star) Projects | | |
|---|---|---|
| Ralston Creek at Liberty Hills Stream Restoration | SW16001 | Active |
| 100 Block Battle Avenue Drainage Improvements | SW16003 | Active |

| ★★ (2-Star) Projects | | |
|---|---|---|
| Jordan Branch (Cool Springs East) Stream Restoration | SW16005 | Active |

| ★ (1-Star) Projects | | |
|---|---|---|
| Figuers Drive Area Drainage Improvements | SW16004 | Active |
| Parkview Drainage Project | SW16002 | Active |

# Capital Investment Program (CIP) – FY 2017 thru 2026

*Transportation*

| ★★★★ (4-Star) Projects | | |
|---|---|---|
| East McEwen Drive Improvements – Phase 4 | ST16007 | Active |
| Sidewalk Lewisburg Ave | ST16030 | Pending |
| S. Margin Infrastructure Upgrades (1st to Columbia) | ST16018 | Pending |
| Franklin Road Improvements & Streetscape | ST16009 | Active |
| Sidewalk Gaps | ST16037 | Pending |
| Carothers Parkway (South) ITS Extension | TOC16001 | Pending |
| Jordan Road Improvements | ST16006 | Active |
| East McEwen Dr. Right-Turn Bypass Lane | ST16008 | Pending |
| West Main Street (Natchez St to Downs Blvd) | ST16032 | Pending |

| ★★★ (3-Star) Projects | | |
|---|---|---|
| Franklin Rd & Mallory Station Rd Int. Improv. | ST16014 | Pending |
| Lewisburg Pike Imp. (Donelson Crk Pkwy to SR-397) | ST16016 | Pending |
| Carothers Parkway Widening (Long Lane to Falcon Creek) | ST16022 | Pending |
| Multi-Use Trail Mack Hatcher (Franklin to Hillsboro) | ST16024 | Pending |
| Carothers Parkway Widening (Falcon Creek to SR-96) | ST16015 | Pending |
| Long Lane/Old Peytonsville Rd Connector at I-65 | ST16017 | Active |
| Liberty Pike Sidewalk | ST16031 | Pending |
| Goose Creek Interchange Lighting | ST16002 | Pending |
| Mallory/N Royal Oaks & Liberty Intersection Imp. | ST16011 | Pending |
| Multi-Use Trail Oxford Glen (Dalily to McEwen) | ST16025 | Pending |
| Multi-Use Trail Forrest Crossing Blvd | ST16026 | Pending |
| Clovercroft Road (SR-96 to Oxford Glen) | ST16028 | Pending |
| Hillsboro Road ITS Extension | TOC16004 | Pending |

# Capital Investment Program (CIP) – FY 2017 thru 2026

*Transportation*

| ★★ (2-Star) Projects | | |
|---|---|---|
| Aspen Grove Dr & Seaboard Ln Intersection Improv. | ST16013 | Active |
| Columbia Ave (Downs Blvd to Fowlkes St) | ST16035 | Pending |
| Major Street Resurfacing | ST16038 | Pending |
| ITS Camera at Columbia Ave & Mack Hatcher Pkwy | TOC16002 | Pending |
| ITS Camera at Franklin Rd & Mallory Station Rd | TOC16003 | Pending |
| Multi-Use Trail SR-96W (Vera Valley Dr to 9th Ave) | ST16020 | Pending |
| Boyd Mill Ave (Downs to SR-96W) | ST16027 | Pending |
| Carters Creek Pk (Old Carters Creek – Downs Blvd) | ST16033 | Pending |

| ★ (1-Star) Projects | | |
|---|---|---|
| East McEwen Drive Extension – Phase 5 | ST16012 | Active |
| North Royal Oaks Blvd (Alexander Plaza to Liberty Pike) | ST16019 | Pending |
| Multi-Use Trail S Royal Oaks Blvd | ST16029 | Pending |
| Hillsboro Road Temporary Sidewalk | ST16036 | Pending |
| Highway 96 West ITS Extension – Phase 1 | TOC16005 | Pending |
| Highway 96 West ITS Extension – Phase 2 | TOC16006 | Pending |
| Carlisle Lane Improvements | ST16001 | Pending |
| Multi-Use Trail (Mack Hatcher Pkwy to EFBP) | ST16021 | Pending |
| Multi-Use Trail 1st Ave (South Margin to Bridge) | ST16023 | Pending |
| Beta Drive Extension | ST16010 | Pending |
| Peytonsville Road Extension | ST16003 | Pending |
| Carothers Parkway Extension | ST16004 | Pending |
| Peytonsville Rd & Pratt Ln Intersection Improv. | ST16005 | Pending |
| Jordan Road (McEwen – Liberty) | ST16034 | Pending |
| Lewisburg Pike ITS Extension | TOC16007 | Pending |

# Capital Investment Program (CIP) – FY 2017 thru 2026

Combined (Excludes Public Utilities & Stormwater)

| ★★★★ (4-Star) Projects | | |
|---|---|---|
| Fire Station 7 (Goose Creek Area) | FD16001 | Active |
| New City Hall | FM16001 | Active |
| Bicentennial Park Schematic Design & Construction | PK16020 | Active |
| Main Barn Restoration (Harlinsdale) | PK16002 | Pending |
| East/Southeast Multipurpose Park | PK16014 | Pending |
| Hayes Home Restoration (Harlinsdale) | PK16001 | Pending |
| Eastern Flank Circle (Loop Road) Repair | PK16018 | Pending |
| East McEwen Drive Improvements – Phase 4 | ST16007 | Active |
| Sidewalk Lewisburg Ave | ST16030 | Pending |
| S. Margin Infrastructure Upgrades (1st to Columbia) | ST16018 | Pending |
| Franklin Road Improvements & Streetscape | ST16009 | Active |
| Sidewalk Gaps | ST16037 | Pending |
| Carothers Parkway (South) ITS Extension | TOC16001 | Pending |
| Jordan Road Improvements | ST16006 | Active |
| East McEwen Dr. Right-Turn Bypass Lane | ST16008 | Pending |
| West Main Street (Natchez St to Downs Blvd) | ST16032 | Pending |

# Capital Investment Program (CIP) – FY 2017 thru 2026

Combined (Excludes Public Utilities & Stormwater)

| ★★★ (3-Star) Projects | | |
|---|---|---|
| Greenway (Aspen Grove to Mack Hatcher) | PK16011 | Pending |
| Jim Warren Park Renovations | PK16008 | Pending |
| Greenway (Pinkerton to Bicentennial) | PK16012 | Pending |
| Greenway & Bridge (Harlinsdale to Fulton Greer) | PK16013 | Pending |
| Franklin Rd & Mallory Station Rd Int. Improv. | ST16014 | Pending |
| Lewisburg Pike Imp. (Donelson Crk Pkwy to SR-397) | ST16016 | Pending |
| Carothers Parkway Widening (Long Lane to Falcon Creek) | ST16022 | Pending |
| Multi-Use Trail Mack Hatcher (Franklin to Hillsboro) | ST16024 | Pending |
| Carothers Parkway Widening (Falcon Creek to SR-96) | ST16015 | Pending |
| Long Lane/Old Peytonsville Rd Connector at I-65 | ST16017 | Active |
| Liberty Pike Sidewalk | ST16031 | Pending |
| Goose Creek Interchange Lighting | ST16002 | Pending |
| Mallory/N Royal Oaks & Liberty Intersection Imp. | ST16011 | Pending |
| Multi-Use Trail Oxford Glen Dr (Dalily to McEwen) | ST16025 | Pending |
| Multi-Use Trail Forrest Crossing Blvd | ST16026 | Pending |
| Clovercroft Road (SR96 to Oxford Glen) | ST16028 | Pending |
| Hillsboro Road ITS Extension | TOC16004 | Pending |

# Capital Investment Program (CIP) – FY 2017 thru 2026

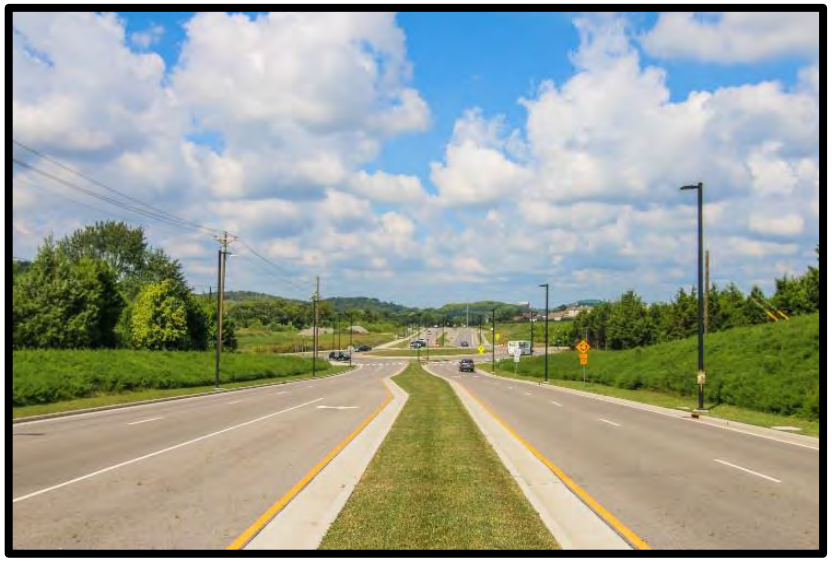
Combined (Excludes Public Utilities & Stormwater)

| ★★ (2-Star) Projects | | |
|---|---|---|
| Lockwood Glen Park | PK16016 | Pending |
| North Barn Restoration (Harlinsdale) | PK16004 | Pending |
| Worker House I & II (Harlinsdale) | PK16006 | Pending |
| Harlinsdale Farm Interurban Trail Connection | PK16019 | Pending |
| Harlinsdale Visitor Center & Museum | PK16005 | Pending |
| Aspen Grove Dr & Seaboard Ln Intersection Improv. | ST16013 | Active |
| Columbia Ave (Downs Blvd to Fowlkes St) | ST16035 | Pending |
| Major Street Resurfacing | ST16038 | Pending |
| ITS Camera at Columbia Ave & Mack Hatcher Pkwy | TOC16002 | Pending |
| ITS Camera at Franklin Rd & Mallory Station Rd | TOC16003 | Pending |
| Multi-Use Trail SR-96W (Vera Valley Dr to 9th Ave) | ST16020 | Pending |
| Boyd Mill Ave (Downs to SR96W) | ST16027 | Pending |
| Carters Creek Pk (Old Carters Creek – Downs Blvd) | ST16033 | Pending |

# Capital Investment Program (CIP) – FY 2017 thru 2026

Combined (Excludes Public Utilities & Stormwater)

| ★ (1-Star) Projects | | |
|---|---|---|
| North Pavilion & Restroom Facility (Harlinsdale) | PK16007 | Pending |
| Maintenance Building Restoration (Harlinsdale) | PK16003 | Pending |
| Liberty Park Improvements | PK16009 | Pending |
| Greenway (Lewisburg to I-65/Harpeth River) | PK16017 | Pending |
| Splash Pad | PK16010 | Pending |
| East McEwen Drive Extension – Phase 5 | ST16012 | Active |
| N Royal Oaks Blvd (Alexander Plaza to Liberty Pk) | ST16019 | Pending |
| Multi-Use Trail S Royal Oaks | ST16029 | Pending |
| Highway 96 West ITS Extension – Phase 1 | TOC16005 | Pending |
| Highway 96 West ITS Extension – Phase 2 | TOC16006 | Pending |
| Carlisle Lane Improvements | ST16001 | Pending |
| Multi-Use Trail (Mack Hatcher Pkwy to EFBP) | ST16021 | Pending |
| Multi-Use Trail 1$^{ST}$ Ave (South Margin to Bridge) | ST16023 | Pending |
| Beta Drive Extension | ST16010 | Pending |
| Peytonsville Road Extension | ST16003 | Pending |
| Carothers Parkway Extension | ST16004 | Pending |
| Peytonsville Rd & Pratt Ln Intersection Improv. | ST16005 | Pending |
| Jordan Road (McEwen – Liberty) | ST16034 | Pending |
| Lewisburg Pike ITS Extension | TOC16007 | Pending |



HISTORIC
FRANKLIN
TENNESSEE

# Capital Investment Program

**** DRAFT****
**6/30/2016**

# FY2017-2026

*This Page Intentionally Blank*

# CAPITAL IMPROVEMENT PLAN FY2017-2026

# Department Summary and

# Projects By Department

*This Page Intentionally Blank*

# DEPARTMENT SUMMARY

| Department | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fire | 80,000 | 4,150,000 | 100,000 | | | | | | | | *4,330,000* |
| Parks | 2,022,517 | 6,550,067 | 7,492,305 | 9,844,176 | 1,100,786 | 4,119,990 | 1,373,286 | 1,789,400 | 1,250,000 | 2,650,000 | *38,192,527* |
| Project & Facilities Mgmt. | | | | | 400,000 | 400,000 | 11,400,000 | 11,400,000 | 500,000 | | *24,100,000* |
| Stormwater | 2,400,000 | 1,010,000 | 1,830,000 | | | 120,000 | 250,000 | 1,650,000 | | | *7,260,000* |
| Streets | 5,651,456 | 6,833,856 | 26,158,200 | 31,716,168 | 27,192,191 | 40,243,200 | 27,926,665 | 28,729,096 | 35,332,340 | 40,966,797 | *270,749,969* |
| Traffic Ops. Center (TOC) | 545,000 | 830,000 | 475,000 | 395,000 | | | 285,000 | 310,000 | 150,000 | | *2,990,000* |
| Water Management | 8,765,000 | 4,623,500 | 7,225,000 | 4,620,000 | 4,653,000 | 5,548,000 | 820,000 | 285,000 | 110,000 | | *36,649,500* |
| **GRAND TOTAL** | **19,463,973** | **23,997,423** | **43,280,505** | **46,575,344** | **33,345,977** | **50,431,190** | **42,054,951** | **44,163,496** | **37,342,340** | **43,616,797** | ***384,271,996*** |

## Report criteria:

All Categories

All Departments

All Priority Levels

All Projects

All Source Types

Status: Active or Funding Obligated or Not Funded or Pending

Type: E or I or M or N or Z

*This Page Intentionally Blank*

# PROJECTS BY DEPARTMENT

| Department | # | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Fire** | | | | | | | | | | | | |
| Fire Station 7 (Goose Creek Area) | FD16001 | 80,000 | 4,150,000 | 100,000 | | | | | | | | *4,330,000* |
| | **Fire Total** | 80,000 | 4,150,000 | 100,000 | | | | | | | | *4,330,000* |
| **Parks** | | | | | | | | | | | | |
| Hayes Home Restoration (Harlinsdale) | PK16001 | | 135,000 | 583,500 | | | | | | | | *718,500* |
| Main Barn Restoration (Harlinsdale) | PK16002 | | 85,000 | 613,000 | | | | | | | | *698,000* |
| Maintenance Building Restoration (Harlinsdale) | PK16003 | | | 76,000 | 473,000 | | | | | | | *549,000* |
| North Barn Restoration (Harlinsdale) | PK16004 | | | | | | 35,000 | 100,000 | 554,400 | | | *689,400* |
| Harlinsdale Visitor Center & Museum | PK16005 | | | | 86,000 | 100,000 | 2,262,760 | 567,000 | 85,000 | | | *3,100,760* |
| Worker House I & II (Harlinsdale) | PK16006 | | | | | | | 92,000 | 250,000 | | | *342,000* |
| North Pavilion & Restroom Facility (Harlinsdale) | PK16007 | | | | 40,000 | 252,500 | | | | | | *292,500* |
| Jim Warren Park Renovations | PK16008 | | | 55,000 | 230,000 | 100,000 | 600,000 | 400,000 | 750,000 | 750,000 | | *2,885,000* |
| Liberty Park Improvements | PK16009 | | | | 68,000 | 324,000 | 165,000 | | | | | *557,000* |
| Splash Pad | PK16010 | | 300,000 | | | | 300,000 | | | | | *600,000* |
| Greenway (Aspen Grove to Mack Hatcher) | PK16011 | 136,336 | 225,819 | 545,100 | | | | | | | | *907,255* |
| Greenway (Pinkerton to Bicentennial) | PK16012 | | 551,817 | 425,419 | 4,732,890 | | | | | | | *5,710,126* |
| Greenway & Bridge (Harlinsdale to Fulton Greer) | PK16013 | | | | | 110,000 | 542,944 | | | | | *652,944* |
| East/Southeast Multipurpose Park | PK16014 | 1,200,000 | 4,000,000 | 4,000,000 | 4,000,000 | | | | | | | *13,200,000* |
| Carter's Hill Battlefield Park | PK16015 | 272,431 | 272,431 | 214,286 | 214,286 | 214,286 | 214,286 | 214,286 | | | | *1,616,292* |
| Lockwood Glen Park | PK16016 | 10,750 | 100,000 | 100,000 | | | | | | | | *210,750* |
| Greenway (Lewisburg to I-65/Harpeth River) | PK16017 | | | | | | | | 150,000 | 500,000 | 2,650,000 | *3,300,000* |
| Eastern Flank Circle (Loop Road) Repair | PK16018 | 130,000 | | | | | | | | | | *130,000* |
| Harlinsdale Farm Interuban Trail Connection | PK16019 | 128,000 | | | | | | | | | | *128,000* |
| Bicentennial Park Schematic Design & Construction | PK16020 | 145,000 | 880,000 | 880,000 | | | | | | | | *1,905,000* |
| | **Parks Total** | 2,022,517 | 6,550,067 | 7,492,305 | 9,844,176 | 1,100,786 | 4,119,990 | 1,373,286 | 1,789,400 | 1,250,000 | 2,650,000 | *38,192,527* |

| Department | # | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project & Facilities Mgmt.** | | | | | | | | | | | | |
| New City Hall | FM16001 | | | | | 400,000 | 400,000 | 11,400,000 | 11,400,000 | 500,000 | | *24,100,000* |
| **Project & Facilities Mgmt. Total** | | | | | | 400,000 | 400,000 | 11,400,000 | 11,400,000 | 500,000 | | *24,100,000* |
| **Stormwater** | | | | | | | | | | | | |
| Ralston Creek at Liberty Hills Stream Restoration | SW16001 | 120,000 | 80,000 | 830,000 | | | | | | | | *1,030,000* |
| Parkview Drainage Project | SW16002 | | | | | | 120,000 | 250,000 | 1,650,000 | | | *2,020,000* |
| 100 Block Battle Avenue Drainage Improvements | SW16003 | 1,200,000 | | | | | | | | | | *1,200,000* |
| Figuers Drive Area Drainage Improvements | SW16004 | 200,000 | 50,000 | 1,000,000 | | | | | | | | *1,250,000* |
| Jordan Branch (Cool Springs E) Stream Restoration | SW16005 | 780,000 | | | | | | | | | | *780,000* |
| Harpeth River Bank Stabilization at WRF | SW16006 | 100,000 | 880,000 | | | | | | | | | *980,000* |
| **Stormwater Total** | | 2,400,000 | 1,010,000 | 1,830,000 | | | 120,000 | 250,000 | 1,650,000 | | | *7,260,000* |
| **Streets** | | | | | | | | | | | | |
| Carlisle Lane Improvements | ST16001 | | | | | | | | 186,000 | 500,000 | 3,500,000 | *4,186,000* |
| Goose Creek Interchange Lighting | ST16002 | | | | | | 60,000 | 810,000 | | | | *870,000* |
| Peytonsville Road Extension | ST16003 | | | | | | 820,800 | 4,500,000 | 5,745,600 | 5,745,600 | | *16,812,000* |
| Carothers Parkway Extension | ST16004 | | | | | 244,800 | 1,500,000 | 3,427,200 | | | | *5,172,000* |
| Peytonsville Rd & Pratt Ln Intersection Improv. | ST16005 | | | | 194,400 | 2,100,000 | 2,721,600 | | | | | *5,016,000* |
| Jordan Road Improvements | ST16006 | | | 50,000 | 500,000 | 1,512,000 | | | | | | *2,062,000* |
| East McEwen Drive Improvements - Phase 4 | ST16007 | 2,600,000 | 1,000,000 | 11,414,400 | 11,414,400 | | | | | | | *26,428,800* |
| East McEwen Dr. Right-Turn Bypass Lane | ST16008 | 70,000 | 350,000 | 554,400 | | | | | | | | *974,400* |
| Franklin Road Improvements & Streetscape | ST16009 | | 2,550,000 | 5,895,000 | 5,895,000 | | | | | | | *14,340,000* |
| Beta Drive Extension | ST16010 | | 140,400 | 2,200,000 | 1,965,600 | | | | | | | *4,306,000* |
| Mallory/N Royal Oaks & Liberty Intersection Imp. | ST16011 | | | | 216,000 | 1,200,000 | 3,024,000 | | | | | *4,440,000* |
| East McEwen Drive Extension - Phase 5 | ST16012 | | | | | | | 75,000 | 2,000,000 | 500,000 | 10,012,800 | *12,587,800* |
| Aspen Grove Dr & Seaboard Ln Intersection Improv. | ST16013 | | | | 50,000 | 650,000 | 1,008,000 | | | | | *1,708,000* |
| Franklin Rd & Mallory Station Rd Int. Improv. | ST16014 | | | 216,000 | 680,000 | 3,024,000 | | | | | | *3,920,000* |
| Carothers Parkway Widening (Falcon Creek to SR-96) | ST16015 | | | 878,400 | 3,500,000 | 6,148,800 | 6,148,800 | | | | | *16,676,000* |
| Lewisburg Pike Imp. (Donelson Crk Pkwy to SR-397) | ST16016 | | | | | | 720,000 | 2,000,000 | 10,000,000 | | | *12,720,000* |
| Long Lane/Old Peytonsville Rd Connector at I-65 | ST16017 | | | | 450,000 | 8,420,000 | 3,920,000 | | | | | *12,790,000* |

| Department | # | | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S. Margin Infastructure Upgrades (1st - Columbia) | ST16018 | | 171,456 | 171,456 | 2,250,000 | 4,800,768 | | | | | | | *7,393,680* |
| N Royal Oaks Blvd (Alexander Plaza to Liberty Pk) | ST16019 | | | | | | | | 412,560 | 2,500,000 | 5,775,840 | | *8,688,400* |
| Multi-Use Trail SR-96W (Vera Valley Dr - 9th Ave) | ST16020 | | | | | | 97,591 | 450,000 | 1,366,276 | | | | *1,913,867* |
| Multi-Use Trail (Mack Hatcher Pkwy to EFBP) | ST16021 | | | | | | | | | 102,496 | 450,000 | 1,434,955 | *1,987,451* |
| Carothers Parkway (Long Lane to Falcon Creek) | ST16022 | | | | | | | 300,000 | 9,135,629 | | | | *9,435,629* |
| Multi-Use Trail 1st Ave (South Margin to Bridge) | ST16023 | | | | | | | 70,000 | 200,000 | 1,200,000 | | | *1,470,000* |
| Multiuse Trail Mack Hatcher (Franklin - Hillsboro) | ST16024 | | | | | | | 125,000 | 75,000 | 2,095,000 | | | *2,295,000* |
| Multi-use Trail Oxford Glen Dr (Daylily - McEwen) | ST16025 | | | | | | 75,000 | 100,000 | 695,000 | | | | *870,000* |
| Multi-use Trail Forrest Crossing Blvd | ST16026 | | | | | | 70,000 | 25,000 | 280,000 | | | | *375,000* |
| Boyd Mill Ave (Downs to SR96W) | ST16027 | | | | | | | | | 390,000 | 500,000 | 6,531,542 | *7,421,542* |
| Clovercroft Road (SR96 to Oxford Glen) | ST16028 | | | | | | | 500,000 | 500,000 | 1,500,000 | 11,958,150 | | *14,458,150* |
| Multi-Use Trail S Royal Oaks Blvd | ST16029 | | | | | | | | | 60,000 | 50,000 | 700,000 | *810,000* |
| Sidewalk Lewisburg Ave | ST16030 | | 80,000 | 100,000 | 400,000 | | | | | | | | *580,000* |
| Liberty Pike Sidewalk | ST16031 | | | 102,000 | | | | | | | | | *102,000* |
| West Main Street (Natchez St to Downs Blvd) | ST16032 | | | | | | | 300,000 | 300,000 | 1,300,000 | 6,852,750 | | *8,752,750* |
| Carters Creek Pk (Old Carters Creek - Downs Blvd) | ST16033 | | | | | | | | 750,000 | 750,000 | 3,000,000 | 18,787,500 | *23,287,500* |
| Jordan Road (McEwen - Liberty) | ST16034 | | | | | 150,000 | 100,000 | 450,000 | 1,700,000 | | | | *2,400,000* |
| Columbia Ave (Downs Blvd to Fowlkes St) | ST16035 | | | | 750,000 | 750,000 | 1,500,000 | 14,900,000 | | | | | *17,900,000* |
| Hillsboro Road Temporary Sidewalk | ST16036 | | 80,000 | 470,000 | | | | | | | | | *550,000* |
| Sidewalk Gaps | ST16037 | | 250,000 | 250,000 | 250,000 | 250,000 | 250,000 | | | | | | *1,250,000* |
| Major Street Resurfacing | ST16038 | n/a | 2,400,000 | 1,700,000 | 1,300,000 | 900,000 | 1,800,000 | 3,100,000 | 1,700,000 | 900,000 | | | *13,800,000* |
| **Streets Total** | | | 5,651,456 | 6,833,856 | 26,158,200 | 31,716,168 | 27,192,191 | 40,243,200 | 27,926,665 | 28,729,096 | 35,332,340 | 40,966,797 | *270,749,969* |
| **Traffic Ops. Center (TOC)** | | | | | | | | | | | | | |
| Carothers Parkway (South) ITS Extension | TOC16001 | | 545,000 | 830,000 | | | | | | | | | *1,375,000* |
| ITS Camera at Columbia Ave & Mack Hatcher Pkwy | TOC16002 | | | | 85,000 | | | | | | | | *85,000* |
| ITS Camera at Franklin Rd and Mallory Station Rd | TOC16003 | | | | 85,000 | | | | | | | | *85,000* |
| Hilllsboro Road ITS Extension | TOC16004 | | | | 305,000 | 395,000 | | | | | | | *700,000* |
| Highway 96 West ITS Extension - Phase 1 | TOC16005 | | | | | | | | 285,000 | | | | *285,000* |
| Highway 96 West ITS Extension - Phase 2 | TOC16006 | | | | | | | | | 310,000 | | | *310,000* |
| Lewisburg Pike ITS Extension | TOC16007 | | | | | | | | | | 150,000 | | *150,000* |
| **Traffic Ops. Center (TOC) Total** | | | 545,000 | 830,000 | 475,000 | 395,000 | | | 285,000 | 310,000 | 150,000 | | *2,990,000* |

| Department | # | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Water Management** | | | | | | | | | | | | |
| 16" Water Line Long Lane Connector | WM16001 | 120,000 | 50,000 | 2,000,000 | | | | | | | | *2,170,000* |
| Bishop Branch Interceptor | WM16002 | | | | 230,000 | 500,000 | 3,080,000 | | | | | *3,810,000* |
| Old Carters Creek Pike Water Line Replacement | WM16003 | 480,000 | | | | | | | | | | *480,000* |
| Sanitary Sewer Priority Rehabilitation Projects | WM16004 | 85,000 | | | | | | | | | | *85,000* |
| Adams Street Infrastructure Improvements | WM16005 | | 1,320,000 | | | | | | | | | *1,320,000* |
| Advanced Metering Infrastructure (AMI) | WM16006 | 400,000 | 550,000 | 550,000 | 500,000 | | | | | | | *2,000,000* |
| Alicia Drive Water Line Replacement | WM16007 | | | | | 100,000 | | | | | | *100,000* |
| Battle Avenue Infrastructure Replacement | WM16008 | | | | | 200,000 | 1,750,000 | | | | | *1,950,000* |
| Berry Circle Sanitary Sewer Line Rehabilitation | WM16009 | | 25,000 | | | | | | | | | *25,000* |
| Bobby Drive Water Line Replacement | WM16010 | 430,000 | 425,000 | | | | | | | | | *855,000* |
| Buckworth Infrastructure Improvements | WM16011 | | | | | 10,000 | 110,000 | | | | | *120,000* |
| Church Street Infrastructure Improvements | WM16012 | | 50,000 | 475,000 | | | | | | | | *525,000* |
| Grassland Tank Demolition | WM16013 | | | | | | 270,000 | | | | | *270,000* |
| Eastview Circle Infrastructure Improvements | WM16014 | | | | 50,000 | 515,500 | | | | | | *565,500* |
| Evans Street Sewer Improvements | WM16015 | 32,000 | 420,500 | | | | | | | | | *452,500* |
| Forrest Crossing Force Main (No.1) Replacement | WM16016 | 110,000 | | | | | | | | | | *110,000* |
| Forrest Street Infrastructure Improvements | WM16017 | | | | 30,000 | 332,500 | | | | | | *362,500* |
| Water Line from Fourth Ave S to Berry Circle | WM16018 | | 93,000 | | | | | | | | | *93,000* |
| Frazier Drive Sanitary Sewer Rehabilitation | WM16019 | 50,000 | | | | | | | | | | *50,000* |
| Gist Street Infrastructure Improvements | WM16020 | | | | 400,000 | | | | | | | *400,000* |
| Glass Lane Water Line Replacement | WM16021 | | | | | 255,000 | | | | | | *255,000* |
| Westview Apt Water Line Replacement (510 96W) | WM16022 | | | | | | | | | 110,000 | | *110,000* |
| Holiday Court Lift Station Rehabilitation | WM16023 | | 260,000 | 200,000 | | | | | | | | *460,000* |
| James and Avondale Infrastructure Improvements | WM16024 | 936,000 | | | | | | | | | | *936,000* |
| Lee Drive Water Line Replacement | WM16025 | | | | 15,000 | 200,000 | | | | | | *215,000* |
| Lewisburg Pike Water Line Replacement | WM16026 | | | | | 120,000 | | | | | | *120,000* |
| Liberty Pike Water Line Replacement | WM16027 | | | | | | | 355,000 | | | | *355,000* |
| Manley Lane Dead End Removal | WM16028 | | | | | | 50,000 | 445,000 | | | | *495,000* |
| Morning Side Drive Water Line Replacement | WM16029 | | | | | | | | 110,000 | | | *110,000* |
| Murfreesboro Road Water line Replacement | WM16030 | | | | 90,000 | 900,000 | | | | | | *990,000* |
| North Petway Sewer Rehabilitation | WM16031 | 100,000 | | | | | | | | | | *100,000* |
| Old Hillsboro Road Water Line | WM16032 | | | | 80,000 | 295,000 | | | | | | *375,000* |

| Department | # | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| New Hope Academy Sewer Line Replacement | WM16033 | | 50,000 | | | | | | | | | *50,000* |
| Sanitary Sewer Rehab Btwn Strahl & W. Fowlkes | WM16034 | | | | | | 30,000 | | | | | *30,000* |
| Water Distribution and Wastewater Collection SCADA | WM16035 | 3,250,000 | | | | | | | | | | *3,250,000* |
| Scruggs Avenue Water Line Replacement | WM16036 | | | | | | | 20,000 | 175,000 | | | *195,000* |
| South Prong Sanitary Sewer Upgrade | WM16037 | | | | 1,225,000 | 1,225,000 | | | | | | *2,450,000* |
| Spencer Creek Sanitary Sewer Replacement | WM16038 | 1,290,000 | 480,000 | | | | | | | | | *1,770,000* |
| Thompson Alley Infrastructure Improvements | WM16039 | 280,000 | | | | | | | | | | *280,000* |
| Highway 96W Water Line Replacement | WM16040 | | | | | | 258,000 | | | | | *258,000* |
| West End Circle Infrastructure Improvements | WM16041 | 202,000 | | | | | | | | | | *202,000* |
| West Main Infrastructure Improvements | WM16042 | | 400,000 | 3,500,000 | 2,000,000 | | | | | | | *5,900,000* |
| Sewer Interceptor Point Repair Projects | WM16043 | 1,000,000 | 500,000 | 500,000 | | | | | | | | *2,000,000* |
| **Water Management Total** | | 8,765,000 | 4,623,500 | 7,225,000 | 4,620,000 | 4,653,000 | 5,548,000 | 820,000 | 285,000 | 110,000 | | *36,649,500* |
| **GRAND TOTAL** | | **19,463,973** | **23,997,423** | **43,280,505** | **46,575,344** | **33,345,977** | **50,431,190** | **42,054,951** | **44,163,496** | **37,342,340** | **43,616,797** | ***384,271,996*** |

## Report criteria:

All Categories

All Departments

All Priority Levels

All Projects

All Source Types

Status: Active or Funding Obligated or Not Funded or Pending

Type: E or I or M or N or Z

*This Page Intentionally Blank*

# CAPITAL IMPROVEMENT PLAN FY2017-2026

## Funding Source Summary

*This Page Intentionally Blank*

# FUNDING SOURCE SUMMARY

| Source | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Facilities Tax | 80,000 | 4,150,000 | 100,000 | | | | | | | | *4,330,000* |
| General | 3,526,456 | 3,763,856 | 7,033,000 | 8,280,408 | 16,437,191 | 12,345,100 | 18,235,282 | 18,143,497 | 13,090,243 | 11,006,173 | *111,861,206* |
| Hotel/Motel Tax | 675,431 | 1,372,431 | 3,171,786 | 1,861,286 | 990,786 | 3,277,046 | 1,373,286 | 1,639,400 | 750,000 | | *15,111,452* |
| MPO/TDOT Funding | | | | | | 606,000 | 2,005,000 | 7,347,520 | | | *9,958,520* |
| Parkland Dedication | 1,347,086 | 5,177,636 | 5,070,519 | 8,732,890 | 110,000 | 842,944 | | 150,000 | 500,000 | 2,650,000 | *24,581,075* |
| Reclaimed Water Capacity | | | | | 240,000 | 240,000 | | | | | *480,000* |
| Reclaimed Water Renewal | | | | 15,000 | | | | | | | *15,000* |
| Road Impact Fees | 2,670,000 | 3,900,000 | 17,360,330 | 19,900,280 | 9,588,600 | 23,807,500 | 18,439,549 | 13,875,980 | 18,771,530 | 25,865,800 | *154,179,569* |
| Stormwater | 2,475,000 | 1,010,000 | 2,672,720 | 1,548,680 | 652,000 | 1,571,000 | 941,834 | 2,356,500 | 1,302,257 | 1,982,323 | *16,512,314* |
| Wastewater Capacity | | | 78,000 | 1,611,000 | 500,000 | 3,609,500 | 120,000 | | 643,080 | 510,000 | *7,071,580* |
| Wastewater Renewal | 5,549,087 | 2,820,500 | 3,157,850 | 2,128,810 | 2,170,400 | 2,241,100 | 120,000 | 57,600 | 1,123,080 | 750,000 | *20,118,427* |
| Water Capacity | 60,000 | 25,000 | 1,155,650 | 178,150 | 274,500 | 264,000 | | | 526,075 | 233,750 | *2,717,125* |
| Water Renewal | 3,080,913 | 1,778,000 | 3,480,650 | 2,318,840 | 2,382,500 | 1,627,000 | 820,000 | 593,000 | 636,075 | 618,750 | *17,335,728* |
| **GRAND TOTAL** | **19,463,973** | **23,997,423** | **43,280,505** | **46,575,344** | **33,345,977** | **50,431,190** | **42,054,951** | **44,163,497** | **37,342,340** | **43,616,796** | ***384,271,996*** |

**Report criteria:**

All Categories

All Departments

All Priority Levels

All Projects

All Source Types

Status: Active or Funding Obligated or Not Funded or Pending

Type: E or I or M or N or Z

*This Page Intentionally Blank*

# CAPITAL IMPROVEMENT PLAN FY2017-2026

## Project by Category

*This Page Intentionally Blank*

# PROJECTS BY CATEGORY

| Category | # | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Emergency Services** | | | | | | | | | | | | |
| Fire Station 7 (Goose Creek Area) | *FD16001* | 80,000 | 4,150,000 | 100,000 | | | | | | | | *4,330,000* |
| **Emergency Services Total** | | 80,000 | 4,150,000 | 100,000 | | | | | | | | *4,330,000* |
| **General Services** | | | | | | | | | | | | |
| New City Hall | *FM16001* | | | | | 400,000 | 400,000 | 11,400,000 | 11,400,000 | 500,000 | | *24,100,000* |
| **General Services Total** | | | | | | 400,000 | 400,000 | 11,400,000 | 11,400,000 | 500,000 | | *24,100,000* |
| **Parks and Recreation** | | | | | | | | | | | | |
| Hayes Home Restoration (Harlinsdale) | *PK16001* | | 135,000 | 583,500 | | | | | | | | *718,500* |
| Main Barn Restoration (Harlinsdale) | *PK16002* | | 85,000 | 613,000 | | | | | | | | *698,000* |
| Maintenance Building Restoration (Harlinsdale) | *PK16003* | | | 76,000 | 473,000 | | | | | | | *549,000* |
| North Barn Restoration (Harlinsdale) | *PK16004* | | | | | | 35,000 | 100,000 | 554,400 | | | *689,400* |
| Harlinsdale Visitor Center & Museum | *PK16005* | | | | 86,000 | 100,000 | 2,262,760 | 567,000 | 85,000 | | | *3,100,760* |
| Worker House I & II (Harlinsdale) | *PK16006* | | | | | | | 92,000 | 250,000 | | | *342,000* |
| North Pavilion & Restroom Facility (Harlinsdale) | *PK16007* | | | | 40,000 | 252,500 | | | | | | *292,500* |
| Jim Warren Park Renovations | *PK16008* | | | 55,000 | 230,000 | 100,000 | 600,000 | 400,000 | 750,000 | 750,000 | | *2,885,000* |
| Liberty Park Improvements | *PK16009* | | | | 68,000 | 324,000 | 165,000 | | | | | *557,000* |
| Splash Pad | *PK16010* | | 300,000 | | | | 300,000 | | | | | *600,000* |
| Greenway (Aspen Grove to Mack Hatcher) | *PK16011* | 136,336 | 225,819 | 545,100 | | | | | | | | *907,255* |
| Greenway (Pinkerton to Bicentennial) | *PK16012* | | 551,817 | 425,419 | 4,732,890 | | | | | | | *5,710,126* |
| Greenway & Bridge (Harlinsdale to Fulton Greer) | *PK16013* | | | | | 110,000 | 542,944 | | | | | *652,944* |
| East/Southeast Multipurpose Park | *PK16014* | 1,200,000 | 4,000,000 | 4,000,000 | 4,000,000 | | | | | | | *13,200,000* |
| Carter's Hill Battlefield Park | *PK16015* | 272,431 | 272,431 | 214,286 | 214,286 | 214,286 | 214,286 | 214,286 | | | | *1,616,292* |

| Category | # | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lockwood Glen Park | PK16016 | 10,750 | 100,000 | 100,000 | | | | | | | | *210,750* |
| Greenway (Lewisburg to I-65/Harpeth River) | PK16017 | | | | | | | | 150,000 | 500,000 | 2,650,000 | *3,300,000* |
| Eastern Flank Circle (Loop Road) Repair | PK16018 | 130,000 | | | | | | | | | | *130,000* |
| Harlinsdale Farm Interuban Trail Connection | PK16019 | 128,000 | | | | | | | | | | *128,000* |
| Bicentennial Park Schematic Design & Construction | PK16020 | 145,000 | 880,000 | 880,000 | | | | | | | | *1,905,000* |
| **Parks and Recreation Total** | | 2,022,517 | 6,550,067 | 7,492,305 | 9,844,176 | 1,100,786 | 4,119,990 | 1,373,286 | 1,789,400 | 1,250,000 | 2,650,000 | *38,192,527* |

## Public Utilities

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16" Water Line Long Lane Connector | WM16001 | 120,000 | 50,000 | 2,000,000 | | | | | | | | *2,170,000* |
| Bishop Branch Interceptor | WM16002 | | | | 230,000 | 500,000 | 3,080,000 | | | | | *3,810,000* |
| Old Carters Creek Pike Water Line Replacement | WM16003 | 480,000 | | | | | | | | | | *480,000* |
| Sanitary Sewer Priority Rehabilitation Projects | WM16004 | 85,000 | | | | | | | | | | *85,000* |
| Adams Street Infrastructure Improvements | WM16005 | | 1,320,000 | | | | | | | | | *1,320,000* |
| Advanced Metering Infrastructure (AMI) | WM16006 | 400,000 | 550,000 | 550,000 | 500,000 | | | | | | | *2,000,000* |
| Alicia Drive Water Line Replacement | WM16007 | | | | | 100,000 | | | | | | *100,000* |
| Battle Avenue Infrastructure Replacement | WM16008 | | | | | 200,000 | 1,750,000 | | | | | *1,950,000* |
| Berry Circle Sanitary Sewer Line Rehabilitation | WM16009 | | 25,000 | | | | | | | | | *25,000* |
| Bobby Drive Water Line Replacement | WM16010 | 430,000 | 425,000 | | | | | | | | | *855,000* |
| Buckworth Infrastructure Improvements | WM16011 | | | | | 10,000 | 110,000 | | | | | *120,000* |
| Church Street Infrastructure Improvements | WM16012 | | 50,000 | 475,000 | | | | | | | | *525,000* |
| Grassland Tank Demolition | WM16013 | | | | | | 270,000 | | | | | *270,000* |
| Eastview Circle Infrastructure Improvements | WM16014 | | | | 50,000 | 515,500 | | | | | | *565,500* |
| Evans Street Sewer Improvements | WM16015 | 32,000 | 420,500 | | | | | | | | | *452,500* |
| Forrest Crossing Force Main (No.1) Replacement | WM16016 | 110,000 | | | | | | | | | | *110,000* |
| Forrest Street Infrastructure Improvements | WM16017 | | | | 30,000 | 332,500 | | | | | | *362,500* |
| Water Line from Fourth Ave S to Berry Circle | WM16018 | | 93,000 | | | | | | | | | *93,000* |
| Frazier Drive Sanitary Sewer Rehabilitation | WM16019 | 50,000 | | | | | | | | | | *50,000* |
| Gist Street Infrastructure Improvements | WM16020 | | | | 400,000 | | | | | | | *400,000* |
| Glass Lane Water Line Replacement | WM16021 | | | | | 255,000 | | | | | | *255,000* |
| Westview Apt Water Line Replacement (510 96W) | WM16022 | | | | | | | | | 110,000 | | *110,000* |
| Holiday Court Lift Station Rehabilitation | WM16023 | | 260,000 | 200,000 | | | | | | | | *460,000* |
| James and Avondale Infrastructure Improvements | WM16024 | 936,000 | | | | | | | | | | *936,000* |
| Lee Drive Water Line Replacement | WM16025 5 | | | | 15,000 | 200,000 | | | | | | *215,000* |

| Category | # | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lewisburg Pike Water Line Replacement | WM16026 | | | | | 120,000 | | | | | | 120,000 |
| Liberty Pike Water Line Replacement | WM16027 | | | | | | | 355,000 | | | | 355,000 |
| Manley Lane Dead End Removal | WM16028 | | | | | | 50,000 | 445,000 | | | | 495,000 |
| Morning Side Drive Water Line Replacement | WM16029 | | | | | | | | 110,000 | | | 110,000 |
| Murfreesboro Road Water line Replacement | WM16030 | | | | 90,000 | 900,000 | | | | | | 990,000 |
| North Petway Sewer Rehabilitation | WM16031 | 100,000 | | | | | | | | | | 100,000 |
| Old Hillsboro Road Water Line | WM16032 | | | | 80,000 | 295,000 | | | | | | 375,000 |
| New Hope Academy Sewer Line Replacement | WM16033 | | 50,000 | | | | | | | | | 50,000 |
| Sanitary Sewer Rehab Btwn Strahl & W. Fowlkes | WM16034 | | | | | | 30,000 | | | | | 30,000 |
| Water Distribution and Wastewater Collection SCADA | WM16035 | 3,250,000 | | | | | | | | | | 3,250,000 |
| Scruggs Avenue Water Line Replacement | WM16036 | | | | | | | 20,000 | 175,000 | | | 195,000 |
| South Prong Sanitary Sewer Upgrade | WM16037 | | | | 1,225,000 | 1,225,000 | | | | | | 2,450,000 |
| Spencer Creek Sanitary Sewer Replacement | WM16038 | 1,290,000 | 480,000 | | | | | | | | | 1,770,000 |
| Thompson Alley Infrastructure Improvements | WM16039 | 280,000 | | | | | | | | | | 280,000 |
| Highway 96W Water Line Replacement | WM16040 | | | | | | 258,000 | | | | | 258,000 |
| West End Circle Infrastructure Improvements | WM16041 | 202,000 | | | | | | | | | | 202,000 |
| West Main Infrastructure Improvements | WM16042 | | 400,000 | 3,500,000 | 2,000,000 | | | | | | | 5,900,000 |
| Sewer Interceptor Point Repair Projects | WM16043 | 1,000,000 | 500,000 | 500,000 | | | | | | | | 2,000,000 |
| **Public Utilities Total** | | 8,765,000 | 4,623,500 | 7,225,000 | 4,620,000 | 4,653,000 | 5,548,000 | 820,000 | 285,000 | 110,000 | | 36,649,500 |
| **Stormwater** | | | | | | | | | | | | |
| Ralston Creek at Liberty Hills Stream Restoration | SW16001 | 120,000 | 80,000 | 830,000 | | | | | | | | 1,030,000 |
| Parkview Drainage Project | SW16002 | | | | | | 120,000 | 250,000 | 1,650,000 | | | 2,020,000 |
| 100 Block Battle Avenue Drainage Improvements | SW16003 | 1,200,000 | | | | | | | | | | 1,200,000 |
| Figuers Drive Area Drainage Improvements | SW16004 | 200,000 | 50,000 | 1,000,000 | | | | | | | | 1,250,000 |
| Jordan Branch (Cool Springs E) Stream Restoration | SW16005 | 780,000 | | | | | | | | | | 780,000 |
| Harpeth River Bank Stabilization at WRF | SW16006 | 100,000 | 880,000 | | | | | | | | | 980,000 |
| **Stormwater Total** | | 2,400,000 | 1,010,000 | 1,830,000 | | | 120,000 | 250,000 | 1,650,000 | | | 7,260,000 |
| **Transportation** | | | | | | | | | | | | |
| Carlisle Lane Improvements | ST16001 | | | | | | | | 186,000 | 500,000 | 3,500,000 | 4,186,000 |
| Goose Creek Interchange Lighting | ST16002 | | | | | | 60,000 | 810,000 | | | | 870,000 |

| Category | # | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Peytonsville Road Extension | ST16003 | | | | | | 820,800 | 4,500,000 | 5,745,600 | 5,745,600 | | 16,812,000 |
| Carothers Parkway Extension | ST16004 | | | | | 244,800 | 1,500,000 | 3,427,200 | | | | 5,172,000 |
| Peytonsville Rd & Pratt Ln Intersection | ST16005 | | | | 194,400 | 2,100,000 | 2,721,600 | | | | | 5,016,000 |
| Jordan Road Improvements | ST16006 | | | 50,000 | 500,000 | 1,512,000 | | | | | | 2,062,000 |
| East McEwen Drive Improvements - Phase 4 | ST16007 | 2,600,000 | 1,000,000 | 11,414,400 | 11,414,400 | | | | | | | 26,428,800 |
| East McEwen Dr. Right-Turn Bypass Lane | ST16008 | 70,000 | 350,000 | 554,400 | | | | | | | | 974,400 |
| Franklin Road Improvements & Streetscape | ST16009 | | 2,550,000 | 5,895,000 | 5,895,000 | | | | | | | 14,340,000 |
| Beta Drive Extension | ST16010 | | 140,400 | 2,200,000 | 1,965,600 | | | | | | | 4,306,000 |
| Mallory/N Royal Oaks & Liberty Intersection Imp. | ST16011 | | | | 216,000 | 1,200,000 | 3,024,000 | | | | | 4,440,000 |
| East McEwen Drive Extension - Phase 5 | ST16012 | | | | | | | 75,000 | 2,000,000 | 500,000 | 10,012,800 | 12,587,800 |
| Aspen Grove Dr & Seaboard Ln Intersection Improv. | ST16013 | | | | 50,000 | 650,000 | 1,008,000 | | | | | 1,708,000 |
| Franklin Rd & Mallory Station Rd Int. Improv. | ST16014 | | | 216,000 | 680,000 | 3,024,000 | | | | | | 3,920,000 |
| Carothers Parkway Widening (Falcon Creek to SR-96) | ST16015 | | | 878,400 | 3,500,000 | 6,148,800 | 6,148,800 | | | | | 16,676,000 |
| Lewisburg Pike Imp. (Donelson Crk Pkwy to SR-397) | ST16016 | | | | | | 720,000 | 2,000,000 | 10,000,000 | | | 12,720,000 |
| Long Lane/Old Peytonsville Rd Connector at I-65 | ST16017 | | | | 450,000 | 8,420,000 | 3,920,000 | | | | | 12,790,000 |
| S. Margin Infastructure Upgrades (1st - Columbia) | ST16018 | 171,456 | 171,456 | 2,250,000 | 4,800,768 | | | | | | | 7,393,680 |
| N Royal Oaks Blvd (Alexander Plaza to Liberty Pk) | ST16019 | | | | | | | 412,560 | 2,500,000 | 5,775,840 | | 8,688,400 |
| Multi-Use Trail SR-96W (Vera Valley Dr - 9th Ave) | ST16020 | | | | | 97,591 | 450,000 | 1,366,276 | | | | 1,913,867 |
| Multi-Use Trail (Mack Hatcher Pkwy to EFBP) | ST16021 | | | | | | | | 102,496 | 450,000 | 1,434,955 | 1,987,451 |
| Carothers Parkway (Long Lane to Falcon Creek) | ST16022 | | | | | | 300,000 | 9,135,629 | | | | 9,435,629 |
| Multi-Use Trail 1st Ave (South Margin to Bridge) | ST16023 | | | | | | 70,000 | 200,000 | 1,200,000 | | | 1,470,000 |
| Multiuse Trail Mack Hatcher (Franklin - Hillsboro) | ST16024 | | | | | | 125,000 | 75,000 | 2,095,000 | | | 2,295,000 |
| Multi-use Trail Oxford Glen Dr (Daylily - McEwen) | ST16025 | | | | | 75,000 | 100,000 | 695,000 | | | | 870,000 |
| Multi-use Trail Forrest Crossing Blvd | ST16026 | | | | | 70,000 | 25,000 | 280,000 | | | | 375,000 |
| Boyd Mill Ave (Downs to SR96W) | ST16027 | | | | | | | | 390,000 | 500,000 | 6,531,542 | 7,421,542 |
| Clovercroft Road (SR96 to Oxford Glen) | ST16028 | | | | | | 500,000 | 500,000 | 1,500,000 | 11,958,150 | | 14,458,150 |
| Multi-Use Trail S Royal Oaks Blvd | ST16029 | | | | | | | | 60,000 | 50,000 | 700,000 | 810,000 |
| Sidewalk Lewisburg Ave | ST16030 | 80,000 | 100,000 | 400,000 | | | | | | | | 580,000 |
| Liberty Pike Sidewalk | ST16031 | | 102,000 | | | | | | | | | 102,000 |
| West Main Street (Natchez St to Downs Blvd) | ST16032 | | | | | | 300,000 | 300,000 | 1,300,000 | 6,852,750 | | 8,752,750 |

| Category | # | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Carters Creek Pk (Old Carters Creek - Downs Blvd) | ST16033 | | | | | | | 750,000 | 750,000 | 3,000,000 | 18,787,500 | *23,287,500* |
| Jordan Road (McEwen - Liberty) | ST16034 | | | | 150,000 | 100,000 | 450,000 | 1,700,000 | | | | *2,400,000* |
| Columbia Ave (Downs Blvd to Fowlkes St) | ST16035 | | | 750,000 | 750,000 | 1,500,000 | 14,900,000 | | | | | *17,900,000* |
| Hillsboro Road Temporary Sidewalk | ST16036 | 80,000 | 470,000 | | | | | | | | | *550,000* |
| Sidewalk Gaps | ST16037 | 250,000 | 250,000 | 250,000 | 250,000 | 250,000 | | | | | | *1,250,000* |
| Major Street Resurfacing | ST16038 | 2,400,000 | 1,700,000 | 1,300,000 | 900,000 | 1,800,000 | 3,100,000 | 1,700,000 | 900,000 | | | *13,800,000* |
| Carothers Parkway (South) ITS Extension | TOC16001 | 545,000 | 830,000 | | | | | | | | | *1,375,000* |
| ITS Camera at Columbia Ave & Mack Hatcher Pkwy | TOC16002 | | | 85,000 | | | | | | | | *85,000* |
| ITS Camera at Franklin Rd and Mallory Station Rd | TOC16003 | | | 85,000 | | | | | | | | *85,000* |
| Hilllsboro Road ITS Extension | TOC16004 | | | 305,000 | 395,000 | | | | | | | *700,000* |
| Highway 96 West ITS Extension - Phase 1 | TOC16005 | | | | | | | 285,000 | | | | *285,000* |
| Highway 96 West ITS Extension - Phase 2 | TOC16006 | | | | | | | | 310,000 | | | *310,000* |
| Lewisburg Pike ITS Extension | TOC16007 | | | | | | | | | 150,000 | | *150,000* |
| **Transportation Total** | | 6,196,456 | 7,663,856 | 26,633,200 | 32,111,168 | 27,192,191 | 40,243,200 | 28,211,665 | 29,039,096 | 35,482,340 | 40,966,797 | *273,739,969* |
| **GRAND TOTAL** | | 19,463,973 | 23,997,423 | 43,280,505 | 46,575,344 | 33,345,977 | 50,431,190 | 42,054,951 | 44,163,496 | 37,342,340 | 43,616,797 | *384,271,996* |

## Report criteria:

All Categories

All Departments

All Priority Levels

All Projects

All Source Types

Type: E or I or M or N or Z

Status: Active or Funding Obligated or Not Funded or Pending

*This Page Intentionally Blank*

# CAPITAL IMPROVEMENT PLAN FY2017-2026

## Category Summary

*This Page Intentionally Blank*

# CATEGORY SUMMARY

| Category | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Emergency Services | 80,000 | 4,150,000 | 100,000 | | | | | | | | *4,330,000* |
| General Services | | | | | 400,000 | 400,000 | 11,400,000 | 11,400,000 | 500,000 | | *24,100,000* |
| Parks and Recreation | 2,022,517 | 6,550,067 | 7,492,305 | 9,844,176 | 1,100,786 | 4,119,990 | 1,373,286 | 1,789,400 | 1,250,000 | 2,650,000 | *38,192,527* |
| Public Utilities | 8,765,000 | 4,623,500 | 7,225,000 | 4,620,000 | 4,653,000 | 5,548,000 | 820,000 | 285,000 | 110,000 | | *36,649,500* |
| Stormwater | 2,400,000 | 1,010,000 | 1,830,000 | | | 120,000 | 250,000 | 1,650,000 | | | *7,260,000* |
| Transportation | 6,196,456 | 7,663,856 | 26,633,200 | 32,111,168 | 27,192,191 | 40,243,200 | 28,211,665 | 29,039,096 | 35,482,340 | 40,966,797 | *273,739,969* |
| **TOTAL** | 19,463,973 | 23,997,423 | 43,280,505 | 46,575,344 | 33,345,977 | 50,431,190 | 42,054,951 | 44,163,496 | 37,342,340 | 43,616,797 | *384,271,996* |

**Report criteria:**

All Categories
All Departments
All Priority Levels
All Projects
All Source Types
Status: Active or Funding Obligated or Not Funded or Pending
Type: E or I or M or N or Z

*This Page Intentionally Blank*

# CAPITAL IMPROVEMENT PLAN FY2017-2026

# Project Commitments

*This Page Intentionally Blank*

**CIP Projects Funded by BOMA Through Prioritization Process**

*The Funds that are in red are funds that have either already been spent or they are committed by contract.

**The funds that are in blue are funds that will be provided through TDOT - State and/or Federal

## Emergency Services

| Project Description | Contract Number | Phase | Funds Committed | Funds Spent (updated 2/28/2016) | FY 2016 (Estimated) | FY 2017 | FY 2018 | FY 2019 | FY 2020 | FY 2021 | Total FY 2017-2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Fire Station 8** | | | **$3,309,526.00** | **$2,003,891.24** | **$1,305,634.76** | | | | | | **$0.00** |
| | COF 2014-0032 | Construction | $3,309,526.00 | $2,003,891.24 | $1,305,634.76 | | | | | | $0.00 |

**CIP Projects Funded by BOMA Through Prioritization Process**

*The Funds that are in red are funds that have either already been spent or they are committed by contract.

**The funds that are in blue are funds that will be provided through TDOT - State and/or Federal

## Parks and Recreation

| Project Description | Contract Number | Phase | Funds Committed | Funds Spent (updated 2/28/2016) | FY 2016 (Estimated) | FY 2017 | FY 2018 | FY 2019 | FY 2020 | FY 2021 | Total FY 2017-2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Fieldstone Farms Tunnles** | | | **$99,972.52** | **$69,215.39** | **$30,757.13** | **$21,235.00** | | | | | **$21,235.00** |
| | COF 2013-0022 | TDOT Grant | - | - | | ($203,184.00) | | | | | **($203,184.00)** |
| | COF 2013-0128 | Design | $99,972.52 | $69,215.39 | $30,757.13 | - | | | | | **$0.00** |
| | TBD | Construction/CEI | - | - | | $224,419.00 | | | | | **$224,419.00** |

**CIP Projects Funded by BOMA Through Prioritization Process**

*The Funds that are in red are funds that have either already been spent or they are committed by contract.

**The funds that are in blue are funds that will be provided through State, Federal or Partnership

## Public Utilities

| Project Description | Contract Number | Phase | Funds Committed | Funds Spent (updated 2/28/2016) | FY 2016 (Estimated) | FY 2017 | FY 2018 | FY 2019 | FY 2020 | FY 2021 | Total FY 2017-2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Watson Branch Upgrade Project** | | | **$115,000.00** | **$84,432.50** | **$30,567.50** | **$1,505,260.00** | | | | | **$1,505,260.00** |
| | COF 2014-0033 | Design | $115,000.00 | $84,432.50 | $30,567.50 | | | | | | $0.00 |
| | | Const. / CEI / ROW | | | - | $1,505,260.00 | | | | | $1,505,260.00 |
| **Ladd Park Gravity Sewer** | | | **$176,600.00** | **$13,103.72** | **$163,496.28** | $2,114,362.50 | | | | | **$2,114,362.50** |
| | COF 2015-0183 | Design | $176,600.00 | $13,103.72 | $163,496.28 | | | | | | $0.00 |
| | | Const. / CEI / ROW | | | - | $2,114,362.50 | | | | | $2,114,362.50 |
| **Goose Creek Sanitary Sewer Extention Project (East of I-65)** | | | **$155,135.00** | **$86,176.91** | **$534,052.59** | | | | | | **$0.00** |
| | COF 2014-0177 | Design / CEI | $132,535.00 | $63,576.91 | $68,958.09 | | | | | | $0.00 |
| | | Const. | | | $167,301.50 | $669,206.00 | | | | | $669,206.00 |
| | COF 2014-0051 | Partnership | | | | ($450,000.00) | | | | | -$450,000.00 |
| | | Const. | | | $124,703.00 | $498,812.00 | | | | | $498,812.00 |
| | COF 2015-0158 | ROW | $22,600.00 | $22,600.00 | $0.00 | | | | | | $0.00 |
| | | ROW | $222,090.00 | $49,000.00 | $173,090.00 | | | | | | $0.00 |
| **Waste Water Reclamation Expansion Design Project** | | | **$6,000,650.00** | **$5,955,549.45** | **$33,141,000.00** | **$44,188,000.00** | **$33,141,000.00** | | | | **$77,329,000.00** |
| | COF 2013-0001 | Design | $6,000,650.00 | $5,955,549.45 | **$45,100.55** | | | | | | $0.00 |
| | | Const. | | | **$31,641,000.00** | **$42,188,000.00** | **$31,641,000.00** | | | | $73,829,000.00 |
| | | CEI | | | $1,500,000.00 | $2,000,000.00 | $1,500,000.00 | | | | $3,500,000.00 |
| **Water Treatment Plant Modifications** | | | **$17,017,390.00** | **$2,411,782.73** | **$14,605,607.27** | | | | | | **$14,605,607.27** |
| | COF 2013-0001 | Design/CEI | $2,999,390.00 | $1,989,318.28 | $1,010,071.72 | | | | | | $0.00 |
| | | Construction | $14,018,000.00 | $422,464.45 | $13,595,535.55 | | | | | | $0.00 |
| **Fieldstone Farms Pump Station #1** | | | **$438,547.00** | **$298,343.45** | **$140,203.55** | | | | | | **$140,203.55** |
| | COF 2013-0090 | Design | $242,547.00 | $230,260.75 | $12,286.25 | | | | | | |
| | COF 2015-0058 | CEI | $196,000.00 | $68,082.70 | $127,917.30 | | | | | | |
| | COF 2014-0301 | Const. | **$1,701,522.00** | **$461,087.10** | **$1,240,434.90** | | | | | | **$1,240,434.90** |

**CIP Projects Funded by BOMA Through Prioritization Process**

*The Funds that are in red are funds that have either already been spent or they are committed by contract.

**The funds that are in blue are funds that will be provided through TDOT - State and/or Federal

## Transportation

| Project Description | Contract Number | Phase | Funds Committed | Funds Spent (updated 2/28/2016) | FY 2016 (Estimated) | FY 2017 | FY 2018 | FY 2019 | FY 2020 | FY 2021 | Total FY 2017-2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SR96E Sidewalk Project | | | $195,335.00 | $55,275.88 | $139,034.50 | $2,208,412.00 | | | | | $2,208,412.00 |
| | COF 2014-0015 | Design | $35,935.00 | $34,303.50 | $1,631.50 | | | | | | $0.00 |
| | COF 2014-0118 | Design | $15,000.00 | $13,975.38 | - | | | | | | $0.00 |
| | COF 2015-0365 | Design | $7,000.00 | $6,997.00 | $3.00 | | | | | | $0.00 |
| | COF 2015-0419 | ROW | $90,000.00 | $0.00 | $90,000.00 | | | | | | $0.00 |
| | COF 2016-0010 | ROW | $47,400.00 | $0.00 | $47,400.00 | | | | | | $0.00 |
| | TBD | Const./ROW | - | - | - | $2,208,412.00 | | | | | $2,208,412.00 |
| SR96W Sidewalk Project | | | $631,042.10 | $32,045.50 | $598,996.60 | | | | | | $0.00 |
| | COF 2014-0086 | Design | $22,546.00 | $19,665.50 | $2,880.50 | | | | | | $0.00 |
| | COF 2015-0040 | Const. | $596,116.10 | $0.00 | $596,116.10 | | | | | | $0.00 |
| | COF 2015-0059 | ROW | $9,000.00 | $9,000.00 | $0.00 | | | | | | $0.00 |
| | | ROW | $3,380.00 | $3,380.00 | $0.00 | | | | | | $0.00 |
| Century Beasley Connector Project | | | $952,183.26 | $333,996.43 | $608,124.63 | | | | | | $0.00 |
| | COF 2007-5-8 | Design | $27,526.00 | $22,020.80 | | | | | | | $0.00 |
| | COF 2014-0001 | Design | $19,557.00 | $15,000.00 | | | | | | | $0.00 |
| | COF 2014-0151 | Const. | $292,082.70 | $0.00 | $292,082.70 | | | | | | $0.00 |
| | COF 2014-0308 | Const. | $58,316.62 | $58,316.62 | | | | | | | $0.00 |
| | COF 2015-0042 | Const. | $399,250.94 | $83,209.01 | $316,041.93 | | | | | | $0.00 |
| | | ROW | $4,500.00 | $4,500.00 | | | | | | | $0.00 |
| | | ROW | $150,950.00 | $150,950.00 | | | | | | | $0.00 |
| Franklin Road and Moores Lane | | | $7,000.00 | $7,000.00 | $337,348.00 | | | | | | $0.00 |
| | COF 2014-0248 | Design | $7,000.00 | $7,000.00 | | | | | | | $0.00 |
| | | ROW | $0.00 | $0.00 | $337,348.00 | | | | | | $0.00 |
| Goose Creek Bypass (TDOT Gap Project) | | | $1,213,980.00 | $1,342,087.71 | $257,912.29 | | | | | | $0.00 |
| | COF 2012-0070 | | $1,213,980.00 | $1,342,087.71 | $257,912.29 | | | | | | $0.00 |
| Columbia Ave Widening Project | | | $1,127,950.00 | $57,500.00 | $0.00 | $240,000.00 | $600,000.00 | $600,000.00 | $1,350,000.00 | $1,350,000.00 | $4,140,000.00 |
| | | Sewer | | | | $80,000.00 | $200,000.00 | $200,000.00 | $550,000.00 | $550,000.00 | $1,580,000.00 |
| | | Water | | | | $80,000.00 | $200,000.00 | $200,000.00 | $450,000.00 | $450,000.00 | $1,380,000.00 |
| | | Reclaimed | | | | $80,000.00 | $200,000.00 | $200,000.00 | $350,000.00 | $350,000.00 | $1,180,000.00 |
| | | Design/ROW/CEI | | | | $1,000,000.00 | $2,000,000.00 | $2,000,000.00 | $7,000,000.00 | $8,000,000.00 | $20,000,000.00 |
| | COF 2001-8-14 | Design | $30,000.00 | $30,000.00 | | | | | | | $0.00 |
| | COF 2004-12-14 | Design | $6,000.00 | $6,000.00 | | | | | | | $0.00 |
| | COF 2006-9-26 | Design | $21,500.00 | $21,500.00 | | | | | | | $0.00 |
| | COF 2016-0015 | Design | $1,070,450.00 | $0.00 | $1,070,450.00 | | | | | | $0.00 |
| | | TDOT | - | - | ($1,070,450.00) | ($1,000,000.00) | ($2,000,000.00) | ($2,000,000.00) | ($7,000,000.00) | ($8,000,000.00) | ($20,000,000.00) |

**CIP Projects Funded by BOMA Through Prioritization Process**

*The Funds that are in red are funds that have either already been spent or they are committed by contract.

**The funds that are in blue are funds that will be provided through TDOT - State and/or Federal

## Transportation

| Project Description | Contract Number | Phase | Funds Committed | Funds Spent (updated 2/28/2016) | FY 2016 (Estimated) | FY 2017 | FY 2018 | FY 2019 | FY 2020 | FY 2021 | Total FY 2017-2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | $13,120,902.36 | $5,450,922.74 | $0.00 | $0.00 | | | | | $0.00 |
| | | | | | | | | | | | $0.00 |
| | | Const. | | | | $946,900.00 | | | | | $946,900.00 |
| | | TDOT | | | | ($946,900.00) | | | | | ($946,900.00) |
| | | Const. | | | | $1,102,995.00 | | | | | $1,102,995.00 |
| | | TDOT | | | | ($1,102,995.00) | | | | | ($1,102,995.00) |
| | | Const. | | | | $357,160.00 | | | | | $357,160.00 |
| | | TDOT | | | | ($357,160.00) | | | | | ($357,160.00) |
| Mack Hatcher NW Extention Project | COF 2007-8-14 | Design | $3,511,901.00 | $3,511,901.00 | | | | | | | $0.00 |
| | COF 2009-0061 | ROW | $44,200.00 | $44,200.00 | | | | | | | $0.00 |
| | COF 2009-0062 | ROW | $65,000.00 | $65,000.00 | | | | | | | $0.00 |
| | COF 2009-0063 | ROW | $33,100.00 | $33,100.00 | | | | | | | $0.00 |
| | COF 2009-0077 | ROW | $31,793.68 | $31,793.68 | | | | | | | $0.00 |
| | COF 2011-0076 | Design | $85,000.00 | $82,450.00 | | | | | | | $0.00 |
| | COF 2013-0034 | Design | $632,566.00 | $632,566.00 | | | | | | | $0.00 |
| | | ROW | $8,725,236.68 | $8,725,236.68 | | | | | | | $0.00 |
| | | TDOT | | ($5,985,532.52) | | | | | | | $0.00 |
| | | TDOT | | ($264,093.26) | | | | | | | $0.00 |
| | | TDOT | | ($1,502,803.84) | | | | | | | $0.00 |
| | COF 2011-0009 | Const. | $77,105.00 | $77,105.00 | | | | | | | $0.00 |
| | | | $108,150.00 | $17,832.00 | $712,168.00 | $134,000.00 | | | | | $134,000.00 |
| Franklin ITS Extension Project | COF 2014-0018 | Design | $108,150.00 | $89,160.00 | $60,840.00 | | | | | | $0.00 |
| | | Design | | | $30,000.00 | | | | | | $0.00 |
| | | Const./CEI | | | $670,000.00 | $670,000.00 | | | | | $670,000.00 |
| | | TDOT | | ($71,328.00) | ($48,672.00) | ($536,000.00) | | | | | ($536,000.00) |
| | | | $348,094.50 | $146,039.17 | $40,411.07 | $265,000.00 | | | | | $265,000.00 |
| Adaptive Signal Control Project | COF 2013-0184 | Deisgn | $348,094.50 | $146,039.17 | $202,055.33 | | | | | | $0.00 |
| | | Const. | | | | $1,325,000.00 | | | | | $1,325,000.00 |
| | | TDOT | - | | ($161,644.26) | ($1,060,000.00) | | | | | ($1,060,000.00) |
| Liberty Pike Improvements (Carothers to Knoll Top) (RIF Offset Agreement) | | | $2,850,000.00 | $0.00 | | $470,000.00 | $2,380,000.00 | | | | $2,850,000.00 |
| | COF 2014-0344 | Deisgn / ROW | $2,850,000.00 | $0.00 | | $470,000.00 | | | | | $470,000.00 |
| | | Const. | | | | | $2,380,000.00 | | | | $2,380,000.00 |
| 1st Ave and Bridge Street (RIF Offset Agreement) | | | $1,283,355.00 | $0.00 | | $165,825.00 | $1,117,530.00 | | | | $1,283,355.00 |
| | COF 2014-0344 | Deisgn / ROW | $165,825.00 | $0.00 | | $165,825.00 | | | | | $165,825.00 |
| | | Const. | $1,117,530.00 | | | | $1,117,530.00 | | | | $1,117,530.00 |

**CIP Projects Funded by BOMA Through Prioritization Process**

*The Funds that are in red are funds that have either already been spent or they are committed by contract.

**The funds that are in blue are funds that will be provided through TDOT - State and/or Federal

## Transportation

| Project Description | Contract Number | Phase | Funds Committed | Funds Spent (updated 2/28/2016) | FY 2016 (Estimated) | FY 2017 | FY 2018 | FY 2019 | FY 2020 | FY 2021 | Total FY 2017-2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | $27,931,254.75 | $14,556,304.05 | $2,902,197.54 | $10,603,541.10 | | | | | $10,603,541.10 |
| | COF 1999-10-12 | Design | $25,000.00 | $23,300.00 | | | | | | | $0.00 |
| | COF 2001-7-10 | Design | $200,000.00 | $200,000.00 | | | | | | | $0.00 |
| | COF 2001-5-15 | Design | $6,000.00 | $6,000.00 | | | | | | | $0.00 |
| | COF 2002-6-11 | Design | $10,000.00 | $10,000.00 | | | | | | | $0.00 |
| | COF 2005-2-8 | Design | $13,148.00 | $13,148.00 | | | | | | | $0.00 |
| | COF 2005-3-8 | Design | $59,250.00 | $46,631.95 | | | | | | | $0.00 |
| | COF 2006-11-14 | Design | $110,000.00 | $110,000.00 | | | | | | | $0.00 |
| | COF 2011-0060 | Design | $223,030.00 | $223,030.00 | | | | | | | $0.00 |
| | COF 2011-0059 | Design | $698,835.00 | $691,658.97 | | | | | | | $0.00 |
| | COF 2012-0110 | Const. | $12,319,944.47 | $11,969,652.68 | | | | | | | $0.00 |
| | COF 2012-0187 | Design | $39,000.00 | $20,225.44 | | | | | | | $0.00 |
| Hillsboro Road Phase II (Independence Square - Mack Hatcher) | COF 2012-0188 | Design | $57,600.00 | $57,600.00 | | | | | | | $0.00 |
| | COF 2013-0011 | Design | $110,825.00 | $110,810.77 | | | | | | | $0.00 |
| | COF 2015-0150 | Design | $36,884.15 | $19,491.89 | $17,392.26 | | | | | | $0.00 |
| | COF 2014-0160 | CEI | $956,803.00 | $0.00 | $191,360.60 | $765,442.40 | | | | | $765,442.40 |
| | COF 2012-0169 | CEI | $748,150.00 | $748,144.35 | | | | | | | $0.00 |
| | COF 2006-4-11 | Design | $22,000.00 | $22,000.00 | | | | | | | $0.00 |
| | COF 2012-0014 | Design | $179,560.00 | $179,560.00 | | | | | | | $0.00 |
| | COF 2012-0115 | Design | $84,650.00 | $84,650.00 | | | | | | | $0.00 |
| | COF 2012-0189 | Design | $17,785.00 | $10,200.00 | $7,585.00 | | | | | | $0.00 |
| | COF 2012-0189 | Design | $17,785.00 | $10,200.00 | $7,585.00 | | | | | | $0.00 |
| | COF 2015-0002 | Const. | $11,995,005.13 | $0.00 | $2,391,001.03 | $9,564,004.10 | | | | | $9,564,004.10 |
| | COF 2015-0002 | Const. (Wtr) | $0.00 | $0.00 | $154,935.60 | $619,742.40 | | | | | $619,742.40 |
| | COF 2015-0002 | Const. (Sewer) | $0.00 | $0.00 | $132,338.05 | $529,352.20 | | | | | $529,352.20 |
| | | TDOT | $0.00 | $0.00 | | ($875,000.00) | | | | | ($875,000.00) |
| | | ROW | $1,713,240.10 | $1,713,240.10 | | | | | | | $0.00 |

# CAPITAL IMPROVEMENT PLAN FY2017-2026

## Project Sheets – Emergency Services

*This Page Intentionally Blank*

**Project #** **FD16001**

**Project Name** **Fire Station 7 (Goose Creek Area)**

**Department** Fire
**Contact** Fire Chief
**Type** New
**Useful Life** 20+
**Category** Emergency Services
**Priority** 4 Star Project
**Status** Active

**Total Cost** **$4,330,000**

## Description

New Fire Station at the Williamson County AG Complex

## Justification

The City currently operates a temporary fire station at the Williamson County AG Complex. This temporary fire station needs to be replaced with a permanent facility.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | 80,000 | | | | | | | | | | 80,000 |
| Construction Engineering / Inspection | | 250,000 | | | | | | | | | 250,000 |
| Construction | | 3,900,000 | | | | | | | | | 3,900,000 |
| Equip/Vehicles/Furnishings | | | 100,000 | | | | | | | | 100,000 |
| **Total** | 80,000 | 4,150,000 | 100,000 | | | | | | | | 4,330,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Facilities Tax | 80,000 | 4,150,000 | 100,000 | | | | | | | | 4,330,000 |
| **Total** | 80,000 | 4,150,000 | 100,000 | | | | | | | | 4,330,000 |

Future Goose
Creek Extention
Peytonsville Rd
City of Franklin GIS Dept.

# CAPITAL IMPROVEMENT PLAN FY2017-2026

## Project Sheets – General Services

*This Page Intentionally Blank*

**Project #** **FM16001**

**Project Name** **New City Hall**

**Department** Project & Facilities Mgmt.

**Contact** Engineering Director

**Type** New

**Useful Life** 20+

**Category** General Services

**Priority** 3 Star Project

**Total Cost** **$24,100,000**

**Status** Pending

## Description

New City Hall Building

## Justification

The City has assessed the need for a new City Hall and believes that the existing City Hall is inadequate to meet present and foresseable future needs, given the rapid growth and increased demand for superior municipal services in Franklin.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | 400,000 | 400,000 | | | | | 800,000 |
| Construction Engineering / Inspection | | | | | | | 400,000 | 400,000 | | | 800,000 |
| Construction | | | | | | | 11,000,000 | 11,000,000 | | | 22,000,000 |
| Equip/Vehicles/Furnishings | | | | | | | | | 500,000 | | 500,000 |
| **Total** | | | | | 400,000 | 400,000 | 11,400,000 | 11,400,000 | 500,000 | | 24,100,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Facilities Tax | | | | | 400,000 | 400,000 | 11,400,000 | 11,400,000 | 500,000 | | 24,100,000 |
| **Total** | | | | | 400,000 | 400,000 | 11,400,000 | 11,400,000 | 500,000 | | 24,100,000 |

3rd Ave N
Alley
Alley
E Main St
Public Sq
1st Ave S
Emily Ct
3rd Ave S
Alley
Church St
2nd Ave S
City of Franklin GIS Dept

# CAPITAL IMPROVEMENT PLAN FY2017-2026

## Project Sheets – Parks and Recreation

*This Page Intentionally Blank*

**Project #** **PK16001**

**Project Name** **Hayes Home Restoration (Harlinsdale)**

**Department** Parks
**Contact** Park Director
**Type** Improvement
**Useful Life** 20+
**Category** Parks and Recreation
**Priority** 3 Star Project
**Status** Pending

**Total Cost** **$718,500**

## Description

Restoration started on the exterior of the home in 2012 through receiving grants and utilizing funding from the Hotel/Mote fund for the stabilization of the foundation and specific features which included the porches, foundation, chimney and gutter systems. The long-term use of the home is to provide offices for the Park Department Recreation/Programming Division and Friends of Franklin Parks, LLC. The historic home also would have a variety of other uses other than offices which shall include the surrounding grounds around the home: small community meeting space, weddings, social gatherings and special events. The equipment shed adjacent to the historic home shall be restored to house farm equipment for the daily maintenance. Post restoration, the house and the grounds will be used for special events and community meeting space.

## Justification

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | 135,000 | | | | | | | | | 135,000 |
| Construction | | | 583,500 | | | | | | | | 583,500 |
| **Total** | | 135,000 | 583,500 | | | | | | | | 718,500 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hotel/Motel Tax | | 135,000 | 583,500 | | | | | | | | 718,500 |
| **Total** | | 135,000 | 583,500 | | | | | | | | 718,500 |

# Park16001 – Hayes Home Restoration

**Project #** **PK16002**

**Project Name** **Main Barn Restoration (Harlinsdale)**

**Department** Parks
**Contact** Park Director
**Type** Improvement
**Useful Life** 20+
**Category** Parks and Recreation
**Priority** 4 Star Project
**Status** Pending

**Total Cost** **$698,000**

## Description

Proposed to rehabilitate the barn to its original state to allow the return of the horse but also a revenue venue for community and private events for park patrons. The stall area to the south should be restored to its original state. The stalls will be utilized during equestrian events or for exhibit during non-equine events. The north end shall be restored with minor stall removal to allow for an event space. A equine commercial rubberized pavers to be installed within the barn that shall provide proper footing for the horse, park user and ADA compliance for public usage. Public restrooms shall be added to code in the main barn area and also restored in the office areas for parks personnel. The offices shall be maintained in their original state to be utilized for parks personnel and the ladies lounge shall be a meeting space for pre and post event planning on the property.

## Justification

Priority Project in the parks master plan.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | 85,000 | | | | | | | | | 85,000 |
| Construction | | | 613,000 | | | | | | | | 613,000 |
| **Total** | | 85,000 | 613,000 | | | | | | | | 698,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hotel/Motel Tax | | 85,000 | 613,000 | | | | | | | | 698,000 |
| **Total** | | 85,000 | 613,000 | | | | | | | | 698,000 |

# Park16002 – Main Barn Restoration

**Project #** **PK16003**

**Project Name** **Maintenance Building Restoration (Harlinsdale)**

**Department** Parks
**Contact** Park Director
**Type** Improvement
**Useful Life** 20+
**Category** Parks and Recreation
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$549,000**

## Description

Adaptive reuse of the what was the colt barn for years on the property to a working maintenance area for Urban Forestry. This will provide for staff to house, maintain and operate a full maintenance operations on all facilities and grounds from the location. Several Parks Department divisions would be housed & operate from the area.

## Justification

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | 76,000 | | | | | | | | 76,000 |
| Construction | | | | 421,000 | | | | | | | 421,000 |
| Equip/Vehicles/Furnishings | | | | 52,000 | | | | | | | 52,000 |
| **Total** | | | 76,000 | 473,000 | | | | | | | 549,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hotel/Motel Tax | | | 76,000 | 473,000 | | | | | | | 549,000 |
| **Total** | | | 76,000 | 473,000 | | | | | | | 549,000 |

# Park16003 – Maintenance Building Restoration

**Project #** **PK16004**

**Project Name** **North Barn Restoration (Harlinsdale)**

**Department** Parks
**Contact** Park Director
**Type** Improvement
**Useful Life** 20+
**Category** Parks and Recreation
**Priority** 2 Star Project
**Status** Pending

**Total Cost** **$689,400**

## Description

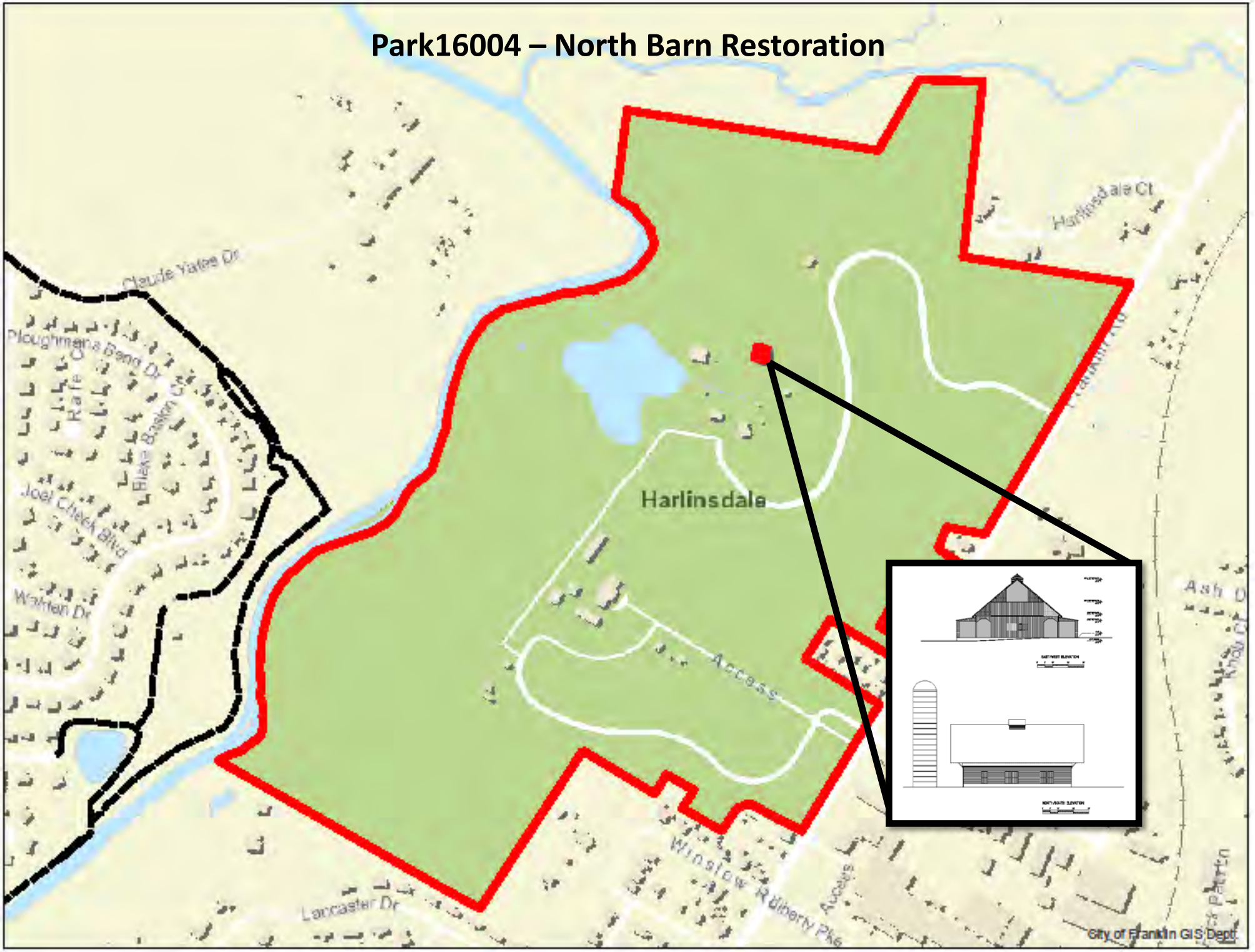
According to the master plan, a specific use for this facility was not decided. Once funding is available for restoration, a community plan should be incorporated into the scope for final design. The barn was used for equestrian functions when privately owned. The concept is to continue equestrian use and rentable space with an outdoor patio for public/private events.

## Justification

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | 35,000 | 100,000 | | | | 135,000 |
| Construction | | | | | | | | 548,300 | | | 548,300 |
| Equip/Vehicles/Furnishings | | | | | | | | 6,100 | | | 6,100 |
| **Total** | | | | | | 35,000 | 100,000 | 554,400 | | | 689,400 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hotel/Motel Tax | | | | | | 35,000 | 100,000 | 554,400 | | | 689,400 |
| **Total** | | | | | | 35,000 | 100,000 | 554,400 | | | 689,400 |

# Park16004 – North Barn Restoration



**Project #** **PK16005**

**Project Name** **Harlinsdale Visitor Center & Museum**

**Department** Parks
**Contact** Park Director
**Type** Improvement
**Useful Life** 20+
**Category** Parks and Recreation
**Priority** 2 Star Project
**Status** Pending

**Total Cost** **$3,100,760**

## Description

According to the master plan, adaptive reuse of the what was the former power plant building to a permanent visitors' center and museum. The museum will house exhibits and displays that would included instructional videos, a pictorial history of the farm and horses of Williamson County. Share the story of Midnight Sun and along with video-biographies of the Harlin and Hayes family. The museum should represent the history of the entire Harlinsdale Farm property and included the American Indian, Civil War, Power Plan the Inter-Urban Rail System and the connection to the Factory. The visitor's center would utilized as a community rentable space for such functions as Rotary meetings, Friends of Franklin Parks, special events, etc…

## Justification

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | 86,000 | 100,000 | | | | | | 186,000 |
| Construction Engineering / Inspection | | | | | | 95,000 | 567,000 | | | | 662,000 |
| Construction | | | | | | 2,167,760 | | | | | 2,167,760 |
| Equip/Vehicles/Furnishings | | | | | | | | 85,000 | | | 85,000 |
| **Total** | | | | 86,000 | 100,000 | 2,262,760 | 567,000 | 85,000 | | | 3,100,760 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hotel/Motel Tax | | | | 86,000 | 100,000 | 2,262,760 | 567,000 | 85,000 | | | 3,100,760 |
| **Total** | | | | 86,000 | 100,000 | 2,262,760 | 567,000 | 85,000 | | | 3,100,760 |

# Park16005 – Visitor Center & Museum

**Project #** PK16006

**Project Name** Worker House I & II (Harlinsdale)

**Department** Parks
**Contact** Park Director
**Type** Improvement
**Useful Life** 20+
**Category** Parks and Recreation
**Priority** 2 Star Project
**Status** Pending

**Total Cost** $342,000

## Description

According to the master plan, a specific use for this facility was not decided. Once funding is available for restoration, a plan should be incorporated into the scope for final design. The houses were utilized by workers on the farm when privately owned. The two structures could be rented or leased to local nonprofits of Williamson County or kept as office space for future farm operations.

## Justification

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | | 92,000 | | | | 92,000 |
| Construction | | | | | | | | 250,000 | | | 250,000 |
| **Total** | | | | | | | 92,000 | 250,000 | | | 342,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hotel/Motel Tax | | | | | | | 92,000 | 250,000 | | | 342,000 |
| **Total** | | | | | | | 92,000 | 250,000 | | | 342,000 |

# Park16006 – Worker House I & II

**Project #** **PK16007**

**Project Name** **North Pavilion & Restroom Facility (Harlinsdale)**

**Department** Parks
**Contact** Park Director
**Type** Improvement
**Useful Life** 20+
**Category** Parks and Recreation
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$292,500**

## Description

Once known as the "hay barn" on the north side of the property is the perfect setting for repurposing the original structure into an open air pavilion and restroom facility. Adjacent to existing parking areas, the barn would be renovated as an open air pavilion with picnic tables, water and electricity. The area would be open to the general public but also an affordable space for family reunions, birthday parties and private events. The barn is approximately 32' width x 48' length. The proposed restroom would be located on either end of the pavilion once designed. Restrooms would be open year-round.

## Justification

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | 40,000 | | | | | | | 40,000 |
| Construction Engineering / Inspection | | | | | 247,000 | | | | | | 247,000 |
| Equip/Vehicles/Furnishings | | | | | 5,500 | | | | | | 5,500 |
| **Total** | | | | 40,000 | 252,500 | | | | | | 292,500 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hotel/Motel Tax | | | | 40,000 | 252,500 | | | | | | 292,500 |
| **Total** | | | | 40,000 | 252,500 | | | | | | 292,500 |

# Park16007 – North Pavilion & Restroom Facility

**Project #** **PK16008**

**Project Name** **Jim Warren Park Renovations**

**Department** Parks
**Contact** Park Director
**Type** Improvement
**Useful Life** 20+
**Category** Parks and Recreation
**Priority** 3 Star Project
**Status** Pending

**Total Cost** **$2,885,000**

## Description

Jim Warren Park Renovations: FY 2018: Update master plan & Addition to Maintenance Facility; FY 2019: Addition to Maintenance Facility: $230,00; FY 2020: Demo/Relocate Football Fields; FY 2021: Two 7 - 8 Year Old Baseball Fields Construction; FY 2022: Expand Skatepark; FY 2023: Miracle Field Construction; FY 2024: Universal Playground Construction

## Justification

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | 230,000 | | | | | | | 230,000 |
| Construction | | | 55,000 | | 100,000 | 600,000 | 400,000 | 750,000 | 750,000 | | 2,655,000 |
| **Total** | | | 55,000 | 230,000 | 100,000 | 600,000 | 400,000 | 750,000 | 750,000 | | 2,885,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hotel/Motel Tax | | | 55,000 | 230,000 | 100,000 | 600,000 | 400,000 | 750,000 | 750,000 | | 2,885,000 |
| **Total** | | | 55,000 | 230,000 | 100,000 | 600,000 | 400,000 | 750,000 | 750,000 | | 2,885,000 |

Park16008 – Jim Warren Park Renovations

**Project #** **PK16009**

**Project Name** **Liberty Park Improvements**

**Department** Parks
**Contact** Park Director
**Type** Improvement
**Useful Life** 20+
**Category** Parks and Recreation
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$557,000**

## Description

Liberty Park Improvements: The first phase of Liberty Park was completed in 2003 with the second phase completed in 2008. Proposed project would complete the additions to the park. The improvements included: two parking lots, tennis courts, basketball court, lighted multipurpose field and a restroom/pavilion combination facility.

## Justification

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | 68,000 | | | | | | | 68,000 |
| Construction Engineering / Inspection | | | | | | 165,000 | | | | | 165,000 |
| Construction | | | | | 310,000 | | | | | | 310,000 |
| Equip/Vehicles/Furnishings | | | | | 14,000 | | | | | | 14,000 |
| **Total** | | | | 68,000 | 324,000 | 165,000 | | | | | 557,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hotel/Motel Tax | | | | 68,000 | 324,000 | 165,000 | | | | | 557,000 |
| **Total** | | | | 68,000 | 324,000 | 165,000 | | | | | 557,000 |

# Park16009 – Liberty Park Improvements

**Project #** **PK16010**

**Project Name** **Splash Pad**

**Department** Parks
**Contact** Park Director
**Type** New
**Useful Life** 20+
**Category** Parks and Recreation
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$600,000**

## Description

According to the Parks Master Plan, two splash pads were identified by the general public as an amenity within the parks system to be included in the next 10-years. One is being proposed at Pinkerton Park or Jim Warren Park and the other to be identified at a later date.

## Justification

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Construction | | 300,000 | | | | 300,000 | | | | | 600,000 |
| **Total** | | 300,000 | | | | 300,000 | | | | | 600,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Parkland Dedication | | 300,000 | | | | 300,000 | | | | | 600,000 |
| **Total** | | 300,000 | | | | 300,000 | | | | | 600,000 |

# Park16010 – Splash Pad

**Project #** **PK16011**

**Project Name** **Greenway (Aspen Grove to Mack Hatcher)**

**Department** Parks
**Contact** Park Director
**Type** New
**Useful Life** 20+
**Category** Parks and Recreation
**Priority** 3 Star Project
**Status** Pending

**Total Cost** **$907,255**

## Description

Aspen Grove to Mack Hatcher was identified in the Parks Master Plan as 1/2 mile greenway connection that will link pedestrians from the Cool Springs area potentially be utilizing Mack Hatcher's multipurpose pathway to Harlinsdale Farm and ultimately to the historic downtown. Land acquisition, design and construction will be part of constructing this missing link to the existing greenway to Aspen Grove Park in the Cool Spring area.

## Justification

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | 136,336 | | | | | | | | | | 136,336 |
| ROW and Easements | | 225,819 | | | | | | | | | 225,819 |
| Construction | | | 545,100 | | | | | | | | 545,100 |
| **Total** | 136,336 | 225,819 | 545,100 | | | | | | | | 907,255 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Parkland Dedication | 136,336 | 225,819 | 545,100 | | | | | | | | 907,255 |
| **Total** | 136,336 | 225,819 | 545,100 | | | | | | | | 907,255 |

Park16011 - Greenway (Aspen Grove to Mack Hatcher)

**Project #** **PK16012**

**Project Name** **Greenway (Pinkerton to Bicentennial)**

**Department** Parks
**Contact** Park Director
**Type** New
**Useful Life** 20+
**Category** Parks and Recreation
**Priority** 3 Star Project
**Status** Pending

**Total Cost** **$5,710,126**

## Description

From the existing trails at Pinkerton Park, the Greenway would head north and west along the banks of the Harpeth River, this time higging a small shelf below Fort Granger Park as the trail approaches Downtown Franklin. City-owned property on the north side of the Harpeth and the Battleground Academy property provide trailhead opportunities. A crosswalk over Franklin Road would be required and these would connect via sidewalk to Downtown Franklin. The Greenway continues west along the north bank of the Harpeth until it is across the Harpeth River from Bicentennial Park which connects into existing trails within Bicentennial Park along the Harpeth River to the Williamson County Recreation Center. Potential trailhead and kiosk with permeable parking at city owned property on Daniels Drive.

## Justification

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | 551,817 | | | | | | | | | 551,817 |
| ROW and Easements | | | 425,419 | | | | | | | | 425,419 |
| Construction Engineering / Inspection | | | | 459,847 | | | | | | | 459,847 |
| Construction | | | | 4,273,043 | | | | | | | 4,273,043 |
| **Total** | | 551,817 | 425,419 | 4,732,890 | | | | | | | 5,710,126 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Parkland Dedication | | 551,817 | 425,419 | 4,732,890 | | | | | | | 5,710,126 |
| **Total** | | 551,817 | 425,419 | 4,732,890 | | | | | | | 5,710,126 |

Park 16012 - (Pinkerton Park to Bicentennial Park)
City of Franklin GIS Dept.

**Project #** **PK16013**

**Project Name** **Greenway & Bridge (Harlinsdale to Fulton Greer)**

**Department** Parks
**Contact** Park Director
**Type** New
**Useful Life** 20+
**Category** Parks and Recreation
**Priority** 3 Star Project
**Status** Pending

**Total Cost** **$652,944**

## Description

This trail segment connects large sections of existing trails maintained by Williamson County Parks and Recreation, formerly Chestnut Bend HOA through open space along the Harpeth and Williamson County trails through Cheek Park and Judge Fulton Greer Park. A bridge to connect the internal trails at the Park at Harlinsdale to the existing Chestnut Bend trails. Sign kiosk, trailhead at Harlinsdale, Cheek Park and at Judge Fulton Greer locations.

## Justification

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | 110,000 | | | | | | 110,000 |
| Construction Engineering / Inspection | | | | | | 537,900 | | | | | 537,900 |
| Equip/Vehicles/Furnishings | | | | | | 5,044 | | | | | 5,044 |
| **Total** | | | | | 110,000 | 542,944 | | | | | 652,944 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Parkland Dedication | | | | | 110,000 | 542,944 | | | | | 652,944 |
| **Total** | | | | | 110,000 | 542,944 | | | | | 652,944 |

# Park16013 - Greenway (Harlinsdale to Cheek & Fulton Greer Park)

**Project #** **PK16014**

**Project Name** **East/Southeast Multipurpose Park**

**Department** Parks
**Contact** Park Director
**Type** New
**Useful Life** 20+
**Category** Parks and Recreation
**Priority** 4 Star Project
**Status** Pending

**Total Cost** **$13,200,000**

## Description

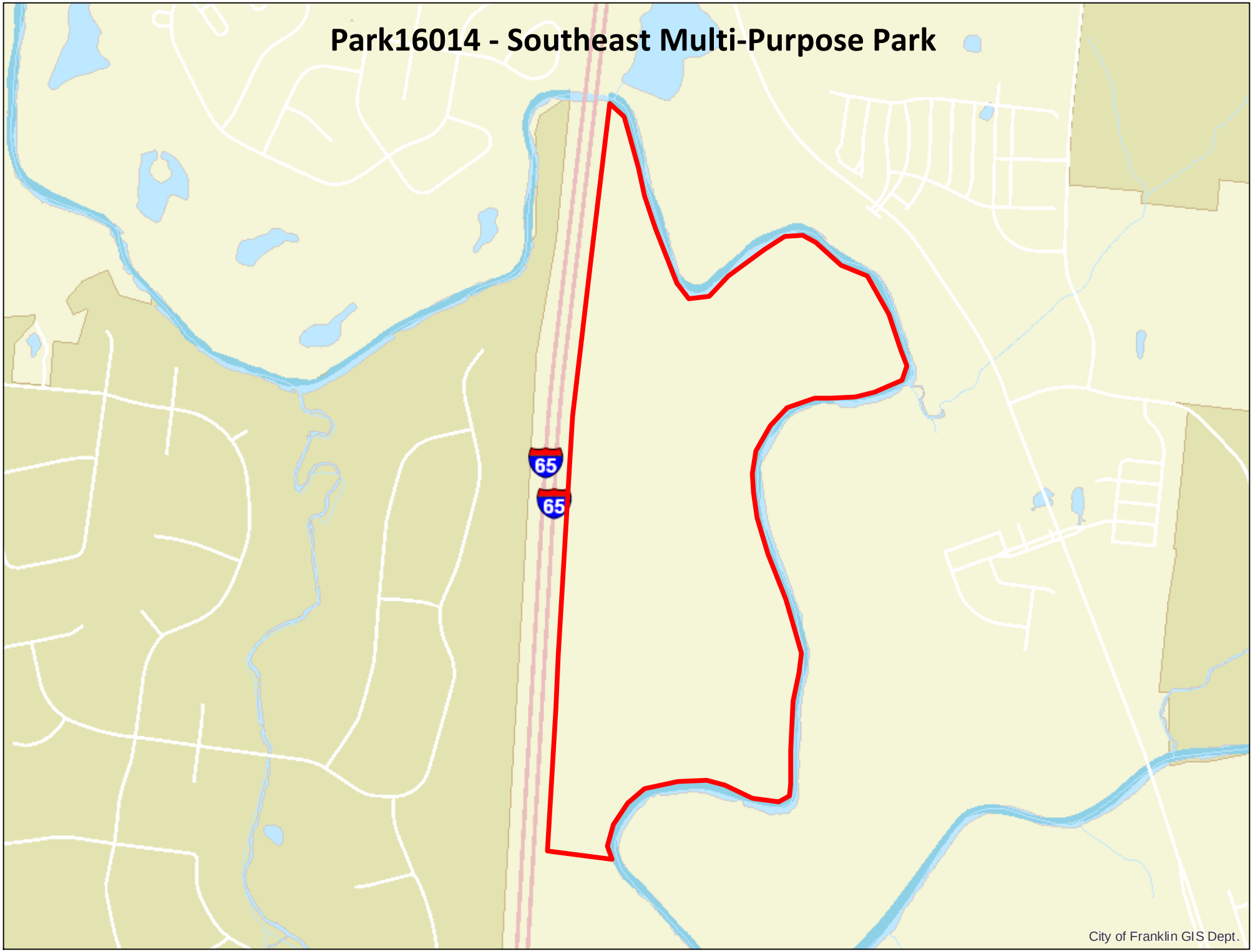
This section of greenway will transition to a multi-use pathway in certain sections. The trail will connect to the proposed Mack Hatcher multi-use pathway in the future. The intersection of Mack Hatcher and Lewisburg Pike will be particularly difficult to manage but an at-grade crossing is proposed at this traffic light. From Mack Hatcher, the trail will continue south along Lewisburg Pike until it heads east near the intersection of Donelson Creek Parkway along the southern edge of the Waters Edge development to the Harpeth River. The trail will again say along the south side of the Harpeth until Five Mile Creek. A bridge crossing to the East side of Five Mile Creek provides an opportunity to connect via easements south to Berry Farms.

## Justification

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | 1,200,000 | | | | | | | | | | 1,200,000 |
| Construction | | 4,000,000 | 4,000,000 | 4,000,000 | | | | | | | 12,000,000 |
| **Total** | 1,200,000 | 4,000,000 | 4,000,000 | 4,000,000 | | | | | | | 13,200,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Parkland Dedication | 1,200,000 | 4,000,000 | 4,000,000 | 4,000,000 | | | | | | | 13,200,000 |
| **Total** | 1,200,000 | 4,000,000 | 4,000,000 | 4,000,000 | | | | | | | 13,200,000 |

# Park16014 - Southeast Multi-Purpose Park



**Project #** PK16015

**Project Name** Carter's Hill Battlefield Park

**Department** Parks
**Contact** Park Director
**Type** New
**Useful Life** 20+
**Category** Parks and Recreation
**Priority** 4 Star Project
**Status** Active

**Total Cost** **$1,616,292**

## Description

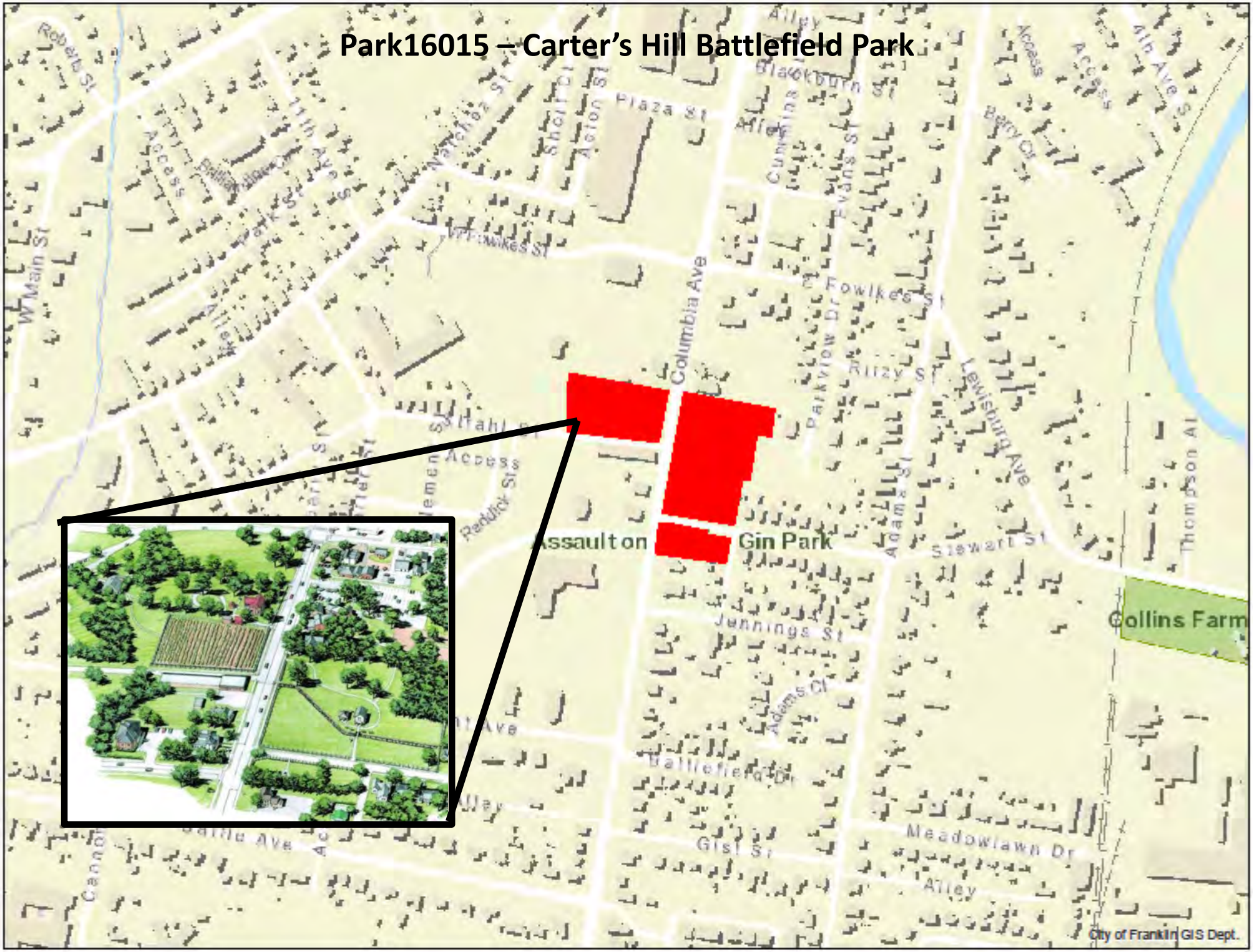
The plan recommends that the City develop, maintain, and provide capital funds for approximately 18 acres of American Civil War battlefield land. The property is located along Columbia Ave (US Hwy 31), generally running between East Fowlkes Street and Strahl Street on the west side of Columbia Avenue and running immediately south by Cleburne Street on the east side of Columbia. In November 2014, community leaders from the battlefield preservation groups approached the City with a proposal that in exchange for $1.5 million from the City, the City would receive 11 properties valued at $6.97 million. Several improvements that would initially be made include a crosswalk on Columbia Avenue, split rail fencing, trails, trash receptacles, interpretive signage, a gravel parking area, electrical work, water to the site, and landscaping.

## Justification

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ROW and Easements | 214,286 | 214,286 | 214,286 | 214,286 | 214,286 | 214,286 | 214,286 | | | | 1,500,002 |
| Construction | 58,145 | 58,145 | | | | | | | | | 116,290 |
| **Total** | 272,431 | 272,431 | 214,286 | 214,286 | 214,286 | 214,286 | 214,286 | | | | 1,616,292 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hotel/Motel Tax | 272,431 | 272,431 | 214,286 | 214,286 | 214,286 | 214,286 | 214,286 | | | | 1,616,292 |
| **Total** | 272,431 | 272,431 | 214,286 | 214,286 | 214,286 | 214,286 | 214,286 | | | | 1,616,292 |

# Park16015 – Carter's Hill Battlefield Park



**Project #** **PK16016**

**Project Name** **Lockwood Glen Park**

**Department** Parks
**Contact** Park Director
**Type** New
**Useful Life** 20+
**Category** Parks and Recreation
**Priority** 2 Star Project
**Status** Pending

**Total Cost** **$210,750**

## Description

In 2015, the City entered into a Professional Service Agreement with Edge Planning Landscape Architecture & Urban Design to provide design services for the approximately 80 acre Lockwood Glen Park. Edge will be providing a final master plan for the park as the City of Franklin and Crescent Communities assume responsibility in for the total cost of the master plan. The goal is to develop a working plan that can be considered a passive public park in the near future. Located adjacent to the Carothers's South Parkway. Part of the plan will include programming the 12-acre lake, public parking areas, public restrooms and walking trails around the Harpeth and the property.

## Justification

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | 10,750 | | | | | | | | | | 10,750 |
| Construction | | 100,000 | 100,000 | | | | | | | | 200,000 |
| **Total** | 10,750 | 100,000 | 100,000 | | | | | | | | 210,750 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Parkland Dedication | 10,750 | 100,000 | 100,000 | | | | | | | | 210,750 |
| **Total** | 10,750 | 100,000 | 100,000 | | | | | | | | 210,750 |

# Park16016 – Lockwood Glen Park

City of Franklin GIS Dept.

**Project #** **PK16017**

**Project Name** **Greenway (Lewisburg to I-65/Harpeth River)**

**Department** Parks
**Contact** Park Director
**Type** New
**Useful Life** 20+
**Category** Parks and Recreation
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$3,300,000**

## Description

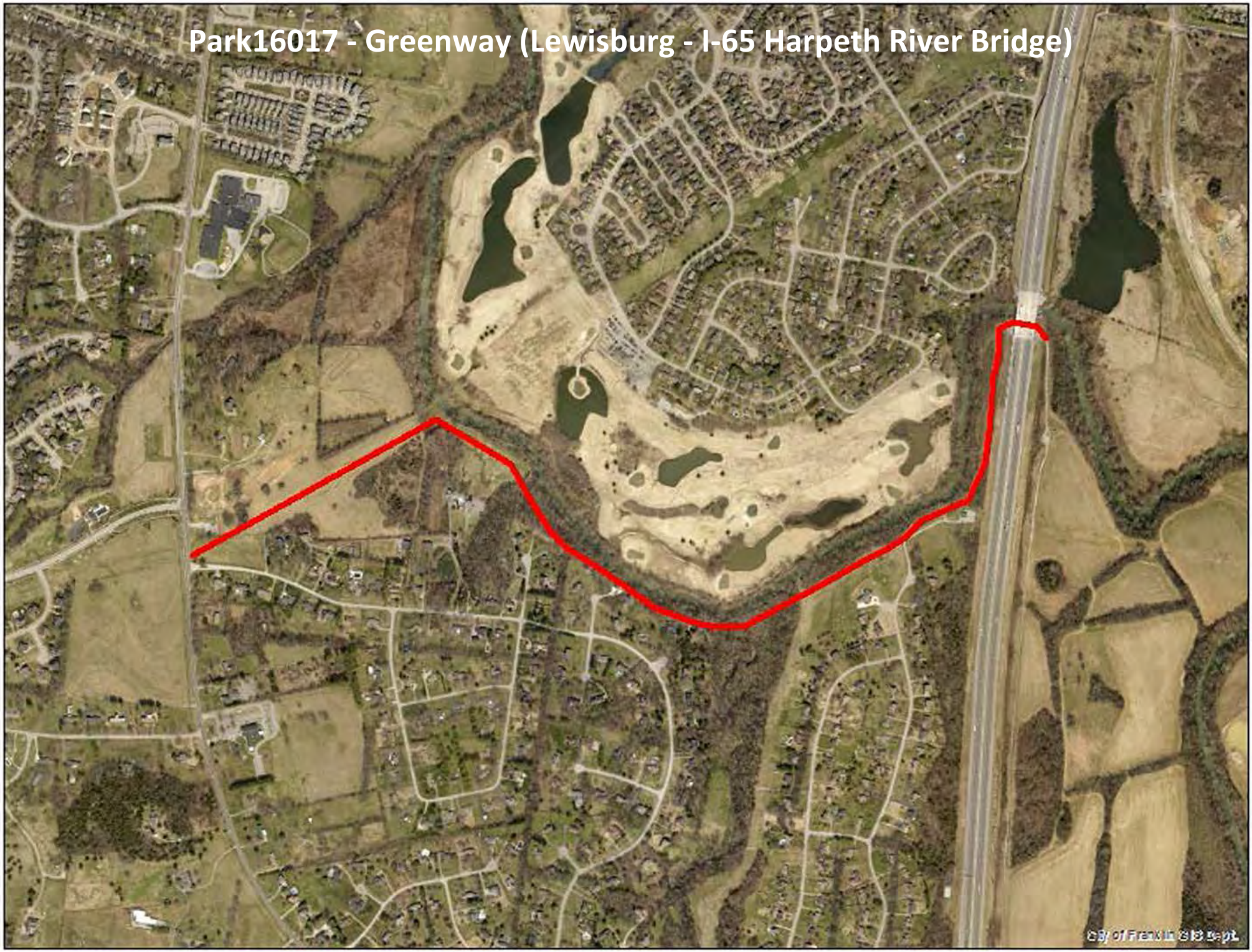
The trail will connect to the proposed Mack Hatcher and Lewisburg Pike multi-use pathway in the future. The trail will start at the intersection of Donelson Creek Parkway and Lewisburg Pike and extend through the Riverbluff Subdivision and parellel the Harpth River until it reaches the Harpeth River Bridge at I-65.

## Justification

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | | | 150,000 | | | 150,000 |
| ROW and Easements | | | | | | | | | 500,000 | | 500,000 |
| Construction Engineering / Inspection | | | | | | | | | | 150,000 | 150,000 |
| Construction | | | | | | | | | | 2,500,000 | 2,500,000 |
| **Total** | | | | | | | | 150,000 | 500,000 | 2,650,000 | 3,300,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Parkland Dedication | | | | | | | | 150,000 | 500,000 | 2,650,000 | 3,300,000 |
| **Total** | | | | | | | | 150,000 | 500,000 | 2,650,000 | 3,300,000 |

# Park16017 - Greenway (Lewisburg - I-65 Harpeth River Bridge)



**Project #** **PK16018**

**Project Name** **Eastern Flank Circle (Loop Road) Repair**

**Department** Parks
**Contact** Park Director
**Type** Improvement
**Useful Life** 20+
**Category** Parks and Recreation
**Priority** 3 Star Project
**Status** Pending

**Total Cost** **$130,000**

## Description

Cover existing DBST with West TN Mix

## Justification

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Construction | 130,000 | | | | | | | | | | 130,000 |
| **Total** | 130,000 | | | | | | | | | | 130,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hotel/Motel Tax | 130,000 | | | | | | | | | | 130,000 |
| **Total** | 130,000 | | | | | | | | | | 130,000 |

# Park16018 – Eastern Flank Circle Repair

**Project #** **PK16019**

**Project Name** **Harlinsdale Farm Interuban Trail Connection**

**Department** Parks
**Contact** Park Director
**Type** Improvement
**Useful Life** 20+
**Category** Parks and Recreation
**Priority** 2 Star Project
**Status** Pending

**Total Cost** **$128,000**

## Description

Perform the final connection from the north to the south end of the property. The area once housed the interurban rail system from Nashville to Franklin. Will allow for pedestrian and vehicular (pre & post special events) movement through the site for ADA access. The roadway would serve as part of the interconnectivity within the park and will be limited to 12' wide only.

## Justification

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Construction | 128,000 | | | | | | | | | | 128,000 |
| **Total** | 128,000 | | | | | | | | | | 128,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hotel/Motel Tax | 128,000 | | | | | | | | | | 128,000 |
| **Total** | 128,000 | | | | | | | | | | 128,000 |

*This Page Intentionally Blank*

**Project #** **PK16020**

**Project Name** **Bicentennial Park Schematic Design & Construction**

**Department** Parks
**Contact** Park Director
**Type** Improvement
**Useful Life** 20+
**Category** Parks and Recreation
**Priority** 4 Star Project
**Status** Active

**Total Cost** **$1,905,000**

## Description

Located at 214 N. Margin St.: Update the current 2008 master plan and design for construction of a paving system or ground cover for the park surrounding the Bicentennial park pavilion, east side of the park and the Worley property if purchased by the City. Design and prepare construction documents to include but not limited to soil testing, stormwater management needs, vehicular load requirements, local regulations and flood restrictions. Project areas are highlighted.

## Justification

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | 145,000 | | | | | | | | | | 145,000 |
| Construction Engineering / Inspection | | 100,000 | 100,000 | | | | | | | | 200,000 |
| Construction | | 780,000 | 780,000 | | | | | | | | 1,560,000 |
| **Total** | 145,000 | 880,000 | 880,000 | | | | | | | | 1,905,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hotel/Motel Tax | 145,000 | 880,000 | 880,000 | | | | | | | | 1,905,000 |
| **Total** | 145,000 | 880,000 | 880,000 | | | | | | | | 1,905,000 |

*This Page Intentionally Blank*

# CAPITAL IMPROVEMENT PLAN FY2017-2026

## Project Sheets – Public Utilities

*This Page Intentionally Blank*

**Project #** **WM16001**

**Project Name** **16" Water Line Long Lane Connector**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$2,170,000**

## Description

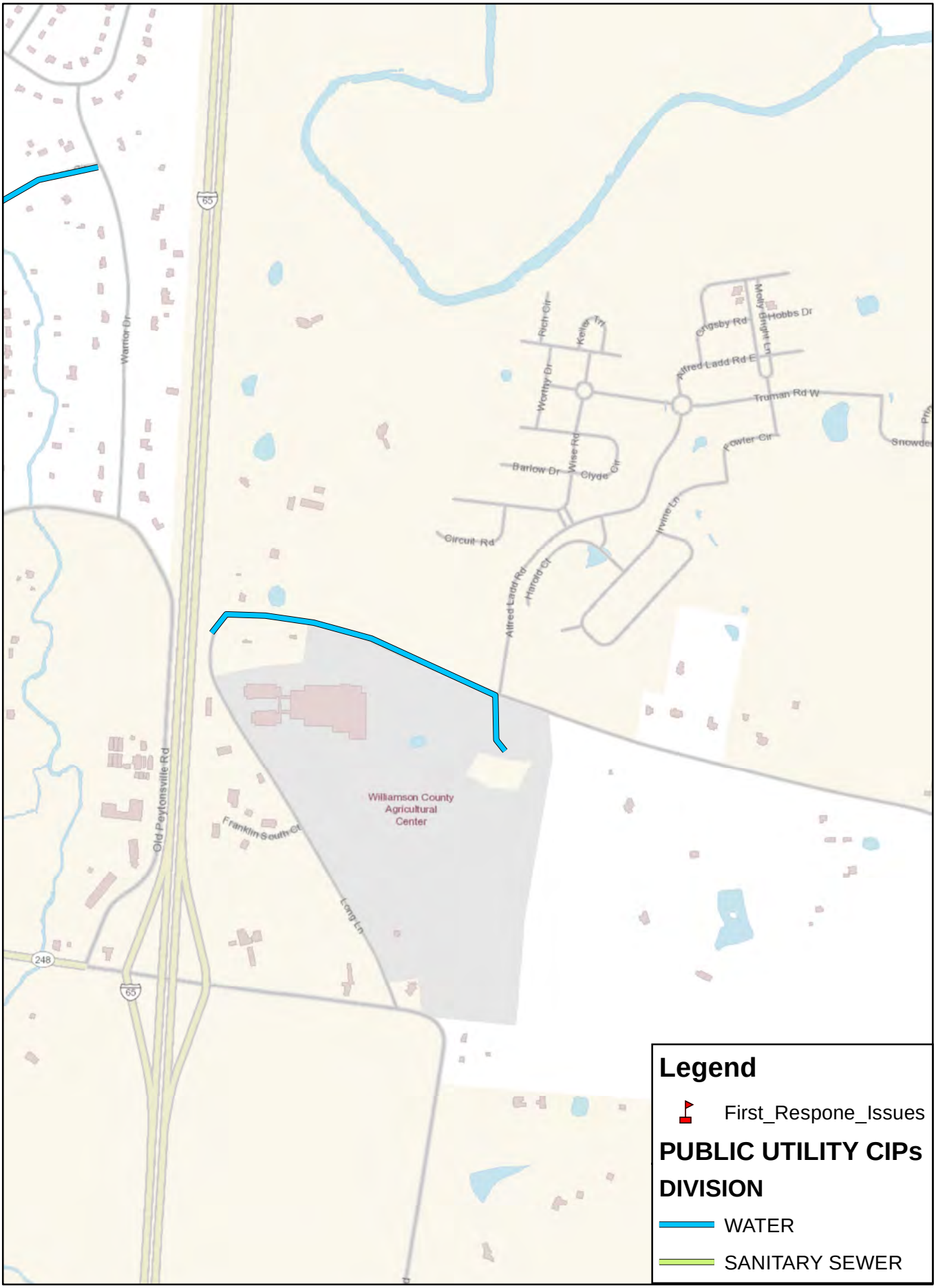
16" Water Main from I-65 to Long Lane Resevor

## Justification

Provide adequate domestic and fire flow to the Goose Creek Area for future and existing customers.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | 120,000 | | | | | | | | | | 120,000 |
| ROW and Easements | | 50,000 | | | | | | | | | 50,000 |
| Construction | | | 2,000,000 | | | | | | | | 2,000,000 |
| **Total** | 120,000 | 50,000 | 2,000,000 | | | | | | | | 2,170,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Capacity | 60,000 | 25,000 | 1,000,000 | | | | | | | | 1,085,000 |
| Water Renewal | 60,000 | 25,000 | 1,000,000 | | | | | | | | 1,085,000 |
| **Total** | 120,000 | 50,000 | 2,000,000 | | | | | | | | 2,170,000 |


Warrior Dr
Rich Cir
Keller Trl
Worthy Dr
Wise Rd
Barlow Dr
Clyde Cir
Circuit Rd
Alfred Ladd Rd
Harold Cir
Irvine Ln
Crigsby Rd
Molly Bright Ln
Hobbs Dr
Alfred Ladd Rd E
Truman Rd W
Fowler Cir
Snowde
Williamson County
Agricultural
Center
Franklin South Ct
Long Ln
Old Peytonsville Rd
248
65
Legend
First_Respone_Issues
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16001

**Project #** **WM16002**

**Project Name** **Bishop Branch Interceptor**

**Department** Water Management
**Contact** Water Management Director
**Type** New
**Useful Life** 20+
**Category** Public Utilities
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$3,810,000**

## Description

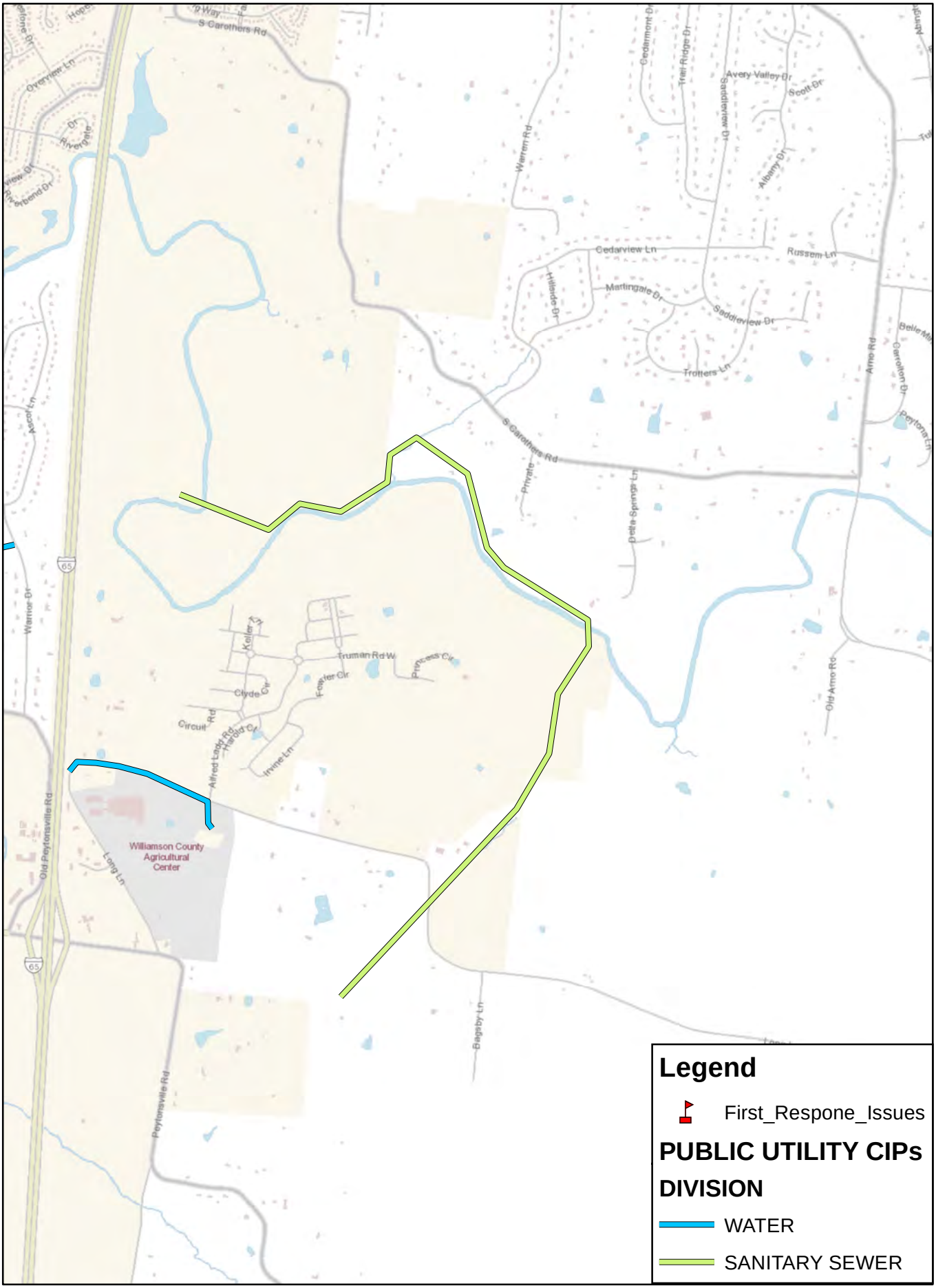
Future Development is aniticpated on the east side of the Goos Creek Interchage. When this area developes we will need to extend gravity sewer from the Ladd Park interceptor down Bishop Branch. The extention is approxaimtly 12,000 LF.

## Justification

This area has great economic develompent potential. The Ladd Park Interceptor does not have the capactiy to handle dense development.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | 230,000 | | | | | | | 230,000 |
| ROW and Easements | | | | | 500,000 | | | | | | 500,000 |
| Construction Engineering / Inspection | | | | | | 80,000 | | | | | 80,000 |
| Construction | | | | | | 3,000,000 | | | | | 3,000,000 |
| **Total** | | | | 230,000 | 500,000 | 3,080,000 | | | | | 3,810,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Wastewater Capacity | | | | 230,000 | 500,000 | 3,080,000 | | | | | 3,810,000 |
| **Total** | | | | 230,000 | 500,000 | 3,080,000 | | | | | 3,810,000 |


S Carothers Rd
Warren Rd
Cedarview Ln
Russem Ln
Martingale Dr
Saddleview Dr
Trotters Ln
Arno Rd
Private
Delta Springs Ln
Truman Rd W
Foster Cir
Princess Cir
Clyde Cv
Circuit Rd
Harold Cv
Irvine Ln
Alfred Ladd Rd
Old Peytonsville Rd
Williamson County Agricultural Center
Long Ln
Peytonsville Rd
Bagsby Ln
Old Arno Rd
Warnoe Dr
65
Legend
First_Respone_Issues
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16002

**Project #** WM16003

**Project Name** Old Carters Creek Pike Water Line Replacement

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 4 Star Project
**Status** Active

**Total Cost** $559,498

## Description

Replacement of approximately 3,200 LF of 6" cast iron water line from West Main Street to terminus of Franklin's water system.

## Justification

Line is over 60 years old. The project will improve water loss, water age, fire flow and water quality.

| Prior | Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 79,498 | Construction | 480,000 | | | | | | | | | | 480,000 |
| Total | Total | 480,000 | | | | | | | | | | 480,000 |

| Prior | Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 79,498 | Water Renewal | 480,000 | | | | | | | | | | 480,000 |
| Total | Total | 480,000 | | | | | | | | | | 480,000 |

Caysens Square Ln
Downs Blvd
Falls Church Ct
Zinnia Ln
Tulip Ln
Alley
Rosebud Ct
Hardison Ave
Scruggs Ave
Davidson Dr
Cothran Dr
Dabney Dr
Access
Horton Ln
Horton Ct
Bradford Dr
Carters Glen Pl
246
W Main St
Carters Creek Pke
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16003

**Project #** **WM16004**

**Project Name** **Sanitary Sewer Priority Rehabilitation Projects**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 4 Star Project
**Status** Active

**Total Cost** **$85,000**

## Description

Rehabilitation of approximately 525 LF of 8" sanitary sewer line and one manhole along Glass Lane.

Rehabilitation of approximately 325 LF of 8" sanitary sewer line and one manhole at 1338 West Main Street.

Rehabilitation of approximately 237 LF of 8" sanitary sewer line and two manholes at 1361 Columbia Avenue.

Rehabilitation of approximately 559 LF of 8" sanitary sewer line and one manhole at Battlefield Drive to Jennings Street.

Rehabilitation of approximately 170 LF of 10" sanitary sewer line and two manholes at 330 11th Avenue North.

## Justification

Lines and manholes have structural defects and are subject to infiltration and inflow.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Construction | 85,000 | | | | | | | | | | 85,000 |
| **Total** | 85,000 | | | | | | | | | | 85,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Wastewater Renewal | 85,000 | | | | | | | | | | 85,000 |
| **Total** | 85,000 | | | | | | | | | | 85,000 |

*This Page Intentionally Blank*

**Project #** WM16005

**Project Name** Adams Street Infrastructure Improvements

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 4 Star Project
**Status** Pending

**Total Cost** **$1,320,000**

## Description

Replacement of 2,875 LF of water line. Size to be determined during design.

Replacement of 2,875 LF of sanitary sewer line. Size to be determined during design.

Anticipate both projects are entirely renewal versus capacity.

## Justification

Lines are approximately 60 years old and have served their useful life. Area has been subject to pressure, disinfection residuals, and flow issues on water line. Sanitary sewer is subject to infiltration and inflow and occasional obstructions.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | 105,000 | | | | | | | | | 105,000 |
| Construction Engineering / Inspection | | 40,000 | | | | | | | | | 40,000 |
| Construction | | 1,175,000 | | | | | | | | | 1,175,000 |
| **Total** | | 1,320,000 | | | | | | | | | 1,320,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | | 510,000 | | | | | | | | | 510,000 |
| Wastewater Renewal | | 810,000 | | | | | | | | | 810,000 |
| **Total** | | 1,320,000 | | | | | | | | | 1,320,000 |

Buford St
E Fowlkes St
Columbia Ave
31
Ritzy St
Parkview Dr
106
431
Adams St
Cleburne St
Stewart St
Thompson Al
Collins Farm
Bonsai Way
Jennings St
Adams Ct
Battlefield Dr
Meadowlawn Dr
Gist St
Alley
Generals Retreat
Bel Aire Dr
Carolyn Ave
Mercury Dr
Highland Ave
Sunset Dr
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16005

**Project #** **WM16006**

**Project Name** **Advanced Metering Infrastructure (AMI)**

**Department** Water Management
**Contact** Water Management Director
**Type** Equipment
**Useful Life** 20+
**Category** Public Utilities
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$2,000,000**

## Description

Replace current AMR system with AMI equipment. Equipment will provide hourly consumption readings at meter points. These data will help improve customer service, complaint resolution, reduced fuel costs, among other benefits.

## Justification

Current system is approaching service life. Transition will replace failing equipment and will improve customer focus.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Equip/Vehicles/Furnishings | 400,000 | 550,000 | 550,000 | 500,000 | | | | | | | 2,000,000 |
| **Total** | 400,000 | 550,000 | 550,000 | 500,000 | | | | | | | 2,000,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | 400,000 | 550,000 | 550,000 | 500,000 | | | | | | | 2,000,000 |
| **Total** | 400,000 | 550,000 | 550,000 | 500,000 | | | | | | | 2,000,000 |

*This Page Intentionally Blank*

**Project #** **WM16007**

**Project Name** **Alicia Drive Water Line Replacement**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 2 Star Project
**Status** Pending

**Total Cost** **$100,000**

## Description

Replace existing 6" transite water line (size to be determined during design) for the length of Alicia Drive (615 LF).

## Justification

Transite line is approximately 60 years old. Line performs well in terms of water quality however introduces operational problems when maintenance is necessary.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | 10,000 | | | | | | 10,000 |
| Construction | | | | | 90,000 | | | | | | 90,000 |
| **Total** | | | | | 100,000 | | | | | | 100,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | | | | | 100,000 | | | | | | 100,000 |
| **Total** | | | | | 100,000 | | | | | | 100,000 |

422
416
412
410
404
419
417
415
413
411
409
407
416
414
412
410
408
406
404
402
Figuers Dr
Alicia Dr
1406
1408
403
405
1410
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16007

**Project #** **WM16008**

**Project Name** **Battle Avenue Infrastructure Replacement**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 3 Star Project
**Status** Pending

**Total Cost** **$1,950,000**

## Description

Replace 3,750 LF of transite and cast iron water line.

Replace 3,750 LF of clay sanitary sewer line.

## Justification

Water and sanitary sewer lines are approximatley 70 years old. There is a significant amount of I/I, particularly on the western side of the project area. The water is subject to potential quality issues and maintenance issues.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | 200,000 | | | | | | 200,000 |
| Construction Engineering / Inspection | | | | | | 60,000 | | | | | 60,000 |
| Construction | | | | | | 1,690,000 | | | | | 1,690,000 |
| **Total** | | | | | 200,000 | 1,750,000 | | | | | 1,950,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | | | | | 80,000 | 585,000 | | | | | 665,000 |
| Wastewater Renewal | | | | | 120,000 | 1,165,000 | | | | | 1,285,000 |
| **Total** | | | | | 200,000 | 1,750,000 | | | | | 1,950,000 |

N Petway St
W Main St
Brookwood Ave
West End Cir
Forrest St
Petway St
Williamson County Administrative Complex
Iris Pl
246
Spring St
Johnson Cir
Mulberry St
Carter St
Strahl St
Reddick St
Granbury St
Williamson County Libary
Park St
Natchez St
W Fowlkes St
11th Ave S
Short Ct
Acton St
Everbright Ave
Bostick St
Academy St
Alley
Green Acres Dr
Harpeth Dr
Perkins Dr
Figuers Dr
Franklin Elementary School
Fairground St
Access
31
Downs Blvd
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16008

**Project #** **WM16009**

**Project Name** **Berry Circle Sanitary Sewer Line Rehabilitation**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 4 Star Project
**Status** Pending

**Total Cost** **$25,000**

## Description

Rehabilitation of 480 feet of 6" clay sanitary sewer and three manholes.

## Justification

The clay line has root intrusion and I/I issues. New development at the end of the line has highlighted operational issues with the line.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Construction | | 25,000 | | | | | | | | | 25,000 |
| **Total** | | 25,000 | | | | | | | | | 25,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Wastewater Renewal | | 25,000 | | | | | | | | | 25,000 |
| **Total** | | 25,000 | | | | | | | | | 25,000 |

S Margin St
Evans St
Lewisburg Ave
Private
4th Ave S
Winstead Ct
Adams St
106
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16009

**Project #** WM16010

**Project Name** Bobby Drive Water Line Replacement

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 2 Star Project
**Status** Active

**Total Cost** $938,000

## Description

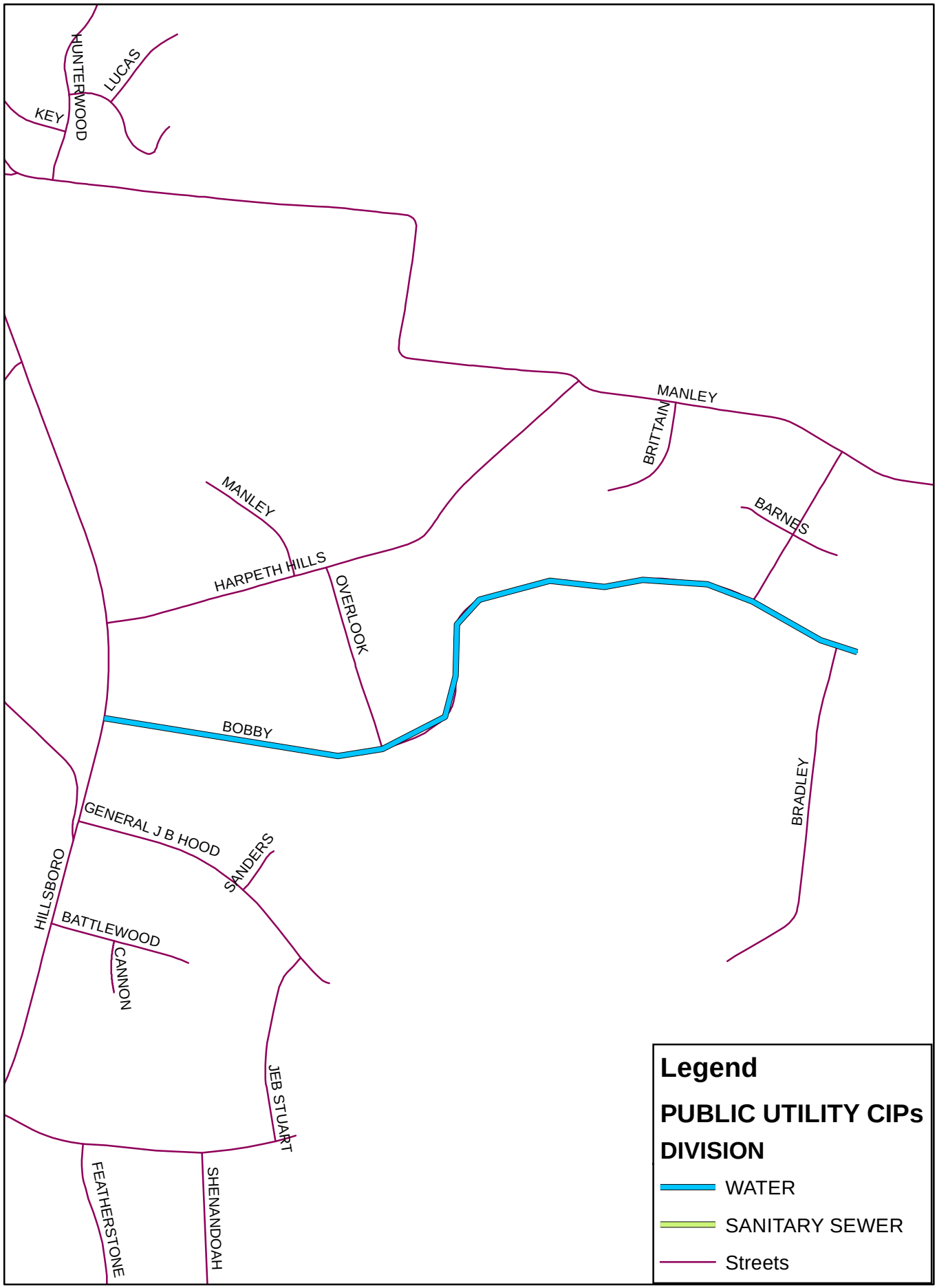
Replacement of approximately 5,700 LF of 4", 6" and 2" water line from Hillsboro Road to Bradley Drive.

## Justification

Improve water quality and fire flow in this area. Line is approximately 50 years old. There have been numerous breaks in this line.

| Prior | Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83,000 | Construction | 430,000 | 425,000 | | | | | | | | | 855,000 |
| Total | Total | 430,000 | 425,000 | | | | | | | | | 855,000 |

| Prior | Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83,000 | Water Renewal | 430,000 | 425,000 | | | | | | | | | 855,000 |
| Total | Total | 430,000 | 425,000 | | | | | | | | | 855,000 |


HUNTERWOOD
LUCAS
KEY
MANLEY
BRITTAIN
MANLEY
BARNES
HARPETH HILLS
OVERLOOK
BOBBY
BRADLEY
GENERAL J B HOOD
SANDERS
HILLSBORO
BATTLEWOOD
CANNON
JEB STUART
FEATHERSTONE
SHENANDOAH
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER
Streets

WM16010

**Project #** **WM16011**

**Project Name** **Buckworth Infrastructure Improvements**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 2 Star Project
**Status** Pending

**Total Cost** **$120,000**

## Description

Replace approximately 600 LF of 8" transite water line.

Rehab approximately 550 LF of 8" clay sanitary sewer line. Rehab one manhole and install one manhole at the end of the line in Buckworth Avenue.

## Justification

Both water and sanitary sewer lines are approximately 60 years old. There have been several operational issues that have required significant repairs.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | 10,000 | | | | | | 10,000 |
| Construction | | | | | | 110,000 | | | | | 110,000 |
| **Total** | | | | | 10,000 | 110,000 | | | | | 120,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | | | | | 10,000 | 90,000 | | | | | 100,000 |
| Wastewater Renewal | | | | | | 20,000 | | | | | 20,000 |
| **Total** | | | | | 10,000 | 110,000 | | | | | 120,000 |

Hwy 96 W
96
Glass Ln
Culberson Blvd
Boyd Mill Ave
Private
Roberts St
Access
N Petway St
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16011

**Project #** **WM16012**

**Project Name** **Church Street Infrastructure Improvements**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 4 Star Project
**Status** Pending

**Total Cost** **$525,000**

## Description

Replace 910 LF of cast iron, galvanized and copper 0.75", 1.5", 2" and 4" water line (size to be determined during design).

Replace 575 LF of 4" clay sanitary sewer line.

## Justification

Water line has reached the service life. Project will improve water quality and flow in the area.

Sanitary sewer line requires monthly cleaning to avoid obstructions. Line is undersized and has I/I issues.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | 50,000 | | | | | | | | | 50,000 |
| Construction | | | 475,000 | | | | | | | | 475,000 |
| **Total** | | 50,000 | 475,000 | | | | | | | | 525,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | | 25,000 | 275,000 | | | | | | | | 300,000 |
| Wastewater Renewal | | 25,000 | 200,000 | | | | | | | | 225,000 |
| **Total** | | 50,000 | 475,000 | | | | | | | | 525,000 |

Municipal Center
Main St
Alley
Williamson County Judicial Center
Church St
4th Ave S
5th Ave S
3rd Ave S
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16012

**Project #** **WM16013**

**Project Name** **Grassland Tank Demolition**

**Department** Water Management

**Contact** Water Management Director

**Type** Improvement

**Useful Life**

**Category** Public Utilities

**Priority** 1 Star Project

**Total Cost** **$270,000**

**Status** Pending

## Description

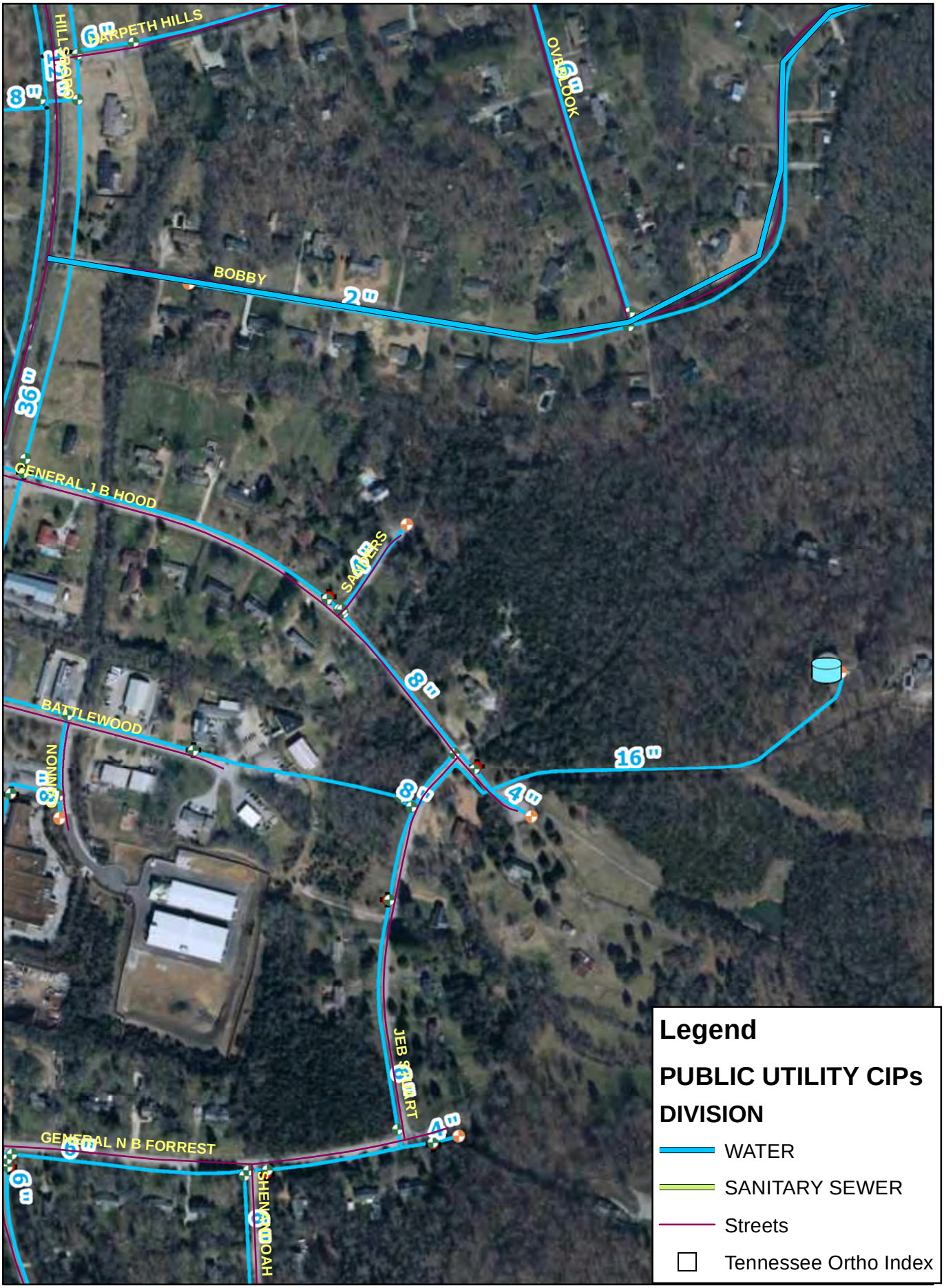
Take Grassland Tank offline in support if IWRP modeling.

## Justification

Finished water reservoir provides no effective storage capacity. Reservoir requires frequent maintenance activities to cycle water.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Construction Engineering / Inspection | | | | | | 20,000 | | | | | 20,000 |
| Construction | | | | | | 250,000 | | | | | 250,000 |
| **Total** | | | | | | 270,000 | | | | | 270,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | | | | | | 270,000 | | | | | 270,000 |
| **Total** | | | | | | 270,000 | | | | | 270,000 |


HILLSBORO
CARPETH HILLS
OVERLOOK
BOBBY
GENERAL J B HOOD
SANDERS
BATTLEWOOD
NONN
JEB STUART
GENERAL N B FORREST
SHENANDOAH
6"
8"
2"
36"
16"
4"
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER
Streets
Tennessee Ortho Index

WM16013

**Project #** **WM16014**

**Project Name** **Eastview Circle Infrastructure Improvements**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 2 Star Project
**Status** Pending

**Total Cost** **$565,500**

## Description

replace 850 LF of 8 inch clay sanitary sewer

replace 2020 LF of 6 inch transite and cast iron pipe

## Justification

To replace approximitly 70 year old infrastructure. Improve maintenance issues

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | 50,000 | | | | | | | 50,000 |
| Construction | | | | | 515,500 | | | | | | 515,500 |
| **Total** | | | | 50,000 | 515,500 | | | | | | 565,500 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | | | | 30,000 | 303,000 | | | | | | 333,000 |
| Wastewater Renewal | | | | 20,000 | 212,500 | | | | | | 232,500 |
| **Total** | | | | 50,000 | 515,500 | | | | | | 565,500 |

*This Page Intentionally Blank*

**Project #** **WM16015**

**Project Name** **Evans Street Sewer Improvements**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 2 Star Project
**Status** Pending

**Total Cost** **$452,500**

## Description

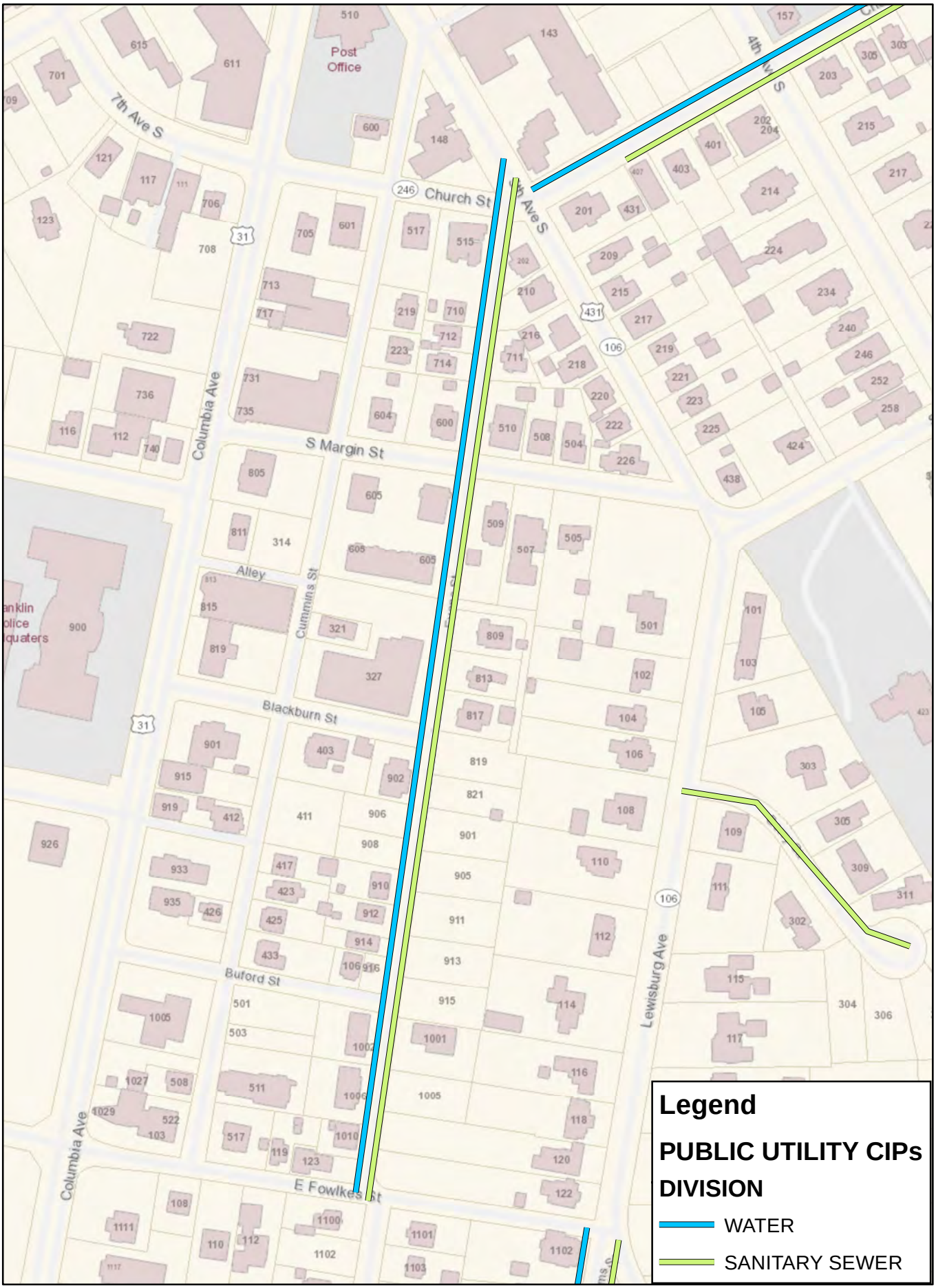
Replace1,682 LF of 8 inch Clay Sanitary Sewer. Replace 4 Manholes

## Justification

replace 70 year old sanitary sewer. This line has significant I/I .

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | 32,000 | | | | | | | | | | 32,000 |
| Construction | | 420,500 | | | | | | | | | 420,500 |
| **Total** | 32,000 | 420,500 | | | | | | | | | 452,500 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Wastewater Renewal | 32,000 | 420,500 | | | | | | | | | 452,500 |
| **Total** | 32,000 | 420,500 | | | | | | | | | 452,500 |


Post Office
7th Ave S
4th Ave S
246 Church St
S Margin St
Columbia Ave
Cummins St
Alley
Blackburn St
Buford St
E Fowlkes St
Lewisburg Ave
31
431
106
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16015

**Project #** **WM16016**

**Project Name** **Forrest Crossing Force Main (No.1) Replacement**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 2 Star Project
**Status** Pending

**Total Cost** **$110,000**

## Description

Replace 1,755 LF of 6 inch sewer forcemain.

## Justification

Sewer Forcemain has passed its life cycle and has caused maintenance issues .

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | 10,000 | | | | | | | | | | 10,000 |
| Construction | 100,000 | | | | | | | | | | 100,000 |
| **Total** | 110,000 | | | | | | | | | | 110,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Wastewater Renewal | 110,000 | | | | | | | | | | 110,000 |
| **Total** | 110,000 | | | | | | | | | | 110,000 |

Jennette Pl
Julia Ct
Sugartree Ln
Emery Ln
Thornton Dr
Oak Meadow Dr
Rand Pl
S Royal Oaks Blvd
Amy Ct
Maplewood Dr
Branch Ct
Brockton Pl
Houchin Dr
Hatfield Dr
Access
S Royal Oaks Blvd
Chatsworth Ct
Bedford Way
Ballington Dr
Attebury Dr
Hartington Ct
Roderick Cir
Roderick Pl E
Roderick Pl W
High Hopes Ct
Wadestone Trl
Creekstone Blvd
Wellington Green
Forrest Crossing Blvd
Stonegate Dr
Edinboro Way
Chelsey Cv
Ridgestone Dr
Valleyview Dr
Emergency Access
Fieldcrest Cir
Hampton Height Ln
Tynebrae Dr
Culpepper Cir
Culpepper Ln
Charing Cross Ct
Emergency Access
Pembroake Ln
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16016

**Project #** **WM16017**

**Project Name** **Forrest Street Infrastructure Improvements**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 3 Star Project
**Status** Pending

**Total Cost** **$362,500**

## Description

Replace 900 LF of 2 inch Galvinized Water Line.

Replace 790 LF of 6 inch Clay Sanitary Sewer Line rehab 2 manhole and install 1 manhole

## Justification

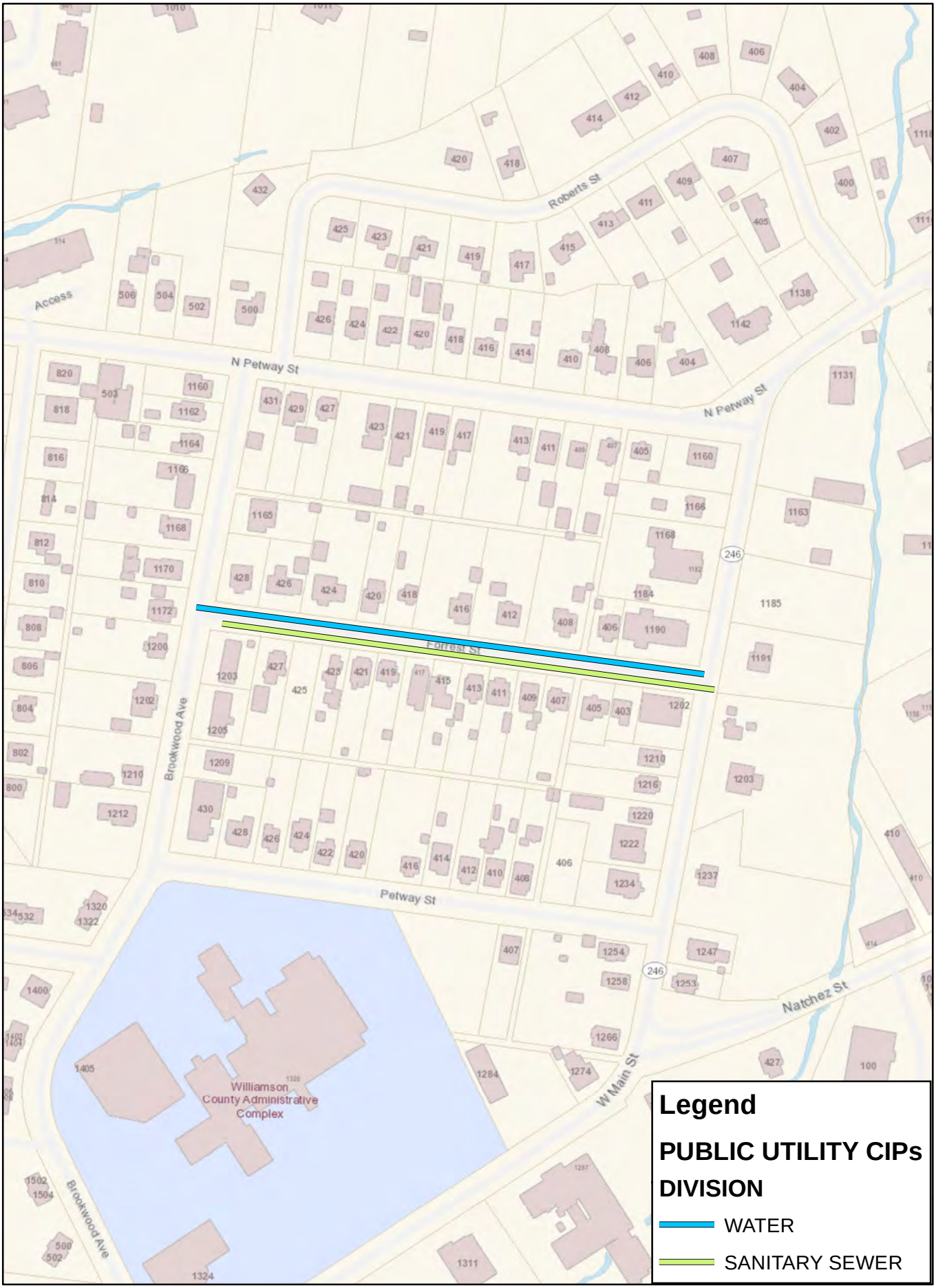
To replace 70 year old infrastructure

water line needs replaced to improve water quality issues and flow .

Sewer line is undersized and requires routine maintenance.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | 30,000 | | | | | | | 30,000 |
| Construction | | | | | 332,500 | | | | | | 332,500 |
| **Total** | | | | 30,000 | 332,500 | | | | | | 362,500 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Reclaimed Water Renewal | | | | 15,000 | | | | | | | 15,000 |
| Water Renewal | | | | 15,000 | 130,000 | | | | | | 145,000 |
| Wastewater Renewal | | | | | 202,500 | | | | | | 202,500 |
| **Total** | | | | 30,000 | 332,500 | | | | | | 362,500 |


Roberts St
N Petway St
Forrest St
Petway St
Brookwood Ave
W Main St
Natchez St
Access
246
Williamson County Administrative Complex
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16017

**Project #** **WM16018**

**Project Name** **Water Line from Fourth Ave S to Berry Circle**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$93,000**

## Description

Install 550 LF of 6" DIP to loop the water line from Fourth Avenue South to Berry Circle.

## Justification

Project is intended to improve fire protection and water quality at the apartment complex on Fourth Avenue South and at the O'More College.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | 8,000 | | | | | | | | | 8,000 |
| Construction | | 85,000 | | | | | | | | | 85,000 |
| **Total** | | 93,000 | | | | | | | | | 93,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | | 93,000 | | | | | | | | | 93,000 |
| **Total** | | 93,000 | | | | | | | | | 93,000 |

Private
4th Ave S
Winstead Ct
Berry Ct
340
345
344
351
357
352
352
352
352
305
309
311
358
358
358
313
304
306
315
308
317
6"
2"
2"
2"
Esri., Inc., City
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16018

**Project #** **WM16019**

**Project Name** **Frazier Drive Sanitary Sewer Rehabilitation**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 2 Star Project
**Status** Pending

**Total Cost** **$50,000**

## Description

Rehabilitation of a section of 8" DIP sanitary sewer.

## Justification

Existing sanitary sewer line has a low point that requires ongoing maintenance to prevent obstructions. The line has caused a sanitary sewer overflow prior to initiation of ongoing maintenance.

Project will require lining due to corrosion once the low point is addressed.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Construction | 50,000 | | | | | | | | | | 50,000 |
| **Total** | 50,000 | | | | | | | | | | 50,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Wastewater Renewal | 50,000 | | | | | | | | | | 50,000 |
| **Total** | 50,000 | | | | | | | | | | 50,000 |

539
539
539
439
443
443
443
449
Cool Springs Blvd
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16019

**Project #** **WM16020**

**Project Name** **Gist Street Infrastructure Improvements**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 3 Star Project
**Status** Pending

**Total Cost** **$400,000**

## Description

Replace 750 LF of 6" clay sanitary sewer line

Replace 890 LF of 6" CIP water line.

## Justification

Sanitary sewer line is subject to I/I. Sewer line is 6" in diameter and needs to be sized at an 8" line.

Water line is subject to failure and needs to be routed in a location better suited for operation and maintenance.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | 40,000 | | | | | | | 40,000 |
| Construction | | | | 360,000 | | | | | | | 360,000 |
| **Total** | | | | 400,000 | | | | | | | 400,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | | | | 150,000 | | | | | | | 150,000 |
| Wastewater Renewal | | | | 250,000 | | | | | | | 250,000 |
| **Total** | | | | 400,000 | | | | | | | 400,000 |

Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER
Battlefield Dr
Generals Retreat
Carolyn Ave
Columbia Ave
Adams Ct
Adams St
31

WM16020

**Project #** **WM16021**

**Project Name** **Glass Lane Water Line Replacement**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 2 Star Project
**Status** Pending

**Total Cost** **$255,000**

## Description

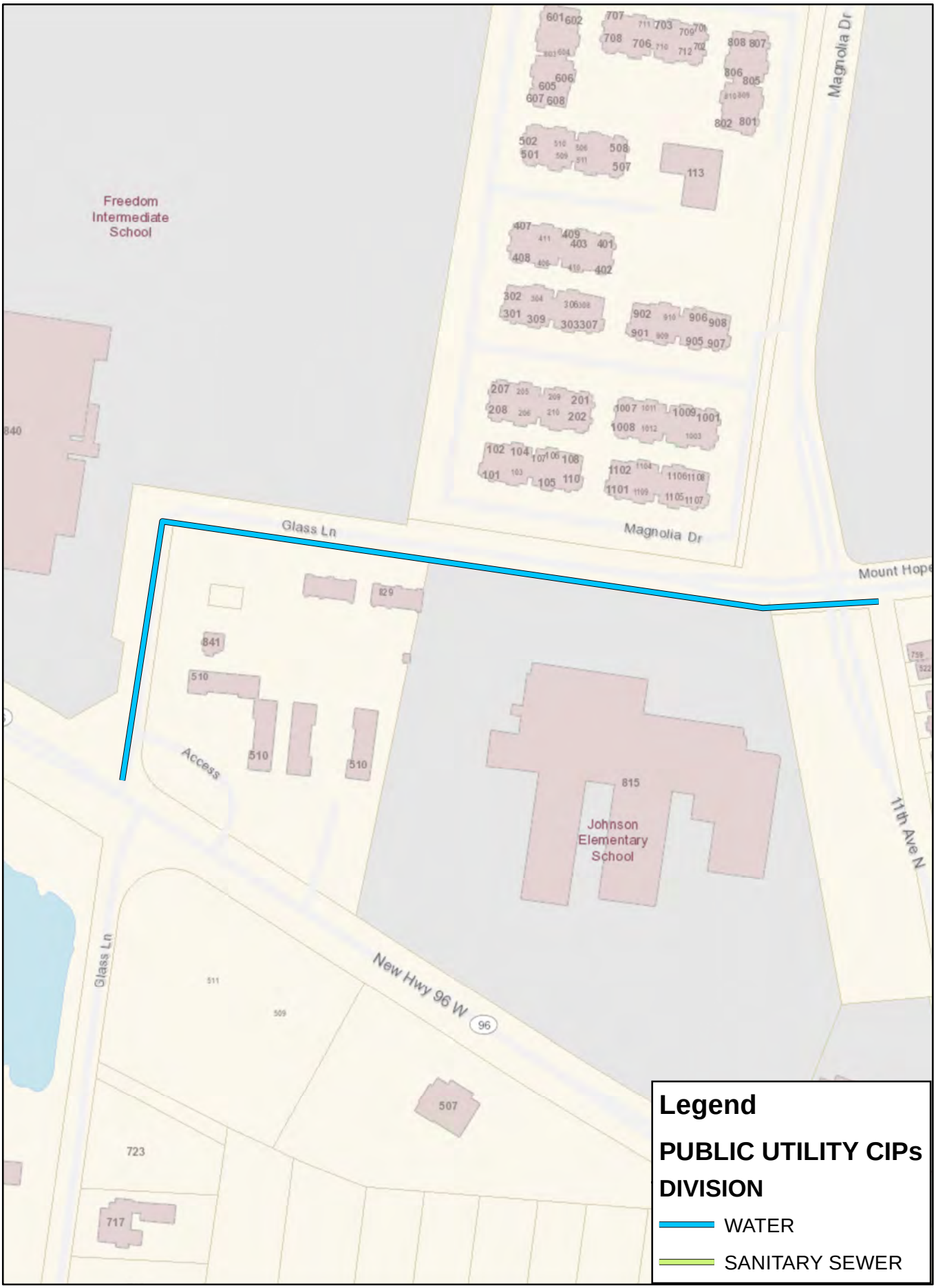
Replace 1,550 LF of CIP 6" water line from Highway 96W to 11th Avenue N/Mt Hope Street.

## Justification

Water line has reached useful life. Line is of various sizes. Replacment will improve domestic and fire flows in the area of Johnson Elementary School and two apartment complexes.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | 20,000 | | | | | | 20,000 |
| Construction | | | | | 235,000 | | | | | | 235,000 |
| **Total** | | | | | 255,000 | | | | | | 255,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | | | | | 255,000 | | | | | | 255,000 |
| **Total** | | | | | 255,000 | | | | | | 255,000 |


Freedom Intermediate School
Magnolia Dr
Glass Ln
Mount Hope
Access
Johnson Elementary School
11th Ave N
New Hwy 96 W
96
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16021

**Project #** **WM16022**

**Project Name** **Westview Apt Water Line Replacement (510 96W)**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 2 Star Project
**Status** Pending

**Total Cost** **$110,000**

## Description

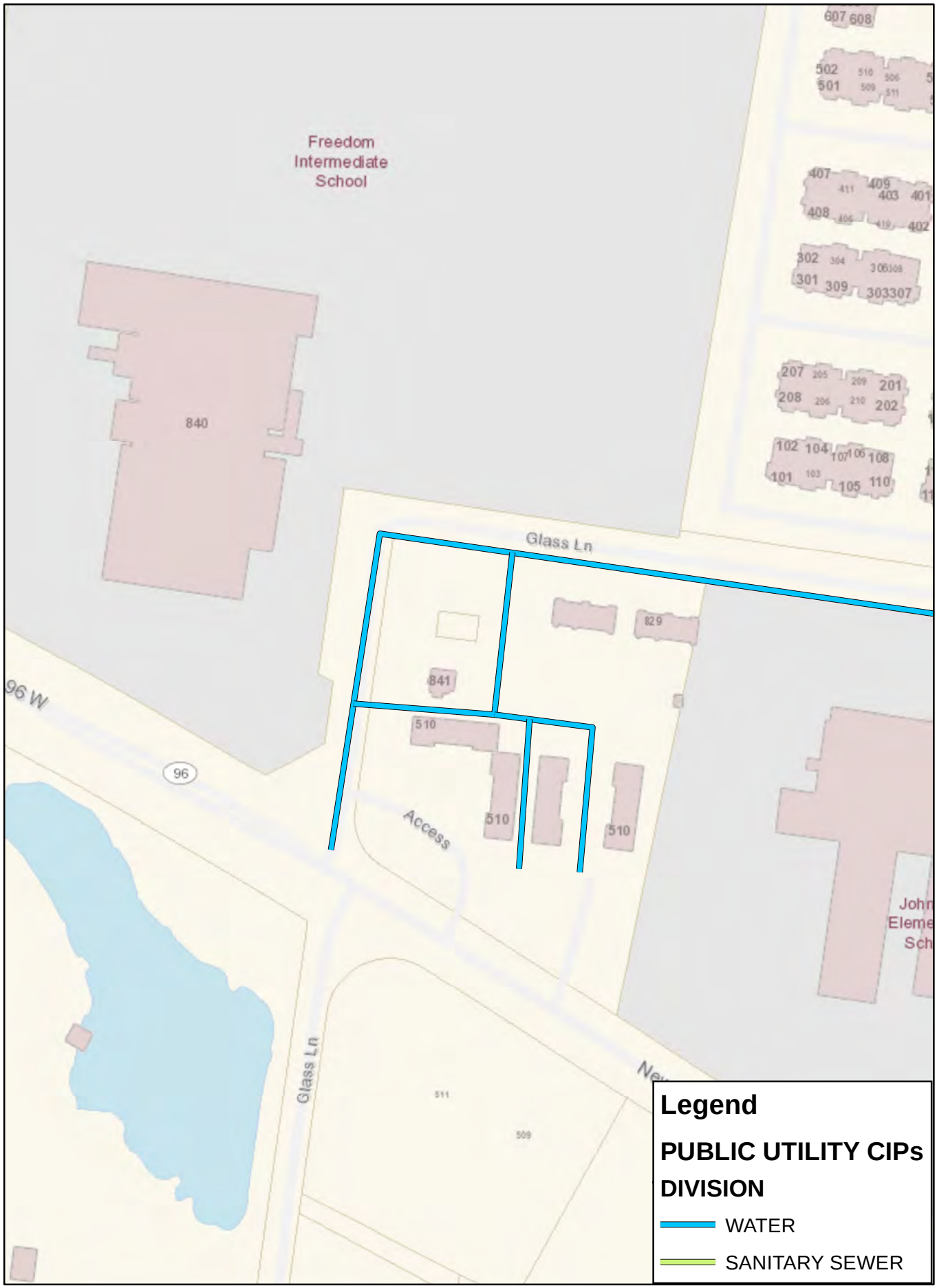
Replace 2" and 1" water line through the Westview Apartment Complex.

## Justification

Line requires upsizing to improve service to customers. Will improve onsite fire protection.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | | | | 10,000 | | 10,000 |
| Construction | | | | | | | | | 100,000 | | 100,000 |
| **Total** | | | | | | | | | 110,000 | | 110,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | | | | | | | | | 110,000 | | 110,000 |
| **Total** | | | | | | | | | 110,000 | | 110,000 |


Freedom
Intermediate
School
840
Glass Ln
829
841
510
510
510
Access
96
96 W
Glass Ln
511
509
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16022

**Project #** WM16023

**Project Name** Holiday Court Lift Station Rehabilitation

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 2 Star Project
**Status** Pending

**Total Cost** **$460,000**

## Description

Rehabilitation of a 43 year old sanitary sewer lift station. Replace "can" station with a suction lift, single stage station.

## Justification

Existing configuration requires operators to frequently enter a confined space. Proposed configuration provides for reduced risk relative to operator safety. Station has exceeded useful life.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | 60,000 | | | | | | | | | 60,000 |
| Construction | | 200,000 | 200,000 | | | | | | | | 400,000 |
| **Total** | | 260,000 | 200,000 | | | | | | | | 460,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Wastewater Renewal | | 260,000 | 200,000 | | | | | | | | 460,000 |
| **Total** | | 260,000 | 200,000 | | | | | | | | 460,000 |

Access
N Royal Oaks Blvd
Interstate 65 Hwy
Murfreesboro Rd
Riverside Dr
6 ''
PS
150
1104
1108
1110
1112
1118
140
132
101
116
105
109
111
121
114
112
1203
1299
1307
1301
1311
1313
1315
1319
96
1304
1306
1308
1312
1316
204
1020
347
65
Esri., Inc., City of Franklin, TN

WM16023

**Project #** WM16024

**Project Name** James and Avondale Infrastructure Improvements

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 2 Star Project
**Status** Active

**Total Cost** $1,018,850

## Description

CIPP lining of 3,895 LF of 8" clay sanitary sewer.

Replace 2,100 LF of CIP 6" water line.

## Justification

Sanitary sewer is subject to I/I, root intrusion and obstructions. Line is beyond its useful life.

Water line is CIP and approximately 60 years old. Improvements will provide better fire flow and improve chlorine residuals.

| Prior | Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 82,850 | Construction | 936,000 | | | | | | | | | | 936,000 |
| Total | Total | 936,000 | | | | | | | | | | 936,000 |

| Prior | Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 82,850 | Water Renewal | 500,000 | | | | | | | | | | 500,000 |
| Total | Wastewater Renewal | 436,000 | | | | | | | | | | 436,000 |
| | Total | 936,000 | | | | | | | | | | 936,000 |

Generals Retreat
Carolyn Ave
Bel Aire Dr
Mercury Dr
Highland Ave
Sunset Dr
James Ave
Avondale Dr
Carr Ave
Confederate Dr
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16024

**Project #** **WM16025**

**Project Name** **Lee Drive Water Line Replacement**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$215,000**

## Description

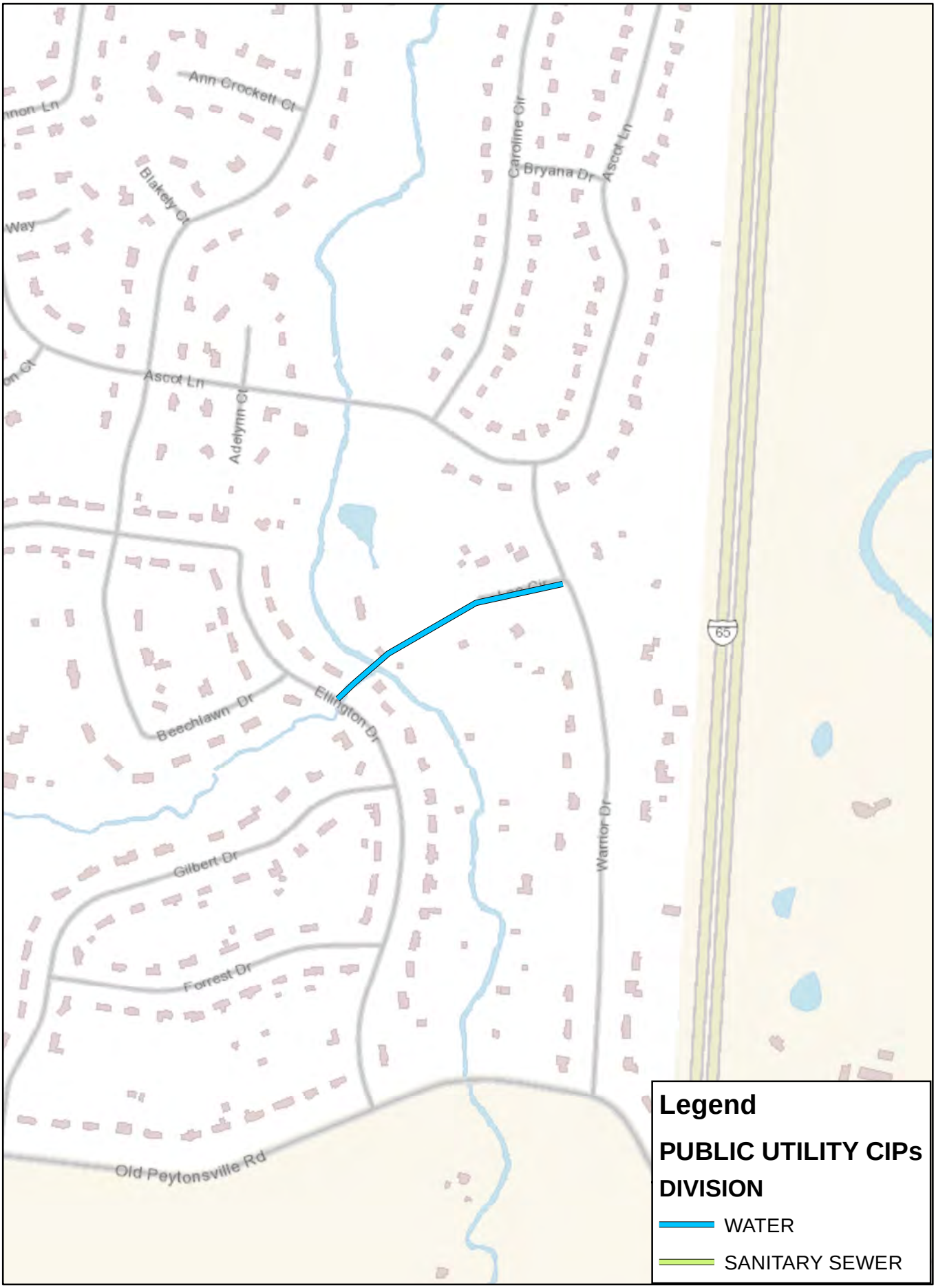
Replace 1,325 LF of CIP water line from Warrior Drive to Ellington Drive, along Lee Drive.

## Justification

Water line is approximately 50 years old. A tributary is eroding parallel to the line and has the potential to cause structural failure of the line in the future.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | 15,000 | | | | | | | 15,000 |
| Construction | | | | | 200,000 | | | | | | 200,000 |
| **Total** | | | | 15,000 | 200,000 | | | | | | 215,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | | | | 15,000 | 200,000 | | | | | | 215,000 |
| **Total** | | | | 15,000 | 200,000 | | | | | | 215,000 |


Ann Crockett Ct
Blakely Ct
Caroline Cir
Bryana Dr
Ascot Ln
Adelynn Ct
Beechlawn Dr
Ellington Dr
Warrior Dr
Gilbert Dr
Forrest Dr
Old Peytonsville Rd
65
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16025

**Project #** **WM16026**

**Project Name** **Lewisburg Pike Water Line Replacement**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 2 Star Project
**Status** Pending

**Total Cost** **$120,000**

## Description

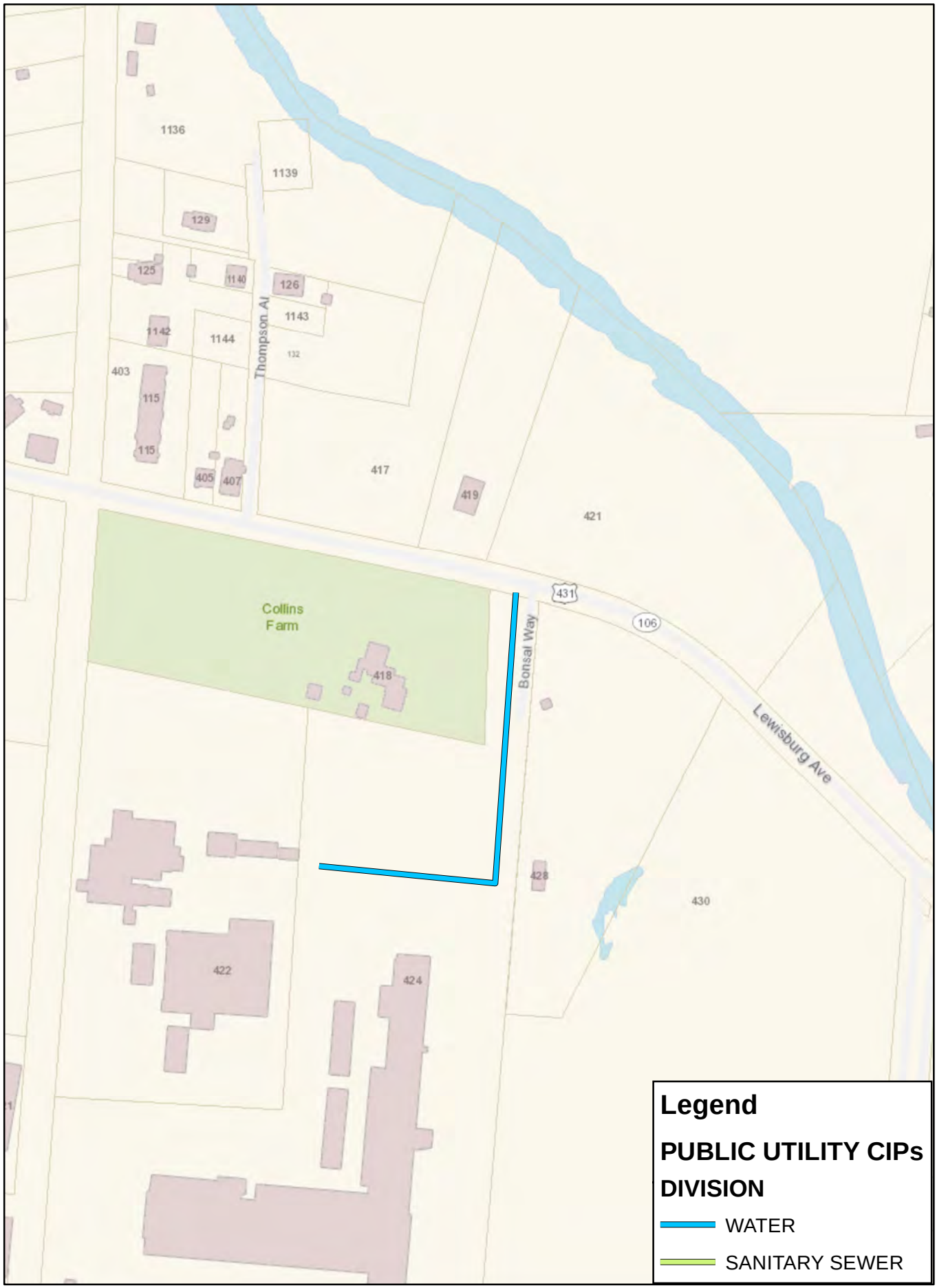
Remove 4" line; move services from 4" to 12"; replace 6 inch transite on Bonsal Way;

## Justification

Line has reached it useful life . Improve fire flow at lumber yard .

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | 10,000 | | | | | | 10,000 |
| Construction | | | | | 110,000 | | | | | | 110,000 |
| **Total** | | | | | 120,000 | | | | | | 120,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | | | | | 120,000 | | | | | | 120,000 |
| **Total** | | | | | 120,000 | | | | | | 120,000 |


1136
1139
129
125
1140
126
1143
1142
1144
132
403
115
115
405
407
417
419
421
Thompson Al
431
106
Collins
Farm
418
Bonsal Way
Lewisburg Ave
428
430
422
424
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16026

**Project #** **WM16027**

**Project Name** **Liberty Pike Water Line Replacement**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$355,000**

## Description

From Eddy Lane to Sycamore; upgrade with 2200 feet of 10" DIP

## Justification

Line is 50 Plus Years old and requires a signficant amount of maintenance .

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | | 25,000 | | | | 25,000 |
| Construction | | | | | | | 330,000 | | | | 330,000 |
| **Total** | | | | | | | 355,000 | | | | 355,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | | | | | | | 355,000 | | | | 355,000 |
| **Total** | | | | | | | 355,000 | | | | 355,000 |

Cherry Dr
Knob Ct
Cedar Dr
Oak Dr
Sycamore Dr
Chestnut Ln
Reveille Ct
Cadet Ct
Cadet Ln
Walnut Dr
Brick Path Ln
Maple Dr
Hickory Dr
Eddy Ct
Access
Reynolds Dr
Eddy Ln
Liberty Elementary School
Ralston Ln
Granger View Ct
Granger View Cir
Ormesby Pl
Montwood Ct
Ridgemont Pl
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16027

**Project #** **WM16028**

**Project Name** **Manley Lane Dead End Removal**

**Department** Water Management
**Contact** Water Management Director
**Type** New
**Useful Life** 20+
**Category** Public Utilities
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$495,000**

## Description

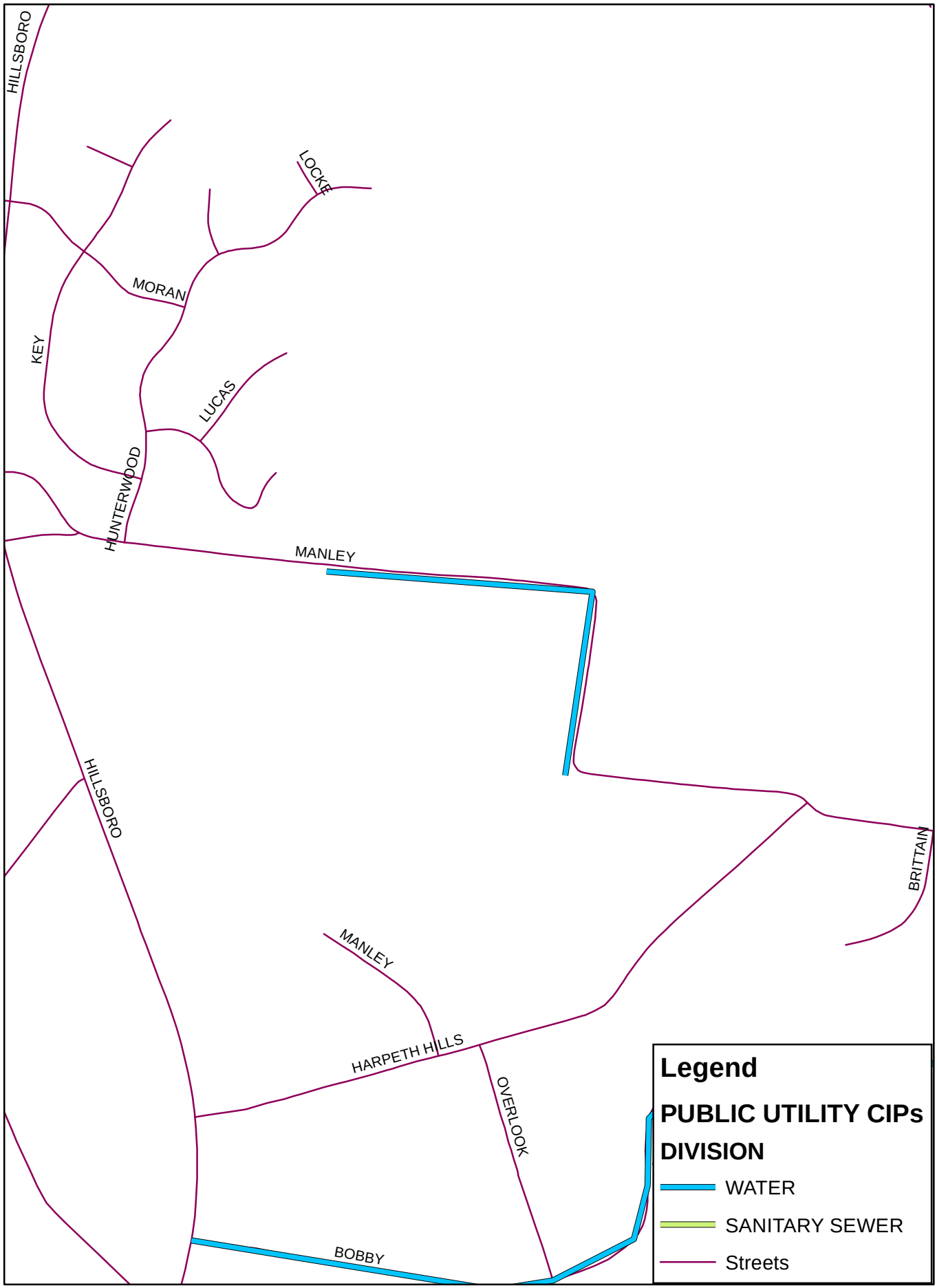
Install 2300 Feet of 8 inch DIP .

## Justification

To eliminate two dead end water lines and improve water flow and redundancy to the area .

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | 50,000 | | | | | 50,000 |
| ROW and Easements | | | | | | | 100,000 | | | | 100,000 |
| Construction | | | | | | | 345,000 | | | | 345,000 |
| **Total** | | | | | | 50,000 | 445,000 | | | | 495,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | | | | | | 50,000 | 445,000 | | | | 495,000 |
| **Total** | | | | | | 50,000 | 445,000 | | | | 495,000 |


HILLSBORO
LOCKE
MORAN
KEY
LUCAS
HUNTERWOOD
MANLEY
HILLSBORO
BRITTAIN
MANLEY
HARPETH HILLS
OVERLOOK
BOBBY
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER
Streets

WM16028

**Project #** **WM16029**

**Project Name** **Morning Side Drive Water Line Replacement**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$110,000**

## Description

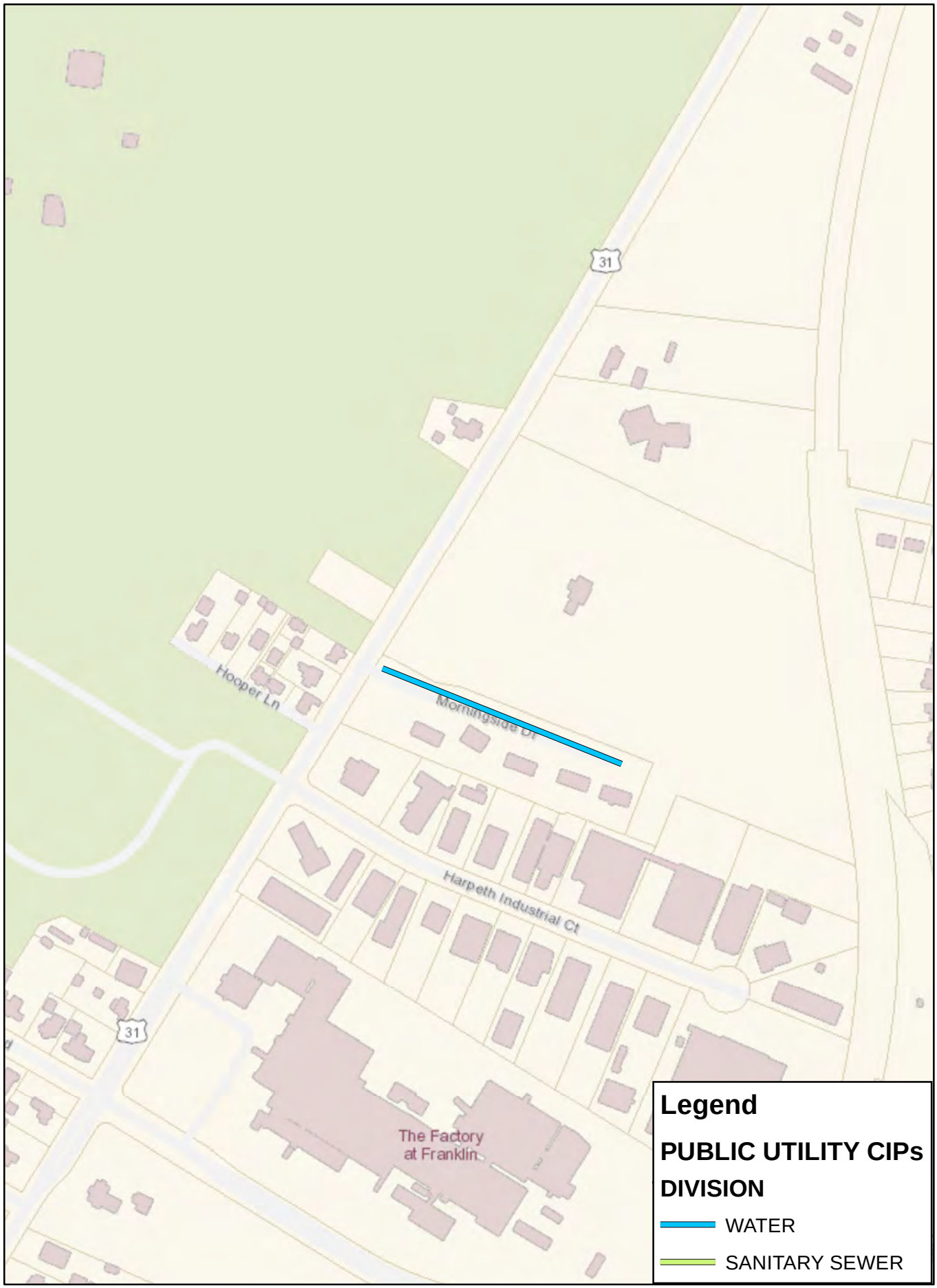
Replace 680 Feet of 6 inch CIP on Morningside Drive

## Justification

Water line is Approximately 60 years old and has reached the end of service life

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | | | 10,000 | | | 10,000 |
| Construction | | | | | | | | 100,000 | | | 100,000 |
| **Total** | | | | | | | | 110,000 | | | 110,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | | | | | | | | 110,000 | | | 110,000 |
| **Total** | | | | | | | | 110,000 | | | 110,000 |


31
Hooper Ln
Harpeth Industrial Ct
31
The Factory at Franklin
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16029

**Project #** **WM16030**

**Project Name** **Murfreesboro Road Water line Replacement**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 2 Star Project
**Status** Pending

**Total Cost** **$990,000**

## Description

Replace approximately 5,000 LF of 8" CIP with 12" DIP.

## Justification

Existing line is subject to frequent line breaks.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | 90,000 | | | | | | | 90,000 |
| Construction | | | | | 900,000 | | | | | | 900,000 |
| **Total** | | | | 90,000 | 900,000 | | | | | | 990,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Capacity | | | | 22,500 | 225,000 | | | | | | 247,500 |
| Water Renewal | | | | 67,500 | 675,000 | | | | | | 742,500 |
| **Total** | | | | 90,000 | 900,000 | | | | | | 990,000 |

Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER
Battle Ground Academy Lower Campus
Fort Granger
Pinkerton Park
Liberty Elementary School
City Hall
Collins Farm
Old Liberty Pke
Eddy Ct
Hickory Dr
Daniels Dr
Reynolds Dr
Fort Granger Dr
Eddy Ln
Ridgemont Pl
Hickory Ridge Dr
Glencoe Ct
Lucinda Ct
Rebecca Ct
Pebble Glen Dr
Elmwood Ct
Ralston Ln
Scotsman Ln
Ormesby Pl
Access
1st Ave N
E Main St
1st Ave S
2nd Ave S
3rd Ave S
Church St
Margin St
4th Ave S
Private
Winstead
Ewingville Dr
Bluegrass Dr
Sturbridge Dr
Gloucester St
Yorktown Dr
Watercress Dr
Eaton Ct
Ashland Ct
Thompson Al
Carnton Ln
Lewisburg Ave
31
96
106
431

WM16030

**Project #** **WM16031**

**Project Name** **North Petway Sewer Rehabilitation**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 3 Star Project
**Status** Pending

**Total Cost** **$100,000**

## Description

CIPP Lining of 1,850 LF of 8" clay pipe ; Replace or rehabilitate 8 manholes;

## Justification

Existing line is subject to I/I and backups due to sags in the line.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Construction | 100,000 | | | | | | | | | | 100,000 |
| **Total** | 100,000 | | | | | | | | | | 100,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Wastewater Renewal | 100,000 | | | | | | | | | | 100,000 |
| **Total** | 100,000 | | | | | | | | | | 100,000 |

*This Page Intentionally Blank*

**Project #** WM16032

**Project Name** Old Hillsboro Road Water Line

**Department** Water Management
**Contact** Water Management Director
**Type** New
**Useful Life** 20+
**Category** Public Utilities
**Priority** 1 Star Project
**Status** Pending

**Total Cost** $375,000

## Description

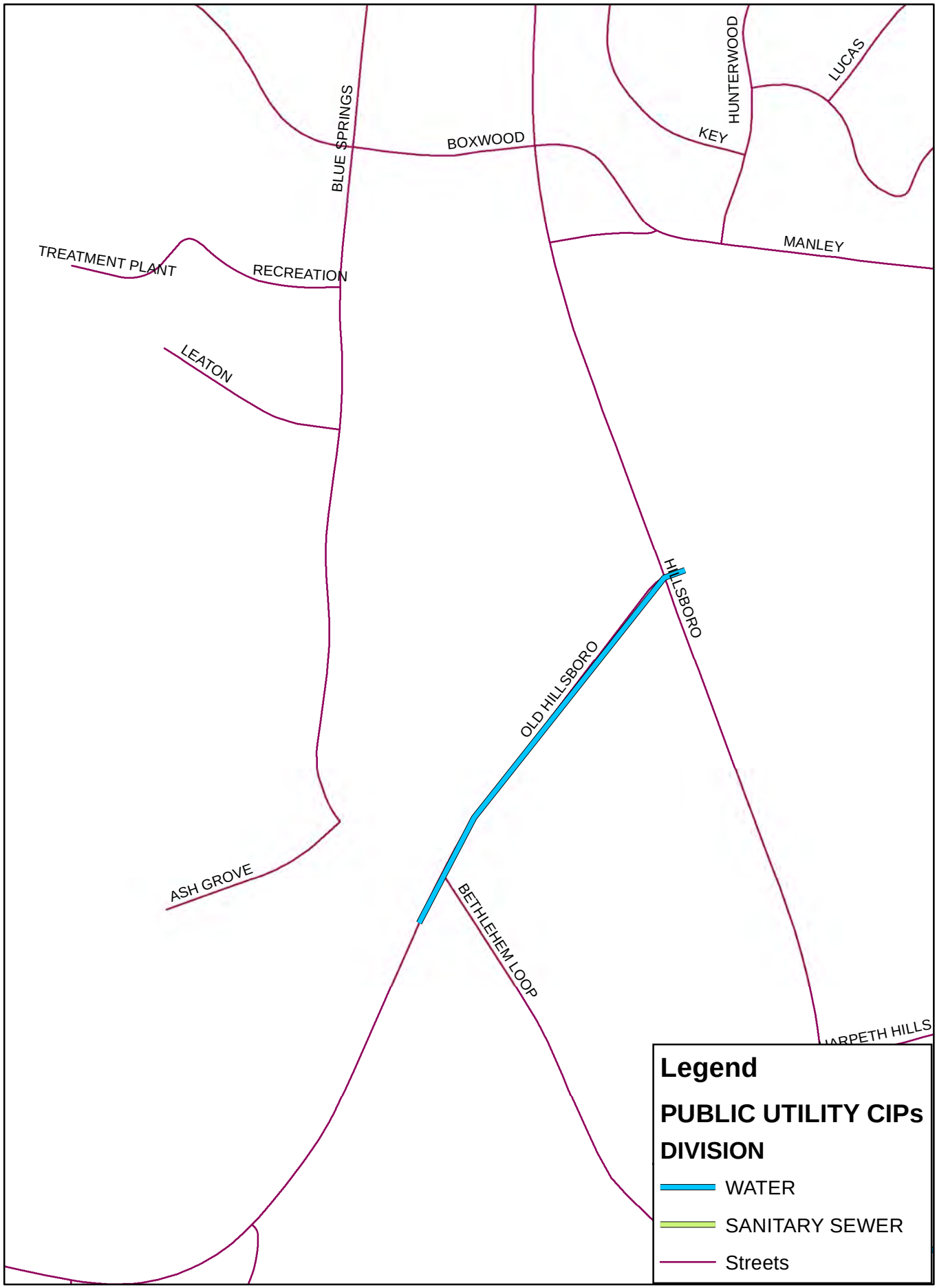
New installation of 1180 Feet of 8 inch Water Line from Hillsboro Road to 8" line on Old Hillsboro Road and Bethlem Loop .

## Justification

To improve Flow to the area and create a second feed . Eliminate the need of existing Booster Station

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | 30,000 | | | | | | | 30,000 |
| ROW and Easements | | | | 50,000 | | | | | | | 50,000 |
| Construction | | | | | 295,000 | | | | | | 295,000 |
| **Total** | | | | 80,000 | 295,000 | | | | | | 375,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | | | | 80,000 | 295,000 | | | | | | 375,000 |
| **Total** | | | | 80,000 | 295,000 | | | | | | 375,000 |


BLUE SPRINGS
BOXWOOD
KEY
HUNTERWOOD
LUCAS
MANLEY
TREATMENT PLANT
RECREATION
LEATON
ASH GROVE
OLD HILLSBORO
HILLSBORO
BETHLEHEM LOOP
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER
Streets

WM16032

**Project #** **WM16033**

**Project Name** **New Hope Academy Sewer Line Replacement**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 3 Star Project
**Status** Pending

**Total Cost** **$50,000**

## Description

Replace 950 feet of 10 inch Clay with 10 inch PVC

## Justification

Sewer line has a lot of I/I and maintenance issues

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Construction | | 50,000 | | | | | | | | | 50,000 |
| **Total** | | 50,000 | | | | | | | | | 50,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Wastewater Renewal | | 50,000 | | | | | | | | | 50,000 |
| **Total** | | 50,000 | | | | | | | | | 50,000 |

Robert A. Ring Indoor Soccer Arena
Willamson County Soccer Complex
DOWNS
Downs Blvd
1878
Willamson County Soccer Complex
1879
1877
1820
New Hope Academy
REDWING
Redwing Ct
QUAIL
WILLOWSPRINGS
Willowsprings Blvd
CHARMING
BARCLAY
Barclay Ln
ALLEY
Alley
MESSENGER
Messenger Ln
ALLEY
PASSAGE
Passage Ln
TYWATER CROSSING
Tywater Crossing Blvd
TYWATER CROSSING
CULLMAN
Cullman Ct
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER
Streets

WM16033

**Project #** **WM16034**

**Project Name** **Sanitary Sewer Rehab Btwn Strahl & W. Fowlkes**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 4 Star Project
**Status** Pending

**Total Cost** **$30,000**

## Description

CIPP lining of 655 LF of 8" clay sanitary sewer line.

## Justification

Line is approximatley 70 years old and has reached its useful life expectancy. Line has been repaired several times in recent years and is subject to I/I.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Construction | | | | | | 30,000 | | | | | 30,000 |
| **Total** | | | | | | 30,000 | | | | | 30,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Wastewater Renewal | | | | | | 30,000 | | | | | 30,000 |
| **Total** | | | | | | 30,000 | | | | | 30,000 |

Franklin Police Headquarters
Plaza St
Short Ct
Acton St
11th Ave S
Natchez St
W Fowlkes St
Columbia Ave
Park St
Strahl Street Park
Strahl St
Carter St
Mulberry St
Reddick St
Granbury St
Williamson County
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16034

**Project #** **WM16035**

**Project Name** **Water Distribution and Wastewater Collection SCADA**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 4 Star Project
**Status** Active

**Total Cost** **$3,250,000**

## Description

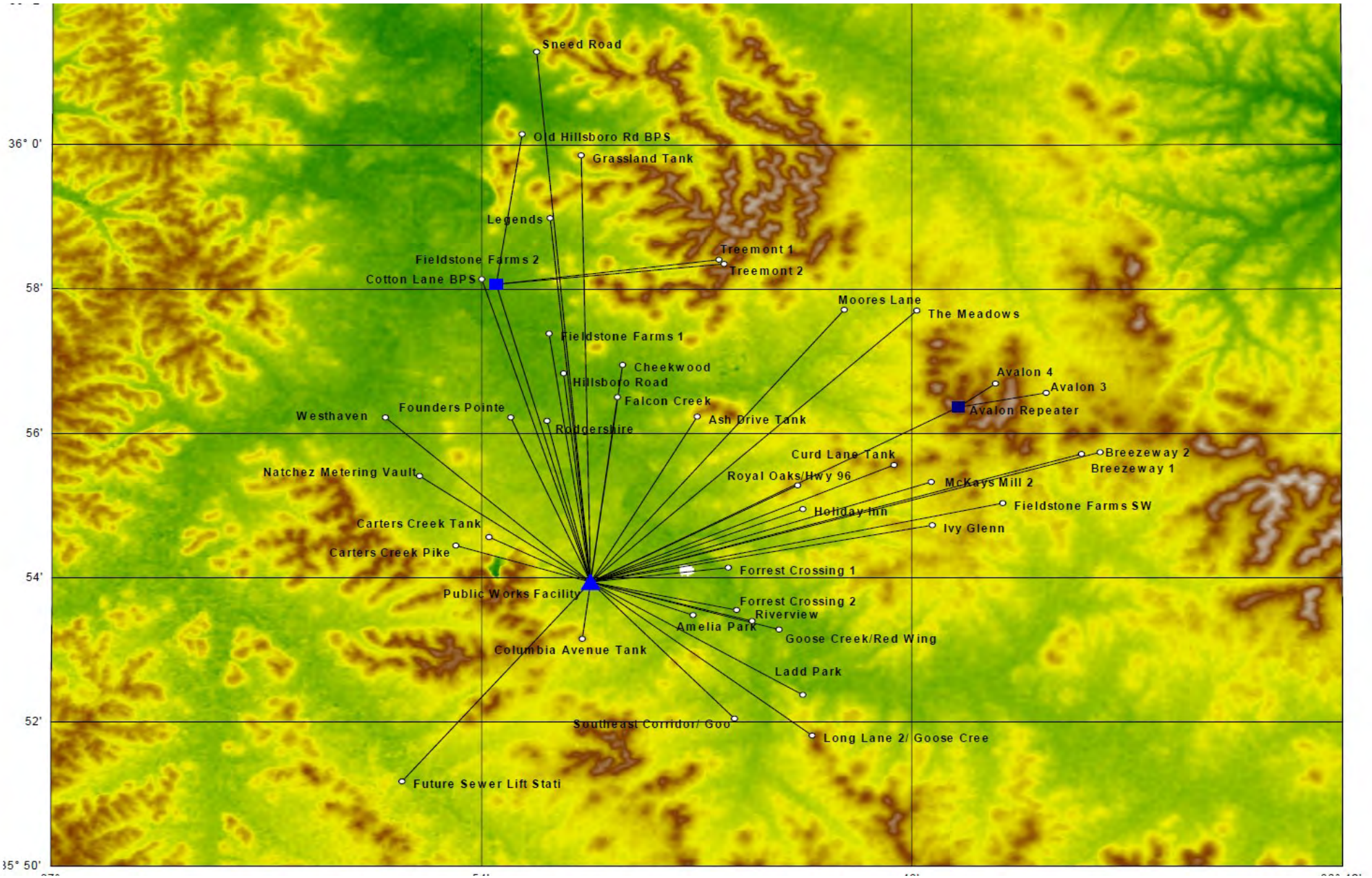
Upgrade Supervisory Control and Data Acquisition (SCADA) at 42 locations in the distribution and collection systems to provide monitoring and operability for staff.

## Justification

Existing SCADA system is approximately 20 years old. Existing antenna and SCADA equipment is housed in the "Hill" property. SCADA system is subject to significant numbers of data transmission failures and does not provide adequate controls of the system for enhanced operations.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Construction | 3,250,000 | | | | | | | | | | 3,250,000 |
| **Total** | 3,250,000 | | | | | | | | | | 3,250,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stormwater | 75,000 | | | | | | | | | | 75,000 |
| Water Renewal | 950,000 | | | | | | | | | | 950,000 |
| Wastewater Renewal | 2,225,000 | | | | | | | | | | 2,225,000 |
| **Total** | 3,250,000 | | | | | | | | | | 3,250,000 |


Sneed Road
Old Hillsboro Rd BPS
Grassland Tank
Legends
Treemont 1
Fieldstone Farms 2
Treemont 2
Cotton Lane BPS
Moores Lane
The Meadows
Fieldstone Farms 1
Cheekwood
Hillsboro Road
Avalon 4
Avalon 3
Falcon Creek
Avalon Repeater
Westhaven
Founders Pointe
Ash Drive Tank
Rodgershire
Curd Lane Tank
Breezeway 2
Breezeway 1
Natchez Metering Vault
Royal Oaks/Hwy 96
McKays Mill 2
Holiday Inn
Fieldstone Farms SW
Carters Creek Tank
Ivy Glenn
Carters Creek Pike
Forrest Crossing 1
Public Works Facility
Forrest Crossing 2
Riverview
Amelia Park
Goose Creek/Red Wing
Columbia Avenue Tank
Ladd Park
Southeast Corridor/ Goo
Long Lane 2/ Goose Cree
Future Sewer Lift Stati
36° 0'
58'
56'
54'
52'
35° 50'

**WM16035**

**Project #** **WM16036**

**Project Name** **Scruggs Avenue Water Line Replacement**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 2 Star Project
**Status** Pending

**Total Cost** **$195,000**

## Description

Replace approxmately 1,075 LF of 4" and 6" CIP along the length of Scruggs Avenue.

## Justification

Line is over 50 years old. The 4" line needs to be upsized to improve fire protection.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | | 20,000 | | | | 20,000 |
| Construction | | | | | | | | 175,000 | | | 175,000 |
| **Total** | | | | | | | 20,000 | 175,000 | | | 195,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | | | | | | | 20,000 | 175,000 | | | 195,000 |
| **Total** | | | | | | | 20,000 | 175,000 | | | 195,000 |

Fountainwood Blvd
Dabney Dr
Villinova Pl
Althea Pl
Caysens Square Ln
Zinnia Ln
Tulip Ln
Hardison Ave
Alley
Rosebud Cir
Scruggs Ave
Davidson Dr
Cothran Dr
Dabney Dr
Bradford Dr
Horton Ln
Horton Ct
W Main St
eek Pke
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16036

**Project #** WM16037

**Project Name** South Prong Sanitary Sewer Upgrade

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 3 Star Project
**Status** Pending

**Total Cost** $2,710,000

## Description

## Justification

| Prior | Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 260,000 | Construction Engineering / Inspection | | | | 125,000 | 125,000 | | | | | | 250,000 |
| Total | Construction | | | | 1,100,000 | 1,100,000 | | | | | | 2,200,000 |
| | **Total** | | | | 1,225,000 | 1,225,000 | | | | | | 2,450,000 |

| Prior | Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 260,000 | Wastewater Capacity | | | | 1,225,000 | | | | | | | 1,225,000 |
| Total | Wastewater Renewal | | | | | 1,225,000 | | | | | | 1,225,000 |
| | **Total** | | | | 1,225,000 | 1,225,000 | | | | | | 2,450,000 |

*This Page Intentionally Blank*

**Project #** WM16038

**Project Name** Spencer Creek Sanitary Sewer Replacement

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 3 Star Project
**Status** Active

**Total Cost** **$1,810,000**

## Description

Replace approximately 1,200 LF of 36" sanitary sewer line under the CSX railroad and Franklin Road along Spencer Creek.

## Justification

Pipe segments upstream and downstream of this location have already been replaced. Remaining segments are subject to I/I and show signs of structural problems.

| Prior | Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40,000 | ROW and Easements | 250,000 | | | | | | | | | | 250,000 |
| Total | Construction Engineering / Inspection | 40,000 | 100,000 | | | | | | | | | 140,000 |
| | Construction | 1,000,000 | 380,000 | | | | | | | | | 1,380,000 |
| | **Total** | 1,290,000 | 480,000 | | | | | | | | | 1,770,000 |

| Prior | Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40,000 | Wastewater Renewal | 1,290,000 | 480,000 | | | | | | | | | 1,770,000 |
| Total | **Total** | 1,290,000 | 480,000 | | | | | | | | | 1,770,000 |

Daniel Mc
374
31
379
e Ct
107
103
354
351
344
340
Franklin Rd
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16038

**Project #** **WM16039**

**Project Name** **Thompson Alley Infrastructure Improvements**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 4 Star Project
**Status** Pending

**Total Cost** **$280,000**

## Description

Replace or rehabilitate 1,050 LF of 8" clay sanitary sewer line.

Replace approximately 500 LF of 4" CIP water line.

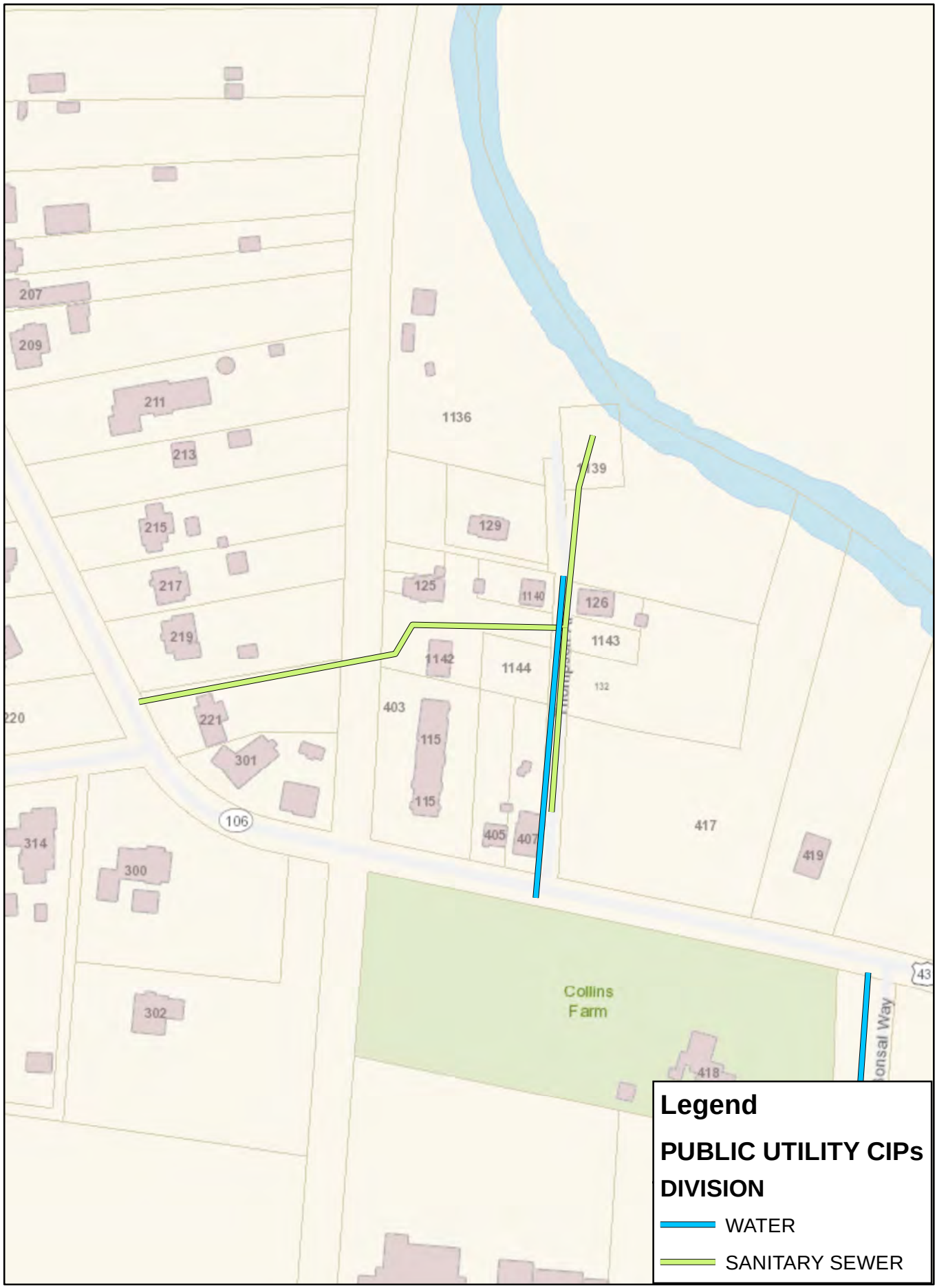
## Justification

Sanitary sewer line is subject to root intrusion and I/I.

Water Line is estimated to be over 70 years old and requires replacement to improve domestic and fire flows.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | 25,000 | | | | | | | | | | 25,000 |
| Construction | 255,000 | | | | | | | | | | 255,000 |
| **Total** | 280,000 | | | | | | | | | | 280,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | 133,913 | | | | | | | | | | 133,913 |
| Wastewater Renewal | 146,087 | | | | | | | | | | 146,087 |
| **Total** | 280,000 | | | | | | | | | | 280,000 |


207
209
211
213
215
217
219
220
221
301
314
300
302
106
1136
1139
129
125
1140
126
1143
1142
1144
132
403
115
115
405
407
417
419
418
Collins
Farm
43
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16039

**Project #** **WM16040**

**Project Name** **Highway 96W Water Line Replacement**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$258,000**

## Description

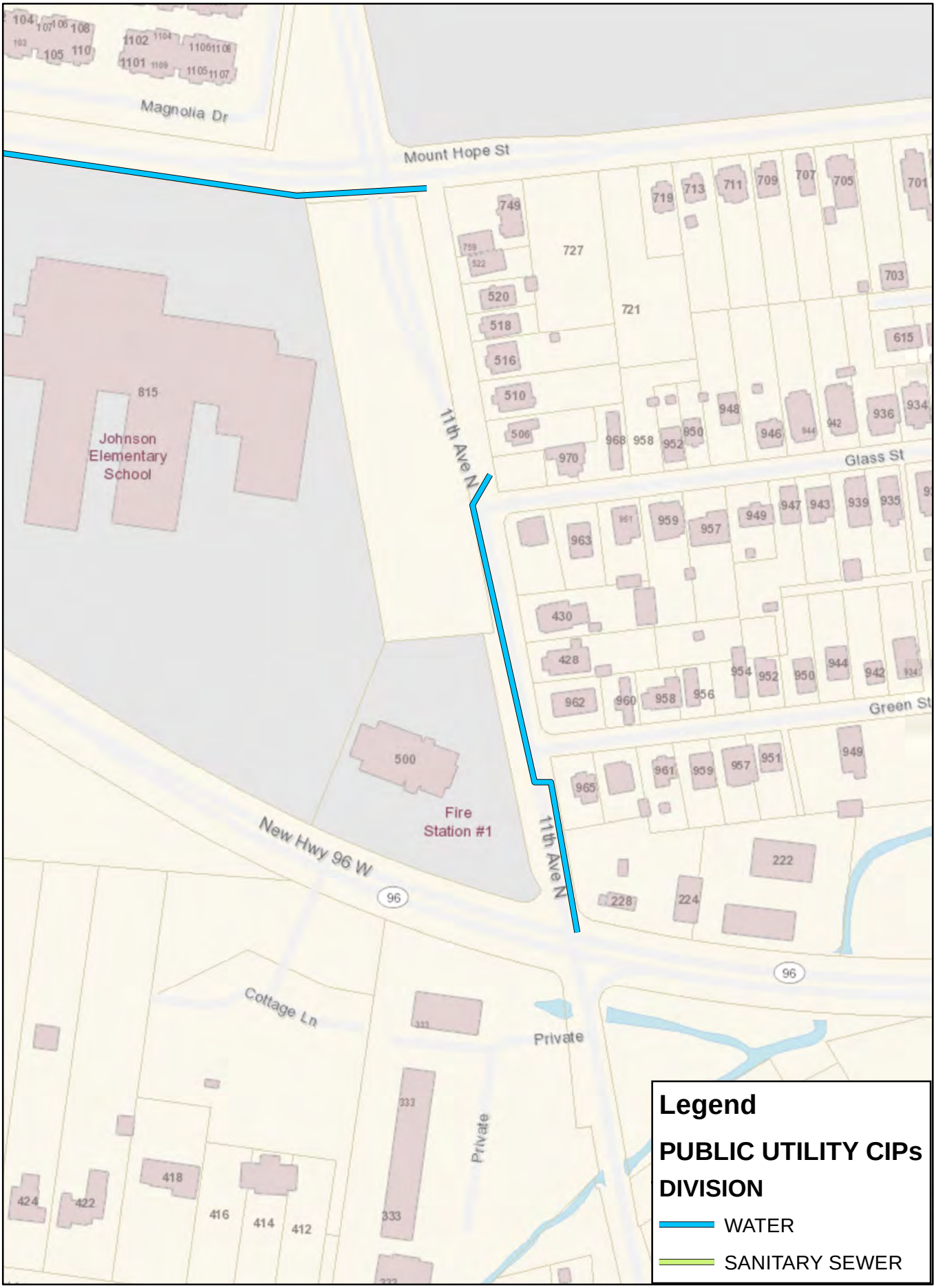
Water main replacement from 96W & 11th Avenue to Glass Street.

## Justification

1,600 LF of 8" water main & several main breaks have occurred in this area.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | 18,000 | | | | | 18,000 |
| Construction | | | | | | 240,000 | | | | | 240,000 |
| **Total** | | | | | | 258,000 | | | | | 258,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | | | | | | 258,000 | | | | | 258,000 |
| **Total** | | | | | | 258,000 | | | | | 258,000 |


Magnolia Dr
Mount Hope St
11th Ave N
Johnson Elementary School
815
Glass St
Green St
Fire Station #1
500
New Hwy 96 W
96
Cottage Ln
Private
Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16040

**Project #** **WM16041**

**Project Name** **West End Circle Infrastructure Improvements**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 3 Star Project
**Status** Pending

**Total Cost** **$202,000**

## Description

East 2" water main. Remove 2" cross country line, add a 6" main.

Existing 8" sewer will be lined.

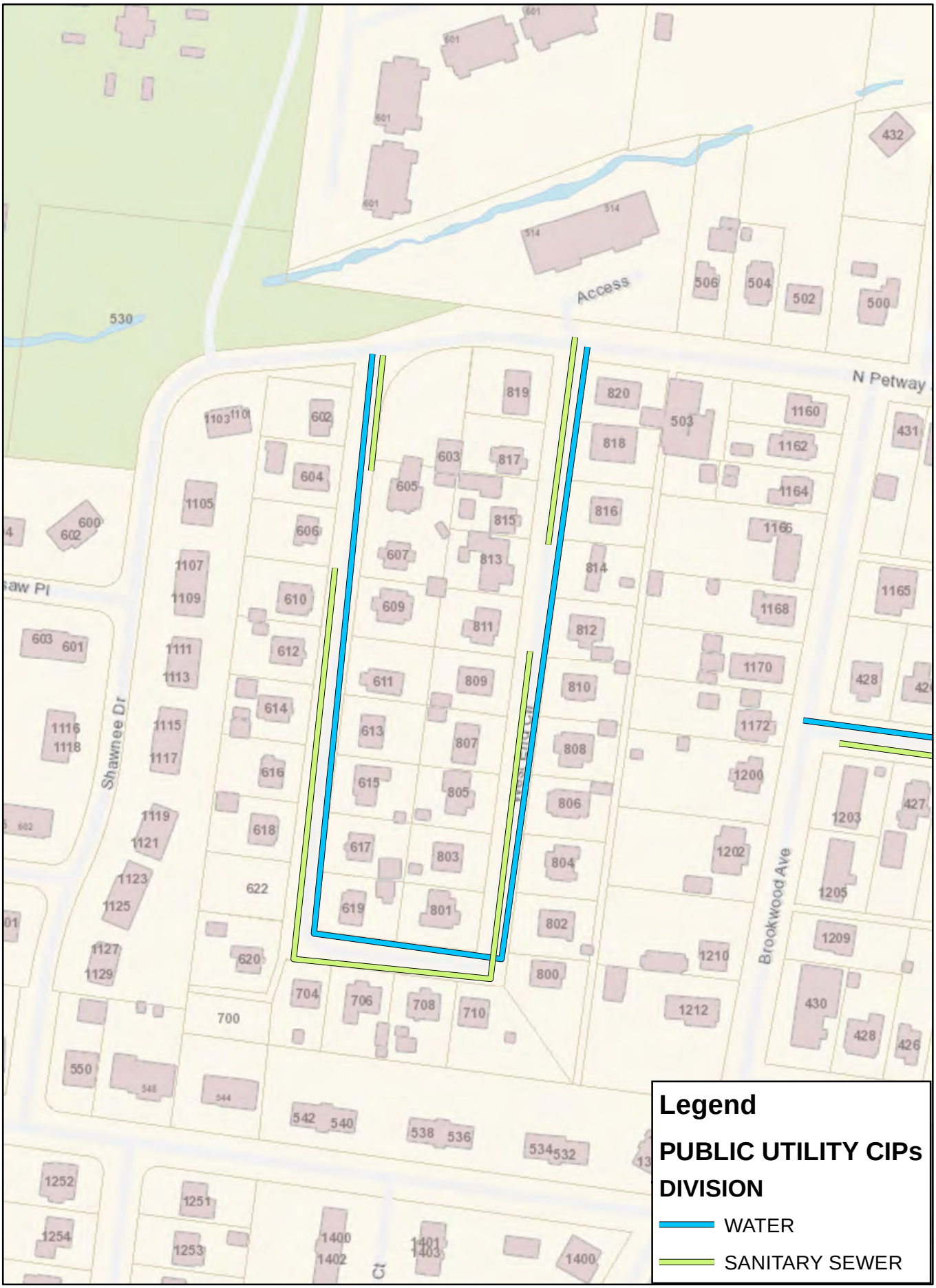
## Justification

Existing 2" galvanized line feeding 20 homes that will be increased to a 6" line, 780 feet, increasing fire flow and improving water quality.

Sewer main experiences significant root intrusion.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | 10,000 | | | | | | | | | | 10,000 |
| Construction | 192,000 | | | | | | | | | | 192,000 |
| **Total** | 202,000 | | | | | | | | | | 202,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | 127,000 | | | | | | | | | | 127,000 |
| Wastewater Renewal | 75,000 | | | | | | | | | | 75,000 |
| **Total** | 202,000 | | | | | | | | | | 202,000 |


Legend
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER
N Petway
Access
Shawnee Dr
Brookwood Ave
530
432
506
504
502
500
819
820
503
1160
431
1162
818
817
603
604
605
1164
1105
816
815
1166
606
607
813
814
1107
1109
610
609
1165
1168
811
812
1111
1113
612
1170
611
809
810
428
614
1116
1118
1115
1117
613
807
808
1172
616
615
805
806
1200
1119
1121
618
617
803
804
1203
427
1202
1123
1125
622
619
801
802
1205
1209
1127
1129
620
800
1210
704
706
708
710
1212
430
700
428
426
550
542
540
538
536
534
532
1252
1251
1254
1253
1400
1402
1401
1403
1400

WM16041

**Project #** WM16042

**Project Name** West Main Infrastructure Improvements

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 4 Star Project
**Status** Pending

**Total Cost** **$5,900,000**

## Description

Replace approximately 12,000 LF of 6" sewer and 8" clay sewer pipe with 12,000 LF of PVC.

Replace approximately 12,000 LF of CIP (various sizes) water main with 12,000 LF of DIP.

## Justification

Water pipe has been in service for 50+ years, various sizes that will be upsized with consistent sizing. Sewer main has been in service 50+ years, various sizes that will be upsized with consistent sizing, significant source of I/I and multiple blockages have occurred.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | 400,000 | | | | | | | | | 400,000 |
| Construction | | | 3,500,000 | 2,000,000 | | | | | | | 5,500,000 |
| **Total** | | 400,000 | 3,500,000 | 2,000,000 | | | | | | | 5,900,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Renewal | | 150,000 | 1,500,000 | 1,000,000 | | | | | | | 2,650,000 |
| Wastewater Renewal | | 250,000 | 2,000,000 | 1,000,000 | | | | | | | 3,250,000 |
| **Total** | | 400,000 | 3,500,000 | 2,000,000 | | | | | | | 5,900,000 |

Popular Grove School
Freedom Middle School
Independence Square Shopping Center
Mount Hope Cemetery
Freedom Intermediate School
Jim Warren Park
New Hope Academy
Franklin Elementary School
Williamson County Justice Center
Municipal Services Complex
Legend
First_Respone_Issues
PUBLIC UTILITY CIPs
DIVISION
WATER
SANITARY SEWER

WM16042

**Project #** **WM16043**

**Project Name** **Sewer Interceptor Point Repair Projects**

**Department** Water Management
**Contact** Water Management Director
**Type** Improvement
**Useful Life** 20+
**Category** Public Utilities
**Priority** 3 Star Project
**Status** Pending

**Total Cost** **$2,000,000**

## Description

As a result of the Harpeth River 54" interceptor failure, the City performed inspections on interceptors 24" in diameter to 54" in diameter. The result of those inspections identified 25 point repairs that are necessary.

## Justification

The result of the inspections identified 25 point repairs that are necessary improvements for proper operation of the collection system. The Department is still investigating the means to repair the individual locations.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Construction | 1,000,000 | 500,000 | 500,000 | | | | | | | | 2,000,000 |
| **Total** | 1,000,000 | 500,000 | 500,000 | | | | | | | | 2,000,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Wastewater Renewal | 1,000,000 | 500,000 | 500,000 | | | | | | | | 2,000,000 |
| **Total** | 1,000,000 | 500,000 | 500,000 | | | | | | | | 2,000,000 |

*This Page Intentionally Blank*

# CAPITAL IMPROVEMENT PLAN FY2017-2026

## Project Sheets – Stormwater

*This Page Intentionally Blank*

**Project #** SW16001

**Project Name** Ralston Creek at Liberty Hills Stream Restoration

**Department** Stormwater
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Stormwater
**Priority** 3 Star Project
**Status** Active

**Total Cost** **$1,030,000**

## Description

Stream and Bank Stabilization project on Ralston Creek at Liberty Hills Subdivision

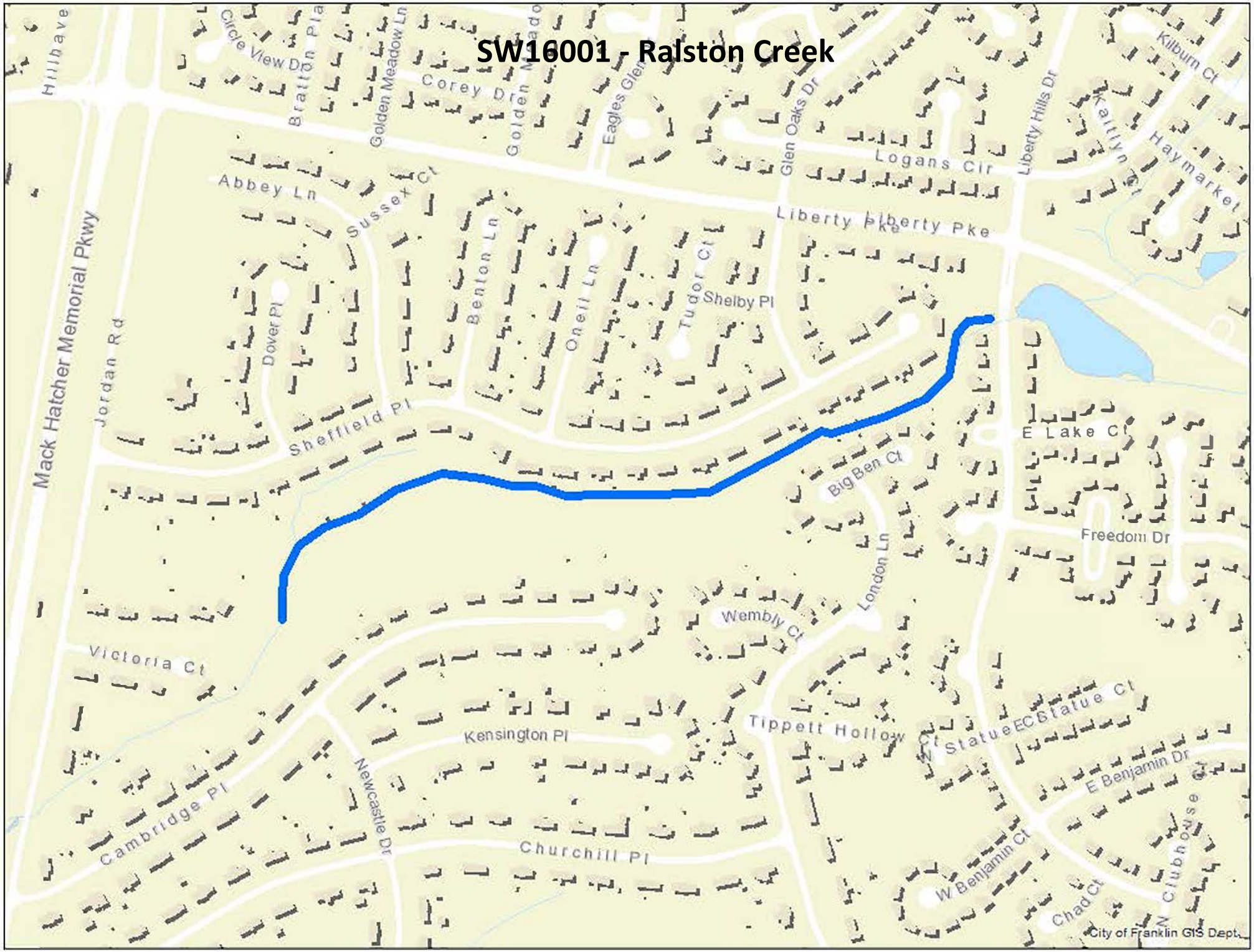
## Justification

The City has received a number of recent complaints from residents in the Royal Oaks Subdivision regarding flooding due to storm water from Ralston Creek overtopping the stream banks. There are also certain areas along Ralston Creek that are experiencing bank failure, some of which the City has attempted to temporarily address until a permanent solution can be determined and installed. The stream originates between Huffines Ridge Drive and I-65 near Centennial High School and flows in a southwesterly direction before entering into the Liberty Hills Subdivision Retention Pond. After leaving the retention pond through its outlet structure, the stream flows through the Royal Oaks Subdivision, where the previously mentioned flooding and bank failures have occurred.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | 120,000 | | | | | | | | | | 120,000 |
| ROW and Easements | | 80,000 | | | | | | | | | 80,000 |
| Construction Engineering / Inspection | | | 80,000 | | | | | | | | 80,000 |
| Construction | | | 750,000 | | | | | | | | 750,000 |
| **Total** | 120,000 | 80,000 | 830,000 | | | | | | | | 1,030,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stormwater | 120,000 | 80,000 | 830,000 | | | | | | | | 1,030,000 |
| **Total** | 120,000 | 80,000 | 830,000 | | | | | | | | 1,030,000 |

# SW16001 - Ralston Creek



**Project #** SW16002

**Project Name** Parkview Drainage Project

**Department** Stormwater
**Contact** Engineering Director
**Type** New
**Useful Life** 20+
**Category** Stormwater
**Priority** 1 Star Project
**Status** Active

**Total Cost** **$2,020,000**

## Description

Install drainage infrastructure in the area of Parkview Drive.

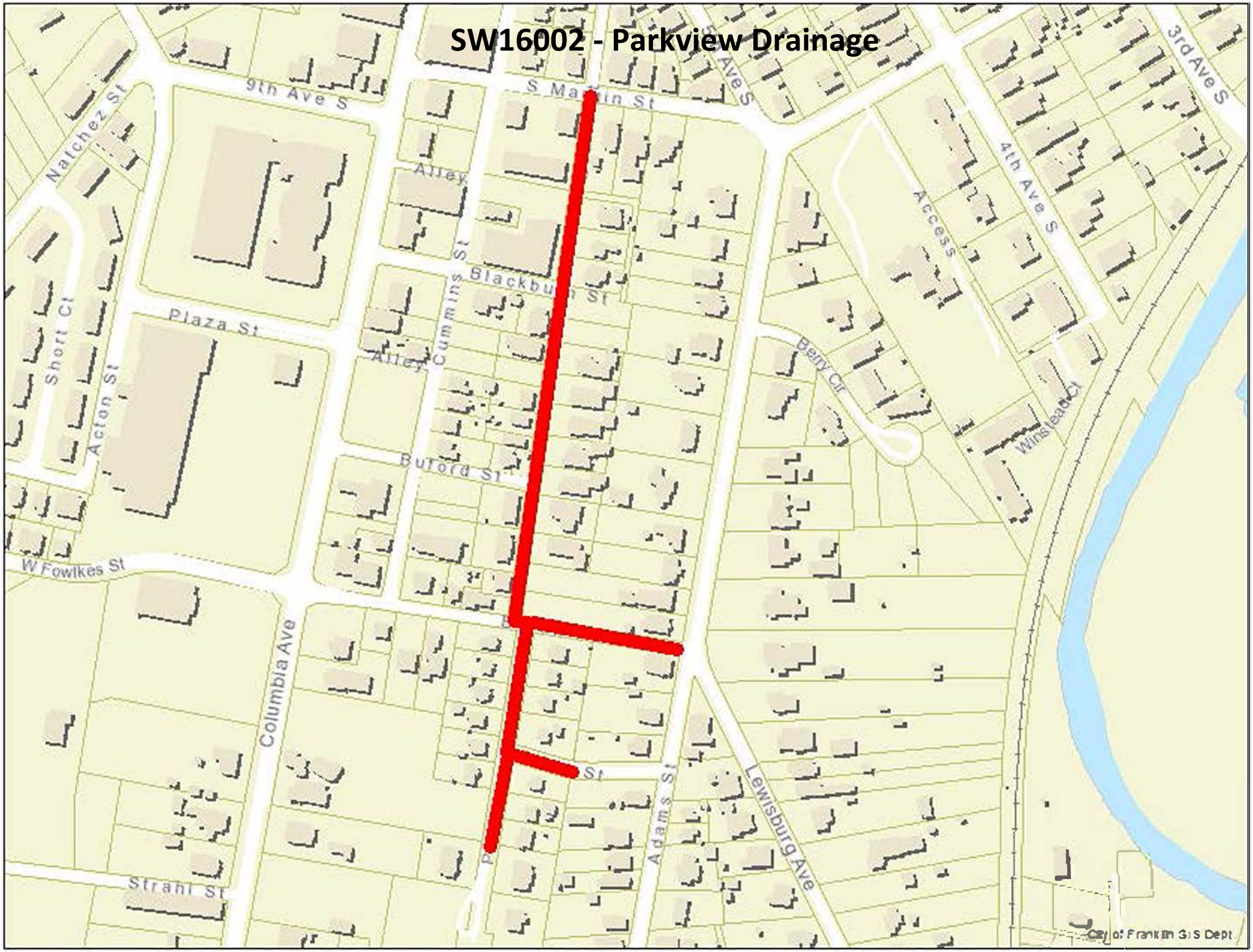
## Justification

The existing stormwater system mainly consists of a series of intermittent roadside ditches and culverts. This area has been a problem since the early 90's with no substantial improvements. The roadways lack drainage infrastructure. This infrastructure is needed to help protect against localized flooding during heavy rain events.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | 120,000 | | | | | 120,000 |
| ROW and Easements | | | | | | | 250,000 | | | | 250,000 |
| Construction Engineering / Inspection | | | | | | | | 150,000 | | | 150,000 |
| Construction | | | | | | | | 1,500,000 | | | 1,500,000 |
| **Total** | | | | | | 120,000 | 250,000 | 1,650,000 | | | 2,020,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stormwater | | | | | | 120,000 | 250,000 | 1,650,000 | | | 2,020,000 |
| **Total** | | | | | | 120,000 | 250,000 | 1,650,000 | | | 2,020,000 |

# SW16002 - Parkview Drainage



**Project #** SW16003

**Project Name** 100 Block Battle Avenue Drainage Improvements

**Department** Stormwater
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Stormwater
**Priority** 3 Star Project
**Status** Active

**Total Cost** **$1,200,000**

## Description

This project includes the construction of a regional detention pond located between 107 Battle Avenue and 101 Fairground Street. This project will include a design for a 100-year storm event and a new stomrwater pump station.

## Justification

For years there have been properties in the Battle Avenue area that have experienced localized flooding. During the May 2010 flood there were approximatly 10 properties that reported damage. This area is located in a low spot within the City creating problems for the last 20 years.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ROW and Easements | 250,000 | | | | | | | | | | 250,000 |
| Construction Engineering / Inspection | 80,000 | | | | | | | | | | 80,000 |
| Construction | 870,000 | | | | | | | | | | 870,000 |
| **Total** | 1,200,000 | | | | | | | | | | 1,200,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stormwater | 1,200,000 | | | | | | | | | | 1,200,000 |
| **Total** | 1,200,000 | | | | | | | | | | 1,200,000 |

# SW16003 - 100 Block Battle Ave

**Project #** SW16004

**Project Name** Figuers Drive Area Drainage Improvements

**Department** Stormwater
**Contact** Engineering Director
**Type** New
**Useful Life** 20+
**Category** Stormwater
**Priority** 1 Star Project
**Status** Active

**Total Cost** **$1,250,000**

## Description

This project includes the installation and upgrade of existing stormwater infrastructure in the Figures Drive Area to include: Channel improvements from Alicia Drive to Figures Drive; Culver upgrades at Perkins Drive and Figures Drive, Diversion Storm Sewer from Figures Dr. to Perkins Dr, Concrete Channel from Perkins Dr. to Alicia Dr and 6x3 RCB at Alicia Dr.

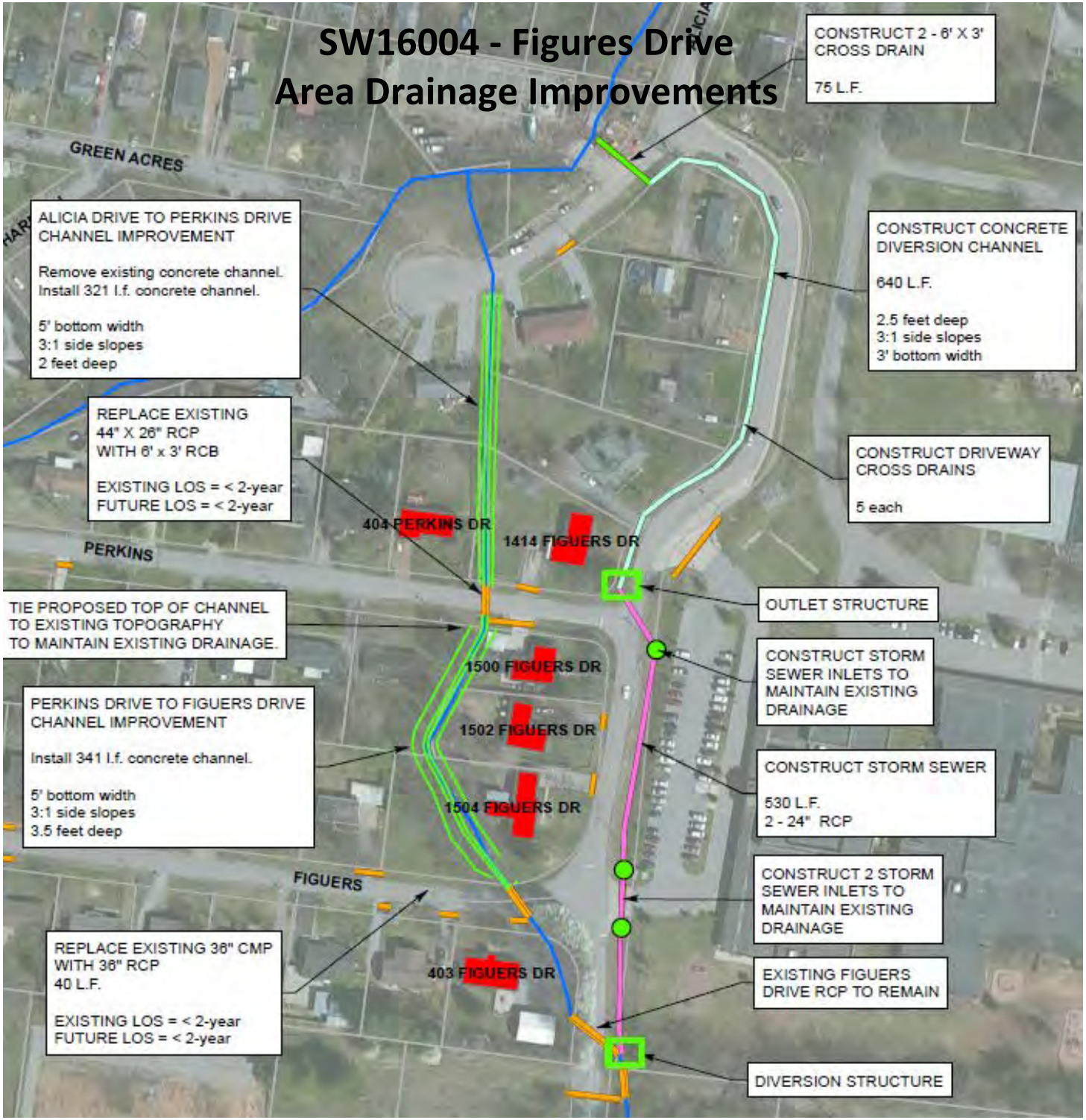
## Justification

The City has received a number of recent complaints from residents in the Figures Drive area. Large rain events can cause flooding on the roadway and impact a few residential structures.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | 200,000 | | | | | | | | | | 200,000 |
| ROW and Easements | | 50,000 | | | | | | | | | 50,000 |
| Construction | | | 1,000,000 | | | | | | | | 1,000,000 |
| **Total** | 200,000 | 50,000 | 1,000,000 | | | | | | | | 1,250,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stormwater | 200,000 | 50,000 | 1,000,000 | | | | | | | | 1,250,000 |
| **Total** | 200,000 | 50,000 | 1,000,000 | | | | | | | | 1,250,000 |

# SW16004 - Figures Drive Area Drainage Improvements



**Project #** SW16005

**Project Name** Jordan Branch (Cool Springs E) Stream Restoration

**Department** Stormwater
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Stormwater
**Priority** 2 Star Project
**Status** Active

**Total Cost** $780,000

## Description

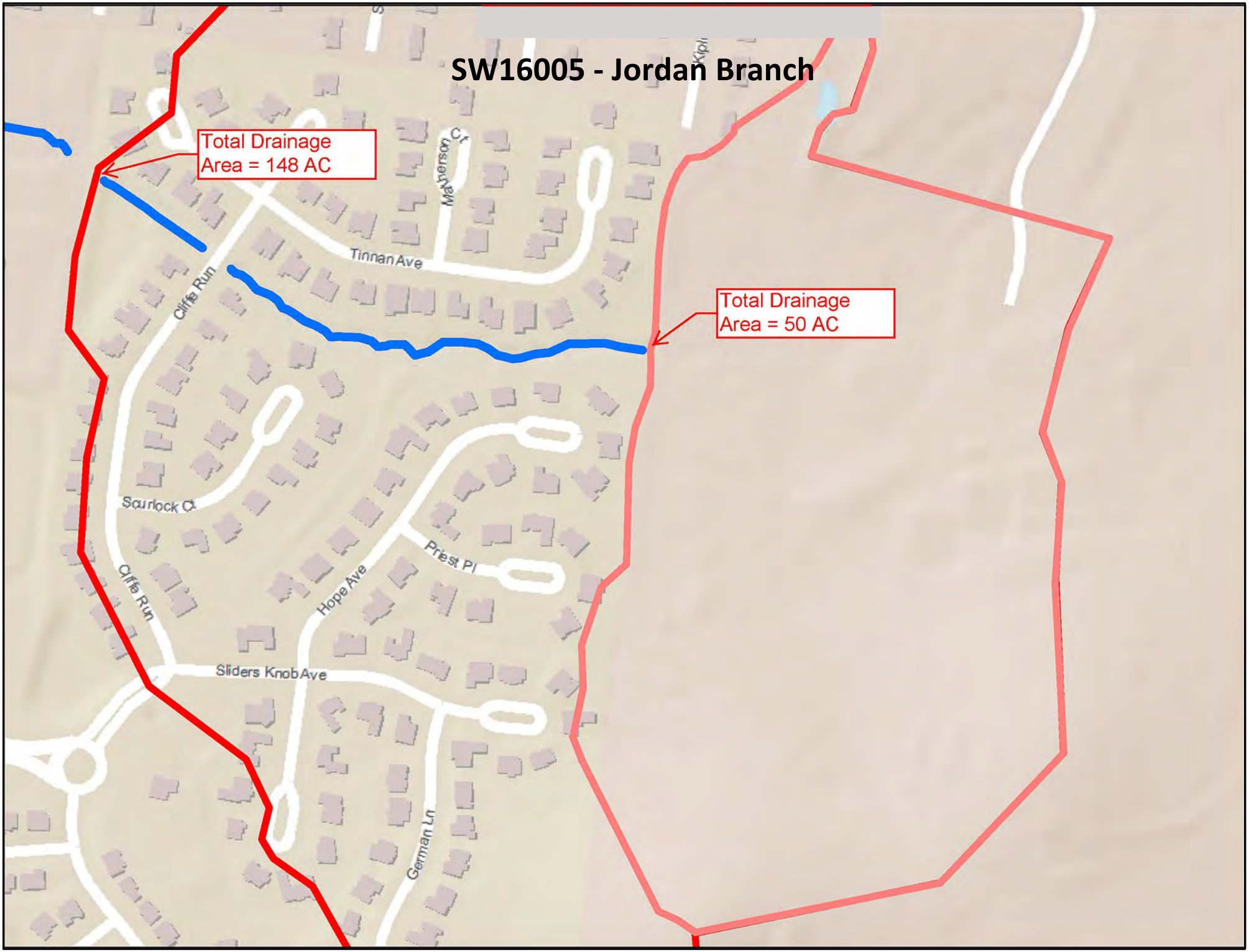
Restore and stabilize banks along Jordan Branch within The Meadow Subdivision located off of Bakers Bridge Avenue.

## Justification

The City of Franklin has had complaints for several years regarding erosion of Jordan Branch/Spencer Creek which flows behind several houses beofre flowing under Cliffe Run in The Meadow Subdivision located off of Bakers Bridge Avenue. Jordan Branch is severely entrenched with eroding and undercut banks. The trees are in danger of falling an dmany could possibly fall on or very near houses. Realtively large portions of backyards are likely going to be "uprooted" when the trees fall. Stormwater channels designed to convey flow from the subdivision to the stream are "head-cutting" which is also contributing to the loss of backyards in the form of eroding channels between lots.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ROW and Easements | 50,000 | | | | | | | | | | 50,000 |
| Construction Engineering / Inspection | 80,000 | | | | | | | | | | 80,000 |
| Construction | 650,000 | | | | | | | | | | 650,000 |
| **Total** | 780,000 | | | | | | | | | | 780,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stormwater | 780,000 | | | | | | | | | | 780,000 |
| **Total** | 780,000 | | | | | | | | | | 780,000 |





You created this PDF from an application that is not licensed to print to novaPDF printer (http://www.novapdf.com)

**Project #** **SW16006**

**Project Name** **Harpeth River Bank Stabilization at WRF**

**Department** Stormwater
**Contact**
**Type** Improvement
**Useful Life** 20+
**Category** Stormwater
**Priority** 4 Star Project
**Status** Active

**Total Cost** **$980,000**

## Description

This project includes stabilization of the Harpeth River banks along the WWTP site.

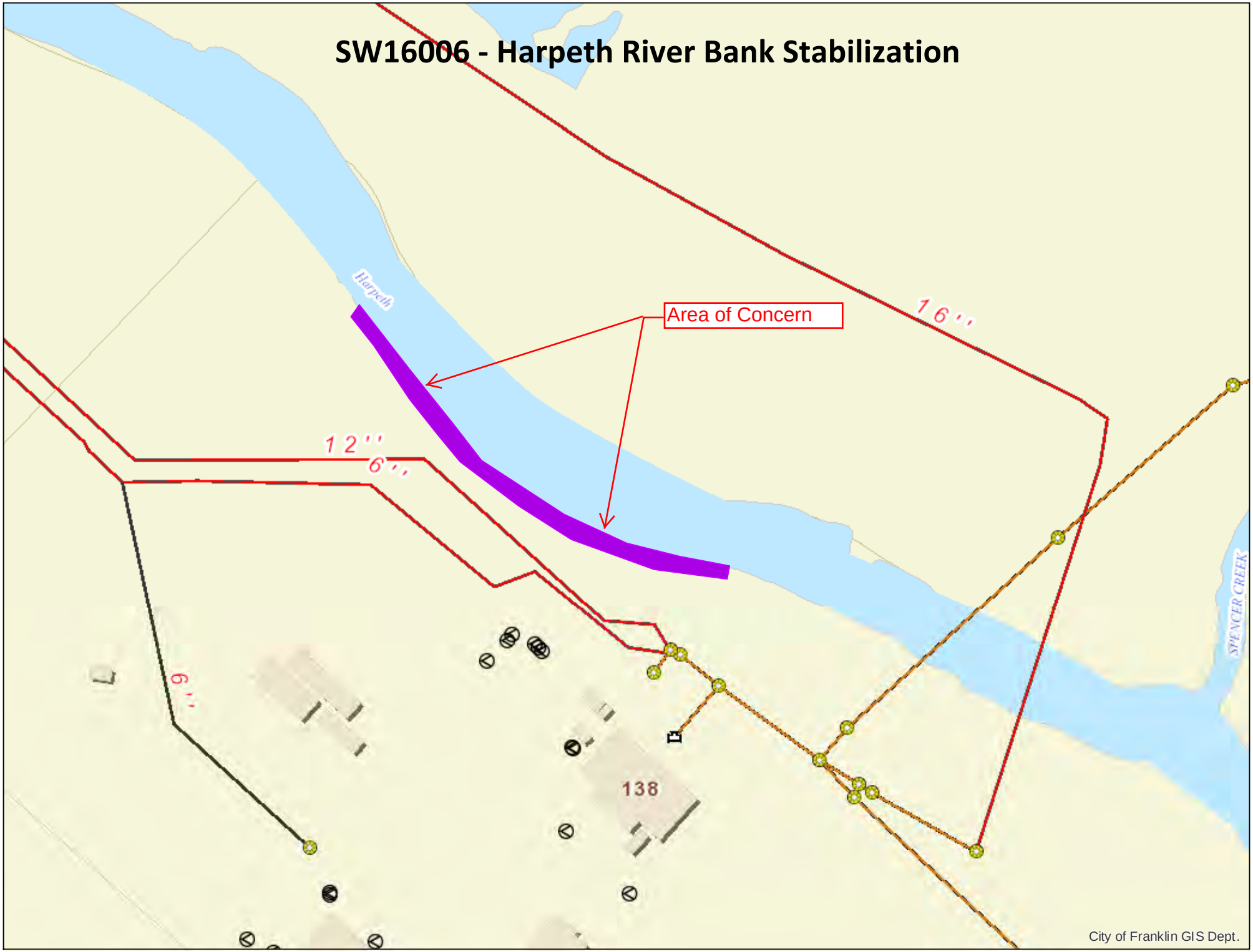
## Justification

The banks have had significant erosion and could be a threat to infrastructure within the area. We currently have one large force main within 10 feet of the existing top of bank.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | 100,000 | | | | | | | | | | 100,000 |
| Construction Engineering / Inspection | | 80,000 | | | | | | | | | 80,000 |
| Construction | | 800,000 | | | | | | | | | 800,000 |
| **Total** | 100,000 | 880,000 | | | | | | | | | 980,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stormwater | 100,000 | 880,000 | | | | | | | | | 980,000 |
| **Total** | 100,000 | 880,000 | | | | | | | | | 980,000 |

# SW16006 - Harpeth River Bank Stabilization



# CAPITAL IMPROVEMENT PLAN FY2017-2026

## Project Sheets – Transportation

*This Page Intentionally Blank*

**Project #** ST16001

**Project Name** Carlisle Lane Improvements

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$4,186,000**

## Description

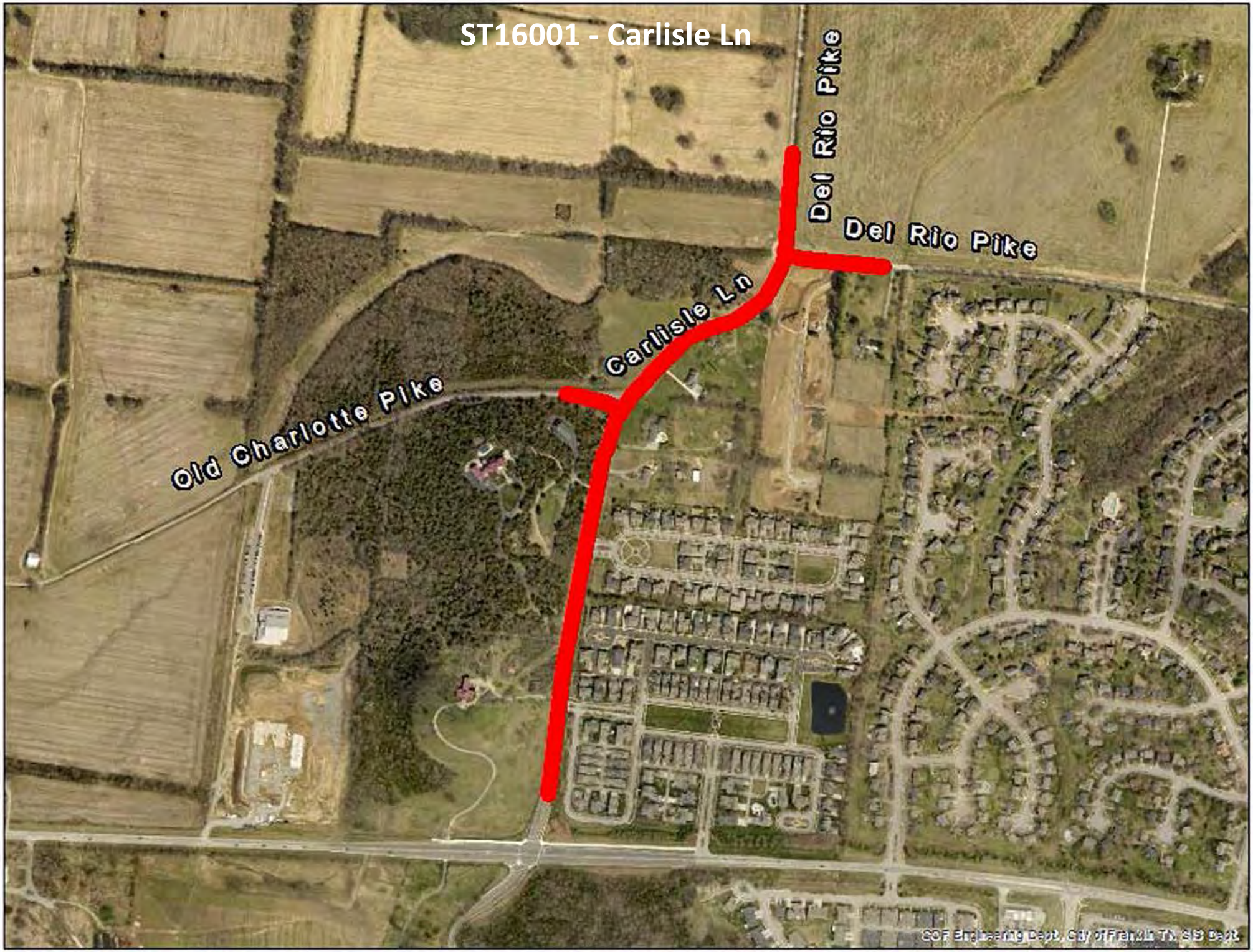
Carlisle Lane Improvements include improvements from Highway 96 West (SR-96) to Del Rio Pike. The typical section will include two (2) lanes with turn lanes; bike lanes; sidewalks, curb/gutter and drainage improvements. Approximate project length of 2,500 LF.

## Justification

Development in this area of the city continues to increase. The roadway has horizontal and vertical alignment issues that need to be corrected to improve safety.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | | | 186,000 | | | 186,000 |
| ROW and Easements | | | | | | | | | 500,000 | | 500,000 |
| Construction Engineering / Inspection | | | | | | | | | | 500,000 | 500,000 |
| Construction | | | | | | | | | | 3,000,000 | 3,000,000 |
| **Total** | | | | | | | | 186,000 | 500,000 | 3,500,000 | 4,186,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | | | | | | 186,000 | 500,000 | 3,220,000 | 3,906,000 |
| Stormwater | | | | | | | | | | 280,000 | 280,000 |
| **Total** | | | | | | | | 186,000 | 500,000 | 3,500,000 | 4,186,000 |


ST16001 - Carlisle Ln
Del Rio Pike
Del Rio Pike
Carlisle Ln
Old Charlotte Pike

**Project #** ST16002

**Project Name** Goose Creek Interchange Lighting

**Department** Streets
**Contact** Engineering Director
**Type** New
**Useful Life** 20+
**Category** Transportation
**Priority** 3 Star Project
**Status** Pending

**Total Cost** **$870,000**

## Description

Interchange Lighting for Goose Creek at I-65. The City will need to partner with TDOT to fund 50% of the cost associated with this project.

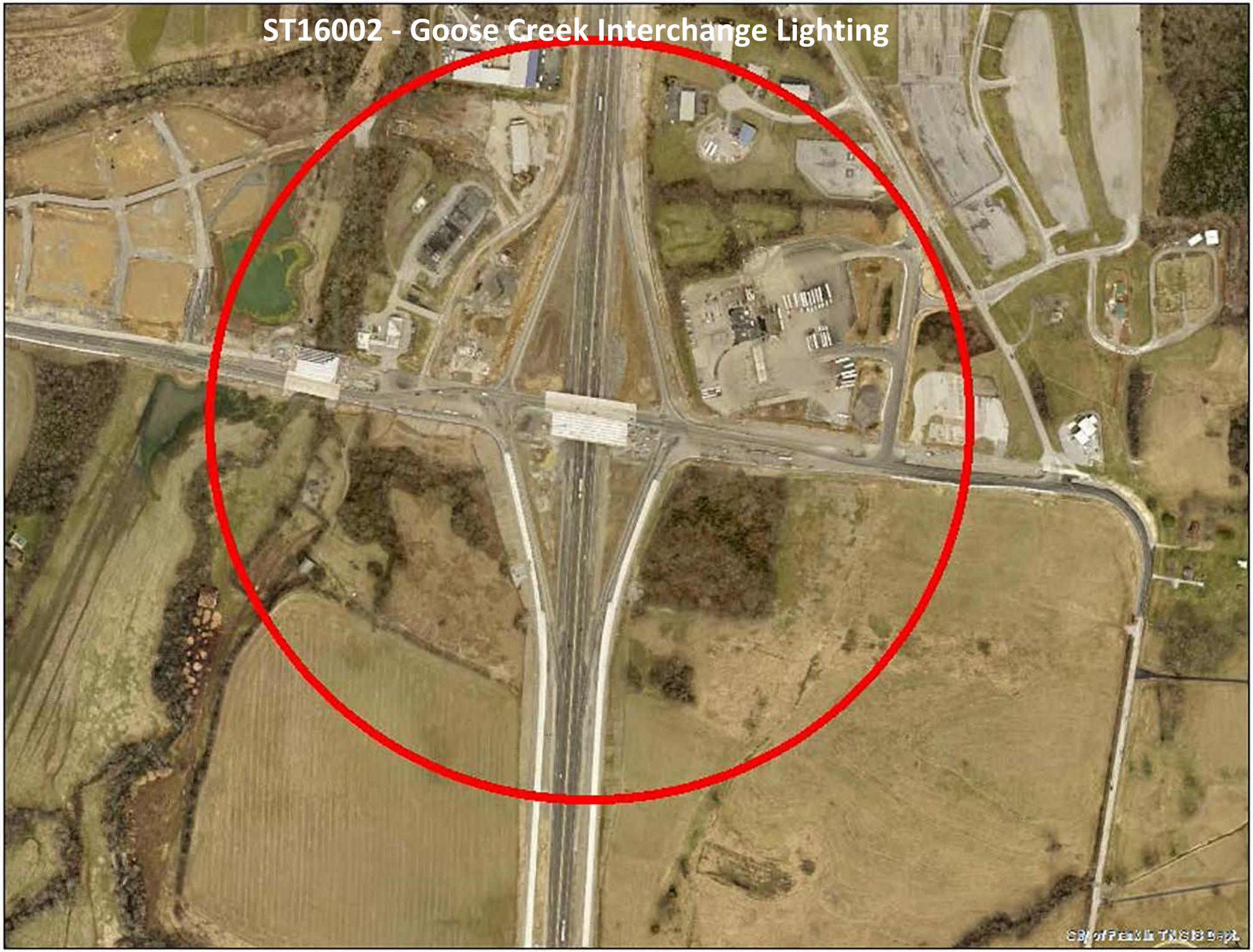
## Justification

Safty: Lighted interscetions and interchanges tend to have fewer crashes than unlighted intersections/interchanges. The majority of the intersection crashes at night are primarily assoicated with visibility.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | 60,000 | | | | | 60,000 |
| Construction Engineering / Inspection | | | | | | | 60,000 | | | | 60,000 |
| Construction | | | | | | | 750,000 | | | | 750,000 |
| **Total** | | | | | | 60,000 | 810,000 | | | | 870,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | | | | 30,000 | 405,000 | | | | 435,000 |
| MPO/TDOT Funding | | | | | | 30,000 | 405,000 | | | | 435,000 |
| **Total** | | | | | | 60,000 | 810,000 | | | | 870,000 |

# ST16002 - Goose Creek Interchange Lighting



**Project #** ST16003

**Project Name** Peytonsville Road Extension

**Department** Streets
**Contact** Engineering Director
**Type** New
**Useful Life** 20+
**Category** Transportation
**Priority** 1 Star Project
**Status** Pending

**Total Cost** $16,812,000

## Description

Extension of Peytonsville Road) east of I-65 to Long Lane. The project shall be constructed as a four (4) lane, median divided facility with turn lanes as requred. Project shall include: access management (as allowable), curb & gutter, ITS Infrastructure, and accomodations for pedestrians and bicycles. Approximate project length of 5,700 LF.

## Justification

Congestion Mitigation: AADT on Carothers Parkway is expected to reach 25,000 VPD. The board has approved numerous developments in the South East section of the City. Approvals include approximately 2,663 Single Family Units, 2,004 Multi-Family Units, 1.8 Million SF in Retail and 3.4 Million SF in Office/Civic Development.

Safety: As traffic increases on Carothers Parkway this roadway will become increasingly important. Long Lane is a collector roadway and will not be able to handle the project AADT that is anticipated on Carothers Parkway and Goose Creek Bypass Extension.

Economic Development: Access to I-65 and Berry Farms potentially makes this the next high growth area within Franklin. It should be noted that future Economic Development opportunities along this roadway will be limited unless the City or a Developer start the extension of the Harpeth River Interceptor. The interceptor will need to be extended approximately 14,000 LF prior to development along this roadway.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | 820,800 | | | | | 820,800 |
| ROW and Easements | | | | | | | 4,500,000 | | | | 4,500,000 |
| Construction Engineering / Inspection | | | | | | | | 615,600 | 615,600 | | 1,231,200 |
| Construction | | | | | | | | 5,130,000 | 5,130,000 | | 10,260,000 |
| **Total** | | | | | | 820,800 | 4,500,000 | 5,745,600 | 5,745,600 | | 16,812,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Road Impact Fees | | | | | | 820,800 | 4,500,000 | 5,489,100 | 5,489,100 | | 16,299,000 |
| Stormwater | | | | | | | | 256,500 | 256,500 | | 513,000 |
| **Total** | | | | | | 820,800 | 4,500,000 | 5,745,600 | 5,745,600 | | 16,812,000 |

ST16003 - Peytonsville Road Extension
Future Carothers Parkway
Goose Creek Extention
Future Carothers Parkway

**Project #** ST16004

**Project Name** Carothers Parkway Extension

**Department** Streets
**Contact** Engineering Director
**Type** New
**Useful Life** 20+
**Category** Transportation
**Priority** 1 Star Project
**Status** Pending

**Total Cost** $5,172,000

## Description

Extension of Carothers Parkway, from proposed Goose Creek Bypass (SR-248) Extension to its existing southern terminus at Long Lane. The project shall be constructed as a four (4) lane, median divided facility with turn lanes as requred. Project shall include: access management (as allowable), curb & gutter, street lights, ITS Infrastructure, and accomodations for pedestrians and bicycles. Approximate project length of 1,600 LF.

## Justification

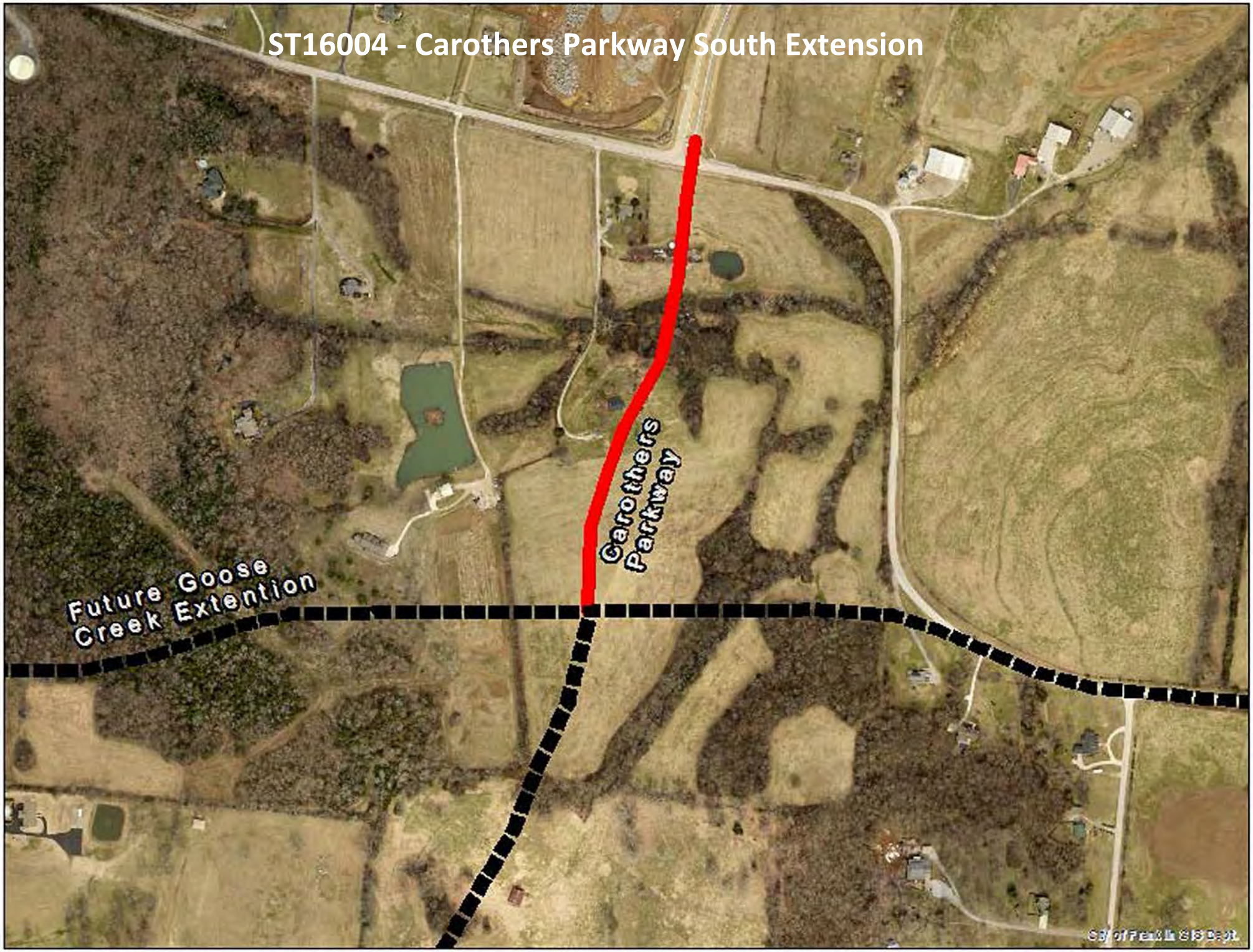
Congestion Mitigation: AADT on Carothers Parkway is expected to reach 25,000 VPD. The board has approved numerous developments in the South East section of the City. Approvals include approximately 2,663 Single Family Units, 2,004 Multi-Family Units, 1.8 Million SF in Retail and 3.4 Million SF in Office/Civic Development.

Safety: As traffic increases on Carothers Parkway this roadway will become increasingly important. Long Lane is a collector roadway and will not be able to handle the project AADT that is anticipated on Carothers Parkway and Goose Creek Bypass Extension.

Economic Development: Access to I-65 and Berry Farms potentially makes this the next high growth area within Franklin. It should be noted that future Economic Development opportunities along this roadway will be limited unless the City or a Developer start the extension of the Harpeth River Interceptor. The interceptor will need to be extended approximately 14,000 LF prior to development along this roadway.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | 244,800 | | | | | | 244,800 |
| ROW and Easements | | | | | | 1,500,000 | | | | | 1,500,000 |
| Construction Engineering / Inspection | | | | | | | 367,200 | | | | 367,200 |
| Construction | | | | | | | 3,060,000 | | | | 3,060,000 |
| **Total** | | | | | 244,800 | 1,500,000 | 3,427,200 | | | | 5,172,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Road Impact Fees | | | | | 244,800 | 1,500,000 | 3,274,200 | | | | 5,019,000 |
| Stormwater | | | | | | | 153,000 | | | | 153,000 |
| **Total** | | | | | 244,800 | 1,500,000 | 3,427,200 | | | | 5,172,000 |


ST16004 - Carothers Parkway South Extension
Carothers Parkway
Future Goose Creek Extention

**Project #** **ST16005**

**Project Name** **Peytonsville Rd & Pratt Ln Intersection Improv.**

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$5,016,000**

## Description

Reconstruction of the intersection of Peytonsville Road and Pratt lane to a conventional T-intersection. The included section Old Peytonsville Road shall be reconstruction as a four (4) lane, median divided facility, while the included section of Pratt Lane shall be reconstructed as a two (2) lane facility. Both streets shall have turn lanes as required. Project shall include: access management (as allowable), curb & gutter, ITS Infrastructure, and accomodations for pedestrians and bicycles. Approximate project length of 2,300 LF.

## Justification

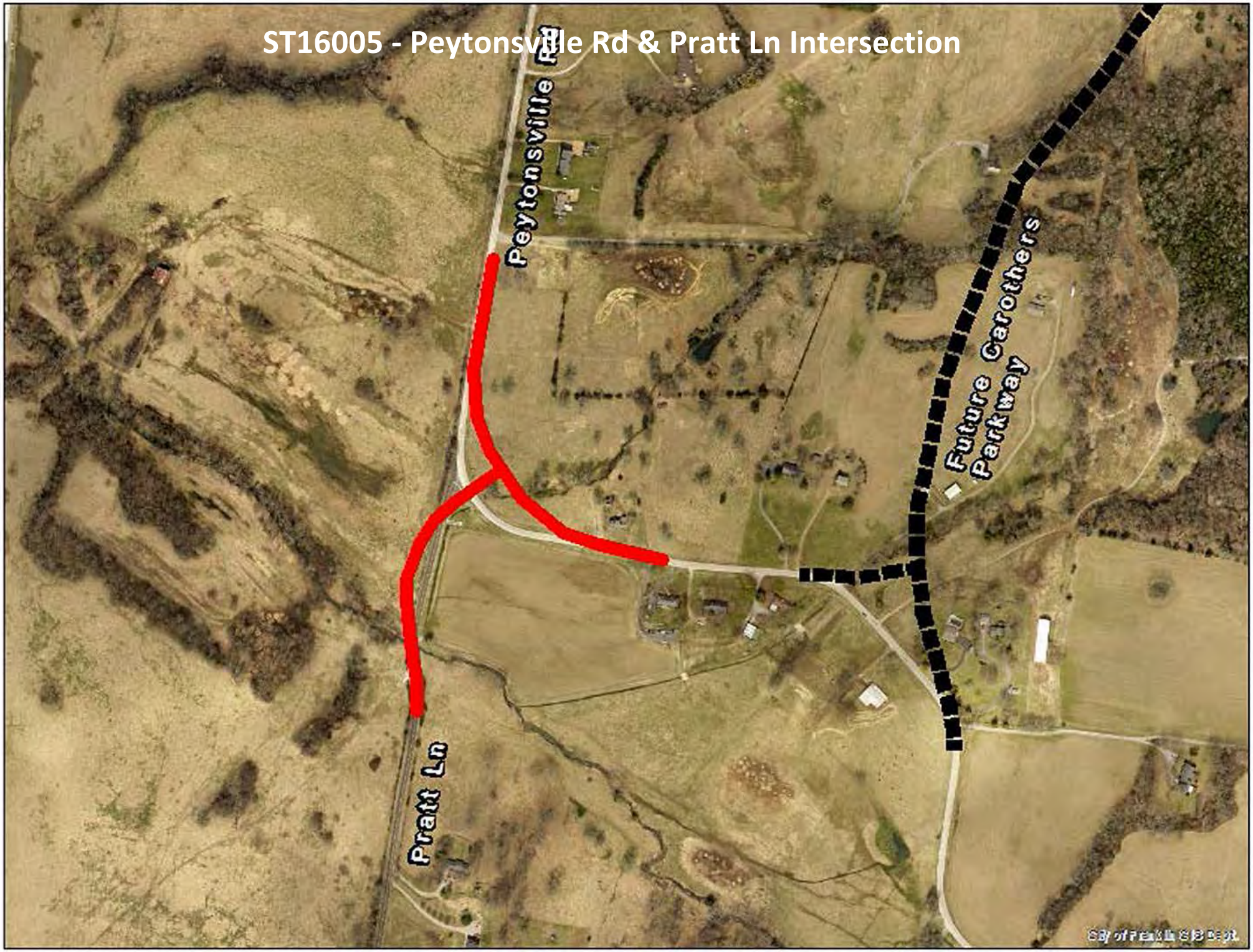
Congestion Mitigation: Peytonsville Road provides access between SR840 and the Goose Creek Interchange. Traffic will increase in this area as development continues. In addition this roadway will see heavy traffic when accidents occur on SR-840 and I-65.

Safety: Peytonsville Rd & Pratt Ln have geometric issues that need to be addressed as traffic increases in this area of the City. It was agreed upon by the Reams-Fleming Team and the City that Reams Fleming will not be allowed to have access to Pratt Lane until the City makes the necessary safety upgrades to this intersection.

Economic Development: Lampo Group is currently proposing their cooperate headquarters in the southern section of Reams-Fleming PUD. This includes approximately 650,000SF of commercial office space. As Reams-Fleming develops the city will need to fund this improvement to reduce congestion and provide alternative routes so that we can retain businesses long term.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | 194,400 | | | | | | | 194,400 |
| ROW and Easements | | | | | 2,100,000 | | | | | | 2,100,000 |
| Construction Engineering / Inspection | | | | | | 291,600 | | | | | 291,600 |
| Construction | | | | | | 2,430,000 | | | | | 2,430,000 |
| **Total** | | | | 194,400 | 2,100,000 | 2,721,600 | | | | | 5,016,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | | 194,400 | 2,100,000 | 2,600,100 | | | | | 4,894,500 |
| Stormwater | | | | | | 121,500 | | | | | 121,500 |
| **Total** | | | | 194,400 | 2,100,000 | 2,721,600 | | | | | 5,016,000 |


ST16005 - Peytonsville Rd & Pratt Ln Intersection
Peytonsville Rd
Future Carothers Parkway
Pratt Ln

**Project #** ST16006

**Project Name** Jordan Road Improvements

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 4 Star Project
**Status** Active

**Total Cost** $2,062,000

## Description

Improvement of Jordan Road, from Aspen Grove Road to Mallory Lane. Reconstruction of Jordan Road to City standard two (2) lane facility with turn lanes as required. Project shall include: curb & gutter, ITS Infrastructure, and accomodations for pedestrians and bicycles. Approximate project length of 1,700 LF.

## Justification

Congestion Mitigation: As McEwen Town Center develops out this roadway will become extremely important to help reduce traffic on Mallory Ln, Cool Springs Blvd and Mallory Lane. The developer of McEwen Town Center was required to improve Jordan Road; however, those conditions were removed by the FMPC and BOMA.

Safety: This rural roadway is located in a very urban area and has extremely narrow lanes and significant geometric issues that need to be corrected. Ideally this would happen as McEwen Town Center develops out its remaining property.

Economic Development: Redevelopment and future economic development in the Cool Springs area continues to occur. Upgrades are needed to reduce congestion and improve safety so that we can retain and attract new businesses long term.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | 50,000 | | | | | | | | 50,000 |
| ROW and Easements | | | | 500,000 | | | | | | | 500,000 |
| Construction Engineering / Inspection | | | | | 162,000 | | | | | | 162,000 |
| Construction | | | | | 1,350,000 | | | | | | 1,350,000 |
| **Total** | | | 50,000 | 500,000 | 1,512,000 | | | | | | 2,062,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | 50,000 | 500,000 | 1,418,100 | | | | | | 1,968,100 |
| Stormwater | | | | | 67,500 | | | | | | 67,500 |
| Wastewater Renewal | | | | | 26,400 | | | | | | 26,400 |
| **Total** | | | 50,000 | 500,000 | 1,512,000 | | | | | | 2,062,000 |

# ST16006 - Jordan Road Improvement

**Project #** ST16007

**Project Name** East McEwen Drive Improvements - Phase 4

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 4 Star Project
**Status** Active

**Total Cost** **$26,428,800**

## Description

Improvement of East McEwen Drive, from 800 feet east of the roundabout at Cool Springs Boulevard/Oxford Glen Drive to Wilson Pike (SR-252). The project shall be constructed as a four (4) lane, median divided facility with turn lanes as requred. Project shall include: access management (as allowable), curb & gutter, street lights, ITS Infrastructure, and accomodations for pedestrians and bicycles. Approximate project length of 8,200 LF.

## Justification

Congestion Mitigation: The Cools Springs Area is a major employment area within middle TN. As development continues along Carothers Parkway so does the AADT on McEwen Drive. McEwen Drive is an important East / West Connector between Nolensville, La Vergne, Smyrna and Rutherford County. In the last few years the Board has approved 5.2 Million SF of Office, 450,000 SF of retail, 700 hotel rooms and 2,418 multifamily units at the Carothers and McEwen Intersection alone. Improving this roadway will help to significantly reduce congestion for commuters trying to access the Cool Springs area.

Safety: This rural roadway is an important East / West Connector between Nolensville, La Vergne, Smyrna and Rutherford County. This roadway has significate vertical and horizontal issues that need corrected to improve safety.

Economic Development: The City has invested heavily in the Carothers McEwen area over the last few years. We are now seeing the private market invest millions of dollars into office and retail space along Carothers Parkway. These upgrades are needed to reduce congestion and improve safety so that we can retain and attract new businesses long term.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | 100,000 | | | | | | | | | | 100,000 |
| ROW and Easements | 2,500,000 | 1,000,000 | | | | | | | | | 3,500,000 |
| Construction Engineering / Inspection | | | 500,000 | 500,000 | | | | | | | 1,000,000 |
| Construction | | | 10,914,400 | 10,914,400 | | | | | | | 21,828,800 |
| **Total** | 2,600,000 | 1,000,000 | 11,414,400 | 11,414,400 | | | | | | | 26,428,800 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Road Impact Fees | 2,600,000 | 1,000,000 | 10,688,830 | 10,688,830 | | | | | | | 24,977,660 |
| Stormwater | | | 545,720 | 545,720 | | | | | | | 1,091,440 |
| Wastewater Renewal | | | 179,850 | 179,850 | | | | | | | 359,700 |
| **Total** | 2,600,000 | 1,000,000 | 11,414,400 | 11,414,400 | | | | | | | 26,428,800 |

ST16007 - East McEwen Drive Improvement
Cool Springs Blvd
McEwen Drive
Wilson Pike

**Project #** ST16008

**Project Name** East McEwen Dr. Right-Turn Bypass Lane

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 4 Star Project
**Status** Pending

**Total Cost** $974,400

## Description

Improvement of roudabout at East McEwen Drive and Cool Springs Boulevard/Oxford Glen Drive. The project consists of the construction of a riight-turn bypass lane for westbound motorists turning right from East McEwen Drive onto Cool Springs Boulevard. Approximate project length of 1,000 LF.

## Justification

Congestion Mitigation: The Cools Springs Area is a major employment area within Middle TN. As development continues along Carothers Parkway so does the AADT on McEwen Drive. McEwen Drive is an important East / West Connector between Nolensville, La Vergne, Smyrna and Rutherford County. In the last few years the Board has approved 5.2 Million SF of Office, 450,000 SF of retail, 700 hotel rooms and 2,418 multifamily units at the Carothers and McEwen Intersection alone. Improving this intersection will help to significantly reduce congestion for commuters trying to access the Cool Springs area.

Safety: This roundabout has one of the highest crash rates within the city. The high crash rate is probably due to lack of public understanding of how to drive through a roundabout and the high volume of traffic utilizing this roundabout. The addition of right-turn bypass lane is anticipated to reduce both congestion and accidents at this intersection.

Economic Development: The City has invested heavily in the Carothers McEwen area over the last few years. We are now seeing the private market invest millions of dollars into office and retail space along Carothers Parkway. These upgrades are needed to reduce congestion and improve safety so that we can retain and attract new businesses long term.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | 70,000 | | | | | | | | | | 70,000 |
| ROW and Easements | | 350,000 | | | | | | | | | 350,000 |
| Construction Engineering / Inspection | | | 59,400 | | | | | | | | 59,400 |
| Construction | | | 495,000 | | | | | | | | 495,000 |
| **Total** | 70,000 | 350,000 | 554,400 | | | | | | | | 974,400 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Road Impact Fees | 70,000 | 350,000 | 529,650 | | | | | | | | 949,650 |
| Stormwater | | | 24,750 | | | | | | | | 24,750 |
| **Total** | 70,000 | 350,000 | 554,400 | | | | | | | | 974,400 |

ST16008 - East McEwen Dr. Right Turn Bypass Lane
Cool Springs Blvd
E McEwen Dr
Oxford Glen Dr

**Project #** ST16009

**Project Name** Franklin Road Improvements & Streetscape

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 4 Star Project
**Status** Active

**Total Cost** **$14,340,000**

## Description

Improvement of Franklin Road, from the bridge at the Harpeth River to Hooper Lane. The project shall be constructed as a three (3) facility. Project shall include: curb & gutter, street lights, ITS Infrastructure, sidewalks, and typical streetscape elements. Approximate project length of 3,500 LF.

## Justification

Congestion Mitigation: This project will provide limited congestion mitigation as it relates to vehicular traffic.

Safety: Pedestrian safety and utility upgrades are on the primary reasons for moving this project forward. This project will provide a safe way for pedestrians to access Harlinsdale Farm, Jamison Station and the Factory. As more events are moved to Harlinsdale Farm the priority of this project continues to increase.

Economic Development: Downtown Franklin is a destination point that attracts numerous visitors and business to City. We need to continue investment within our historic downtown area to ensure that it remains a safe and walkable community to all residents and visitors

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | 50,000 | | | | | | | | | 50,000 |
| ROW and Easements | | 2,500,000 | | | | | | | | | 2,500,000 |
| Construction Engineering / Inspection | | | 450,000 | 450,000 | | | | | | | 900,000 |
| Construction | | | 5,445,000 | 5,445,000 | | | | | | | 10,890,000 |
| **Total** | | 2,550,000 | 5,895,000 | 5,895,000 | | | | | | | 14,340,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Road Impact Fees | | 2,550,000 | 4,405,450 | 4,405,450 | | | | | | | 11,360,900 |
| Stormwater | | | 272,250 | 272,250 | | | | | | | 544,500 |
| Hotel/Motel Tax | | | 750,000 | 750,000 | | | | | | | 1,500,000 |
| Water Capacity | | | 155,650 | 155,650 | | | | | | | 311,300 |
| Wastewater Capacity | | | 78,000 | 156,000 | | | | | | | 234,000 |
| Water Renewal | | | 155,650 | 155,650 | | | | | | | 311,300 |
| Wastewater Renewal | | | 78,000 | | | | | | | | 78,000 |
| **Total** | | 2,550,000 | 5,895,000 | 5,895,000 | | | | | | | 14,340,000 |

S16009 - Franklin Rd Improvements & Streetscape
Harpeth Industrial Ct.
Liberty Pike
Franklin Road

**Project #** ST16010

**Project Name** Beta Drive Extension

**Department** Streets
**Contact** Engineering Director
**Type** New
**Useful Life** 20+
**Category** Transportation
**Priority** 1 Star Project
**Status** Pending

**Total Cost** $4,306,000

## Description

Extension of Beta Drive from its current southern terminus at Alpha Drive to Southeast Parkway. The project shall be constructed as a two (2) lane facility with turn lanes as requred. Project shall include: curb & gutter, sidewalks, and a bridge across Saw Mill Creek. Approximate project length of 1,200 LF.

## Justification

Congestion Mitigation: Columbia Ave has historically been one of our most congested roadways within the City of Franklin. The widening of Columbia Ave will help with this congestion but additional connectivity is needed to provide long term relief and access to the numerous business located in this area of the city.

Safety: As traffic increases on Columbia Ave this roadway will become increasingly important. Beta Drive Extension will provide a safe alternative route for both pedestrians and vehicles within the area.

Economic Development: Significant redevelopment is anticipated along Columbia Ave as improvements are implemented. Additional connectivity is needed to reduce congestion so that we can retain and attract new businesses long term.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | 140,400 | | | | | | | | | 140,400 |
| ROW and Easements | | | 2,200,000 | | | | | | | | 2,200,000 |
| Construction Engineering / Inspection | | | | 210,600 | | | | | | | 210,600 |
| Construction | | | | 1,755,000 | | | | | | | 1,755,000 |
| **Total** | | 140,400 | 2,200,000 | 1,965,600 | | | | | | | 4,306,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | 140,400 | 2,200,000 | 1,830,850 | | | | | | | 4,171,250 |
| Stormwater | | | | 87,750 | | | | | | | 87,750 |
| Water Renewal | | | | 11,000 | | | | | | | 11,000 |
| Wastewater Renewal | | | | 36,000 | | | | | | | 36,000 |
| **Total** | | 140,400 | 2,200,000 | 1,965,600 | | | | | | | 4,306,000 |

ST16010 - Beta Drive Extension
Alpha Dr
Beta Dr.
Columbia Ave
Mack Hatcher
Southeast Pkwy
Noah Dr

**Project #** ST16011

**Project Name** Mallory/N Royal Oaks & Liberty Intersection Imp.

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 3 Star Project
**Status** Pending

**Total Cost** $4,440,000

## Description

Intersection improvements to North Royal Oaks Boulevard, Liberty Pike and Mallory Lane. This intersection is projected to be at a failure level in the next 3-4 years based on the proposed development along Carothers Parkway. If this porject is not completed, there will be significant delays at this key intersection.

## Justification

Congestion Mitigation: It is anticipated that this roadway will reach failure levels within the next 5 years. The increased traffic is a result of all the development along Carothers Parkway and other areas within Cool Springs.

Safety: No existing safety concerns at this intersection. Pedestrian facilities should be incorporated to the intersection improvements to comply with the Cities master plan.

Economic Development: Redevelopment and future economic development in the Cool Springs area continues. This improvement is needed to maintain our high quality of life by reducing congestion and improving safety along this Major Arterial Roadway.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | 216,000 | | | | | | | 216,000 |
| ROW and Easements | | | | | 1,200,000 | | | | | | 1,200,000 |
| Construction Engineering / Inspection | | | | | | 324,000 | | | | | 324,000 |
| Construction | | | | | | 2,700,000 | | | | | 2,700,000 |
| **Total** | | | | 216,000 | 1,200,000 | 3,024,000 | | | | | 4,440,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Road Impact Fees | | | | 216,000 | 1,200,000 | 2,721,400 | | | | | 4,137,400 |
| Stormwater | | | | | | 135,000 | | | | | 135,000 |
| Water Capacity | | | | | | 55,000 | | | | | 55,000 |
| Wastewater Renewal | | | | | | 112,600 | | | | | 112,600 |
| **Total** | | | | 216,000 | 1,200,000 | 3,024,000 | | | | | 4,440,000 |

ST16011 - Mallory/N Royal Oaks & Liberty Intersection
Mallory Ln
I-65
Liberty Pike
N. Royal Oaks

**Project #** ST16012

**Project Name** East McEwen Drive Extension - Phase 5

**Department** Streets
**Contact** Engineering Director
**Type** New
**Useful Life** 20+
**Category** Transportation
**Priority** 1 Star Project
**Status** Active

**Total Cost** $12,587,800

## Description

Extension of East McEwen Drive from Wilson Pike (SR-252) to the Franklin/Brentwood City Limits. This project shall be constructed as a two (2) lane facility with earthwork to support a future expansion to a four (4) lane, median divided facility. This project shall include: access management (as possible), curb & gutter, ITS Infrastructure, and accomodations for pedestrians and bicycles. Approximate project length is 5,300 LF.

## Justification

Congestion Mitigation: The Cools Springs Area is a major employment area within middle TN. As development continues along Carothers Parkway so does the AADT on McEwen Drive. McEwen Drive is an important East / West Connector between Nolensville, La Vergne, Smyrna and Rutherford County. In the last few years the Board has approved 5.2 Million SF of Office, 450,000 SF of retail, 700 hotel rooms and 2,418 multifamily units at the Carothers and McEwen Intersection alone. This new roadway will help to significantly reduce congestion for commuters trying to access the Cool Springs area and should be coordinated with the City of Brentwood's planned extension of East McEwen Drive.

Safety: This new roadway will be needed to reduce long term safety concerns on Clovercroft Roadway near the Breezeway School. These improvements should be coordinated with the City of Brentwood's planned extension of East McEwen Drive.

Economic Development: The City has invested heavily in the Carothers McEwen area over the last few years. We are now seeing the private market invest millions of dollars into office and retail space along Carothers Parkway. These upgrades are needed to reduce congestion and improve safety so that we can retain and attract new businesses long term. These improvements should be coordinated with the City of Brentwood's planned extension of East McEwen Drive.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | | 75,000 | | | | 75,000 |
| ROW and Easements | | | | | | | | 2,000,000 | 500,000 | | 2,500,000 |
| Construction Engineering / Inspection | | | | | | | | | | 1,072,800 | 1,072,800 |
| Construction | | | | | | | | | | 8,940,000 | 8,940,000 |
| **Total** | | | | | | | 75,000 | 2,000,000 | 500,000 | 10,012,800 | 12,587,800 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Road Impact Fees | | | | | | | 75,000 | 2,000,000 | 500,000 | 9,565,800 | 12,140,800 |
| Stormwater | | | | | | | | | | 447,000 | 447,000 |
| **Total** | | | | | | | 75,000 | 2,000,000 | 500,000 | 10,012,800 | 12,587,800 |

ST16012 - East McEwen Drive Improvements
McEwen Drive
Wilson Pike

**Project #** ST16013

**Project Name** Aspen Grove Dr & Seaboard Ln Intersection Improv.

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 2 Star Project
**Status** Active

**Total Cost** $1,708,000

## Description

Reconstruction of intersection at Aspen Grove Drive and Seabord Lane to allow for more efficient peak hour movements. Approximate project length of 1,000 LF.

## Justification

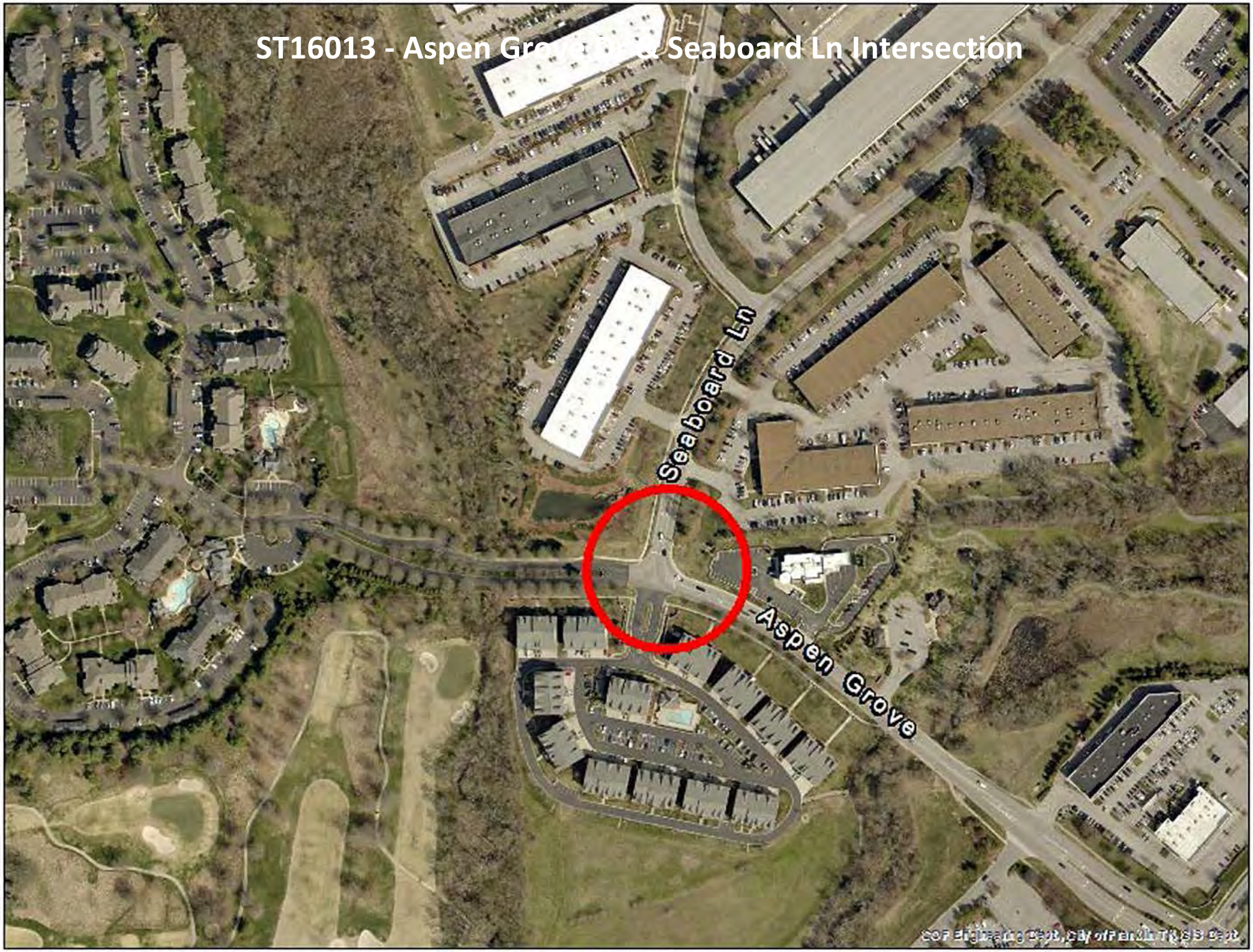
Congestion Mitigation: Capacity at this intersection is at failure levels during both the AM and PM peak hours. The Board has funded a project for city staff to evaluate and make recommendations to the full BOMA on possible solutions.

Safety: Pedestrian facilities should be incorporated into the intersection improvement project to comply with the Cities long range master plan.

Economic Development: Redevelopment and future economic development along this corridor is possible. Upgrades are needed to reduce congestion so that we can retain and attract new businesses long term.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | 50,000 | | | | | | | 50,000 |
| ROW and Easements | | | | | 650,000 | | | | | | 650,000 |
| Construction Engineering / Inspection | | | | | | 108,000 | | | | | 108,000 |
| Construction | | | | | | 900,000 | | | | | 900,000 |
| **Total** | | | | 50,000 | 650,000 | 1,008,000 | | | | | 1,708,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | | 50,000 | 650,000 | 963,000 | | | | | 1,663,000 |
| Stormwater | | | | | | 45,000 | | | | | 45,000 |
| **Total** | | | | 50,000 | 650,000 | 1,008,000 | | | | | 1,708,000 |


ST16013 - Aspen Gr
Seaboard Ln Intersection
Seaboard Ln
Aspen Grove

**Project #** ST16014

**Project Name** Franklin Rd & Mallory Station Rd Int. Improv.

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 3 Star Project
**Status** Pending

**Total Cost** $3,920,000

## Description

Reconstruction of intersection at Franklin Road (SR-6/US-31) and Mallory Station Road to allow for more efficient peak hour movements. Approximate project length of 1,000 LF.

## Justification

Congestion Mitigation: Capacity at this intersection is approaching failures and it currently has significate peak hour delays.

Safety: No existing safety concerns at this intersection. Pedestrian facilities should be incorporated to the intersection improvement to comply with the Cities master plan.

Economic Development: Redevelopment and future economic development along this corridor is limited. This improvement is needed to maintain our high quality of life by reducing congestion and improving safety along this Major Arterial Roadway.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | 216,000 | | | | | | | | 216,000 |
| ROW and Easements | | | | 680,000 | | | | | | | 680,000 |
| Construction Engineering / Inspection | | | | | 324,000 | | | | | | 324,000 |
| Construction | | | | | 2,700,000 | | | | | | 2,700,000 |
| **Total** | | | 216,000 | 680,000 | 3,024,000 | | | | | | 3,920,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | 108,000 | 340,000 | 1,444,500 | | | | | | 1,892,500 |
| Road Impact Fees | | | 108,000 | 340,000 | 1,444,500 | | | | | | 1,892,500 |
| Stormwater | | | | | 135,000 | | | | | | 135,000 |
| **Total** | | | 216,000 | 680,000 | 3,024,000 | | | | | | 3,920,000 |

ST 16014 - Franklin Rd & Mallory Station Rd
Future S Berrys Chapel Rd
Mallory Station Rd
Franklin Rd

**Project #** ST16015

**Project Name** Carothers Parkway Widening (Falcon Creek to SR-96)

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 3 Star Project
**Status** Pending

**Total Cost** $16,676,000

## Description

Improvement of Carothers Parkway, from Long Lane to South Carothers Road. Widen from two (2) lanes to to four (lane) median divided, wth turn lanes as required.. Project shall include: access management (as allowable), curb & gutter, street lights, ITS Infrastructure, and accomodations for pedestrians and bicycles. Approximate project length of 14,500 LF.

## Justification

Congestion Mitigation: AADT on Carothers Parkway is expected to reach 25,000 VPD. The board has approved numerous developments in the South East section of the City. Approvals include approximately 2,663 Single Family Units, 2,004 Multi-Family Units, 1.8 Million SF in Retail and 3.4 Million SF in Office/Civic Development.

Safety: As traffic increases on Carothers Parkway access management will become increasing important to move vehicles and reduce accidents. This roadway should be constructed with a median to reduce conflict points and increase safety.

Economic Development: Redevelopment and future economic development along this corridor is limited. This improvement is needed to maintain our high quality of life by reducing congestion and improving safety along the Major Arterial Roadway.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | 878,400 | | | | | | | | 878,400 |
| ROW and Easements | | | | 3,500,000 | | | | | | | 3,500,000 |
| Construction Engineering / Inspection | | | | | 658,800 | 658,800 | | | | | 1,317,600 |
| Construction | | | | | 5,490,000 | 5,490,000 | | | | | 10,980,000 |
| **Total** | | | 878,400 | 3,500,000 | 6,148,800 | 6,148,800 | | | | | 16,676,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Road Impact Fees | | | 878,400 | 3,500,000 | 5,199,300 | 5,199,300 | | | | | 14,777,000 |
| Stormwater | | | | | 274,500 | 274,500 | | | | | 549,000 |
| Reclaimed Water Capacity | | | | | 150,000 | 150,000 | | | | | 300,000 |
| Water Renewal | | | | | 165,000 | 165,000 | | | | | 330,000 |
| Wastewater Renewal | | | | | 360,000 | 360,000 | | | | | 720,000 |
| **Total** | | | 878,400 | 3,500,000 | 6,148,800 | 6,148,800 | | | | | 16,676,000 |

# ST16015 - Carothers Parkway Widening (SR96 - Falcon Creek)

**Project #** ST16016

**Project Name** Lewisburg Pike Imp. (Donelson Crk Pkwy to SR-397)

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 3 Star Project
**Status** Pending

**Total Cost** **$12,720,000**

## Description

This section is to be constructed as a 4-lane, median divided roadway cross-section. The improvements are to also include curb and gutters, sidewalks, multiuse trail on the East Side and other apppurtenances as required. The cost estimate does not include utility relocations required or right-of-way costs. Limits of construction are from Mack Hatcher Parkway to just south of Sullivan Farms Subdivision. Approximately 6,000 LF.

## Justification

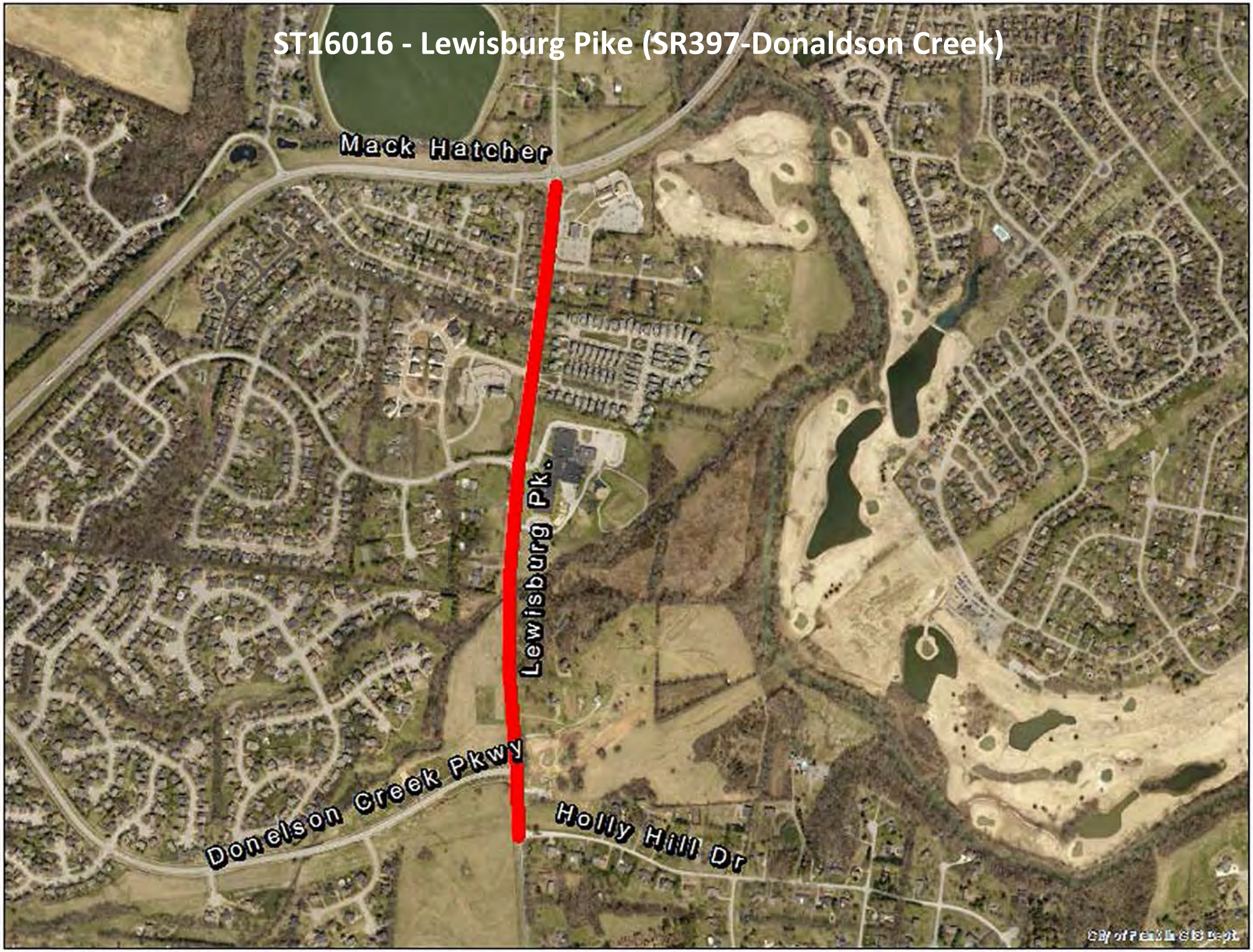
Congestion Mitigation: AADT on Lewisburg Pike is expected to reach 25,000 VPD. The board has approved numerous developments in the South East section of the City. Approvals include approximately 2,663 Single Family Units, 2,004 Multi-Family Units, 1.8 Million SF in Retail and 3.4 Million SF in Office/Civic Development.

Safety: As traffic increases on Lewisburg Pike access management will become increasing important to move vehicles and reduce accidents. This roadway should be constructed with a median to reduce conflict points and increase safety.

Economic Development: Redevelopment and future economic development along this corridor is limited. This improvement is needed to maintain our high quality of life by reducing congestion and improving safety along the Major Arterial Roadway.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | 720,000 | | | | | 720,000 |
| ROW and Easements | | | | | | | 2,000,000 | | | | 2,000,000 |
| Construction Engineering / Inspection | | | | | | | | 1,000,000 | | | 1,000,000 |
| Construction | | | | | | | | 9,000,000 | | | 9,000,000 |
| **Total** | | | | | | 720,000 | 2,000,000 | 10,000,000 | | | 12,720,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Road Impact Fees | | | | | | 144,000 | 400,000 | 1,836,880 | | | 2,380,880 |
| Stormwater | | | | | | | | 450,000 | | | 450,000 |
| MPO/TDOT Funding | | | | | | 576,000 | 1,600,000 | 7,347,520 | | | 9,523,520 |
| Water Renewal | | | | | | | | 308,000 | | | 308,000 |
| Wastewater Renewal | | | | | | | | 57,600 | | | 57,600 |
| **Total** | | | | | | 720,000 | 2,000,000 | 10,000,000 | | | 12,720,000 |


ST16016 - Lewisburg Pike (SR397-Donaldson Creek)
Mack Hatcher
Lewisburg Pk.
Donelson Creek Pkwy
Holly Hill Dr

**Project #** ST16017

**Project Name** Long Lane/Old Peytonsville Rd Connector at I-65

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 3 Star Project
**Status** Active

**Total Cost** $12,790,000

## Description

Included in the update to the Major Thoroughfare Plan are 2 crossings of I-65. This project is one of those crossings as is intended to connect Old Peytonsville Road with Long Lane. The main advantage of this crossing is to allow for traffic interconnectivity across I-65 without having to use Goose Creek By-Pass or Highway 96. Limits of construction are from Five Mile Creek Bridge to 500 feet east of Baskin Property. Approximately 2,500 LF.

## Justification

Congestion Mitigation: AADT on Carothers Parkway and Lewisburg Pike is expected to reach 25,000 VPD. The Board has approved numerous developments in the South East section of the City. Approvals include approximately 2,663 Single Family Units, 2,004 Multi-Family Units, 1.8 Million SF in Retail and 3.4 Million SF in Office/Civic Development. In addition TDOT has approved 7 traffic signals along Goose Creek Bypass. This option will provide an important alternative route to avoid future congestion.

Safety: As traffic increases on Carothers Parkway and Lewisburg Pike this roadway will become increasingly important. This connection will help reduce traffic on our arterial roadways and provide options to avoid future congestion at the Goose Creek Interchange.
Economic Development: This roadway will help future and existing businesses in the area by reducing congestion and making this an attractive place to live and work.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | 450,000 | | | | | | | 450,000 |
| ROW and Easements | | | | | 4,500,000 | | | | | | 4,500,000 |
| Construction Engineering / Inspection | | | | | 420,000 | 420,000 | | | | | 840,000 |
| Construction | | | | | 3,500,000 | 3,500,000 | | | | | 7,000,000 |
| **Total** | | | | 450,000 | 8,420,000 | 3,920,000 | | | | | 12,790,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | | 450,000 | 8,032,000 | 3,532,000 | | | | | 12,014,000 |
| Stormwater | | | | | 175,000 | 175,000 | | | | | 350,000 |
| Water Capacity | | | | | 49,500 | | | | | | 49,500 |
| Wastewater Capacity | | | | | | 49,500 | | | | | 49,500 |
| Reclaimed Water Capacity | | | | | 90,000 | 90,000 | | | | | 180,000 |
| Water Renewal | | | | | 49,500 | | | | | | 49,500 |
| Wastewater Renewal | | | | | 24,000 | 73,500 | | | | | 97,500 |
| **Total** | | | | 450,000 | 8,420,000 | 3,920,000 | | | | | 12,790,000 |

ST16017 - Long Lane Old Peytonsville Rd Connector
Peytonsville Rd
Warrior Dr
Old Peytonsville Rd
Long Ln
Long Ln

**Project #** ST16018

**Project Name** S. Margin Infastructure Upgrades (1st - Columbia)

**Department** Streets
**Contact**
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 4 Star Project
**Status** Pending

**Total Cost** $7,393,680

## Description

This project is to upgrade Sanitary Sewer, Water and Stormwater infrastructure in our historic downtown area. We are having issues with all utilities along this corridor and they are in need of upgrades and replacement.

The existing stormwater system mainly consists of a series of intermittent roadside ditches and culverts. This area has been a problem since the early 90's with no improvements made. The roadways lack drainage infrastructure. This infrastructure is needed to help protect localized flooding during heavy rain events. This project would also include the install of a water quality feature at the Harpeth River. The goal is to extend infrastructure into the Parkview Area to address localized flooding

## Justification

Congestion Mitigation: Congestion along S. Margin Street is very heavy during peak hours and events. This project would not increase vehicular capacity but would provide need and key pedestrian connections within our historic downtown area.

Safety: Providing sidewalks and street lights in our historic downtown area will help ensure our downtown remains a safe and walkable community.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | 171,456 | 171,456 | | | | | | | | | 342,912 |
| ROW and Easements | | | 2,250,000 | | | | | | | | 2,250,000 |
| Construction Engineering / Inspection | | | | 514,368 | | | | | | | 514,368 |
| Construction | | | | 4,286,400 | | | | | | | 4,286,400 |
| **Total** | 171,456 | 171,456 | 2,250,000 | 4,800,768 | | | | | | | 7,393,680 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | 171,456 | 171,456 | 2,250,000 | 3,220,158 | | | | | | | 5,813,070 |
| Stormwater | | | | 642,960 | | | | | | | 642,960 |
| Water Renewal | | | | 294,690 | | | | | | | 294,690 |
| Wastewater Renewal | | | | 642,960 | | | | | | | 642,960 |
| **Total** | 171,456 | 171,456 | 2,250,000 | 4,800,768 | | | | | | | 7,393,680 |

# ST16018 - S. Margin Infrastructure Upgrades

**Project #** ST16019

**Project Name** N Royal Oaks Blvd (Alexander Plaza to Liberty Pk)

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$8,688,400**

## Description

Complete the widening of North Royal Oaks Bolevar, a major arterial street, as a four (4) lane cross section with sidewalks, street lighting and other required appurtenances. Limits of construction are Alexander Plz to Liberty Pike. Approximate project length of 4,000 LF.

## Justification

This is the one remaining area that needs to be widen from two (2) to four (4) lanes. When this project is complete, we will have a four (4) lane arterial roadway from Mack Hatcher Parkway (SR-397) to Moores Lane (SR-441) that parallels I-65.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | | 412,560 | | | | 412,560 |
| ROW and Easements | | | | | | | | 2,500,000 | | | 2,500,000 |
| Construction Engineering / Inspection | | | | | | | | | 5,157,000 | | 5,157,000 |
| Construction | | | | | | | | | 618,840 | | 618,840 |
| **Total** | | | | | | | 412,560 | 2,500,000 | 5,775,840 | | 8,688,400 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Road Impact Fees | | | | | | | 412,560 | 2,500,000 | 4,532,430 | | 7,444,990 |
| Stormwater | | | | | | | | | 257,850 | | 257,850 |
| Water Capacity | | | | | | | | | 313,500 | | 313,500 |
| Wastewater Capacity | | | | | | | | | 179,280 | | 179,280 |
| Water Renewal | | | | | | | | | 313,500 | | 313,500 |
| Wastewater Renewal | | | | | | | | | 179,280 | | 179,280 |
| **Total** | | | | | | | 412,560 | 2,500,000 | 5,775,840 | | 8,688,400 |

ST16019 - N Royal Oaks (Alexander Plz - Liberty)
Freedom Dr
N. Royal Oaks
London Ln
I-65
Lakeview Dr
Holiday Ct

**Project #** **ST16020**

**Project Name** **Multi-Use Trail SR-96W (Vera Valley Dr - 9th Ave)**

**Department** Streets
**Contact** Engineering Director
**Type** New
**Useful Life** 20+
**Category** Transportation
**Priority** 2 Star Project
**Status** Pending

**Total Cost** **$1,913,867**

## Description

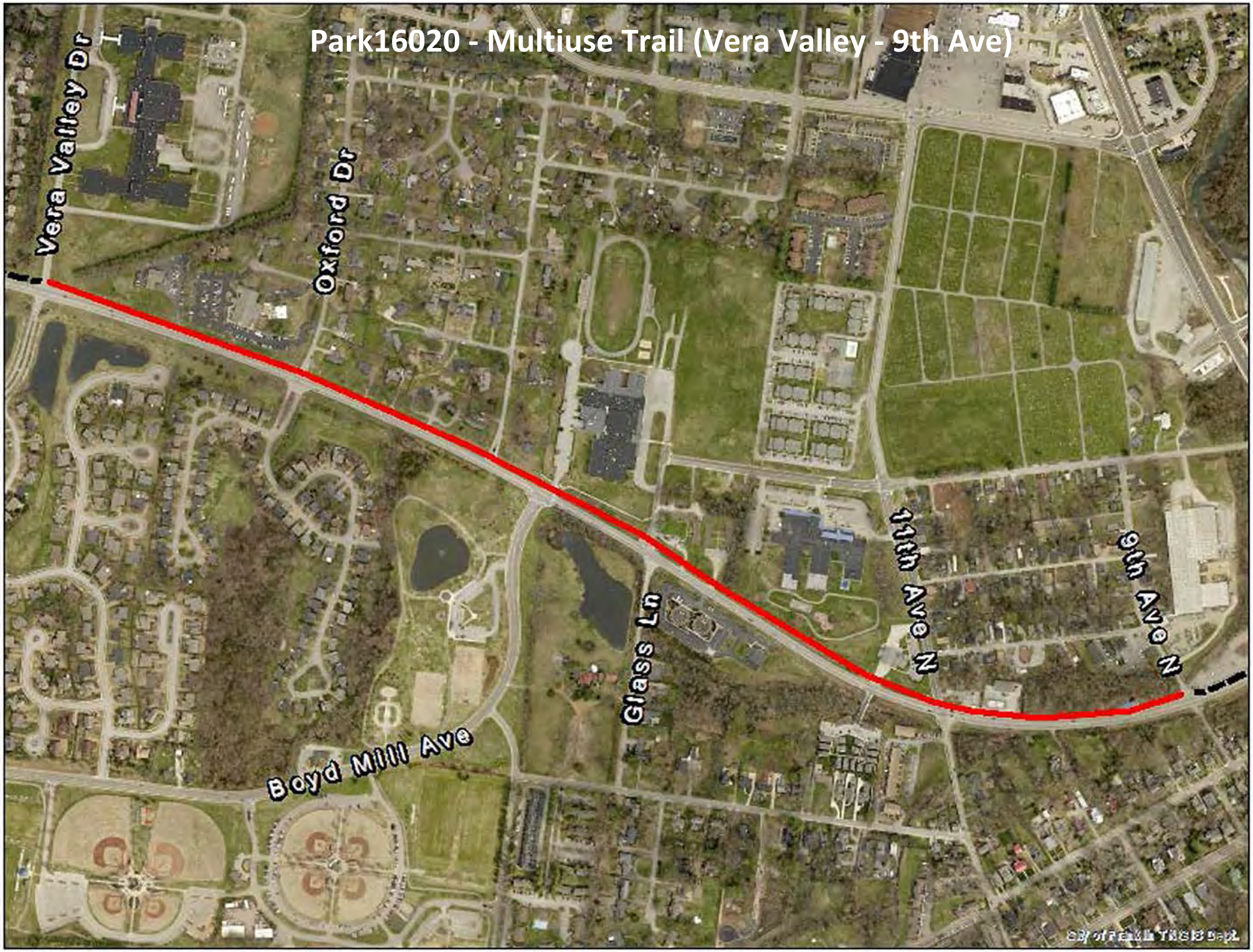
Extend ten (10) foot multi-use trail from Vera Valley Drive to 9th Avenue in Downtown Franklin. Approximate project length is 5,800 LF.

## Justification

This project will provid pedestrian, bicycling access to Freedom Middle School, Freedom Intermediate School from the neighborhoods surrounding Hwy 96 West. Two other schools exist with in the vicinity of this trail – Poplar Grove School and Johnson Elementary. Students from these two schools will also benefit as they will have access to this trail (if it is constructed). Also, Jim Warren Park, three subdivisions (Clairemonte, Spencer Hall, West Field Estates) and two churches (The Church of West Franklin, The Kingdom Hall of Jehovah's Witness) and a Fire Station are located along SR 96, with in this project vicinity.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | 97,591 | | | | | | 97,591 |
| ROW and Easements | | | | | | 450,000 | | | | | 450,000 |
| Construction Engineering / Inspection | | | | | | | 146,386 | | | | 146,386 |
| Construction | | | | | | | 1,219,890 | | | | 1,219,890 |
| **Total** | | | | | 97,591 | 450,000 | 1,366,276 | | | | 1,913,867 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | | | 97,591 | 450,000 | 1,305,282 | | | | 1,852,873 |
| Stormwater | | | | | | | 60,994 | | | | 60,994 |
| **Total** | | | | | 97,591 | 450,000 | 1,366,276 | | | | 1,913,867 |


Park16020 - Multiuse Trail (Vera Valley - 9th Ave)
Vera Valley Dr
Oxford Dr
Glass Ln
11th Ave N
9th Ave N
Boyd Mill Ave

**Project #** ST16021

**Project Name** Multi-Use Trail (Mack Hatcher Pkwy to EFBP)

**Department** Streets
**Contact** Engineering Director
**Type** New
**Useful Life** 20+
**Category** Transportation
**Priority** 1 Star Project
**Status** Pending

**Total Cost** $1,987,451

## Description

Twelve (12) foot multi-use trail along Lewsiburg Pike (SR-106/US-431), from Mack Hatcher Parkway (SR-397) to Eastern Flank Battlefield Park (EFBP). Approximate project length is 5,000 LF.

## Justification

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | | | 102,496 | | | 102,496 |
| ROW and Easements | | | | | | | | | 450,000 | | 450,000 |
| Construction Engineering / Inspection | | | | | | | | | | 153,745 | 153,745 |
| Construction | | | | | | | | | | 1,281,210 | 1,281,210 |
| **Total** | | | | | | | | 102,496 | 450,000 | 1,434,955 | 1,987,451 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | | | | | | 102,497 | 450,000 | 1,370,894 | 1,923,391 |
| Stormwater | | | | | | | | | | 64,060 | 64,060 |
| **Total** | | | | | | | | 102,497 | 450,000 | 1,434,954 | 1,987,451 |

ST16021 - Multiuse Trail (EFBP - Mack Hatcher)
City of Franklin GIS Dept.

**Project #** ST16022

**Project Name** Carothers Parkway (Long Lane to Falcon Creek)

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 3 Star Project
**Status** Pending

**Total Cost** **$9,435,629**

## Description

Widen Carothers Parkway from 2 to 4 Lanes from Long Lane to Falcon Creek Subdivision.

## Justification

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | 300,000 | | | | | 300,000 |
| Construction Engineering / Inspection | | | | | | | 978,817 | | | | 978,817 |
| Construction | | | | | | | 8,156,812 | | | | 8,156,812 |
| **Total** | | | | | | 300,000 | 9,135,629 | | | | 9,435,629 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Road Impact Fees | | | | | | 300,000 | 8,727,789 | | | | 9,027,789 |
| Stormwater | | | | | | | 407,840 | | | | 407,840 |
| **Total** | | | | | | 300,000 | 9,135,629 | | | | 9,435,629 |

ST16022 Carothers Parkway (Long Lane to Falcon Creek)
Carothers Parkway
Long Ln
City of Franklin TN GIS Dept.

**Project #** ST16023

**Project Name** Multi-Use Trail 1st Ave (South Margin to Bridge)

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$1,470,000**

## Description

This project would connect Pinkerton Park, Historic downtown Franklin and would eventaully be extended to Bicentennial Park. Construction would include a 12' wid multipuse trail on the east side of 1st Ave

## Justification

This project was identified as a short term project as part of the CTNP.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | 70,000 | | | | | 70,000 |
| ROW and Easements | | | | | | | 200,000 | | | | 200,000 |
| Construction Engineering / Inspection | | | | | | | | 50,000 | | | 50,000 |
| Construction | | | | | | | | 1,150,000 | | | 1,150,000 |
| **Total** | | | | | | 70,000 | 200,000 | 1,200,000 | | | 1,470,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | | | | 70,000 | 200,000 | 1,200,000 | | | 1,470,000 |
| **Total** | | | | | | 70,000 | 200,000 | 1,200,000 | | | 1,470,000 |

ST16023 - Multiuse Trail 1st Ave (South Margin to Bridge)
Franklin Rd
Main St.
1st Ave North
City of Franklin TN GIS Dept.

**Project #** ST16024

**Project Name** Multiuse Trail Mack Hatcher (Franklin - Hillsboro)

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 3 Star Project
**Status** Pending

**Total Cost** $2,295,000

## Description

The Mack Hatcher Parkway (SR-397) has been designed with a multi-use path on the south side of the road. A 12' multi-use path exists from Franklin Road to Daniel McMahon Lane.

## Justification

In order to compelte this pedestrian network so there is a complete network around this major corridor, the comletion of a multi-use path from Hillsboro Road to Daniel McMahone Lane is necessary.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | 125,000 | | | | | 125,000 |
| Construction Engineering / Inspection | | | | | | | 75,000 | | | | 75,000 |
| Construction | | | | | | | | 2,095,000 | | | 2,095,000 |
| **Total** | | | | | | 125,000 | 75,000 | 2,095,000 | | | 2,295,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | | | | 125,000 | 75,000 | 2,095,000 | | | 2,295,000 |
| **Total** | | | | | | 125,000 | 75,000 | 2,095,000 | | | 2,295,000 |

ST16024 - Multiuse Trail Mack Hatcher (Franklin - Hillsboro)
Hillsboro Road
Mack Hatcher Parkway
Franklin Road
City of Franklin TN GIS Dept.

**Project #** ST16025

**Project Name** Multi-use Trail Oxford Glen Dr (Daylily - McEwen)

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 3 Star Project
**Status** Pending

**Total Cost** **$870,000**

## Description

12' Wide multi-use trail to provide pedestrian access and benefit the neighborhoods in the area.

## Justification

The northern section of Oxford Glen Drive from McEwen Drive to Liberty Pike already has bike lanes, however the righ-of-way has enough room for the construction of a 12' wide multi-use trail. This trail will connect to the proposed trail system on McEwen Drive.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | 75,000 | | | | | | 75,000 |
| ROW and Easements | | | | | | 100,000 | | | | | 100,000 |
| Construction | | | | | | | 695,000 | | | | 695,000 |
| **Total** | | | | | 75,000 | 100,000 | 695,000 | | | | 870,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | | | 75,000 | 100,000 | 695,000 | | | | 870,000 |
| **Total** | | | | | 75,000 | 100,000 | 695,000 | | | | 870,000 |

ST16025 - Multiuse Trail Oxford Glen Dr (Daylily - McEwen)
McEwen Drive
Oxford Glen Dr
Liberty Pike
City of Franklin TN GIS Dept.

**Project #** ST16026

**Project Name** Multi-use Trail Forrest Crossing Blvd

**Department** Streets
**Contact** Engineering Director
**Type** Unassigned
**Useful Life** 20+
**Category** Transportation
**Priority** 3 Star Project
**Status** Pending

**Total Cost** $375,000

## Description

This proejct would include a 12' wide multi-use trail to fill in a gap between the forrest crossing neighborhood and South Roayl Oaks.

## Justification

This multi-use trail could onday be connected to the future tail system along Mack Hatcher and provide connectivity to parks, downtown and different areas within the City.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | 70,000 | | | | | | 70,000 |
| ROW and Easements | | | | | | 25,000 | | | | | 25,000 |
| Construction | | | | | | | 280,000 | | | | 280,000 |
| **Total** | | | | | 70,000 | 25,000 | 280,000 | | | | 375,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | | | 70,000 | 25,000 | 280,000 | | | | 375,000 |
| **Total** | | | | | 70,000 | 25,000 | 280,000 | | | | 375,000 |

ST16026 - Multiuse Trail Forrest Crossing Blvd
S Royal Oaks Blvd
Forrest Crossing Blvd
City of Franklin TN GIS Dept.

**Project #** ST16027

**Project Name** Boyd Mill Ave (Downs to SR96W)

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 2 Star Project
**Status** Active

**Total Cost** $7,421,542

## Description

Boyd Mill Avenue is a major collector that needs to be upgraded to City standards. The upgrad will occur from Highway 96 West (SR-96W) to Downs Blvd). This project would include two 12' travel lanes, turn lanes as requried, bike lanes, curb and gutter, sidewalks and street lights.

## Justification

Boyd Mill is a key residential roadway that moves residents from their neighborhood to Highway 96 so they can access the larger network and get through the city or to the interstate. In addition this roadway provide connectivity to the existing park facilities.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | | | 390,000 | | | 390,000 |
| ROW and Easements | | | | | | | | | 500,000 | | 500,000 |
| Construction Engineering / Inspection | | | | | | | | | | 500,000 | 500,000 |
| Construction | | | | | | | | | | 6,031,542 | 6,031,542 |
| **Total** | | | | | | | | 390,000 | 500,000 | 6,531,542 | 7,421,542 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | | | | | | 390,000 | 500,000 | 5,715,279 | 6,605,279 |
| Stormwater | | | | | | | | | | 191,263 | 191,263 |
| Water Renewal | | | | | | | | | | 385,000 | 385,000 |
| Wastewater Renewal | | | | | | | | | | 240,000 | 240,000 |
| **Total** | | | | | | | | 390,000 | 500,000 | 6,531,542 | 7,421,542 |

ST16027 - Boyd Mill Ave (Downs to SR96W)
SR96
Boyd Mill Ave
Downs Blvd
City of Franklin TN GIS Dept.

**Project #** ST16028

**Project Name** Clovercroft Road (SR96 to Oxford Glen)

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 3 Star Project
**Status** Pending

**Total Cost** $14,458,150

## Description

Upgrade Clovercroft Roadway to include 3 lanes, curb and gutter, 12' trail on the north side, sidewalk on the south side, and drainage improvements.

## Justification

Clovercroft Road is proposed to be upgraded to City standards from Murfreesboro Road (SR-96) to Oxford Glen Drive. This is a key section of road that connects neighborhoods to Murfreesboro Road and to Oxford Glen which provides connections into the Cool Springs Area and I-65.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | 500,000 | 500,000 | | | | 1,000,000 |
| ROW and Easements | | | | | | | | 1,500,000 | | | 1,500,000 |
| Construction Engineering / Inspection | | | | | | | | | 1,200,000 | | 1,200,000 |
| Construction | | | | | | | | | 10,758,150 | | 10,758,150 |
| **Total** | | | | | | 500,000 | 500,000 | 1,500,000 | 11,958,150 | | 14,458,150 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | | | | 500,000 | 500,000 | 1,500,000 | 10,940,243 | | 13,440,243 |
| Stormwater | | | | | | | | | 537,907 | | 537,907 |
| Wastewater Renewal | | | | | | | | | 480,000 | | 480,000 |
| **Total** | | | | | | 500,000 | 500,000 | 1,500,000 | 11,958,150 | | 14,458,150 |

ST16028 - Clovercroft Road (SR96 to Oxford Glen)
Oxford Glen Dr
Clovercroft Road
SR96
City of Franklin TN GIS Dept.

**Project #** ST16029

**Project Name** Multi-Use Trail S Royal Oaks Blvd

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$810,000**

## Description

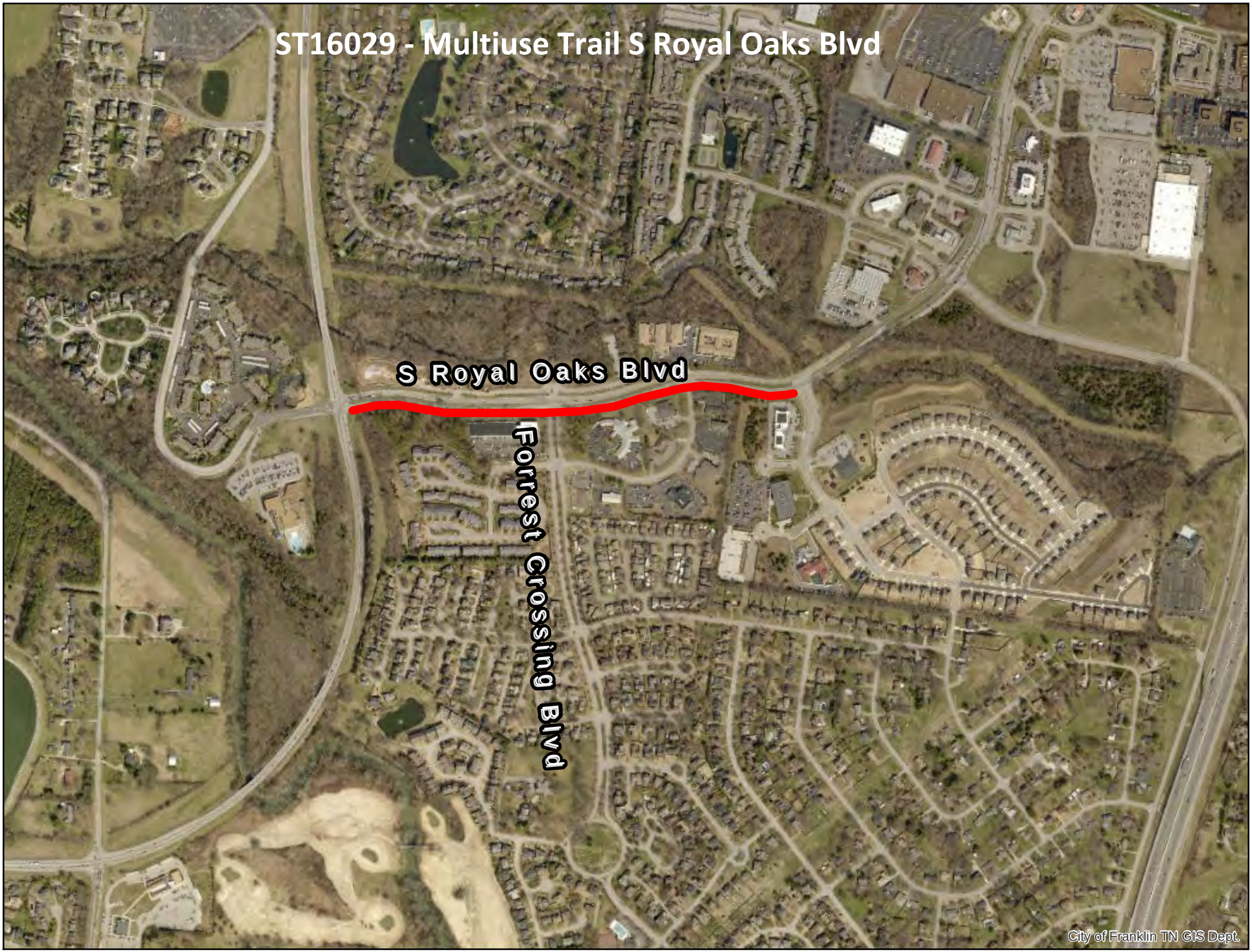
Upgrade existing sidewalk along S Royal Oaks Blvd to a 12' wide multiuse Trail

## Justification

This trail system will provide connectivity from the Creekstone and Forrest Crossing HOA to the future Mack Hatcher Parkway Multiuse Trail.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | | | 60,000 | | | 60,000 |
| ROW and Easements | | | | | | | | | 50,000 | | 50,000 |
| Construction | | | | | | | | | | 700,000 | 700,000 |
| **Total** | | | | | | | | 60,000 | 50,000 | 700,000 | 810,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | | | | | | 60,000 | 50,000 | 700,000 | 810,000 |
| **Total** | | | | | | | | 60,000 | 50,000 | 700,000 | 810,000 |


ST16029 - Multiuse Trail S Royal Oaks Blvd
S Royal Oaks Blvd
Forrest Crossing Blvd
City of Franklin TN GIS Dept.

**Project #** ST16030

**Project Name** Sidewalk Lewisburg Ave

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 4 Star Project
**Status** Pending

**Total Cost** **$580,000**

## Description

Build a sidewalk along the north side of Lewisburg Ave. This project will require the installation of curb and gutter, storm infastrcutre and a rebuilding at least one lane of traffic.

## Justification

This will provide additional sidewalk in our downtown and provide connectivity to Thompson Alley and the Park.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | 80,000 | | | | | | | | | | 80,000 |
| ROW and Easements | | 100,000 | | | | | | | | | 100,000 |
| Construction | | | 400,000 | | | | | | | | 400,000 |
| **Total** | 80,000 | 100,000 | 400,000 | | | | | | | | 580,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | 80,000 | 100,000 | 400,000 | | | | | | | | 580,000 |
| **Total** | 80,000 | 100,000 | 400,000 | | | | | | | | 580,000 |

ST16030 - Sidewalk Lewisburg Ave
Lewisburg Ave
tewart St
Thompson Al
City of Franklin TN GIS Dept.

**Project #** **ST16031**

**Project Name** **Liberty Pike Sidewalk**

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 3 Star Project
**Status** Pending

**Total Cost** **$102,000**

## Description

Install 850' of sidewalk from CSCC property line to Turning Wheel Ln.

## Justification

As developmoent continues along Liberty Pike, this will be the one remaining section of sidewalk needed to connect McKays Mill Area to Carothers Parkway.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Construction | | 102,000 | | | | | | | | | 102,000 |
| **Total** | | 102,000 | | | | | | | | | 102,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | 102,000 | | | | | | | | | 102,000 |
| **Total** | | 102,000 | | | | | | | | | 102,000 |

ST16031 - Sidewalk liberty Pike
Turning Wheel Ln
Liberty Pike
City of Franklin TN GIS Dept.

**Project #** ST16032

**Project Name** West Main Street (Natchez St to Downs Blvd)

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 4 Star Project
**Status** Pending

**Total Cost** **$8,752,750**

## Description

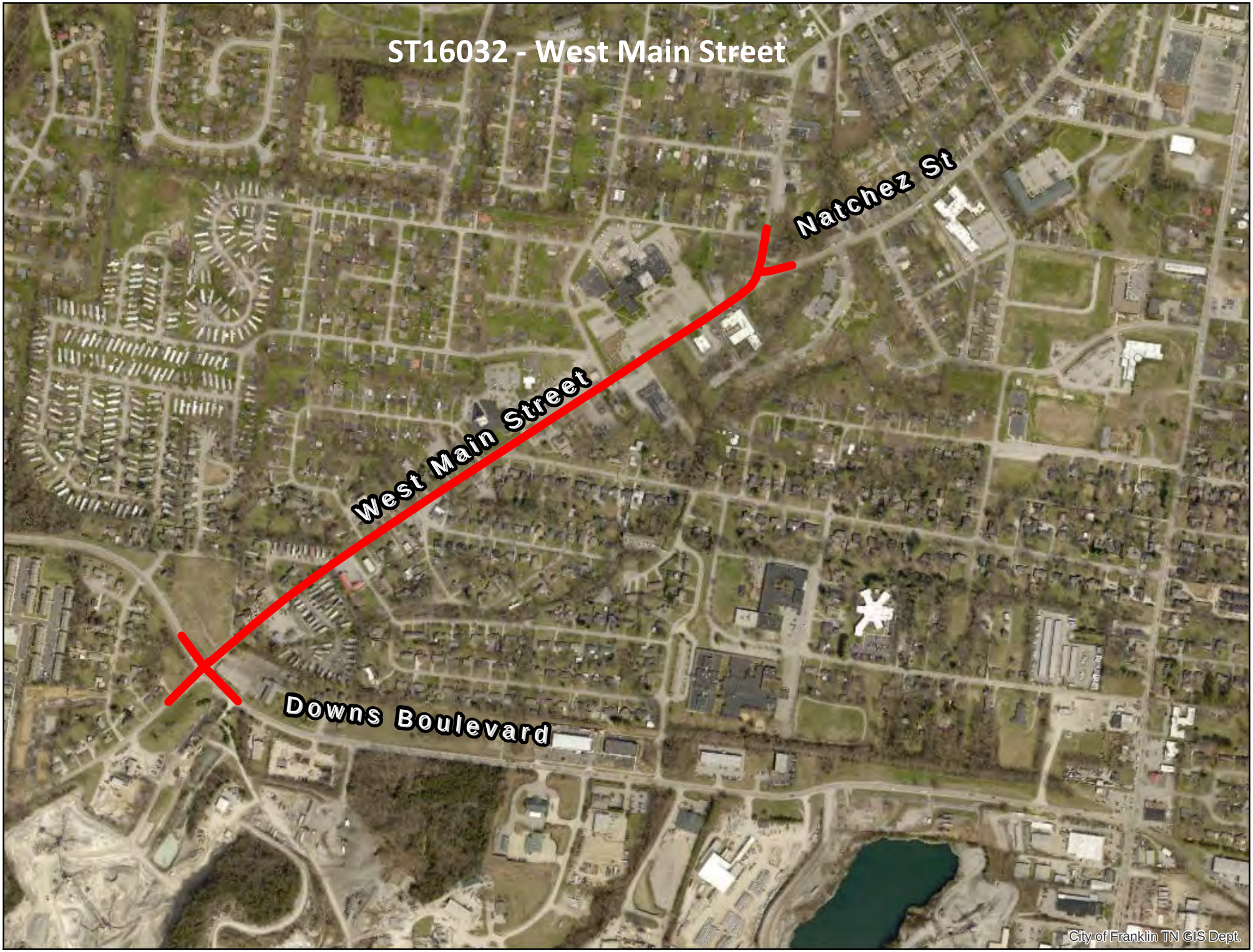
Widen existing roadway to 3 lanes, curb and gutter, drainage and sidewalks.

## Justification

West Main Street has a mixture of heavy commercial, industrial and residental use. Currently this roadway has limited sidewalks and turnlanes. The 2015 LOS is C from Natchez Street to Battle Avenue and a D from Battle Avenue to Downs Boulevard. Following the improvements the LOS is expected to be a B.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | 300,000 | 300,000 | | | | 600,000 |
| ROW and Easements | | | | | | | | 1,300,000 | | | 1,300,000 |
| Construction Engineering / Inspection | | | | | | | | | 600,000 | | 600,000 |
| Construction | | | | | | | | | 6,252,750 | | 6,252,750 |
| **Total** | | | | | | 300,000 | 300,000 | 1,300,000 | 6,852,750 | | 8,752,750 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Road Impact Fees | | | | | | 300,000 | 300,000 | 1,300,000 | 5,250,000 | | 7,150,000 |
| Stormwater | | | | | | | | | 250,000 | | 250,000 |
| Water Capacity | | | | | | | | | 212,575 | | 212,575 |
| Wastewater Capacity | | | | | | | | | 463,800 | | 463,800 |
| Water Renewal | | | | | | | | | 212,575 | | 212,575 |
| Wastewater Renewal | | | | | | | | | 463,800 | | 463,800 |
| **Total** | | | | | | 300,000 | 300,000 | 1,300,000 | 6,852,750 | | 8,752,750 |


ST16032 - West Main Street
Natchez St
West Main Street
Downs Boulevard
City of Franklin TN GIS Dept.

**Project #** ST16033

**Project Name** Carters Creek Pk (Old Carters Creek - Downs Blvd)

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 2 Star Project
**Status** Active

**Total Cost** $23,287,500

## Description

Widen existing roadway from 2 to 4 lanes, add curb and gutter, improve storm drainage, upgrade utilities and incorporate pedestrian facilities.

## Justification

Carters Creek Pike (SR-246) will be widened from 2 to 4 lanes to help the flow of traffic. The widening will happen from Mack Hatcher Parkway to Downs Boulevard. The 2015 LOS is C in two small segmenets and B for the majority of the road. The 2040 LOS after improvements changes slightly to a LOS of B from Downs Boulevard to the future Mack Hatcher Parkway.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | | 750,000 | 750,000 | | | 1,500,000 |
| ROW and Easements | | | | | | | | | 3,000,000 | | 3,000,000 |
| Construction Engineering / Inspection | | | | | | | | | | 1,500,000 | 1,500,000 |
| Construction | | | | | | | | | | 17,287,500 | 17,287,500 |
| **Total** | | | | | | | 750,000 | 750,000 | 3,000,000 | 18,787,500 | 23,287,500 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Road Impact Fees | | | | | | | 750,000 | 750,000 | 3,000,000 | 16,300,000 | 20,800,000 |
| Stormwater | | | | | | | | | | 1,000,000 | 1,000,000 |
| Water Capacity | | | | | | | | | | 233,750 | 233,750 |
| Wastewater Capacity | | | | | | | | | | 510,000 | 510,000 |
| Water Renewal | | | | | | | | | | 233,750 | 233,750 |
| Wastewater Renewal | | | | | | | | | | 510,000 | 510,000 |
| **Total** | | | | | | | 750,000 | 750,000 | 3,000,000 | 18,787,500 | 23,287,500 |

ST16033 - Carters Creek Pike
West Main Street
Downs Boulevard
Carters Creek Pike
City of Franklin TN GIS Dept.

**Project #** ST16034

**Project Name** Jordan Road (McEwen - Liberty)

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$2,400,000**

## Description

Improve existing 2 lanes to add curb and gutter, drainage, and sidewalks

## Justification

Jordan Road is a rural roadway surrounded by an urban environment. As development continues in this area of the city we need to look at improving the roadway to city standards.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | 150,000 | 100,000 | | | | | | 250,000 |
| ROW and Easements | | | | | | 450,000 | | | | | 450,000 |
| Construction Engineering / Inspection | | | | | | | 250,000 | | | | 250,000 |
| Construction | | | | | | | 1,450,000 | | | | 1,450,000 |
| **Total** | | | | 150,000 | 100,000 | 450,000 | 1,700,000 | | | | 2,400,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | | 150,000 | 100,000 | 450,000 | 1,390,000 | | | | 2,090,000 |
| Stormwater | | | | | | | 70,000 | | | | 70,000 |
| Wastewater Capacity | | | | | | | 120,000 | | | | 120,000 |
| Wastewater Renewal | | | | | | | 120,000 | | | | 120,000 |
| **Total** | | | | 150,000 | 100,000 | 450,000 | 1,700,000 | | | | 2,400,000 |

ST16034 - Jordan Road
Jordan Road
McEwen Dr
Jordan Road
Liberty Pike
City of Franklin TN GIS Dept.

**Project #** ST16035

**Project Name** Columbia Ave (Downs Blvd to Fowlkes St)

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 2 Star Project
**Status** Pending

**Total Cost** $17,900,000

## Description

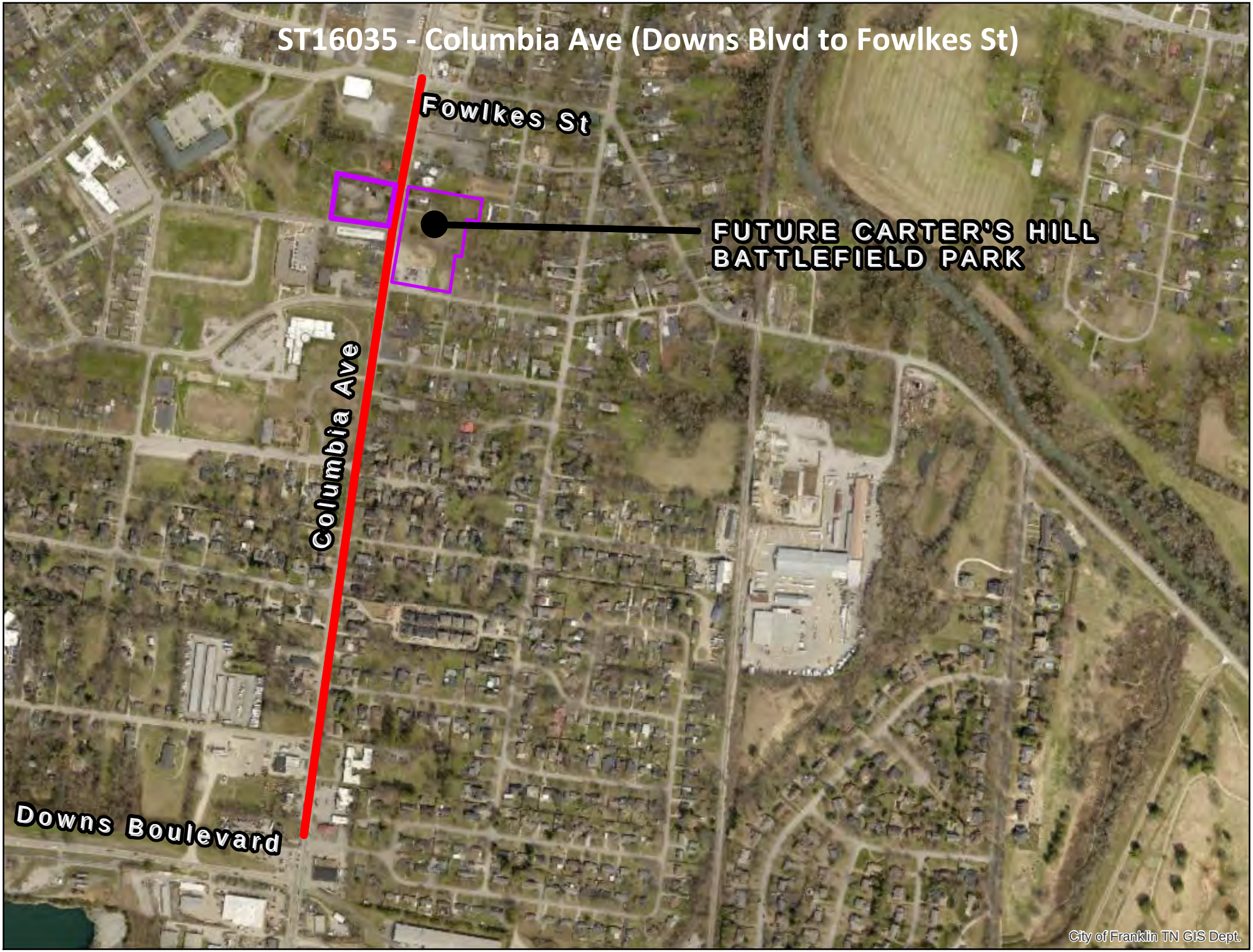
Columbia Avenue, a major arterial will be widen from 2 to 3 lanes from Fowlkes Street to Downs Boulevard.

## Justification

This roadway is an important part of the Downtown grid network. Columbia Avenue is one of the major corridors used to get downtown and it carries both car and truck traffic. There will be increased pressure on the City to improve this corridor as the Carter's Hill Battlefield Park develops out over the next few years.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | 750,000 | 750,000 | | | | | | | 1,500,000 |
| ROW and Easements | | | | | 1,500,000 | | | | | | 1,500,000 |
| Construction Engineering / Inspection | | | | | | 1,200,000 | | | | | 1,200,000 |
| Construction | | | | | | 13,700,000 | | | | | 13,700,000 |
| **Total** | | | 750,000 | 750,000 | 1,500,000 | 14,900,000 | | | | | 17,900,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Road Impact Fees | | | 750,000 | 750,000 | 1,500,000 | 12,822,000 | | | | | 15,822,000 |
| Stormwater | | | | | | 700,000 | | | | | 700,000 |
| Water Capacity | | | | | | 209,000 | | | | | 209,000 |
| Wastewater Capacity | | | | | | 480,000 | | | | | 480,000 |
| Water Renewal | | | | | | 209,000 | | | | | 209,000 |
| Wastewater Renewal | | | | | | 480,000 | | | | | 480,000 |
| **Total** | | | 750,000 | 750,000 | 1,500,000 | 14,900,000 | | | | | 17,900,000 |


ST16035 - Columbia Ave (Downs Blvd to Fowlkes St)
Fowlkes St
FUTURE CARTER'S HILL
BATTLEFIELD PARK
Columbia Ave
Downs Boulevard
City of Franklin TN GIS Dept.

**Project #** ST16036

**Project Name** Hillsboro Road Temporary Sidewalk

**Department** Streets
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 20+
**Category** Transportation
**Priority** 1 Star Project
**Status** Active

**Total Cost** $550,000

## Description

Build a temporary Sidewalk from North of Claude Yates Dr to North of Mack Hatcher Parkway

## Justification

This work is currently included in the Mack Hatcher NW Extension Project. It is unknown when the state will fund the construction of Mack Hatcher, leaving a critical gap in our pedestrian network. The purpose of this project is to construct a temporary sidewalk along Hillsboro Road to provide safe pedestrian facilities.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | 80,000 | | | | | | | | | | 80,000 |
| Construction | | 470,000 | | | | | | | | | 470,000 |
| **Total** | 80,000 | 470,000 | | | | | | | | | 550,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | 80,000 | 470,000 | | | | | | | | | 550,000 |
| **Total** | 80,000 | 470,000 | | | | | | | | | 550,000 |

ST16036 - Hillsboro Road Temporary Sidewalk
Mack Hatcher Parkway
Hillsboro Road
City of Franklin TN GIS Dept.

**Project #** ST16037

**Project Name** Sidewalk Gaps

**Department** Streets
**Contact** Engineering Director
**Type** New
**Useful Life** 20+
**Category** Transportation
**Priority** 4 Star Project
**Status** Pending

**Total Cost** **$1,250,000**

## Description

Annual budget of $250,000 over a 5-year period to "fill-in" gaps in the existing sidewalk network.

## Justification

Segments of sidewalk that do not have logical connections (e.g gaps) exist in many areas around the City. An dedicated budget item on an annual basis would allow the City the opportunity to complete existing sidewalk networks by "filling-in" these gaps.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Construction | 250,000 | 250,000 | 250,000 | 250,000 | 250,000 | | | | | | 1,250,000 |
| **Total** | 250,000 | 250,000 | 250,000 | 250,000 | 250,000 | | | | | | 1,250,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | 250,000 | 250,000 | 250,000 | 250,000 | 250,000 | | | | | | 1,250,000 |
| **Total** | 250,000 | 250,000 | 250,000 | 250,000 | 250,000 | | | | | | 1,250,000 |

*This Page Intentionally Blank*

**Project #** ST16038

**Project Name** Major Street Resurfacing

**Department** Streets
**Contact** Streets Director
**Type** Maintenance
**Useful Life** 10-20 years
**Category** Transportation
**Priority** 2 Star Project
**Status** Pending

**Total Cost** **$13,800,000**

## Description

The resurfacing (e.g. paving) of major roadways within the City are proposed to be included in the Capital Investment Plan (CIP) as follows:

2017 - Cool Springs Blvd, from Mack Hatcher Pkwy to East McEwen Dr
2018 - Royal Oaks Blvd/Mallory Ln, from Mack Hatcher Pkwy to Cool Springs Blvd
2019 - Mallory Ln, from Cool Springs Blvd to Moores Ln
2020 - Liberty Pk, from Franklin Rd to Broadgate Dr/Waverly Pl
2021 - Del Rio Pk, from Cotton Ln to Hillsboro Rd
2022 - Carothers Pkwy, from Long Ln to Isabella Ln
2023 - East McEwen Dr, from Cool Springs Blvd to Wilson Pk
2024 - Boyd Mill Ave/Carlisle Ln, from SR-96W (Jim Warren Park) to Del Rio Pk

As expected, any scheduled maintenance would be signficantly postponed by the funding over major reconstruction projects. For example, the funding of the East McEwen Drive Phase 4 Project would eliminate the immediate need to repave that section of East McEwen Drive, as repaving would be performed as a part of the reconstruction project.

## Justification

Currently, the City of Franklin Streets Department primarily utilizes State Street Aid to fund the maintenance (e.g. paving) of City streets. The yearly shortfall in available funds for resurfacing projects forces the City to extend to time between pavement maintenance to an undesirable level (e.g. greater than 20 year cycle). To meet the needs of the entire City, large projects must be broken into many projects over a multi-year timespan. This can lead to shorter pavement life and less than desirable rideability.

The inclusion of major resurfacing projects in the Capital Investment Plan (CIP) would allow the Streets Department to focus their annual budget on local streets and minor collectors. This additional funding would also allow for a shorter cycle between paving cycles, which will lead to better street conditions.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Construction | 2,400,000 | 1,700,000 | 1,300,000 | 900,000 | 1,800,000 | 3,100,000 | 1,700,000 | 900,000 | | | 13,800,000 |
| **Total** | 2,400,000 | 1,700,000 | 1,300,000 | 900,000 | 1,800,000 | 3,100,000 | 1,700,000 | 900,000 | | | 13,800,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | 2,400,000 | 1,700,000 | 1,300,000 | 900,000 | 1,800,000 | 3,100,000 | 1,700,000 | 900,000 | | | 13,800,000 |
| **Total** | 2,400,000 | 1,700,000 | 1,300,000 | 900,000 | 1,800,000 | 3,100,000 | 1,700,000 | 900,000 | | | 13,800,000 |

*This Page Intentionally Blank*

**Project #** **TOC16001**

**Project Name** **Carothers Parkway (South) ITS Extension**

**Department** Traffic Ops. Center (TOC)
**Contact** Engineering Director
**Type** New
**Useful Life** 10-20 years
**Category** Transportation
**Priority** 4 Star Project
**Status** Pending

**Total Cost** **$1,375,000**

## Description

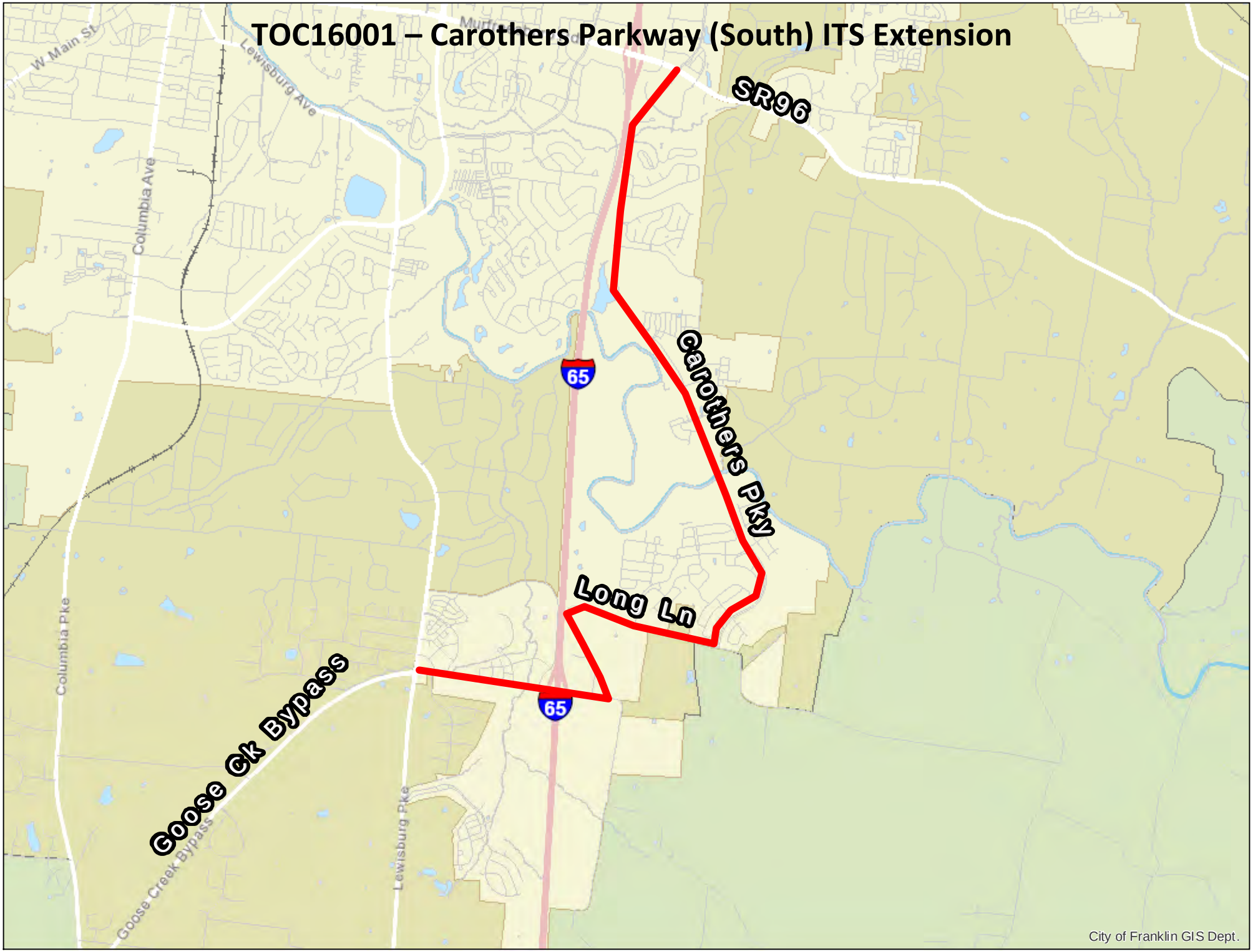
Project includes: 35,000 LF fiber optic cable, 13,000 LF of conduit with pull boxes, and five (5) closed caption television (CCTV) cameras.

## Justification

The project will provide communication to/from Carothers Parkway (from Long Lane to Murfreesboro Road), Fire Station 7 (Ag Center), the seven (7) intersections along Goose Creek Bypass (SR-248) and Peytonsville Road (from Lewisburg Pike to Long Lane), and the existing CCTV camera at Lewisburg Pike (SR-106/US-431). Approximate project length is 35,000 LF.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | 125,000 | | | | | | | | | | 125,000 |
| Construction Engineering / Inspection | 20,000 | 30,000 | | | | | | | | | 50,000 |
| Construction | 400,000 | 800,000 | | | | | | | | | 1,200,000 |
| **Total** | 545,000 | 830,000 | | | | | | | | | 1,375,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | 545,000 | 830,000 | | | | | | | | | 1,375,000 |
| **Total** | 545,000 | 830,000 | | | | | | | | | 1,375,000 |


TOC16001 – Carothers Parkway (South) ITS Extension
SR96
Carothers Pky
Long Ln
Goose Ck Bypass
65
65
W Main St
Lewisburg Ave
Columbia Ave
Columbia Pke
Goose Creek Bypass
Lewisburg Pke
City of Franklin GIS Dept.

**Project #** **TOC16002**

**Project Name** **ITS Camera at Columbia Ave & Mack Hatcher Pkwy**

**Department** Traffic Ops. Center (TOC)
**Contact** Engineering Director
**Type** New
**Useful Life** 4-10 years
**Category** Transportation
**Priority** 2 Star Project
**Status** Pending

**Total Cost** **$85,000**

## Description

Install closed caption television (CCTV) camera to monitor traffic at the intersection of Mack Hatcher Parkway (SR-397) and Columbia Avenue (SR-6/US-31).

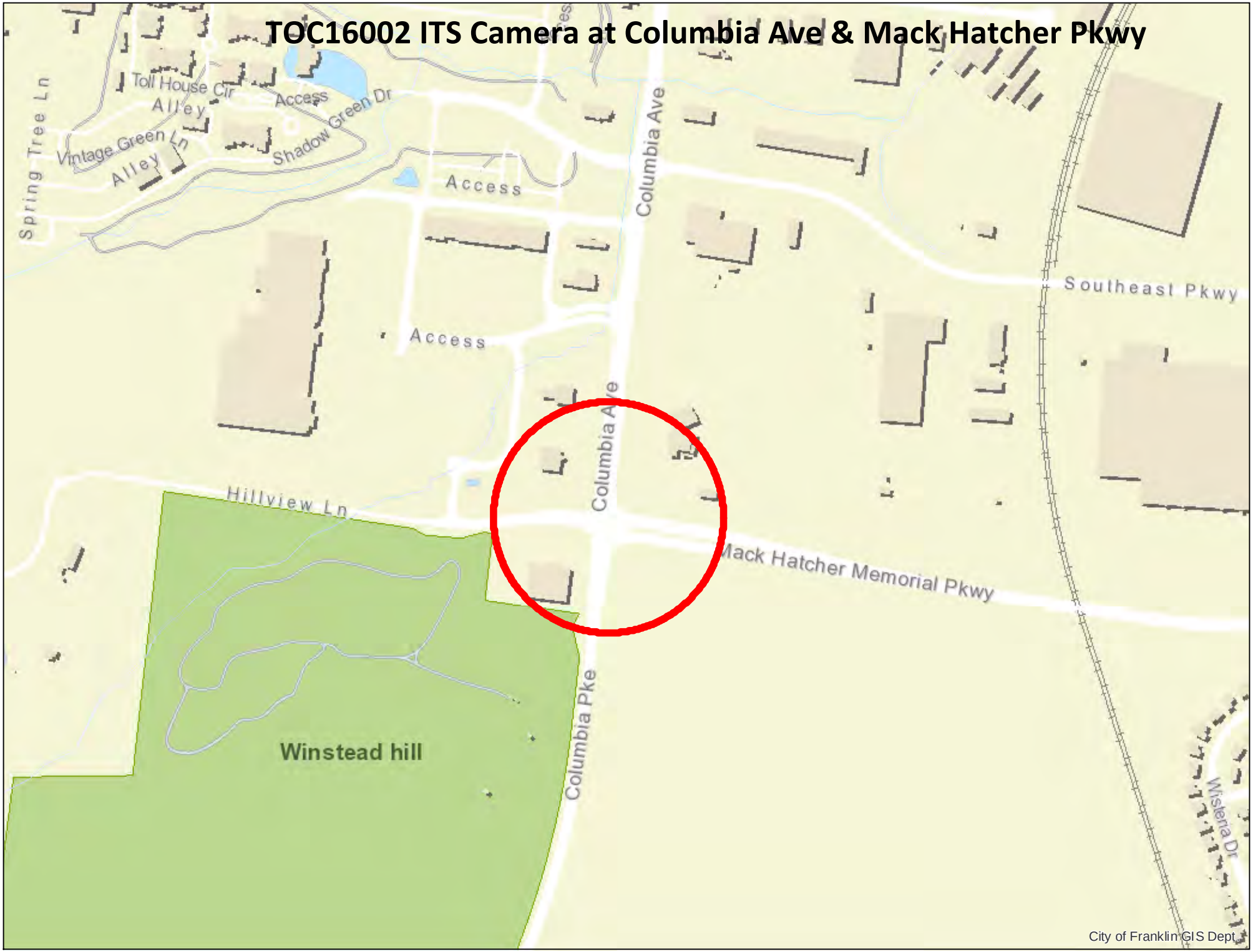
## Justification

This camera will allow the Traffic Operations Center (TOC) to better monitor traffic in this busy area. The camera could also be utilized to monitor issues during the construction of the Columbia Avenue Widening Project.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | 10,000 | | | | | | | | 10,000 |
| Construction Engineering / Inspection | | | 10,000 | | | | | | | | 10,000 |
| Construction | | | 65,000 | | | | | | | | 65,000 |
| **Total** | | | 85,000 | | | | | | | | 85,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | 85,000 | | | | | | | | 85,000 |
| **Total** | | | 85,000 | | | | | | | | 85,000 |

# TOC16002 ITS Camera at Columbia Ave & Mack Hatcher Pkwy



**Project #** **TOC16003**

**Project Name** **ITS Camera at Franklin Rd and Mallory Station Rd**

**Department** Traffic Ops. Center (TOC)
**Contact** Engineering Director
**Type** New
**Useful Life** 4-10 years
**Category** Transportation
**Priority** 2 Star Project
**Status** Pending

**Total Cost** **$85,000**

## Description

Install closed caption television (CCTV) camera to monitor traffic at the intersection of Franklin Road (SR-6/US-31) and Mallory Station Road.

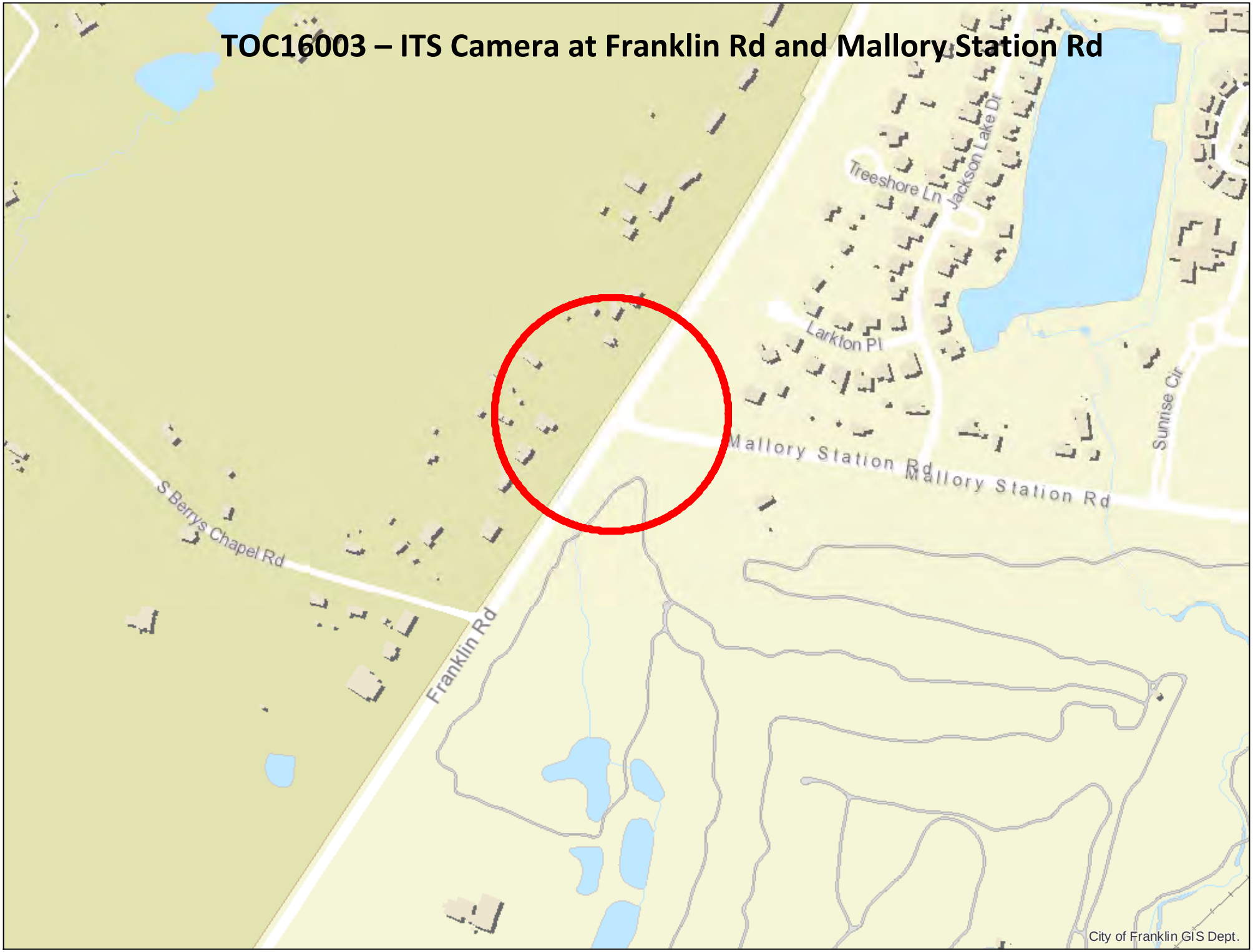
## Justification

This camera will allow the Traffic Operations Center (TOC) to better monitor traffic in this busy area.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | 10,000 | | | | | | | | 10,000 |
| Construction Engineering / Inspection | | | 10,000 | | | | | | | | 10,000 |
| Construction | | | 65,000 | | | | | | | | 65,000 |
| **Total** | | | 85,000 | | | | | | | | 85,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | 85,000 | | | | | | | | 85,000 |
| **Total** | | | 85,000 | | | | | | | | 85,000 |

# TOC16003 – ITS Camera at Franklin Rd and Mallory Station Rd



**Project #** **TOC16004**

**Project Name** **Hilllsboro Road ITS Extension**

**Department** Traffic Ops. Center (TOC)
**Contact** Engineering Director
**Type** New
**Useful Life** 10-20 years
**Category** Transportation
**Priority** 3 Star Project
**Status** Pending

**Total Cost** **$700,000**

## Description

Project includes: 11,000 LF of fiber optic cable, 9,000 LF conduit and pull boxes, three (3) closed caption television (CCTV) cameras, and connection to three (3) existing traffic signals.

## Justification

This project will allow Traffic Operations Center (TOC) personnel to better monitor traffic and existing signals on the Hillsboro Road (SR-106/US-431) corridor.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | 75,000 | | | | | | | | 75,000 |
| Construction Engineering / Inspection | | | 30,000 | 45,000 | | | | | | | 75,000 |
| Construction | | | 200,000 | 350,000 | | | | | | | 550,000 |
| **Total** | | | 305,000 | 395,000 | | | | | | | 700,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | 305,000 | 395,000 | | | | | | | 700,000 |
| **Total** | | | 305,000 | 395,000 | | | | | | | 700,000 |

# TOC16004 - Hillsboro Road ITS Extension

**Project #** TOC16005

**Project Name** Highway 96 West ITS Extension - Phase 1

**Department** Traffic Ops. Center (TOC)
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 10-20 years
**Category** Transportation
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$285,000**

## Description

This project would replace existing aerial fiber that is currently attached to 3rd party utility poles along Highway 96 West (SR-96W), from 11th Avenue North to Downs Boulevard. Project includes: 7,500 LF of fiber optic cable and 6,000 LF of conduit & pull boxes.

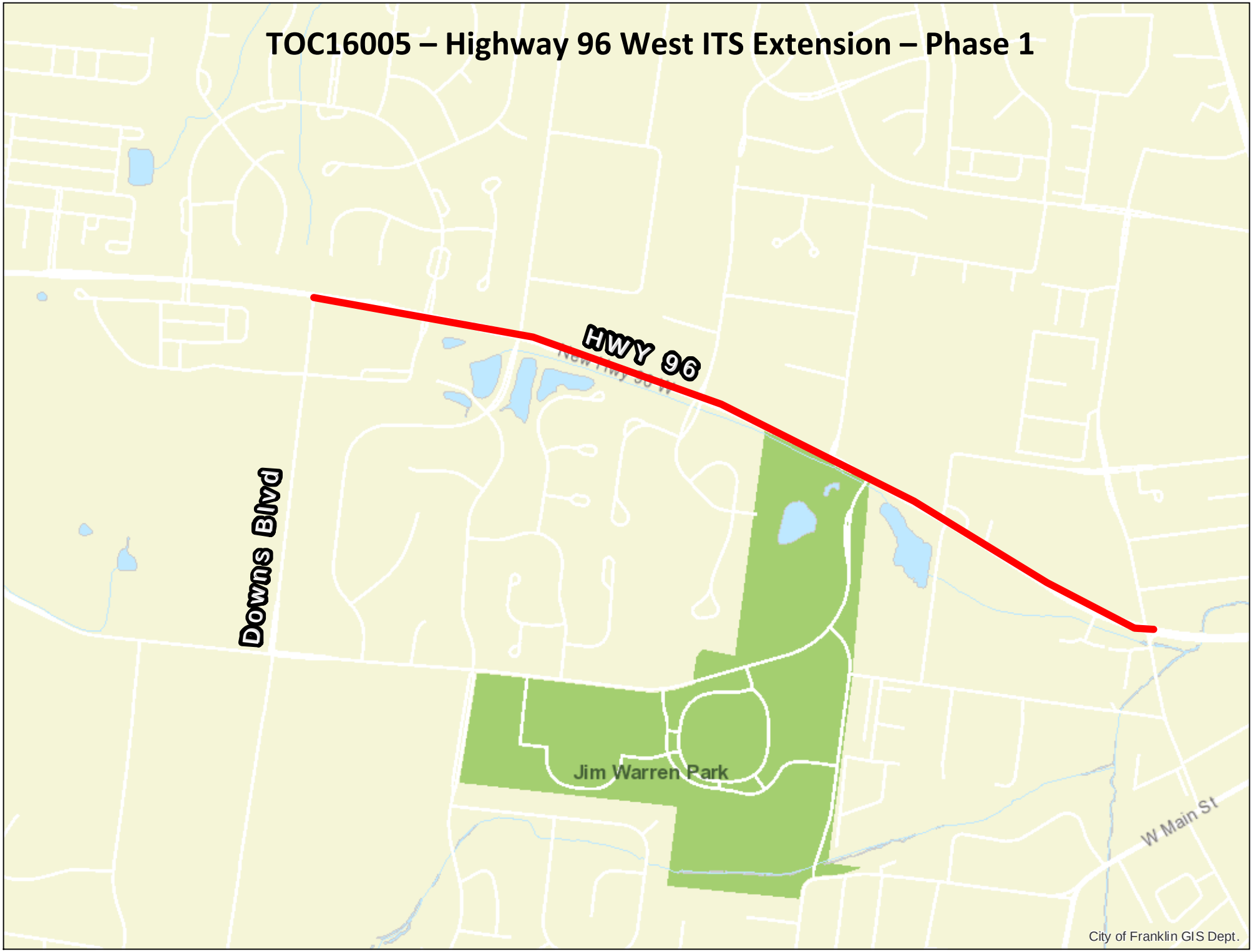
## Justification

This project will provide a secure, underground conduit system for City of Franklin IT & ITS communication fiber optic cable, from Downs Boulevard to 11th Avenue North.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | | 35,000 | | | | 35,000 |
| Construction Engineering / Inspection | | | | | | | 25,000 | | | | 25,000 |
| Construction | | | | | | | 225,000 | | | | 225,000 |
| **Total** | | | | | | | 285,000 | | | | 285,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | | | | | 285,000 | | | | 285,000 |
| **Total** | | | | | | | 285,000 | | | | 285,000 |

# TOC16005 – Highway 96 West ITS Extension – Phase 1



**Project #** **TOC16006**

**Project Name** **Highway 96 West ITS Extension - Phase 2**

**Department** Traffic Ops. Center (TOC)
**Contact** Engineering Director
**Type** Improvement
**Useful Life** 10-20 years
**Category** Transportation
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$310,000**

## Description

This project would replace existing aerial fiber that is currently attached to 3rd party utility poles along Highway 96 West (SR-96W), from Westhaven Boulevard to Downs Boulevard. Project includes: 8,500 LF of fiber optic cable and 7,000 LF of conduit & pull boxes. This system would provide connection to the traffic signals at Carlisle Lane and at Mack Hatcher Parkway (SR-397).

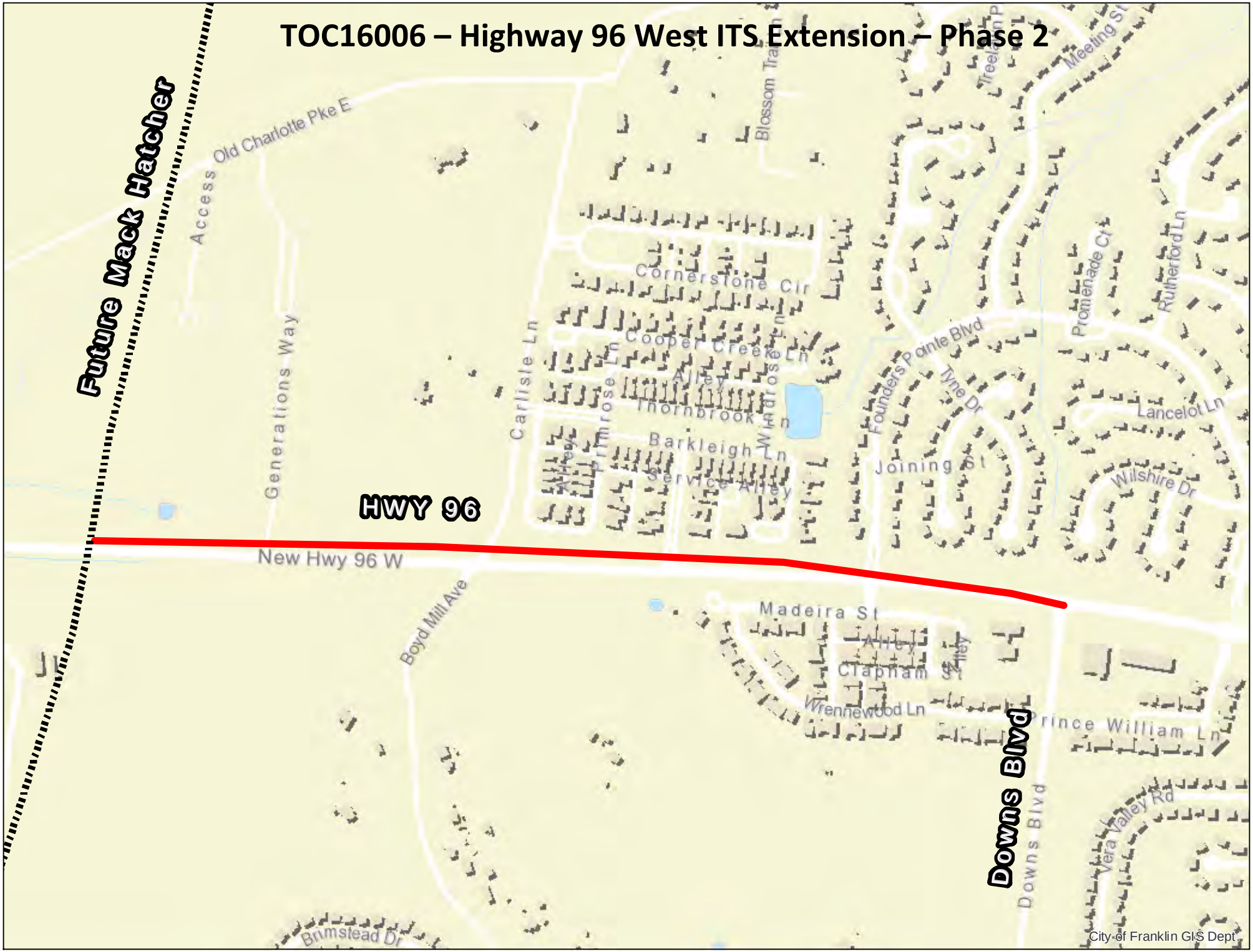
## Justification

This project will provide a secure, underground conduit system for City of Franklin IT & ITS communication fiber optic cable, from Westhaven Boulevard to Downs Boulevard.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | | | 35,000 | | | 35,000 |
| Construction Engineering / Inspection | | | | | | | | 25,000 | | | 25,000 |
| Construction | | | | | | | | 250,000 | | | 250,000 |
| **Total** | | | | | | | | 310,000 | | | 310,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | | | | | | 310,000 | | | 310,000 |
| **Total** | | | | | | | | 310,000 | | | 310,000 |

# TOC16006 – Highway 96 West ITS Extension – Phase 2



**Project #** **TOC16007**

**Project Name** **Lewisburg Pike ITS Extension**

**Department** Traffic Ops. Center (TOC)
**Contact** Engineering Director
**Type** New
**Useful Life** 10-20 years
**Category** Transportation
**Priority** 1 Star Project
**Status** Pending

**Total Cost** **$150,000**

## Description

This project would install fiber optic communication cable on existing utlity poles along Lewisburg Pike (SR-106/US-431), from Goose Creek Bypass (SR-248) to Mack Hatcher Parkway (SR-397). Project includes approximnately 15,000 LF of fiber optic cable with connection to existing traffic signals.

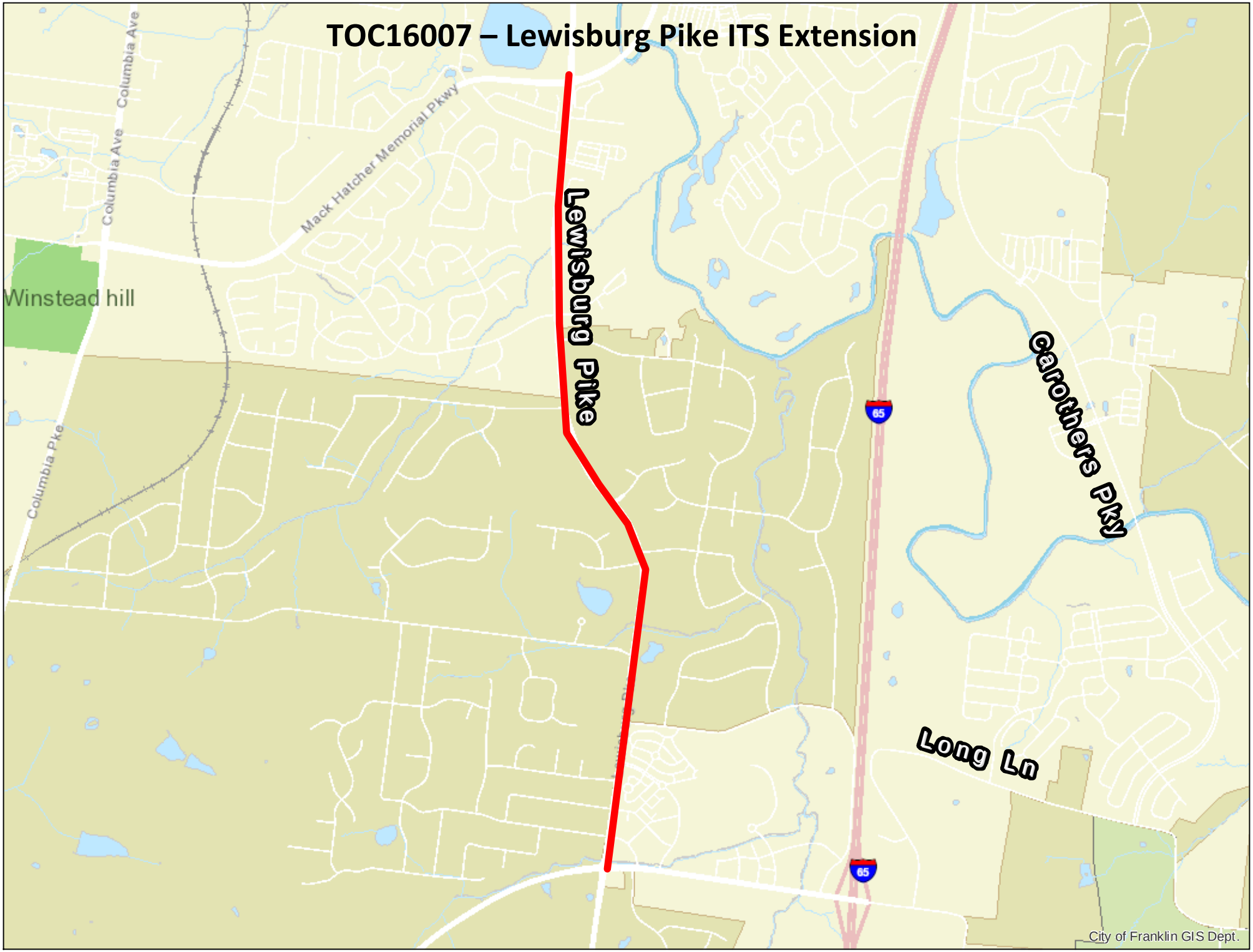
## Justification

This project would provide a redundant communication system for traffic signals and ITS equipment in the Goose Creek Area.

| Expenditures | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Design/Planning (Professional Services) | | | | | | | | | 25,000 | | 25,000 |
| Construction | | | | | | | | | 125,000 | | 125,000 |
| **Total** | | | | | | | | | 150,000 | | 150,000 |

| Funding Sources | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 | FY 22 | FY 23 | FY 24 | FY 25 | FY 26 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | | | | | | | | 150,000 | | 150,000 |
| **Total** | | | | | | | | | 150,000 | | 150,000 |

# TOC16007 – Lewisburg Pike ITS Extension



## STREET PROJECT NOT INCLUDED IN THE FY2017-2026 CIP

| PROJECT | Proposed: Debt Service Paid By | EST. COST |
|---|---|---|
| Boyd Mill Ave - Westhaven Connector | General Fund | $ 2,294,006 |
| Carlisle Lane Improvements - North of SR 96W to Mack Hatcher | General Fund | $ 5,153,085 |
| Carothers Pkwy - (Liberty to SR96E) | General & Road Impact Fund | $ 12,959,050 |
| Carothers Pkwy - (Merdian Blvd to Nissan Way) | General & Road Impact Fund | $ 11,821,740 |
| Carothers Pkwy - (Nissan Way to Liberty | General & Road Impact Fund | $ 19,922,146 |
| Carothers Pkwy - (Northern City Limits to Merdian Blvd) | General & Road Impact Fund | $ 12,936,000 |
| Cool Springs Boulevard - (Aspen Grove to Mallory) | General & Road Impact Fund | $ 8,276,100 |
| Cool Springs Boulevard - (Mack Hatcher Pkwy to Aspen Grove) | General & Road Impact Fund | $ 11,939,340 |
| Cool Springs Boulevard - (Mallory to Carothers) | General & Road Impact Fund | $ 10,266,480 |
| Del Rio Pike Improvements - (Rizer Point Dr. to Carlisle Ln) | General Fund | $ 5,142,060 |
| Eddy Lane Improvements - LDM Technologies to Liberty Pike | General Fund | $ 2,501,100 |
| Eddy Lane Improvements - LDM Technologies to Murfreesboro Rd (SR 96) | General Fund | $ 2,627,100 |
| Franklin Road (SR 6) Improvements - Mack Hatcher Pkwy (SR 397) to Harpeth Industriao Court | General, Road Impact & State/Federal Fund | $ 9,544,500 |
| Franklin Road Improvements - (Mallory Station Rd to Mack Hatcher) | General, Road Impact & State/Federal Fund | $ 8,834,190 |
| Franklin Road Improvements - (Moore's Lane to Mallory Station Rd) | General, Road Impact & State/Federal Fund | $ 11,252,360 |
| Horton Lane - (Boyd Mill Ave to Northern Boundary of Willow Springs) | General Fund | $ 2,594,340 |
| Liberty Pike (Mack Hatcher to Franklin Rd) | General & Road Impact Fund | $ 12,246,080 |
| Liberty Pike (McKays Mill to Wilson Pike) | General & Road Impact Fund | $ 9,968,620 |
| Lewisburg Pike (SR 106) Widening - Donelson Creek Pkwy to Old Peytonsvill Road | General, Road Impact & State/Federal Fund | $ 22,392,628 |
| Mallory Lane (Moores Ln to Mallory Station Rd) | General & Road Impact Fund | $ 17,640,000 |
| Mallory Lane (Mallory Station Rd to Jordan Road) | General & Road Impact Fund | $ 11,760,000 |
| Mallory Lane (Jordan Road to Liberty PIke) | General & Road Impact Fund | $ 16,758,000 |
| Mack Hatcher Pkwy (SR 397) Widening - Southeast Quadrant (Murfreesboro Rd (SR 96E) to Columbia Ave (SR 6)) | State & Federal | $ 33,108,320 |
| Mack Hatcher Pkwy Extension - Southwest Quadrant | State & Federal | $ 41,577,872 |
| Mallory Station Rd (Mallory Lane to General George Patton) | General Fund | $ 9,033,640 |
| Mallory Station Rd (General George Patton to Franklin Rd) | General Fund | $ 6,468,000 |
| Southeast Parkway Improvements | General Fund | $ 3,671,640 |
| SR 96 West - (Vintage Grove Lane to 11th Ave) | General, Road Impact & State/Federal Fund | $ 16,305,240 |
| Streetscape - SR 96 West (11h Ave to Hillsboro Rd) | State/Federal | $ 10,326,960 |
| Streetscape - Third Ave South (Main St to Harpeth River Bridge) & Fourth Ave (North & South) | State/Federal | $ 6,176,520 |