



City of Franklin

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

Meeting Agenda

Franklin Municipal Planning Commission

Thursday, June 23, 2016

7:00 PM

Board Room

Notice is hereby given that the Franklin Municipal Planning Commission will hold a regular meeting on Thursday, June 23, 2016, at 7:00 p.m. in the City Hall Board Room. Additional information can be found at www.franklin.tn.gov/planning.

The purpose of the meeting will be to consider matters brought to the attention of the Planning Commission and will include the following.

The typical process for discussing an item is as follows:

1. Staff presentation,
2. Public comments,
3. Applicant presentation, and
4. Motion/discussion/vote.

Applicants are encouraged to come to the meeting, even if they agree with the staff recommendation. The Planning Commission may defer or disapprove an application/request unless someone is present to represent it.

For accommodations due to disabilities or other special arrangements, please contact the Human Resources Department at (615) 791-3216, at least 24 hours prior to the meeting.

CALL TO ORDER

MINUTES

1. [16-0529](#) May 26th, 2016, FMPC Minutes

Attachments: [5-26-16 FMPC Minutes](#)

CITIZEN COMMENTS ON ITEMS NOT ON THE AGENDA

Open for Franklin citizens to be heard on items not included on this Agenda. As provided by law, the Planning Commission shall make no decisions or consideration of action of citizen comments, except to refer the matter to the Planning Director for administrative consideration, or to schedule the matter for Planning Commission consideration at a later date. Those citizens addressing the Planning Commission are required to complete a Public Comment Card in order for their name and address to be included within the official record.

ANNOUNCEMENTS

VOTE TO PLACE NON-AGENDA ITEMS ON THE AGENDA

The non-agenda process, by design, is reserved for rare instances, and only minor requests shall be considered. Non-agenda items shall be considered only upon the unanimous approval of all of the Planning Commission members.

CONSENT AGENDA

The items under the consent agenda are deemed by the Planning Commission to be non-controversial and routine in nature and will be approved by one motion. The items on the consent agenda will not be individually discussed. Any member of the Planning Commission, City Staff, or the public desiring to discuss an item on the consent agenda may request that it be removed and placed on the regular agenda. It will then be considered in its printed order.

- Initial Consent Agenda
- Secondary Consent Agenda- to include any items in which Commissioners recuse themselves

SITE PLAN SURETIES

2. [16-0543](#) 510 Columbia Avenue Subdivision, site plan, (FirstBank); release the maintenance agreement for landscaping improvements. (CONSENT AGENDA)
3. [16-0544](#) Bancorp South Subdivision, site plan, (Liberty Pike Office Building); accept the landscaping improvements, release the performance agreement and establish a maintenance agreement for one year. (CONSENT AGENDA)
4. [16-0545](#) Brentwood Pointe III PUD Subdivision, site plan, lot 8 (The View); release the maintenance agreement for landscaping (Phase 2) improvements. (CONSENT AGENDA)
5. [16-0546](#) Hearth at Franklin Subdivision, site plan, (Assisted Living); release the maintenance agreement for landscaping improvements. (CONSENT AGENDA)
6. [16-0547](#) Highlands at Ladd Park PUD Subdivision, site plan, sections 1-4; release the maintenance agreement for landscaping section 2 improvements. (CONSENT AGENDA)
7. [16-0548](#) Hurstbourne Park PUD Subdivision, site plan, sections 1-3; release the maintenance agreement for landscaping (section 1) improvements; extend the performance agreement for landscaping (section 3) improvements. (CONSENT AGENDA)
8. [16-0549](#) LedgeLawn Subdivision, site plan; release the maintenance agreement for landscaping improvements. (CONSENT AGENDA)

9. [16-0550](#) Nissan North America Subdivision, site plan, revision 2 (Parking Addition); accept the landscaping improvements, release the performance agreement and establish a maintenance agreement for one year. (CONSENT AGENDA)
10. [16-0551](#) Silver Grace PUD Subdivision, site plan, section 1; release the maintenance agreement for landscaping Phase A improvements. (CONSENT AGENDA)
11. [16-0552](#) Spring Creek Subdivision, site plan, section 1, revision 4 (Spring Creek Center); release the maintenance agreement for landscaping (Hotel) improvements; extend the performance agreement for landscaping (Retail) improvements. (CONSENT AGENDA)
12. [16-0553](#) Stream Valley PUD Subdivision, site plan, section 3; release the maintenance agreement for landscaping Phase 1 improvements. (CONSENT AGENDA)
13. [16-0554](#) Westhaven PUD Subdivision, site plan, section 21, revision 2 (resubdivision of lot 1140); release the maintenance agreement for landscaping improvements. (CONSENT AGENDA)
14. [16-0555](#) Westhaven PUD Subdivision, site plan, section 22; release the maintenance agreement for landscaping improvements. (CONSENT AGENDA)
15. [16-0556](#) Westhaven PUD Subdivision, site plan, section 26; release the maintenance agreement for landscaping (Phase 1) and landscaping (Phase 2) improvements. (CONSENT AGENDA)
16. [16-0557](#) Westhaven PUD Subdivision, site plan, section 27; extend the performance agreement for landscaping improvements. (CONSENT AGENDA)
17. [16-0558](#) Westhaven PUD Subdivision, site plan, section 28; release the maintenance agreement for landscaping improvements. (CONSENT AGENDA)
18. [16-0559](#) Westhaven PUD Subdivision, site plan, section 34; release the maintenance agreement for landscaping improvements. (CONSENT AGENDA)
19. [16-0560](#) Westhaven PUD Subdivision, site plan, section 35; release the maintenance agreement for landscaping improvements. (CONSENT AGENDA)

REZONINGS AND DEVELOPMENT PLANS

20. [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
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21. [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
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22. [16-0513](#) Consideration of Ordinance 2016-21, "An Ordinance to Rezone 35.74 Acres from Agricultural District to Specific Development Residential 0.56 District for the Property Located North of Del Rio Pike and East of Del Rio Court."; Establishing a Public Hearing for September 27, 2016 (07/28/16 FMPC recommended favorably 6-2)

Sponsors: Franklin Municipal Planning Commission and Josh King

Attachments: [Rizer Withdrawal Request](#)
[6144 MAP RizerPointRezoning.pdf](#)
[Rizer Point Rezoning 6.2.2016.pdf](#)
[Ord 2016-021 RizerPoint_with location map Law Approved](#)
[Rizer Point Rezoning 6.2.2016.pdf](#)
[6144 RP_RZ_Conditions of Approval 01.pdf](#)
[citizen comment Mr. Eric Pan](#)
[citizen comment Mrs Lupe Veloz](#)
[citizen comment Mr Jeff Brodoski](#)
[Item 22- Rizer Agricultural rezoning](#)
[RizerPoint_Letter Mr. ONeal](#)

23. [16-0530](#) Consideration of Resolution 2016-30, "A Resolution to Approving a Development Plan for Rizer Point PUD Subdivision, for the Property Located North of Del Rio Pike and East of Del Rio Court."; Establishing a Public Hearing for September 27, 2016. (07/28/16 FMPC recommended for disapproval 7-1)

Sponsors: Franklin Municipal Planning Commission and Josh King

Attachments: [Rizer Dev Plan Withdrawal request](#)
[6145RizerPointDevPlan.pdf](#)
[Elevations.pdf](#)
[Layout.pdf](#)
[Full_Rizer Point PUD Dev Plan 6.2.2016.pdf](#)
[6145_RizerPoint_COA.pdf](#)
[2016-30 RES_RizerPointPUD Dev Plan with attachment Law Approved](#)
[citizen comment Mr. Eric Pan](#)
[citizen comment Mrs Lupe Veloz](#)
[citizen comment Mr Jeff Brodoski](#)
[Item 23- Rizer development plan](#)
[RizerPoint_Letter Mr. ONeal](#)

24. [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](#)

25. [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](#)

26. [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.r](#)
[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

SITE PLANS, PRELIMINARY PLATS, AND FINAL PLATS

27. [16-0561](#) Highlands at Ladd Park PUD Subdivision, final plat, section 33 & resubdivision of Lot 1080, creating 38 single-family lots and 4 open space lots located southeast of Carothers Parkway and north of Long Lane. (Consent Agenda)

Attachments: [6149 Highlands at Ladd Park Sec 33 FP Conditions of Approval_01.pdf](#)
[6149 Highlands at Ladd Park PUD Subd, FP, Sec 33 Map.pdf](#)
[2016028-52- final plat ladd sec 33-SUBMITTED 6-1-16.pdf](#)

28. [16-0531](#) Sullivan Farms PUD Subdivision, final plat, section G, lots 833-835, a revision to three lots located at the intersection of Inwood Way and Birkdale Court within the Sullivan Farms Subdivision (CONSENT AGENDA)

Sponsors: Franklin Municipal Planning Commission and Josh King

Attachments: [6146sULLIVANfARMSfp.pdf](#)
[SullivanFarmsPlat.pdf](#)
[6146_SullivanFarms_Conditions of Approval_01.pdf](#)

29. [16-0344](#) Watson Glen Subdivision, final plat, Section 1, Revision 17, resubdivision of Lot 24 into 2 lots, on 20.54 acres, located at Oak Meadow Drive. (Consent Agenda)

Attachments: [4.28.16 FMPC item. staff report and attachments](#)
[6091 MAP Watson Glen Subd Sec 1 Rev 17 Final Plat](#)
[Final Plat WATSON GLEN SEC 1 REV 17](#)
[6091 Conditions of Approval_02](#)

Legislative History

4/28/16	Franklin Municipal Planning Commission	referred to the Franklin Municipal Planning Commission
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STREET NAMING APPROVALS AND LAND USE PLAN AMENDMENTS

30. [16-0534](#) Consideration of the street name "Centley Way" for the connector street between Century Court and Beasley Drive". (CONSENT AGENDA)

Attachments: [Map Centley Way](#)

31. [16-0533](#) Land Use Plan Amendment request, to amend language in the Franklin Road Small Area Plan (FRSAP) and the Special Area Considerations for Berrys Chapel Character Area, Special Area 7 (BCCO-7).

Attachments: [6142 BCCO-7 LUPA MAP](#)
[Franklin Land Use Plan BCCO 7 Section](#)
[Ironhorse LUPA presentation 6.7.2016](#)

32. [16-0501](#) Land Use Plan Amendment request, to remove the property located at 1152 Hillview Lane from Southall Character Area, Special Area 3 (SOCO-3), add it to Southall Character Area, Special Area 7 (SOCO-7), and revise recommendations for SOCO-7.

Attachments: [Land Use Location Map](#)
[Zoning Map](#)
[Franklin Land Use Plan SOCO Section](#)
[Shadow Green LUPA presentation 6.7.2016](#)

33. [16-0532](#) Land Use Plan Amendment request, to remove the properties located at 4344 and 4350 South Carothers Road from Seward Hall Character Area, Special Area 3 (SWCO-3), and add them to McEwen Character Area, Special Area 6 (MECO-6).

Attachments: [Location Map](#)
[LUPA presentation 6.2.2016](#)
[Land Use Plan SWCO-3 Section](#)
[Land Use Plan MECO-6 Section](#)

NON-AGENDA ITEMS

ANY OTHER BUSINESS

ADJOURN



City of Franklin

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

Meeting Minutes - Draft

Franklin Municipal Planning Commission

Thursday, May 26, 2016

7:00 PM

Board Room

CALL TO ORDER

Present 9 - Commissioner Harrison, Commissioner Petersen, Commissioner McLemore, Commissioner Franks, Commissioner Gregory, Commissioner Allen, Commissioner Orr, Commissioner Lindsey, and Commissioner Hathaway

MINUTES

1. April 28, 2016 FMPC Minutes

Attachments: [4-28-16 FMPC Minutes](#)

Commissioner Lindsey moved, seconded by Commissioner Harrison to approve the April 28, 2016, Minutes as presented. The motion carried by the following vote:

Aye: 9 - Commissioner Harrison, Commissioner Petersen, Commissioner McLemore, Commissioner Franks, Commissioner Gregory, Commissioner Allen, Commissioner Orr, Commissioner Lindsey, and Commissioner Hathaway

Chairing: 0

CITIZEN COMMENTS ON ITEMS NOT ON THE AGENDA

ANNOUNCEMENTS

VOTE TO PLACE NON-AGENDA ITEMS ON THE AGENDA

CONSENT AGENDA

Approval of the Consent Agenda

A motion was made by Commissioner Harrison, seconded by Commissioner McLemore, to approve items 2 through 3, items 5 through 11, items 13 through 16, items 21 through 22, and items 24 through 27 on the Initial Consent Agenda. The motion carried by the following vote:

Aye: 9 - Commissioner Harrison, Commissioner Petersen, Commissioner McLemore, Commissioner Franks, Commissioner Gregory, Commissioner Allen, Commissioner Orr, Commissioner Lindsey, and Commissioner Hathaway

Chairing: 0

Approval of the Consent Agenda

A motion was made by Commissioner Harrison, seconded by Commissioner Orr, to approve item number 4 on the Secondary Consent Agenda. The motion carried by the following vote:

Aye: 8 - Commissioner Harrison, Commissioner Petersen, Commissioner McLemore, Commissioner Franks, Commissioner Allen, Commissioner Orr, Commissioner Lindsey, and Commissioner Hathaway

Recused: 1 - Commissioner Gregory

Chairing: 0

Approval of the Consent Agenda

A motion was made by Commissioner Harrison, seconded by Commissioner Allen, to approve item number 23 on the Tertiary Consent Agenda. The motion carried by the following vote:

Aye: 8 - Commissioner Harrison, Commissioner Petersen, Commissioner McLemore, Commissioner Franks, Commissioner Gregory, Commissioner Allen, Commissioner Orr, and Commissioner Lindsey

Recused: 1 - Commissioner Hathaway

Chairing: 0

SITE PLAN SURETIES

2. Alexander Plaza PUD Subdivision, site plan, (Kroger Site Renovations); release the maintenance agreement for water and sewer improvements. (CONSENT AGENDA)
This Planning Item was approved.
3. Battle Ground Academy Subdivision, site plan, (Fieldhouse and Mary Campbell Visual Arts Center); release the maintenance agreement for drainage improvements. (CONSENT AGENDA)
This Planning Item was approved.
4. Berry Farms Town Center PUD Subdivision, site plan, section 1, revision 1; release the maintenance agreement for landscaping Phase 1A, landscaping Phase 1B, landscaping Phase 1C, landscaping Phase 1D, landscaping parking screen and landscaping Lewisburg Avenue street trees improvements. (CONSENT AGENDA)
This Planning Item was approved.

5. Creekstone Commons PUD Subdivision, site plan, section 2; release the maintenance agreement for landscaping improvements. (CONSENT AGENDA)

This Planning Item was approved.
6. Creekstone Commons PUD Subdivision, site plan, section 3; release the maintenance agreement for landscaping improvements. (CONSENT AGENDA)

This Planning Item was approved.
7. Eddy Lane Industrial Office Subdivision, site plan; release the maintenance agreement for landscaping Phase 1A improvements. (CONSENT AGENDA)

This Planning Item was approved.
8. Generals Retreat PUD Subdivision, site plan; accept the drainage/detention, sidewalk and streets improvements, release the performance agreement and establish a maintenance agreement for one year. (CONSENT AGENDA)

This Planning Item was approved.
9. Hurstbourne Park PUD Subdivision, site plan, sections 1 – 3; release the maintenance agreement for landscaping (section 1) improvements. (CONSENT AGENDA)

This Planning Item was approved.
10. Nissan North America Subdivision, site plan, revision 2 (Parking Addition); extend the performance agreement for drainage improvements. (CONSENT AGENDA)

This Planning Item was approved.
11. Silver Grace PUD Subdivision, site plan, section 1; release the maintenance agreement for landscaping Phase A improvements; extend the performance agreement for landscaping Phase B and landscaping Phase C improvements for six months. (CONSENT AGENDA)

This Planning Item was approved.

12. Stream Valley PUD Subdivision, site plan, section 3; release the maintenance agreement for landscaping Phase 1 improvements.
(CONSENT AGENDA)

Ms. Kortas stated that a citizen had wanted to pull Item 12 but had not understood when to do so.

Attorney Corn stated that since that part of the Consent Agenda had already passed, the citizen would not be allowed to pull the item unless the Planning Commission voted unanimously that she could.

Alderman Petersen moved, seconded by Mr. Orr that Item 12 be heard, and the motion passed unanimously (9-0).

Ms. Kortas stated that staff was recommending to release the maintenance agreement for landscaping phase one improvements.

Ms. Candace Crumrine, of 609 Streamside Lane, Stream Valley Subdivision, stated that there was some confusion as to what was part of the maintenance release. As a neighborhood, Stream Valley, has gone through much effort to pull things together over the timeframe. They have been trying to work with the Homeowners Association (HOA), the Aldermen, and Mr. Gerth, the City's Community Development Administrator. Quite frankly, the homeowners do not think that their voices are being heard to where things are changing for the better. They had a couple of improvements in things that are not related to the trees in the front, so she wanted to thank the Planning Commission for that. Some of the main concerns are the common areas, so they are trying to understand if someone could work with them and communicate with the neighborhood and not the HOA, which is funded by the developer, because they do not really get anything done with the HOA. It would be helpful if they could form that communication. They had many photos that they could deliver to all of the non-representatives of Franklin and not something that she would pay for moving forward.

Ms. Allen asked what the concerns were for Stream Valley.

Ms. Crumrine stated that there were a few of the common area trees that had actually died. There were also weeds, dirt and rock in some of the area and not grass. It is very unsightly. It brings something down that one thought they were investing in, and she would not have purchased in Stream Valley had she known this. They would like for someone in the City to speak up for them with the developer and the neighborhood so that they can get some things fixed. There are runoffs that are infested and unsightly with the green covering. This is not what would be seen in Berry Farms, Westhaven, or Tollgate in Thompson's Station..

Alderman Petersen asked if the Planning Commission was just voting on the specific landscaping that was covered under item 12.

Ms. Kortas stated that it was for the site plan, section 3, to release the maintenance agreement for landscaping Phase 1 improvements.

Ms. Crumrine stated that there were two trees that she could recall that were on Streamside Lane between Stream Valley Boulevard and a little bump-out that Pulte was looking to connect to.

Chair Hathaway asked if it would be appropriate to defer the release.

Ms. Kortas stated that this was up to the Planning Commission. She stated that the City's Landscape Architect was at Stream Valley on May 9, 2016, to do the inspection.

Chair Hathaway asked for citizen comments.

Mr. Ryan Anderson, of 829 Shade Tree Lane, stated that he wanted to reiterate what Ms. Crumrine had stated that the HOA and the developer had really not lived up to the expectation of what the homeowners believed they purchased. He was confused on the action items that the Planning Commission was going to be voting on at this meeting. He did not believe that what he was prepared to speak on related to this. Any improvement in trees would be welcomed. He thought they would have to come back in the future to discuss the major items, such as retention ponds that are breeding mosquitoes, large sections of sidewalk that were put in and did not have sodding or build-up of dirt around it so there were 2-three-inch gaps between the edge of the sidewalk and the surrounding landscape, maintenance of green spaces, maintenance of the carriage trail that he lives on, which has hackberry trees that are not being maintained. They are paying Franklin taxes and paying HOA fees, which are \$60.00 a month, and there is presently no return on the investment.

Chair Hathaway asked if there was an applicant, but there was not.

Mr. Franks moved, seconded by Mr. Orr to defer item 12 to the June 23, 2016, Planning Commission meeting.

Ms. Kortas stated that item 12 could not be deferred for just one month that it would have to be a minimum of a six month extension. Since the applicant has already fulfilled the mandatory one year maintenance, they can request to come to the June 23, 2016, Planning Commission meeting.

Mr. Franks changed his motion to extend the maintenance agreement for six months.

Commissioner Franks moved, seconded by Commissioner Orr, to extend the maintenance agreement for six months. The motion carried by the following votes:

Aye: 9 - Commissioner Harrison, Commissioner Petersen, Commissioner McLemore, Commissioner Franks, Commissioner Gregory, Commissioner Allen, Commissioner Orr, Commissioner Lindsey, and Commissioner Hathaway

Chairing: 0

- 13.** Westhaven PUD Subdivision, site plan, section 18; extend the performance agreement for landscaping improvements. (CONSENT AGENDA)

This Planning Item was approved.

- 14.** Westhaven PUD Subdivision, site plan, section 20, revision 4, lots 848, 1158 and 1159 (Golf Clubhouse); release the maintenance agreement for landscaping improvements. (CONSENT AGENDA)

This Planning Item was approved.

15. Westhaven PUD Subdivision, site plan, section 21, revision 1; release the maintenance agreement for landscaping improvements. (CONSENT AGENDA)

This Planning Item was approved.

16. Westhaven PUD Subdivision, site plan, section 32, lots 4033 and 5051; release the maintenance agreement for landscaping improvements. (CONSENT AGENDA)

This Planning Item was approved.

REZONINGS AND DEVELOPMENT PLANS

17. 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) And Rezone 218.58 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."

Attachments: [Ord 2016-19 6021 Lockwood Glen Rezoning Res Map.pdf](#)
[Lockwood Glen PUD Subdivision, rezoning \(Residential\) - submittal 003 Plans.pdf](#)
[Ordinance 2016-19 Rezone the King Parcel into the Lockwood Glen Law Approved](#)
[Updated Ord 2016-19 6021 Lockwood Glen Rezoning Res Map Updated.pdf](#)
[Lockwood Glen 2nd reading date move request](#)

Mr. Baumgartner stated that Lockwood Glen was originally approved in 2008. The existing property owner at 4373 South Carothers Road decided not to sell the property to Crescent Lockwood at that time and has since opted to sell his property. This additional piece would become part of the Lockwood Glen Subdivision. Approval of Ordinance 2016-19 was recommended to the Board of Mayor and Aldermen (BOMA).

Chair Hathaway asked for citizen comments. There were none.

Mr. Khris Pascarella, of Pearl Street Partners, stated that they were in agreement with the Conditions of Approval. He requested approval of Ordinance 2016-19 to the BOMA.

Mr. Martin stated that the proper way to make the motion would be to say, "Approval of 2016-19 is recommended to the BOMA."

Commissioner Harrison moved, seconded by Commissioner McLemore that Ordinance 2016-19 be recommended to the Board of Mayor and Aldermen for approval. The motion carried by the following vote:

Aye: 9 - Commissioner Harrison, Commissioner Petersen, Commissioner McLemore, Commissioner Franks, Commissioner Gregory, Commissioner Allen, Commissioner Orr, Commissioner Lindsey, and Commissioner Hathaway

Chairing: 0

18. *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."; Establishing a Public Hearing for August 9, 2016. (05/26/16 FMPC 9-0) FIRST OF THREE READINGS

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

Mr. Baumgartner stated that Lockwood Glen was originally approved in 2008. The City staff and the developers have been working together to request that these properties be zoned Neighborhood Commercial for the use of the residents moving into this corridor. The Planning staff requested the applicant to look into the creation of Neighborhood Commercial zoning districts in this area and the applicant has agreed. This will match the recently rezoned properties across South Carothers to the southeast that were rezoned to Neighborhood Commercial. Staff also recommends, that should the surplus right-of-way land at the intersection of Carothers Parkway and South Carothers Road be abandoned, this land should also be rezoned to the Neighborhood Commercial zoning district. Approval of Ordinance 2016-20 was recommended to the BOMA.

Chair Hathaway asked for citizen comments. There were none.

Mr. Khris Pascarella, of Pearl Street Partners, stated that they were in agreement with the Conditions of Approval. He requested approval of Ordinance 2016-20 to the BOMA.

Commissioner Allen moved, seconded by Commissioner Orr that Ordinance 2016-20 be recommended to the Board of Mayor and Aldermen for approval. The motion carried by the following vote:

Aye: 9 - Commissioner Harrison, Commissioner Petersen, Commissioner McLemore, Commissioner Franks, Commissioner Gregory, Commissioner Allen, Commissioner Orr, Commissioner Lindsey, and Commissioner Hathaway

Chairing: 0

19. 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 Cartohers Parkway, 4373 South Carothers Road."; Establishing a Public Hearing for August 9, 2016. (05/26/16 FMPC 9-0)

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](#)

Mr. Baumgartner stated that the Lockwood Glen Development Plan was approved in February 2008 (COF# 1619). The purpose of this revision was to include the King Parcel into the development and remove the bottom portions of the development to be rezoned to Neighborhood Commercial to the southeast of the development. Approval of Resolution 2016-28 was recommended to the BOMA.

Chair Hathaway asked for citizen comments. There were none.

Mr. Khris Pascarella, of Pearl Street Partners, stated that they were in agreement with the Conditions of Approval. He requested approval of Resolution 2016-28 to the BOMA.

Alderman Petersen asked if part of the shared driveway had been taken care of, and Mr. Pascarella stated that it had.

Commissioner Harrison moved, seconded by Commissioner Lindsey that Resolution 2016-28 be recommended to the Board of Mayor and Aldermen for approval. The motion carried by the following vote:

Aye: 9 - Commissioner Harrison, Commissioner Petersen, Commissioner McLemore, Commissioner Franks, Commissioner Gregory, Commissioner Allen, Commissioner Orr, Commissioner Lindsey, and Commissioner Hathaway

Chairing: 0

20. Consideration of Resolution 2016-25, to Be Entitled: "A Resolution Approving a Revised Development Plan for the Berry Farms Town Center PUD Subdivision, for the Property Located East of Lewisburg Pike and North of Goose Creek Bypass"; Establishing a Public hearing for July 12, 2016 (05/26/16 FMPC 9-0)

Attachments: [Town Center Pattern Book pg 19 24 and 27 revisions.pdf](#)
[MAP_BFTC_RESOLUTION2016-025.pdf](#)
[Conditions of Approval 01](#)
[2016-25 RES LAW APPROVED Berry Farms PUD Revision with attachments](#)

Ms. Gregory recused herself from item 20.

Mr. King stated that the Berry Farms Town Center PUD Subdivision was at the northeast quadrant of Goose Creek and I-65. The applicant was proposing to clarify some language contained in the pattern book (pages 23, 29 & 32) by clarifying and adding uses. He showed on the screen and discussed the differences between the proposed pattern book and the pattern book that was previously approved by the BOMA. The applicant was adding selected uses identified in the City of Franklin Zoning Ordinance, not originally included in the original pattern book. This was being done so that the applicant's pattern book and the City of Franklin's Zoning Ordinance were in compliance with each other. Approval of Resolution 2016-25 was recommended to the BOMA.

Chair Hathaway asked for citizen comments. There were none.

Mr. Harrison moved, seconded by Mr. Franks to add an amendment to Resolution 2016-25 to add the conditions of approval. The motion passed unanimously (9-0).

Alderman Petersen asked if the list of Civic Institutional Uses and the list of Commercial Uses were being added.

Mr. King stated that they were being added.

Commissioner Harrison moved, seconded by Commissioner Franks that Resolution 2016-25 be recommended to the Board of Mayor and Aldermen for approval. The motion carried by the following vote:

Aye: 8 - Commissioner Harrison, Commissioner Petersen, Commissioner McLemore, Commissioner Franks, Commissioner Allen, Commissioner Orr, Commissioner Lindsey, and Commissioner Hathaway

Recused: 1 - Commissioner Gregory

Chairing: 0

SITE PLANS, PRELIMINARY PLATS, AND FINAL PLATS

21. Amelia Park PUD Subdivision, Final Plat, Section 4, 47 Lots (45 Residential 2 Open Space) located off Clovercroft Road. (Consent Agenda)

Attachments: [6118 Amelia Park PUD Subd, FP, Sec 4 Conditions of Approval 01.pdf](#)
[6118 Amelia Park PUD Subd, FP, Sec 4 Map.pdf](#)
[Final Plat Section 4 Plans.pdf](#)

This Planning Item was approved.

22. Echelon PUD Subdivision, final plat, section 2, creating 47 single-family lots and five open-space lots on 16.56 acres, located at 0 South Carothers Road. (Consent Agenda)

Attachments: [6119 Echelon PUD Subdivision, FP, Sec 2 Conditions of Approval 01](#)
[6119 MAP Echelon PUD Subd, FP, Sec 2](#)
[PLAT Echelon PUD Subdivision Final Plat Section 2](#)

This Planning Item was approved.

23. Poe Subdivision, Revision 1, Lots 3 & 4, final plat, revision of setback lines on 0.45 acres, located at 226 and 230 11th Avenue South (Consent Agenda)

Attachments: [6112 PoeSubd Conditions of Approval 01.pdf](#)
[MAP 6112 Poe SubD.pdf](#)
[Poe Subdivision - Revision to Lots 3 4 5-08-16.pdf](#)

This Planning Item was approved.

24. Riverbluff Subdivision, Final Plat, Section 1, Revision 1, Resubdivision of Lots 75-81 on 1.60 acres located east of Lewisburg Pike (Consent Agenda)

Attachments: [6055 Riverbluff Subd Rev 1, Revision Lots 75-81 Conditions of Approval 01.pdf](#)
[6055 Riverbluff Subd, FP, Sec 1, Rev 1 resub of lots Map.pdf](#)
[Riverbluff Subdivision, Revision 1, Revision To Lots 75-81 - submittal 003.pdf](#)

This Planning Item was approved.

25. Stream Valley PUD Subdivision, Section 9, Lot 296, Revision 1, final plat, revision of lot line between lots 296 and 295, located at 304 and 305 Oberlin Court(Consent Agenda)

Attachments: [6113-StreamValley_Sec9Conditions of Approval 01.pdf](#)
[MAP 6113_SVSec9.pdf](#)
[Stream Valley, Section 9 Final Plat, Revision 1 - submittal 002.pdf](#)

This Planning Item was approved.

26. Synergy Bank Addition, final plat, Revision 2, relocating easements and buffers associated with the Synergy Bank development on a 2.03 acre parcel, located at 722 Columbia Avenue (Consent Agenda)

Attachments: [6114_Synergy_Conditions of Approval 01.pdf](#)
[MAP 6114SynergyBank.pdf](#)
[Synergy-Bank-Rev-2-Plat-Signed-PDF.pdf](#)

This Planning Item was approved.

27. Williamson County Ag Expo Park, Site Plan, ADA Parking addition, creation of 48 accessible parking spaces adjacent to the existing expo building located at 4215 Long Lane (Consent Agenda)

Attachments: [6117_AgExpo_Conditions of Approval 01.pdf](#)
[map 6117AGExpoCenter.pdf](#)
[AG Site Layout.pdf](#)
[2016-05-04 Ag Center ADA Parking Addition Full Set.pdf](#)

This Planning Item was approved.

ZONING ORDINANCE TEXT AMENDMENTS

28. *Consideration of Ordinance 2016-005, To Be Entitled: "An Ordinance To Amend Various Chapters Of The City Of Franklin, Tennessee, Zoning Ordinance Pertaining To The Approval Of Development Plans, Site Plans And Vested Property Rights."; Establishing a Public Hearing for July 12, 2016 (05/26/16 FMPC 9-0) FIRST OF THREE READINGS

Attachments: [Ordinance 2016-005 Vested Property Right Ordinance Law Approved](#)
[2](#)
[Powerpoint Ordinance 2016-005 Vested Property Rights 4-8-16](#)

Mr. Svoboda stated that property right is established under the provisions of the Vested Property Rights Amendment (VPRA). The development standards in effect on the date of approval of the plan will remain the development standards applicable to a project throughout the established vesting period.

The VPRA enabled local governments to adopt an Ordinance that specifically identifies the types of plans approved by the local government that will cause a property right to vest and to identify what constitutes approval of those plans. The purposes of Ordinance 2016-005 are to amend the following:

- Chapter 1 to add a new Section for Vested Property Rights to specifically identify the types of plans approved by the City of Franklin on, or after, January 1, 2015, that will cause a vested property right to be established and identify what constitutes approval of those plans.*
- Chapter 2 to revise the Specific Development Review Procedures in Chapter 2 for Planned Unit Developments (PUDs) and Site Plans in order to add the VPRA standards pertaining to Vesting Periods and Time Limits and to update the procedures for amendments.*
- Chapter 8 to add definitions for several words/phrases referred to in the VPRA.*

Approval of Ordinance 2016-005 was recommended to the BOMA.

Mr. Franks asked Attorney Corn if the adoption of Ordinance 2016-005 would coincide, 100 percent, with the State of Tennessee statute. Attorney Corn stated that it would.

Commissioner McLemore moved, seconded by Commissioner Harrison that Ordinance 2016-005 be recommended to the Board of Mayor and Aldermen for approval. The motion carried by the following vote:

Aye: 9 - Commissioner Harrison, Commissioner Petersen, Commissioner McLemore, Commissioner Franks, Commissioner Gregory, Commissioner Allen, Commissioner Orr, Commissioner Lindsey, and Commissioner Hathaway

Chairing: 0

NON-AGENDA ITEMS

ANY OTHER BUSINESS

ADJOURN

There being no further business, the meeting adjourned at 7:30 p.m.

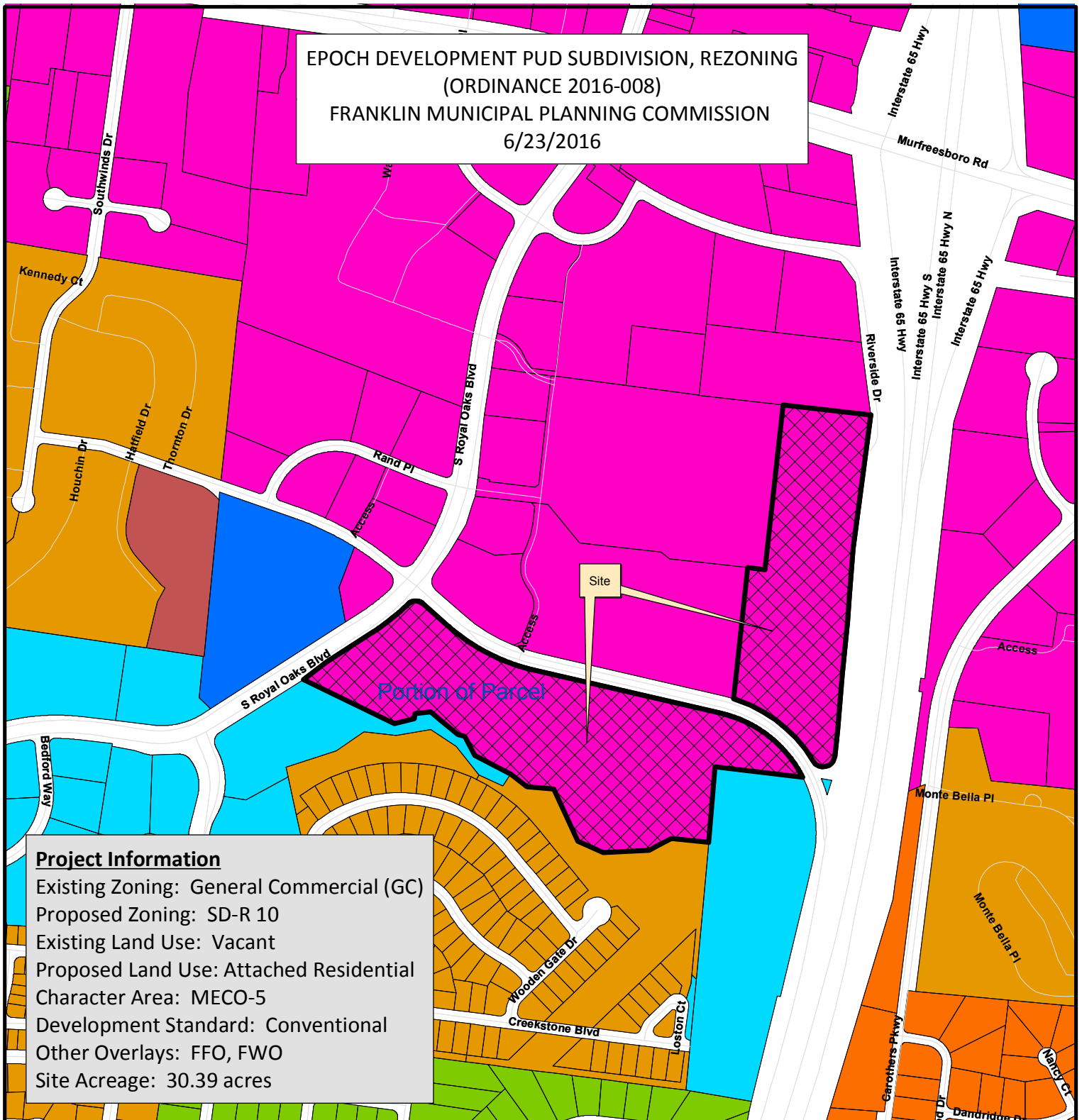
Chair Mike Hathaway

A motion was made by Commissioner Harrison, seconded by Commissioner Orr, to adjourn. The motion carried by the following vote:

Aye: 9 - Commissioner Harrison, Commissioner Petersen, Commissioner McLemore, Commissioner Franks, Commissioner Gregory, Commissioner Allen, Commissioner Orr, Commissioner Lindsey, and Commissioner Hathaway

Chairing: 0

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

- | | |
|--|---------------------------------------|
| Epoch Development PUD | SD-R Specific Development-Residential |
| AG Agricultural District | SD-X Specific Development-Variety |
| ER Estate Residential | OR Office Residential District |
| R-1 Residential District | GO General Office District |
| R-2 Residential District | CC Central Commercial District |
| R-3 Residential District | NC Neighborhood Commercial District |
| R-6 Historic Core Residential District | GC General Commercial District |
| RM-10 Attached 10 Residential District | LI Light Industrial District |
| RM-15 Attached 15 Residential District | HI Heavy Industrial District |
| RM-20 Attached 20 Residential District | CI Civic and Institutional District |



0 250 500 1,000
Feet

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It was compiled from the most authentic information available.
The City is not responsible for any errors or omissions contained hereon.
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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 1. 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 PROCEEDING 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. SUBDIVISION, 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.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 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, REVISION 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 PROCEEDING 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, REVISION 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:

CITY OF FRANKLIN, TENNESSEE:

By: _____
Eric Stuckey
City Administrator/Recorder

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 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
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: 6 STORIES MAXIMUM
ALLOWABLE: NORTH PARCEL - 4 STORIES
PROPOSED: 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: 1BR - 72 UNITS * 1.5 = 108 SPACES
2BR - 116 UNITS * 2.5 = 290 SPACES
3BR - 16 UNITS * 3.0 = 48 SPACES
TOTAL REQUIRED = 446 SPACES
INCLUDING 9 ADA SPACES
MAXIMUM PARKING: NORTH SITE - 536 SPACES; SOUTH SITE - 273 SPACES
SOUTH SITE: 1BR - 28 UNITS * 1.5 = 42 SPACES
2BR - 50 UNITS * 2.5 = 125 SPACES
3BR - 20 UNITS * 3.0 = 60 SPACES
TOTAL REQUIRED = 227 SPACES
INCLUDING 7 ADA SPACES

PROPOSED: NORTH SITE: 430 REGULAR SPACES
COMPACT SPACE (0 % OF TOTAL): 0
ADA SPACES: 16
TOTAL PROVIDED: 446
SOUTH SITE: 186 REGULAR SPACES
COMPACT SPACES (14 % OF TOTAL): 31
ADA SPACES: 10
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.

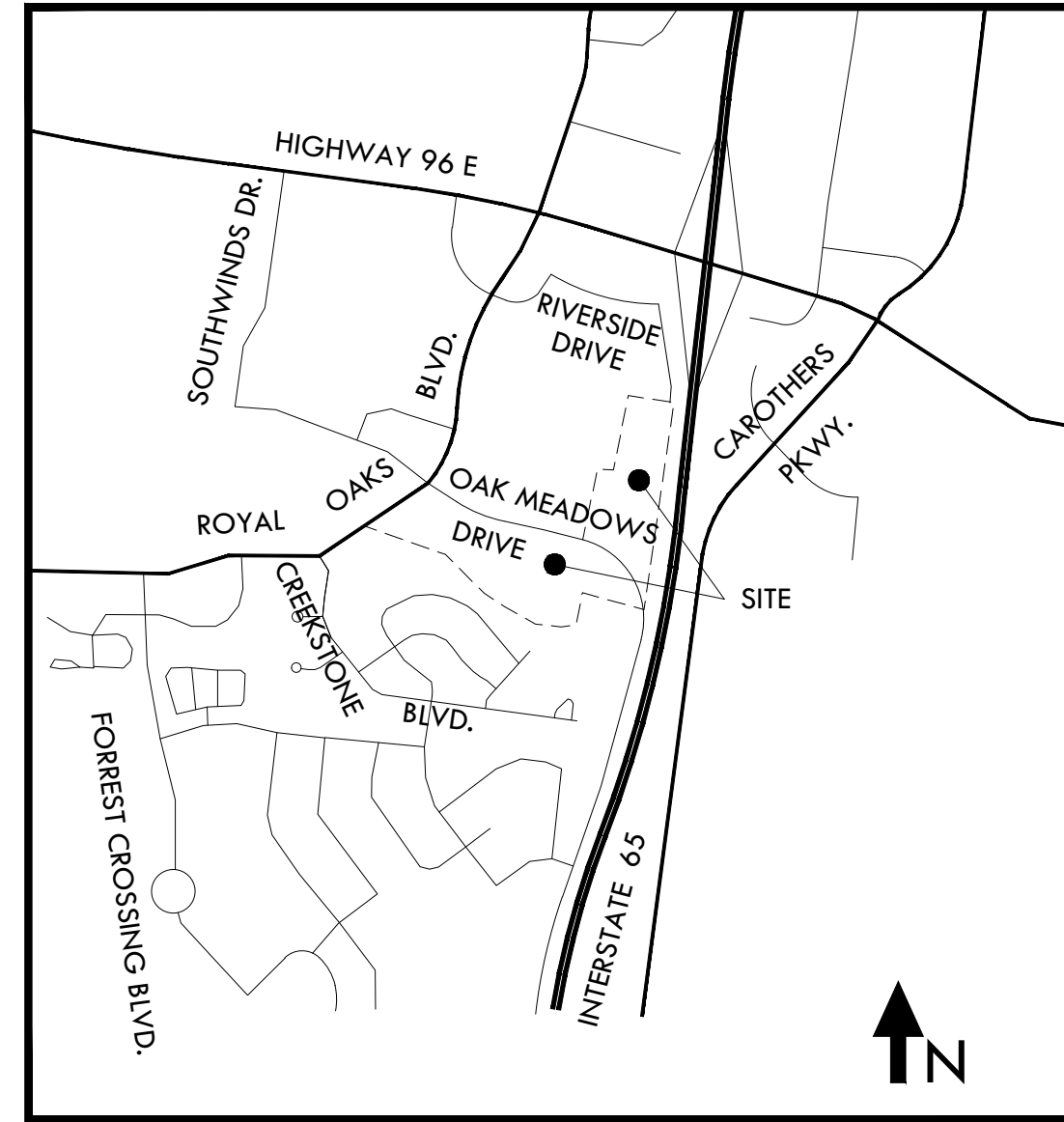
PARKLAND DEDICATION: FEE IN LIEU OF FOR 4.64 ACRES, 302 TOTAL UNITS PROPOSED

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.
INFORMAL OPEN SPACE REQUIRED (67% OF OPEN SPACE REQUIRED): 2.4 AC. PROVIDED
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 northerly 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

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(615) 873-1795
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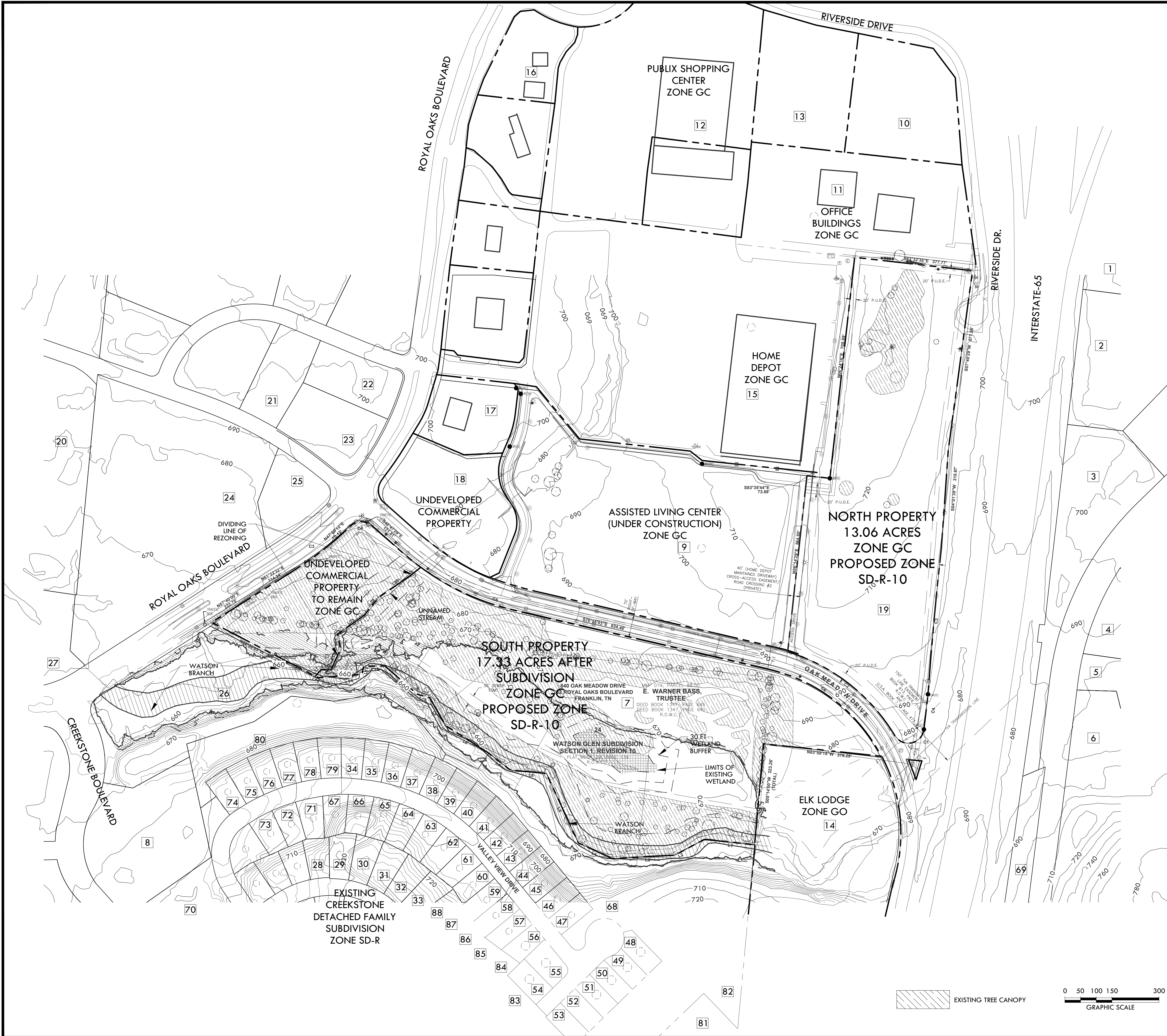
THE EPOCH DEVELOPMENT
REZONING SUBMITTAL
COF #6085
FRANKLIN, TN

REVISIONS	DATE
No.	

06/02/16 15001

C0.0

COVER SHEET



ID	PRECID	DEED / PLAT	LAND USE	OWNER	ZONING
1	079-09005	DB 344 DP 639 PB35 PP114	HOTEL	BRE/LO PROP LLC	GC
2	079-09005	DB 296 DP 435 PB22 PP11	AUTO DLR	ADKINS RODNEY G	GC
3	079-07000	DB 4341 DP 763 PB22 PP11	CHURCH	CHURCH GATE THE	GC
4	079-08000	DB 337 DP 710 PB61 PP69	REC	SOAR ADVENTURE TOWER LLC	GC
5	079-08000	DB 336 DP 555	UNDEV	NICHOLS I DONALD	SD-R
6	079-08000	DB 139 DP 525	ATTACHED RESID	UNITED DOMINION REALTY LP	GC
7	079-08000	DB 1347 DP 645 PB29 PP139	UNDEV	BASS E WARNER TR	GC
8	079-10001	DB 232 DP 130 PB31 PP12	DAYCARE	WOOD & WOOD LLC	GO
9	079-10100	DB 633 DP 243 PB62 PP45	ASST. LYG	DOMINION SENIOR LIVING OF FRANKLIN L	GC
10	079-10101	DB 44 DP 660	OFFICE	S207 LLC	GC
11	079-10102	DB 200 DP 199 PB19 PP59	OFFICE	UN DON REALTY LLC	GC
12	079-10103	DB 44 DP 660 PB59 PP3	RETAIL	PUBLIC TENNESSEE LLC	GC
13	079-10104	DB 638 DP 806 PB22 PP120	ASST. LYG	FRANKLIN TN SENIOR CARE PROPERTY LLC	GC
14	079-10105	DB 44 DP 792 PB29 PP139	REC	NASHVILLE LODGE #72 BPO ELKS	GO
15	079-10110	DB 44 DP 792 PB29 PP139	RETAIL	HD DEVELOPMENT OF MARYLAND INC	GC
16	079-10114	DB 44 DP 792 PB29 PP139	RETAIL	PUBLIC TENNESSEE LLC	GC
17	079-10116	DB 44 DP 792 PB29 PP139	RETAIL	FIRST CITIZENS BANK AND TR CO	GC
18	079-10117	DB 44 DP 792 PB29 PP139	UNDEV	BASS E WARNER TR	GC
19	079-10119	DB 44 DP 792 PB29 PP139	UNDEV	BASS E WARNER TR	GC
20	079-10140	DB 437 DP 993 PB41 PP33	UNDEV	SW2 TENNESSEE LLC	RM-20
21	0790-A0000	DB 44 DP 792 PB29 PP139	INSTIT	CHURCH CORNERSTONE MINISTRIES INC	GC
22	0790-A0001	DB 44 DP 792 PB29 PP139	RETAIL	MAGUI CHERYL S FAMILY TRUST	GC
23	0790-A0002	DB 44 DP 792 PB29 PP139	RETAIL	LCJ LLC	GC
24	0790-A0004	DB 44 DP 792 PB29 PP139	RETAIL	UNITED STATES POSTAL SERV	C1
25	0790-A0001	DB 44 DP 792 PB29 PP139	RETAIL	COMMUNITY BANK	GC
26	0790-C0250	DB 136 DP 628	UNDEV	CADENCE BANK NA	GO
27	0790-C0260	DB 136 DP 628	UNDEV	ROYAL OAKS PARK SOUTH	GO
28	0790-D0000	DB 44 DP 792 PB29 PP139	RESIDENTIAL	THURM DAVID M	SD-R
29	0790-D0000	DB 44 DP 792 PB29 PP139	RESIDENTIAL	HAMILTON MALORY	SD-R
30	0790-D0000	DB 44 DP 792 PB29 PP139	RESIDENTIAL	LYLE JORDAN WILLIAM	SD-R
31	0790-D0000	DB 44 DP 792 PB29 PP139	RESIDENTIAL	LYANGLISTA BERNARDINO JR	SD-R
32	0790-D0000	DB 44 DP 792 PB29 PP139	RESIDENTIAL	CASANDREA ONESTES	SD-R
33	0790-D0000	DB 44 DP 792 PB29 PP139	RESIDENTIAL	VOSS STEPHEN H	SD-R
34	0790-D0000	DB 44 DP 792 PB29 PP139	RESIDENTIAL	KHOT SOHAM	SD-R
35	0790-D0000	DB 44 DP 792 PB29 PP139	RESIDENTIAL	GOUGH RYAN M	SD-R
36	0790-D0000	DB 44 DP 792 PB29 PP139	RESIDENTIAL	SULLIVAN JOHN	SD-R
37	0790-D0000	DB 44 DP 792 PB29 PP139	RESIDENTIAL	CULLEN ROBERT BARRY	SD-R
38	0790-D0000	DB 44 DP 792 PB29 PP139	RESIDENTIAL	MILLER ROBERT FRANK	SD-R
39	0790-D0000	DB 44 DP 792 PB29 PP139	RESIDENTIAL	OHARANI KHARUNISSA	SD-R
40	0790-D0000	DB 44 DP 792 PB29 PP139	RESIDENTIAL	KNOX CONSUELA S	SD-R
41	0790-D0000	DB 44 DP 792 PB29 PP139	RESIDENTIAL	DAWKINS BRETON GUY	SD-R
42	0790-D0000	DB 44 DP 792 PB29 PP139	RESIDENTIAL	CONKALUX MARGARET A	SD-R
43	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	SMITH CHRISTOPHER S	SD-R
44	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	DANIELS THOMAS	SD-R
45	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	SUNDARAM BARATH SHANNUGA	SD-R
46	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	HOSSAIN MOHAMMAD	SD-R
47	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	MAPPIDEN LAWRENCE	SD-R
48	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	BECHARD BRIAN	SD-R
49	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	VIJAYAN SATHISH	SD-R
50	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	RUSSO JOHN M	SD-R
51	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	QUIGLEY J PATRICK	SD-R
52	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	BONHAM SYDNEY	SD-R
53	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	BURGER JORDAN	SD-R
54	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	NOLAN MICHAEL S TRUST	SD-R
55	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	PARIS SREKANTH	SD-R
56	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	KOLLI MURALI KRISHNA	SD-R
57	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	RAMAN VENKATESH	SD-R
58	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	RAJENDRAN THAMIL S	SD-R
59	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	OPPARAJUDU SRIKANTH	SD-R
60	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	CHINTAKIND VARUN K	SD-R
61	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	KRISHNAN JAGADEESWARAN	SD-R
62	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	MOHAMED ABDEL R J	SD-R
63	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	PICHAMUTHU NARAYANAN	SD-R
64	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	ZELLER JAMES S JR	SD-R
65	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	MURRAY KIMBERLY	SD-R
66	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	DIPPER NATHAN M	SD-R
67	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	YIGLI MARIO G	SD-R
68	0790-E0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	CREEKSTONE HOMEOWNERS ASSOCIATION I	SD-R
69	089-02009	DB 44 DP 792 PB29 PP139	RESIDENTIAL	A T & T CORP BY & THROUGH	R-2
70	089-04020	DB 44 DP 792 PB29 PP139	RESIDENTIAL	CREEKSTONE HOMEOWNERS ASSOCIATION IN	SD-R
71	089-04040	DB 44 DP 792 PB29 PP139	RESIDENTIAL	BLACKSHER NICOLE E	SD-R
72	089-04070	DB 44 DP 792 PB29 PP139	RESIDENTIAL	GRUSE JONATHAN	SD-R
73	089-04080	DB 44 DP 792 PB29 PP139	RESIDENTIAL	KUMAR RATNA	SD-R
74	089-05000	DB 44 DP 792 PB29 PP139	RESIDENTIAL	BLANKENSHIP JON I	SD-R
75	089-05020	DB 44 DP 792 PB29 PP139	RESIDENTIAL	BURRELL GERALD MARK	SD-R
76	089-05030	DB 44 DP 792 PB29 PP139	RESIDENTIAL	BUCKNER RICHARD D	SD-R
77	089-05030	DB 44 DP 792 PB29 PP139	RESIDENTIAL	LERCHE MICHAEL	SD-R
78	089-05040	DB 44 DP 792 PB29 PP139	RESIDENTIAL	RUSSELL KAREN KINGSBURY	SD-R
79	089-05050	DB 44 DP 792 PB29 PP139	RESIDENTIAL	THEURER DAVID S	SD-R
80	089-05060	DB 44 DP 792 PB29 PP139	RESIDENTIAL	CREEKSTONE HOMEOWNERS ASSOCIATION IN	SD-R
81	089-P0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	BARLOW JOHN	SD-R
82	089-P0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	ERWIN DEVAN A	SD-R
83	089-P0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	PATEL NIKUNJI M	SD-R
84	089-P0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	JANI BHAVESHKUMAR	SD-R
85	089-P0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	HARRIS JOHN	SD-R
86	089-P0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	LEDGISTER KEVIN ARTHUR	SD-R
87	089-P0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	JOHANSEN MICHAEL	SD-R
88	089-P0100	DB 44 DP 792 PB29 PP139	RESIDENTIAL	COLLIER EDWARD W III	SD-R

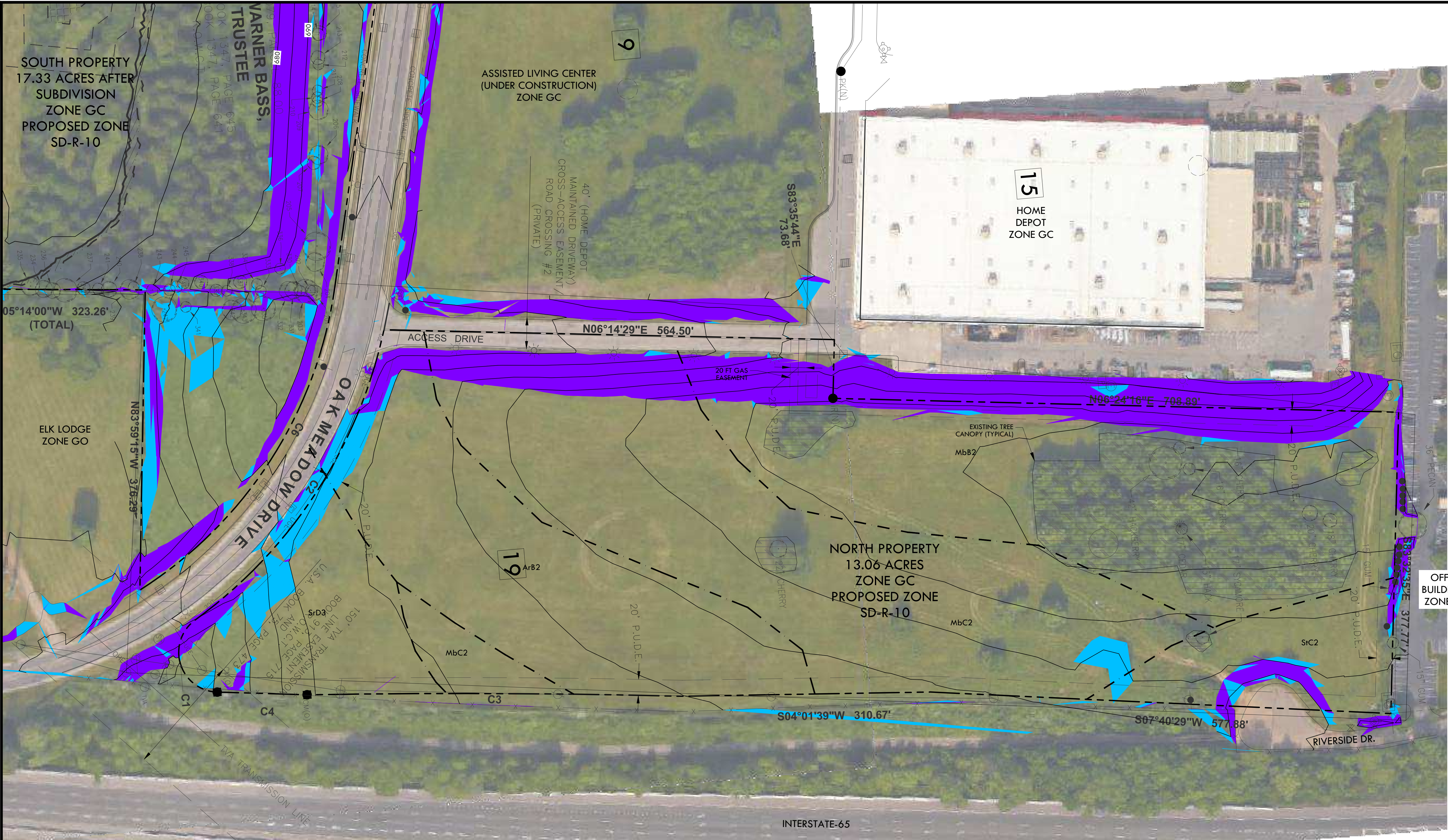
CRUNK ENGINEERING LLC
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SUITE 600
FRANKLIN, TN 37067
(615) 873-1795
WWW.CRUNKENG.COM

THE EPOCH DEVELOPMENT
REZONING SUBMITTAL

COF #6085 FRANKLIN, TN

REVISIONS	DATE	
No.		
06/02/16		15001

C1.0
OVERALL EXISTING
CONDITIONS PLAN



SLOPE LEGEND

- GREATER THAN 1.4% AND LESS THAN 20% SLOPE
- GREATER THAN 20% SLOPE

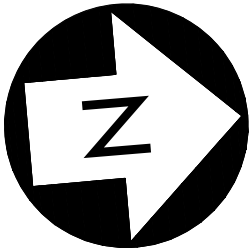
SOIL TYPES

- ArB2 Armour silt loam, 2% to 5% slopes, eroded
- CaC2 Capling 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
- SrC2 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



THE EPOCH DEVELOPMENT
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COF #6085 FRANKLIN, TN

REVISIONS

No.	DATE

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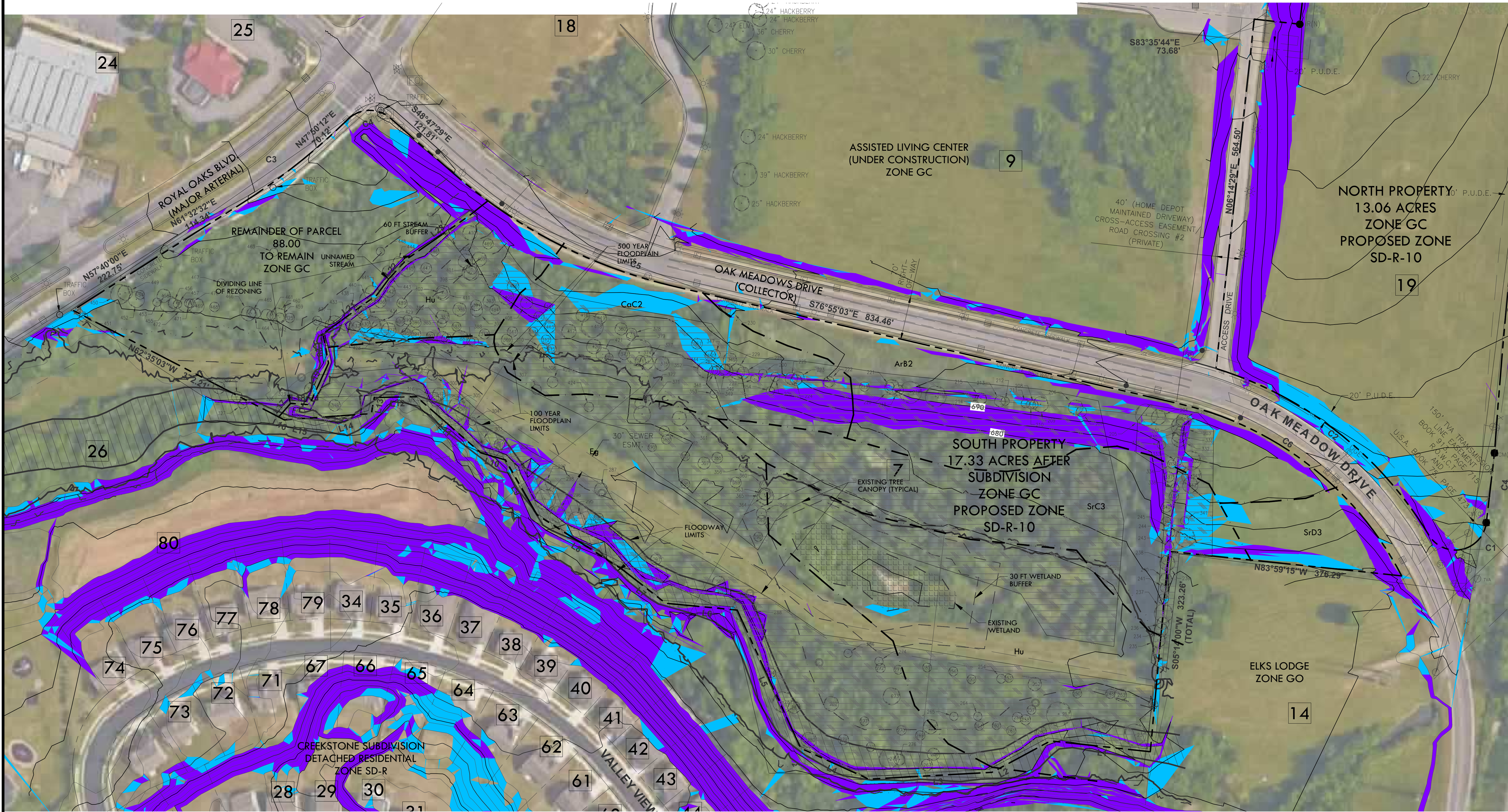
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NORTH SITE
EXISTING
CONDITIONS PLAN



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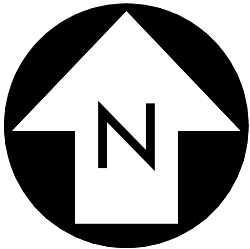
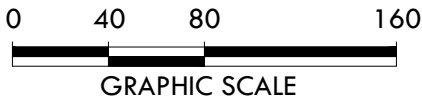


SLOPE LEGEND

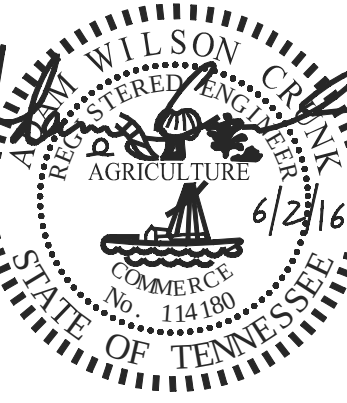
- GREATER THAN 1.4% AND LESS THAN 20% SLOPE
- GREATER THAN 20% SLOPE

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 Silversville clay loam, 5% to 12% slopes, eroded
- SrD3 Silversville clay loam, 12% to 20% slopes, severely eroded
- SrC2 Silversville silt loam, 5% to 12% slopes, eroded



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THE EPOCH DEVELOPMENT
REZONING SUBMITTAL
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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

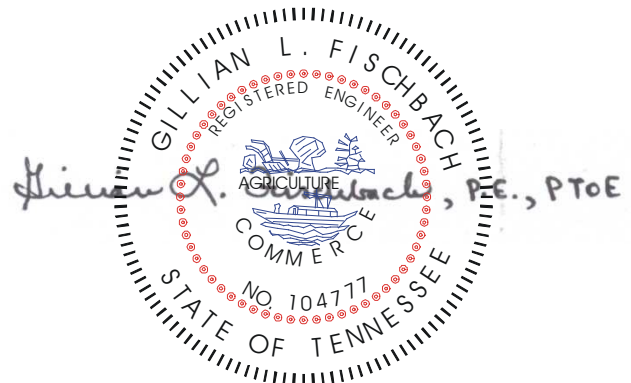


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1. INTRODUCTION

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.

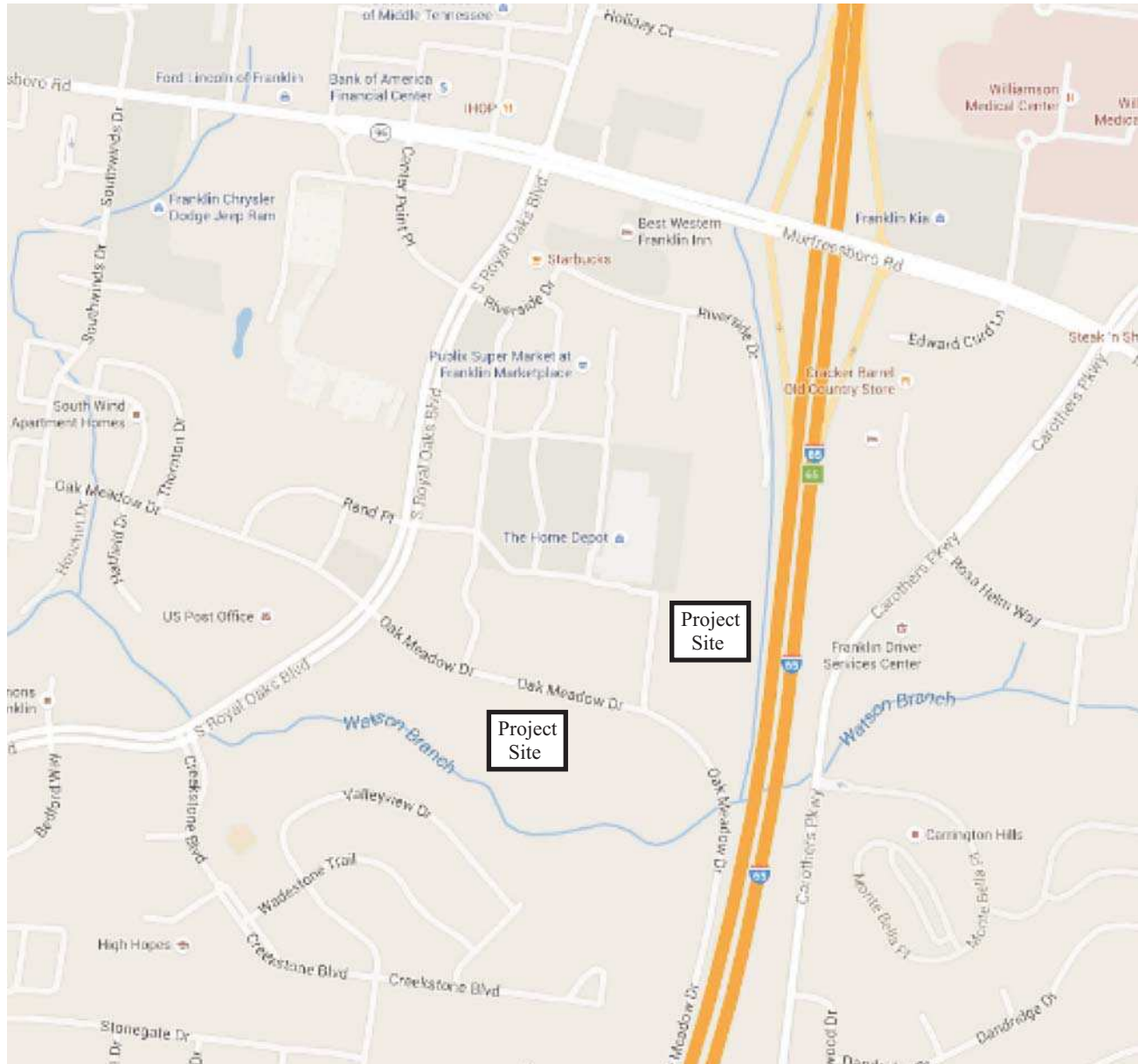
Access for the southern portion of the site will be provided at two locations on Oak Meadow Drive, and access for the northern portion of the site will be provided at one location on the eastern access for the Home Depot shopping center on the north side of Oak Meadow Drive. Also, secondary access for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

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



No Scale

Figure 1.
Location of the Project Site

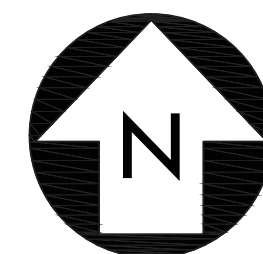
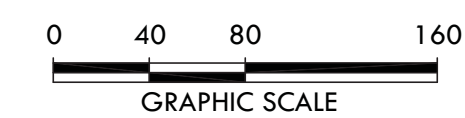


LINE TABLE		
LINE	BEARING	DISTANCE
L1	N83°48'10"W	161.22'
L2	S61°46'08"W	106.65'
L3	S86°48'30"W	198.12'
L4	N65°28'52"W	120.02'
L5	N24°43'04"W	244.21'
L6	N84°36'00"W	115.35'
L7	N52°04'01"W	87.70'
L8	N57°18'12"W	163.19'
L9	N29°52'55"W	101.80'
L10	N74°02'09"W	41.15'
L11	N48°56'27"W	137.25'
L12	S88°57'25"W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



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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	DATE	
	No.	

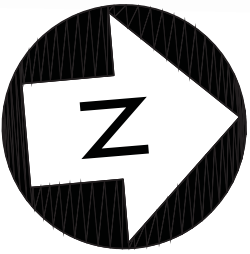
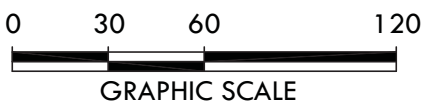
04/07/16 15001

C2.2
SOUTH SITE
DEVELOPMENT
PLAN



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



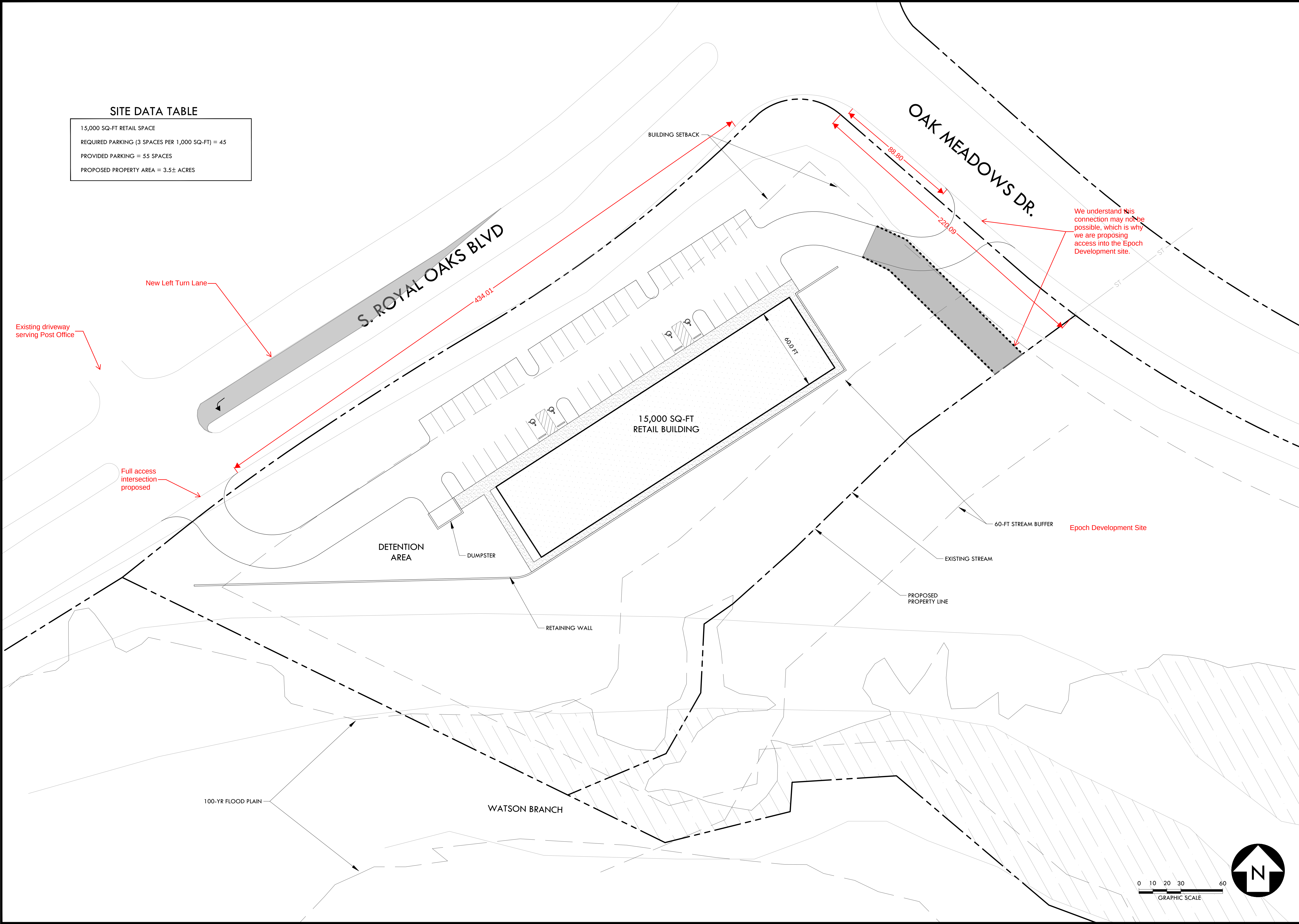
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REVISIONS	DATE
No.	

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	

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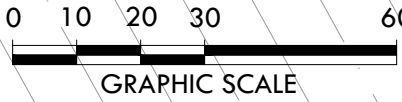
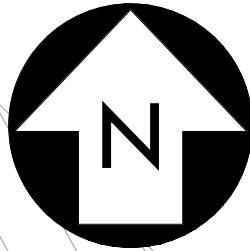


PROPOSED RETAIL SITE
AT
ROYAL OAKS & OAK MEADOWS DRIVE
FRANKLIN, TN

REVISIONS	
No.	DATE

04/27/1515001

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:

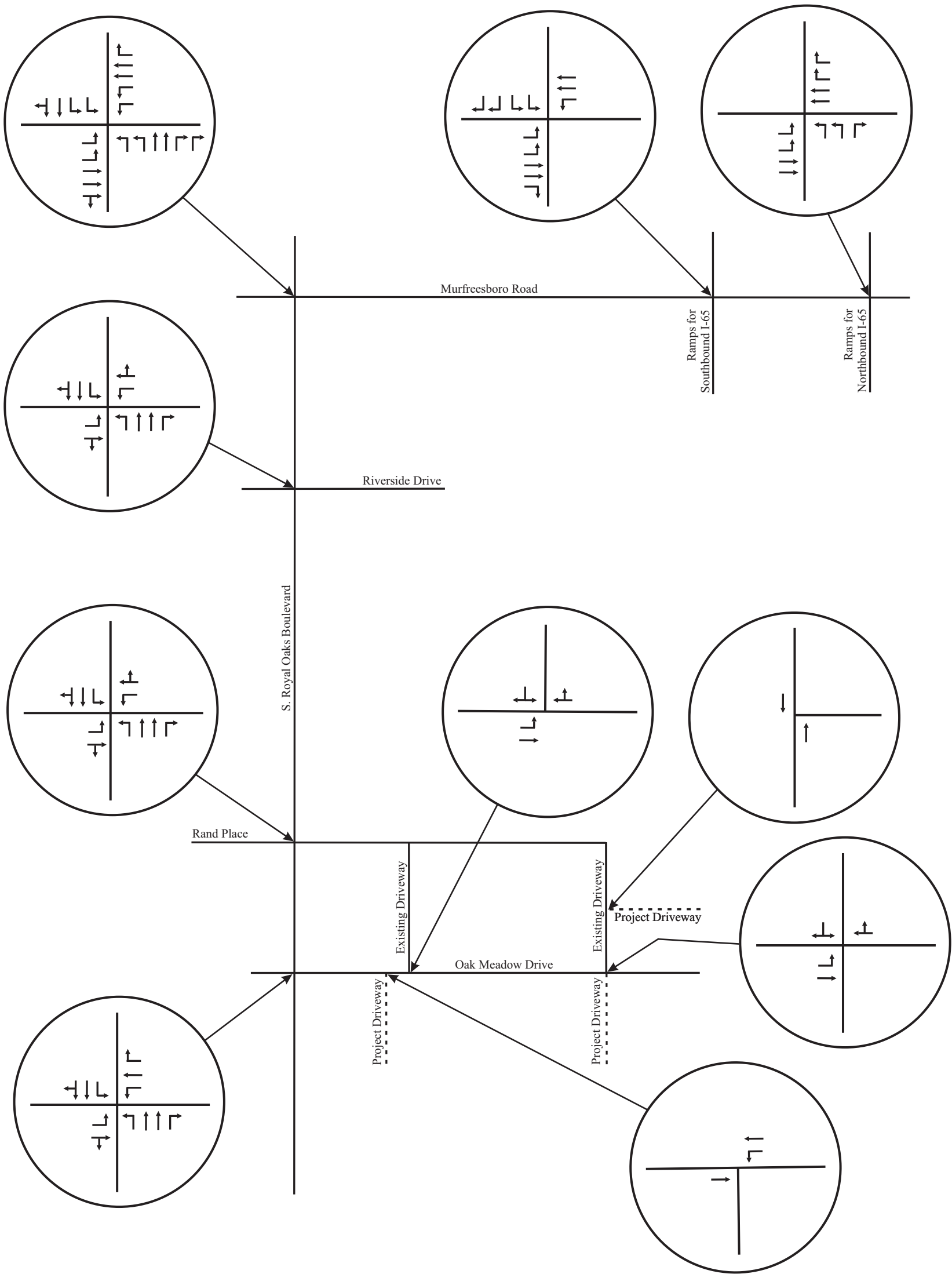
5. Murfreesboro Road and Royal Oaks Boulevard
6. Murfreesboro Road and the Ramps for Southbound I-65
7. Murfreesboro Road and the Ramps for Northbound I-65

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.



No Scale

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

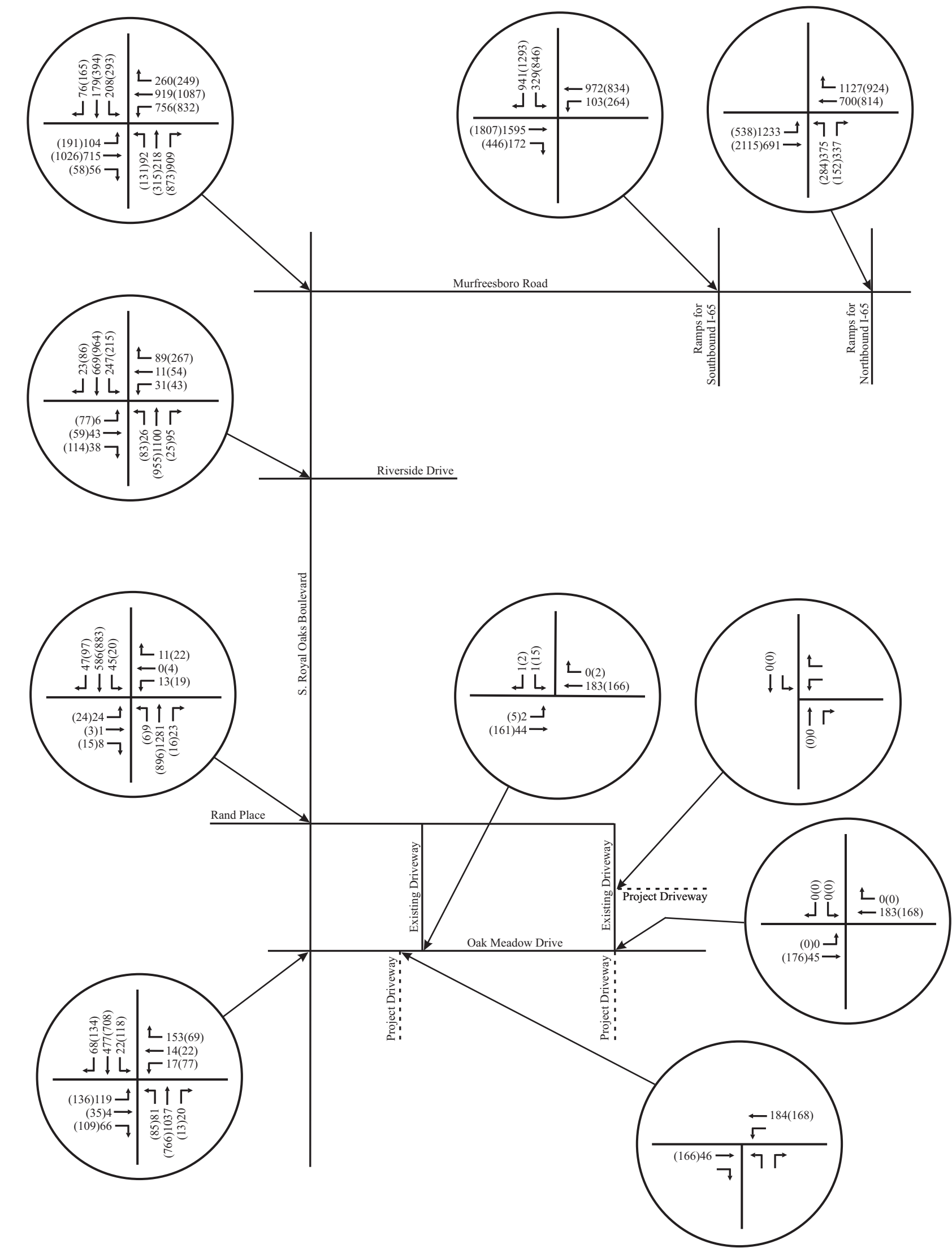


Figure 4.
Existing Peak Hour Traffic Volumes within the Study Area

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	95 TH %-ILE QUEUE	LEVEL OF SERVICE	95 TH %-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%	
2015	22,638	2.35%	
			Overall Growth
			2.65%

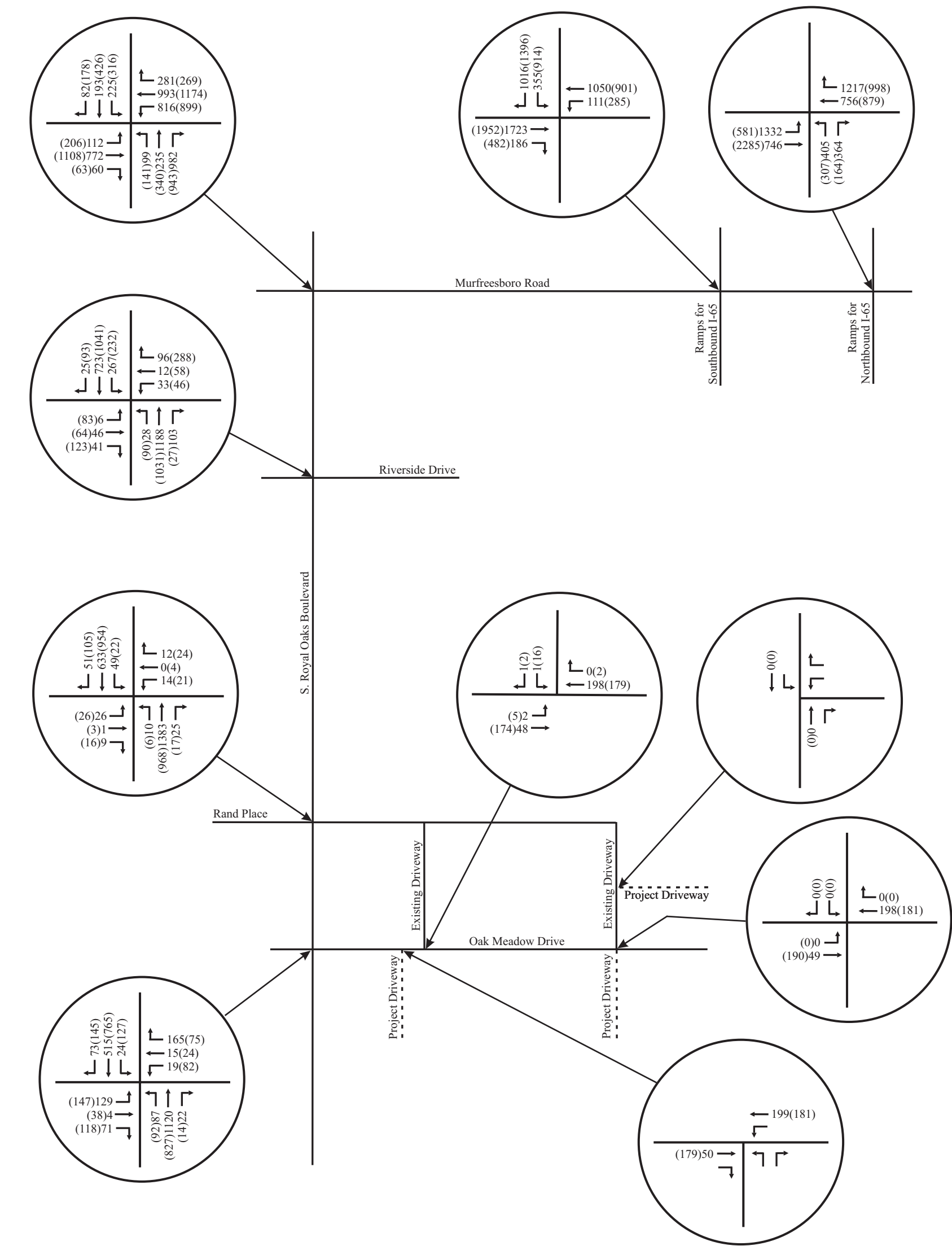


Figure 5A.
Initial Background Peak Hour Traffic Volumes within the Study Area

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.

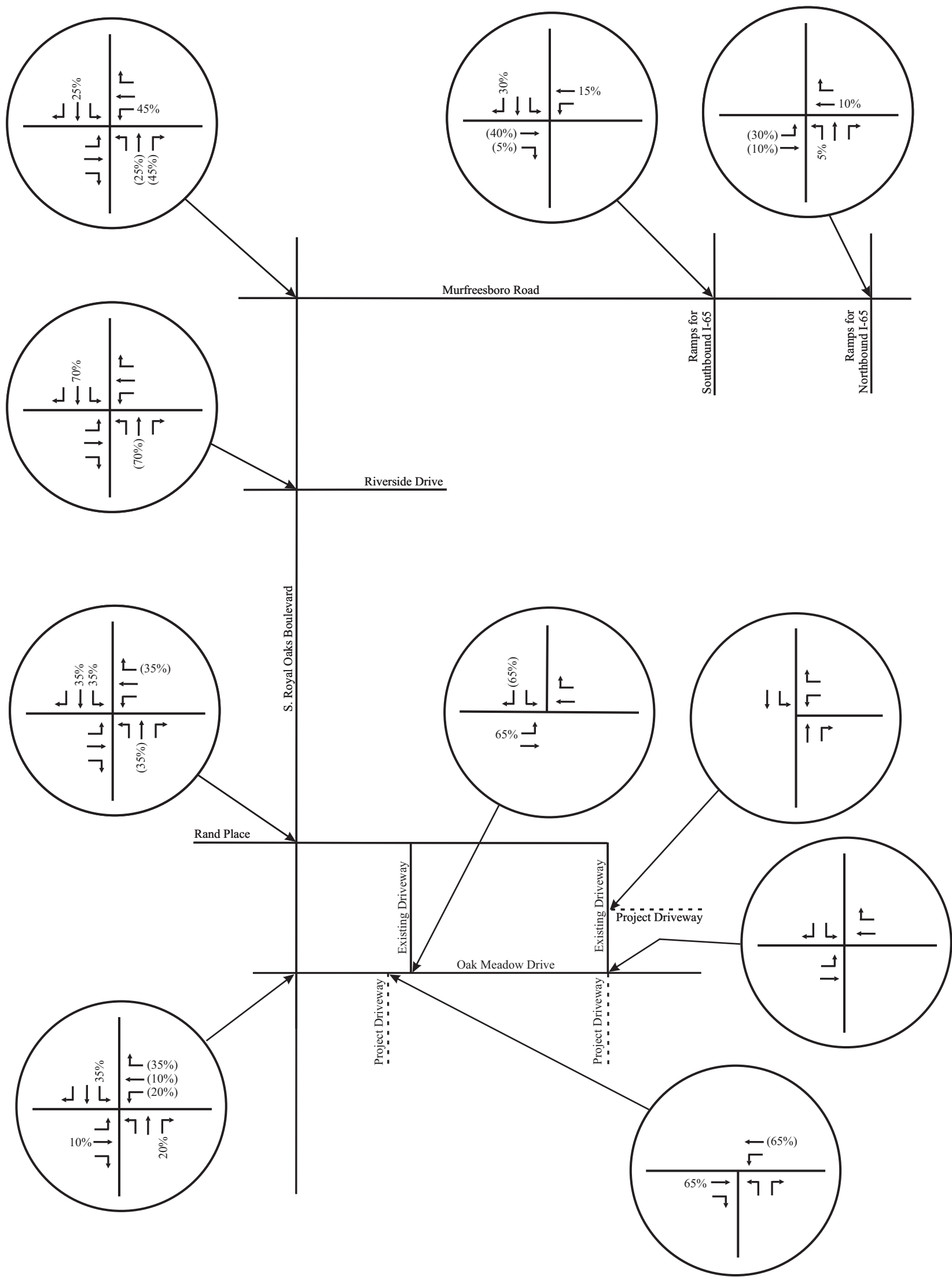
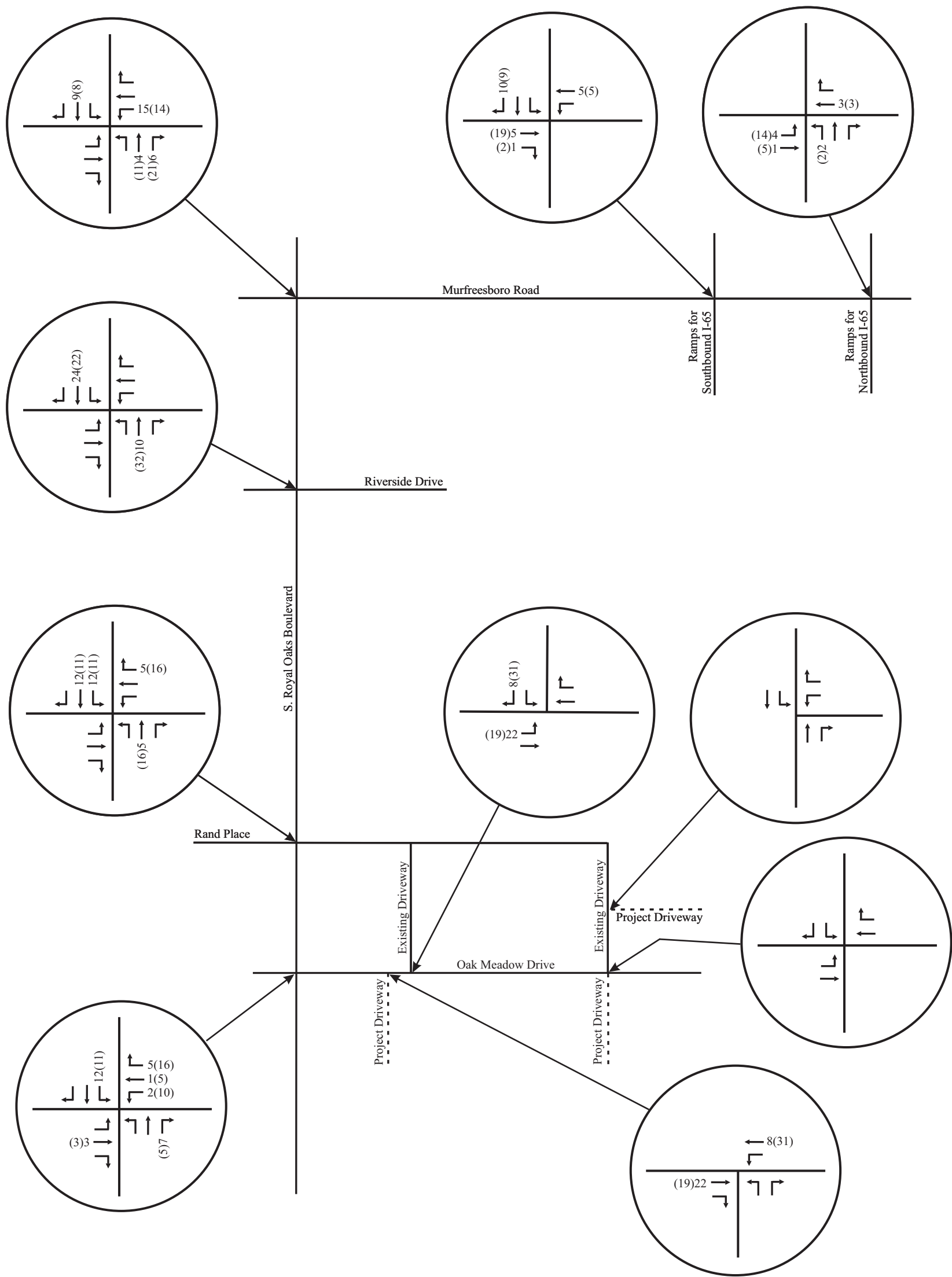


Figure 5B.
Directional Distribution of Peak Hour Traffic Generated by
the Somerby Assisted Living Facility



No Scale

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

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

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Transportation Group, LLC
Traffic Engineering and Planning



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	95 TH %-ILE QUEUE	LEVEL OF SERVICE	95 TH %-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.

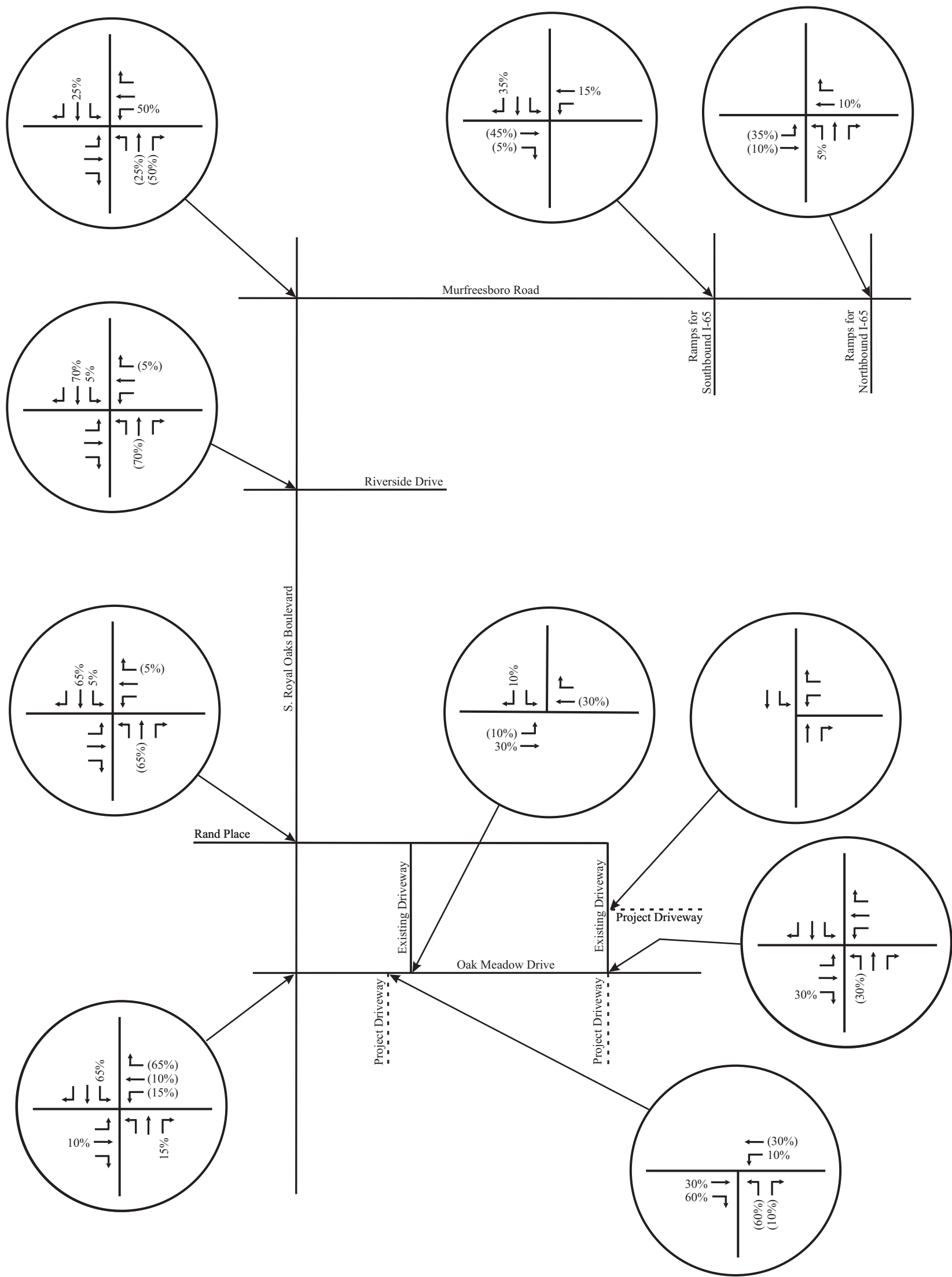
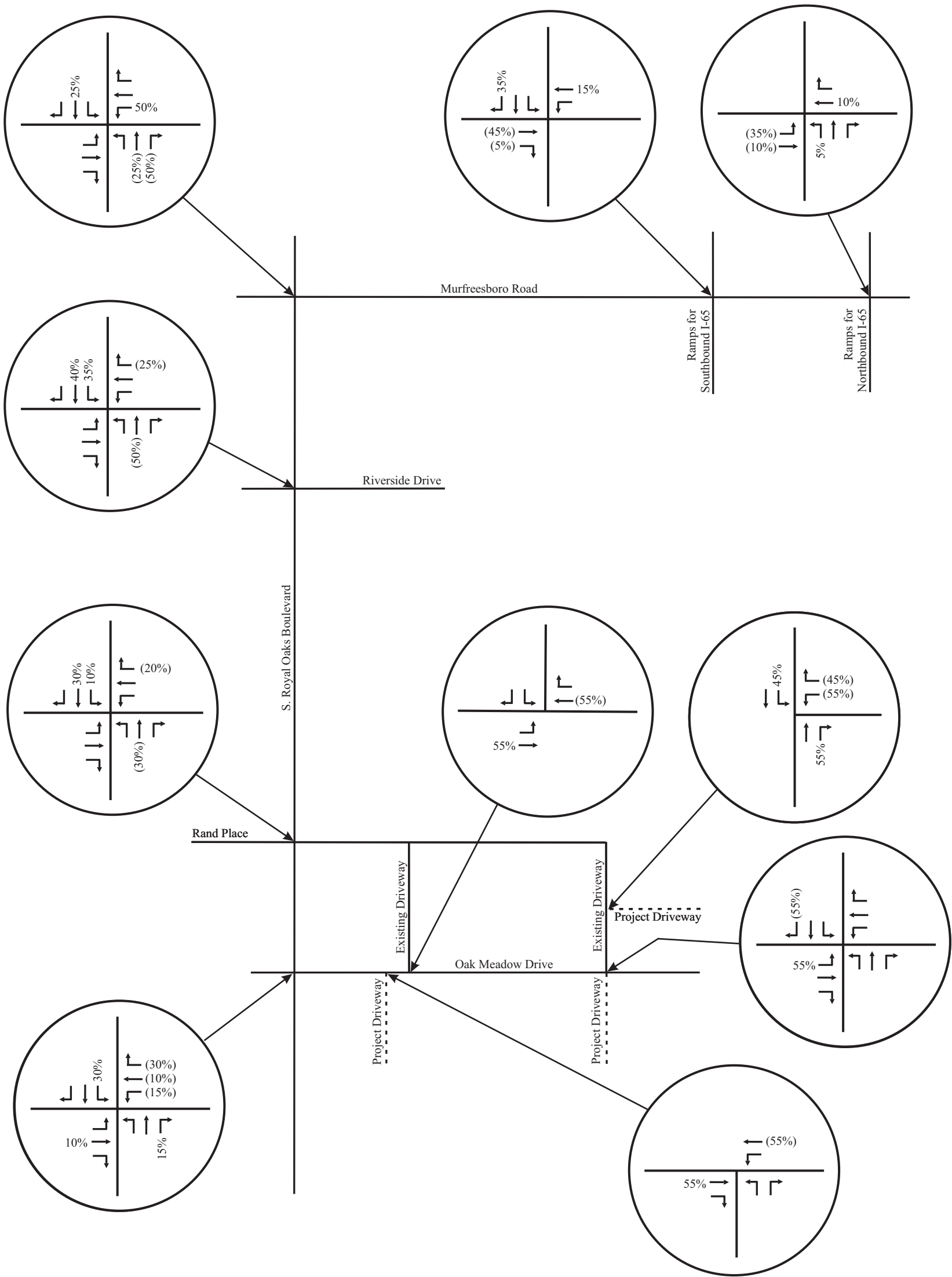


Figure 6A.
Directional Distribution of Peak Hour Traffic Volumes
Generated by the Proposed Apartments (Southern Site)

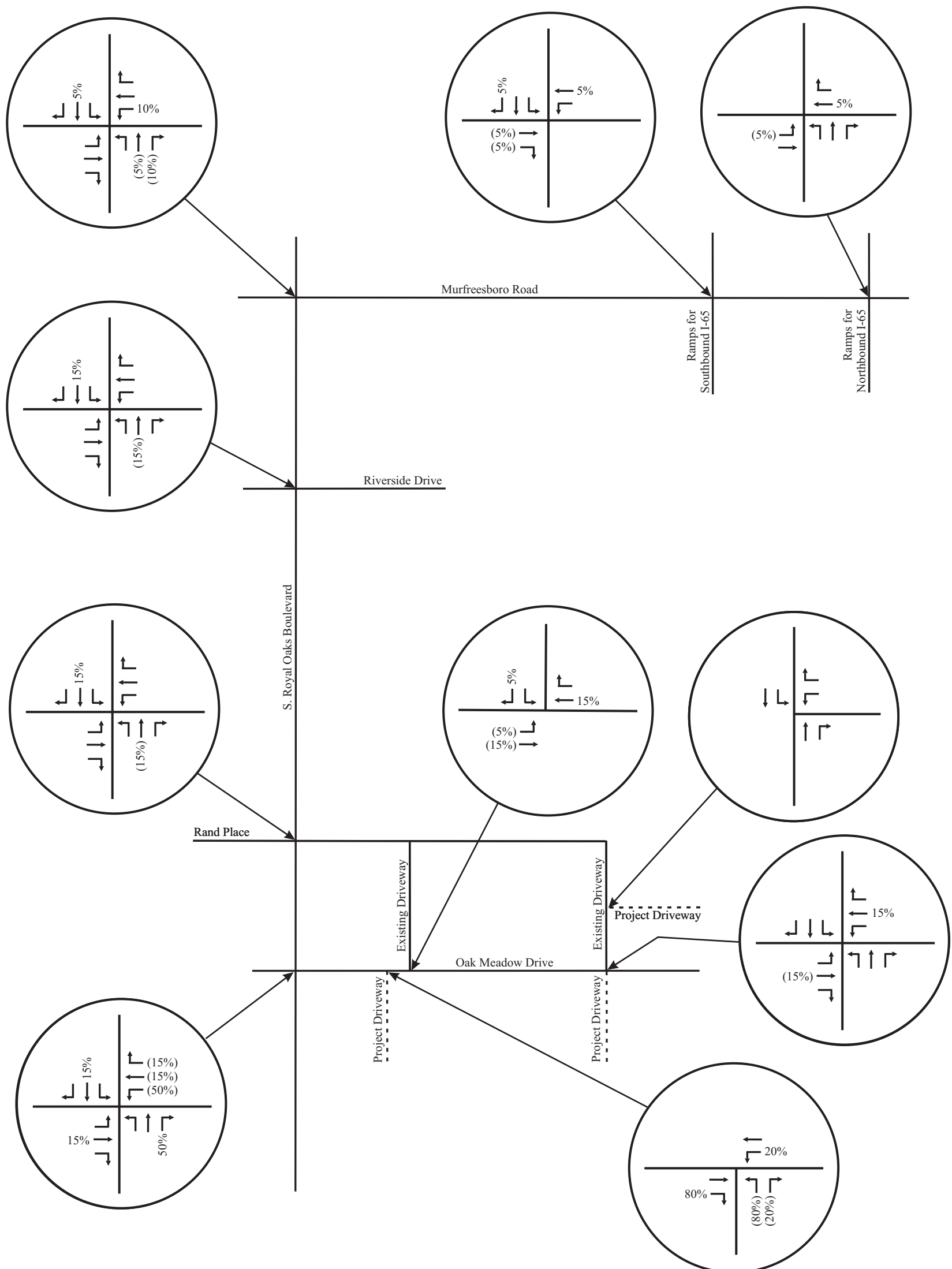


No Scale

XX - Entering Volumes
(XX) - Exiting Volumes

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

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

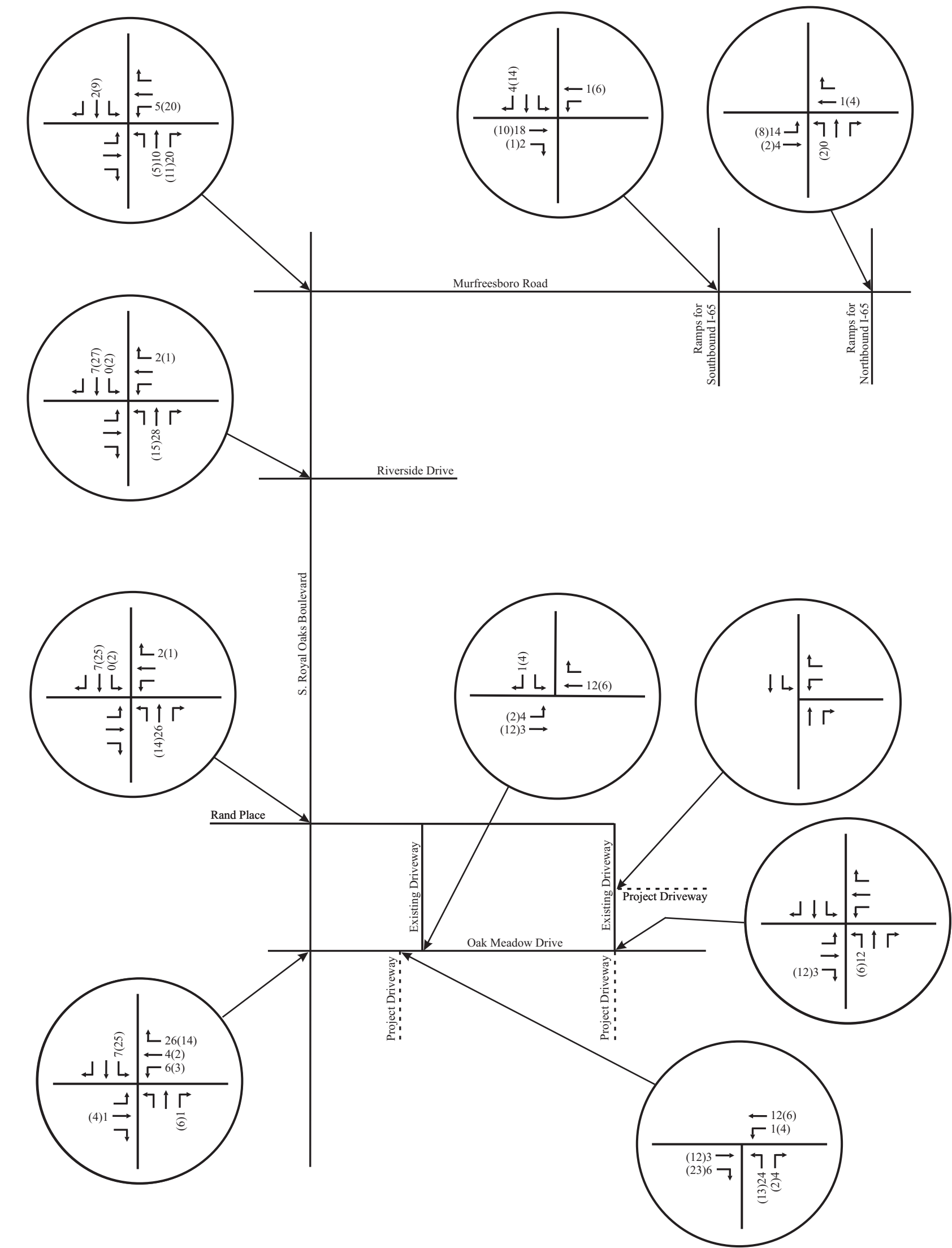
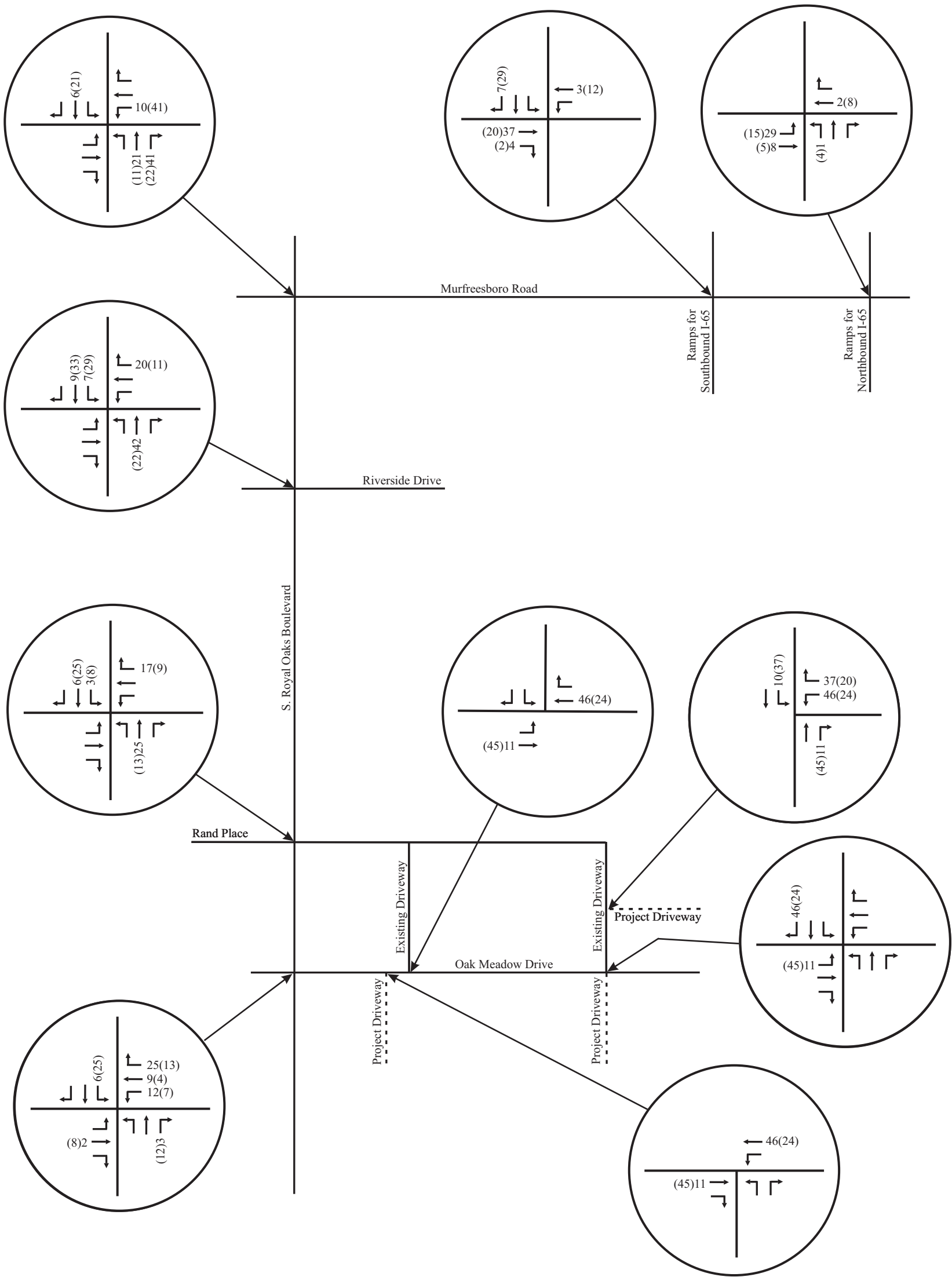


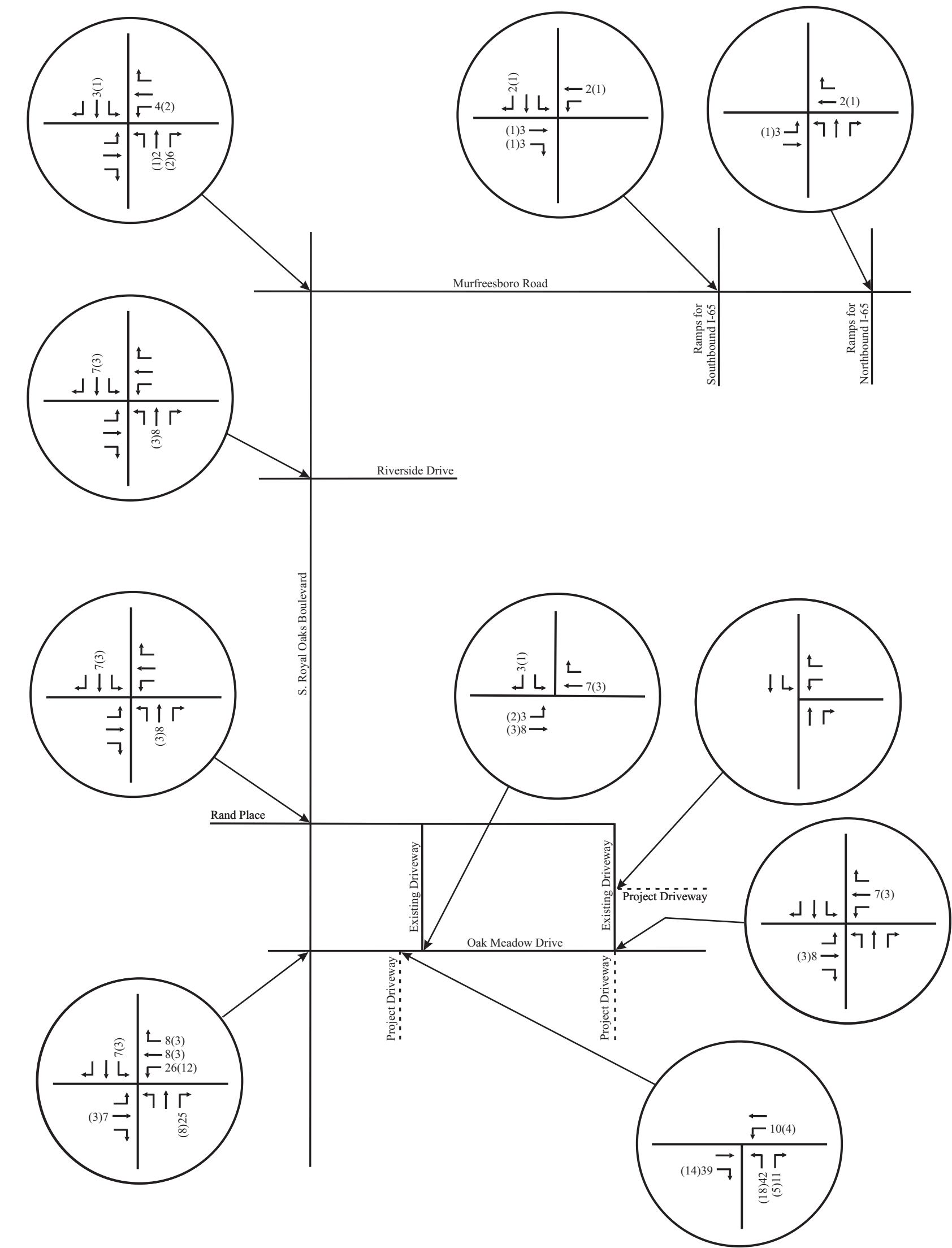
Figure 7A.
Peak Hour Traffic Volumes Generated by the
Proposed Apartments (Southern Site)



No Scale

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

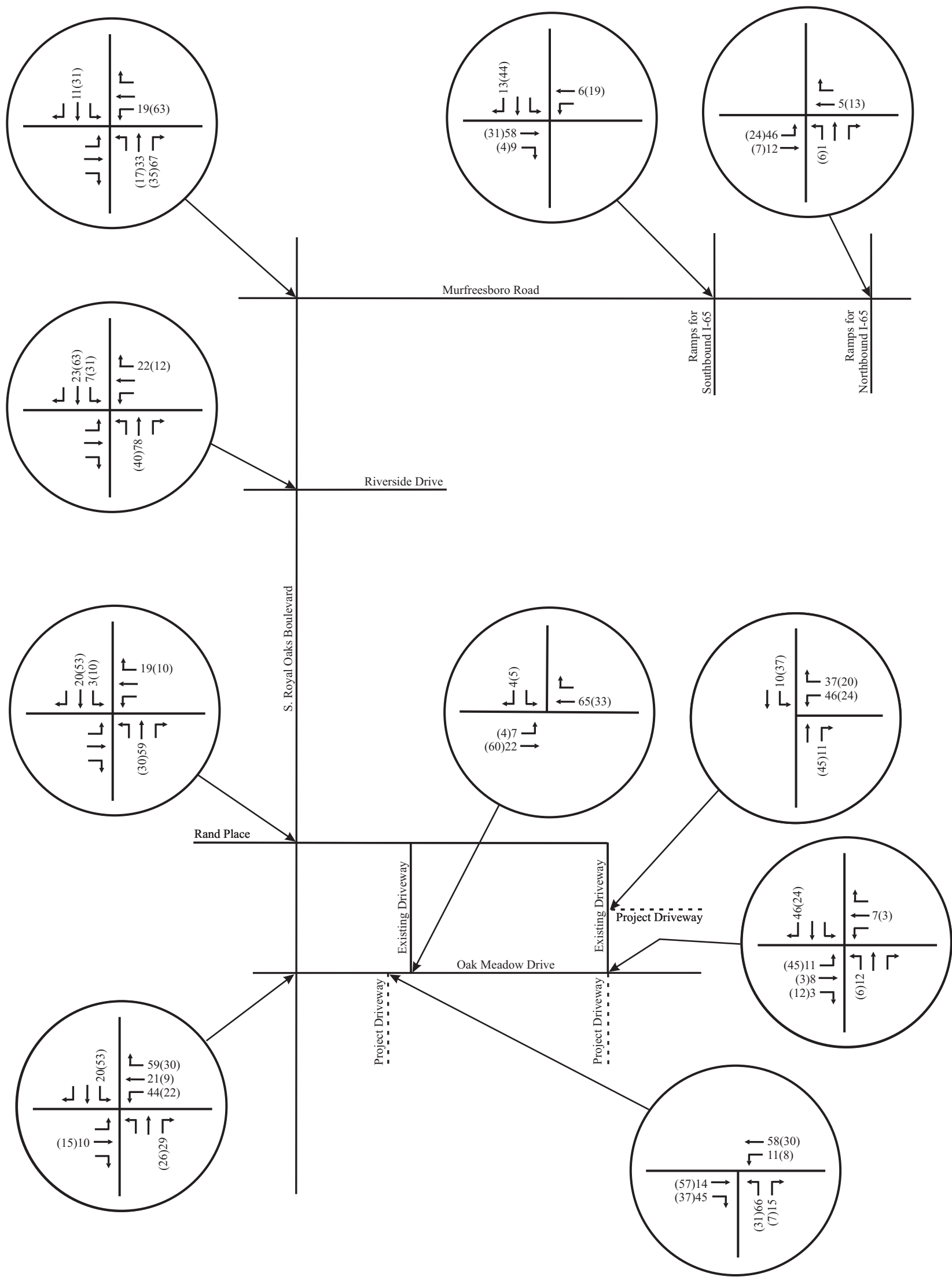
Figure 7B.
Peak Hour Traffic Volumes Generated by the
Proposed Apartments (Northern Site)



No Scale

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

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



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

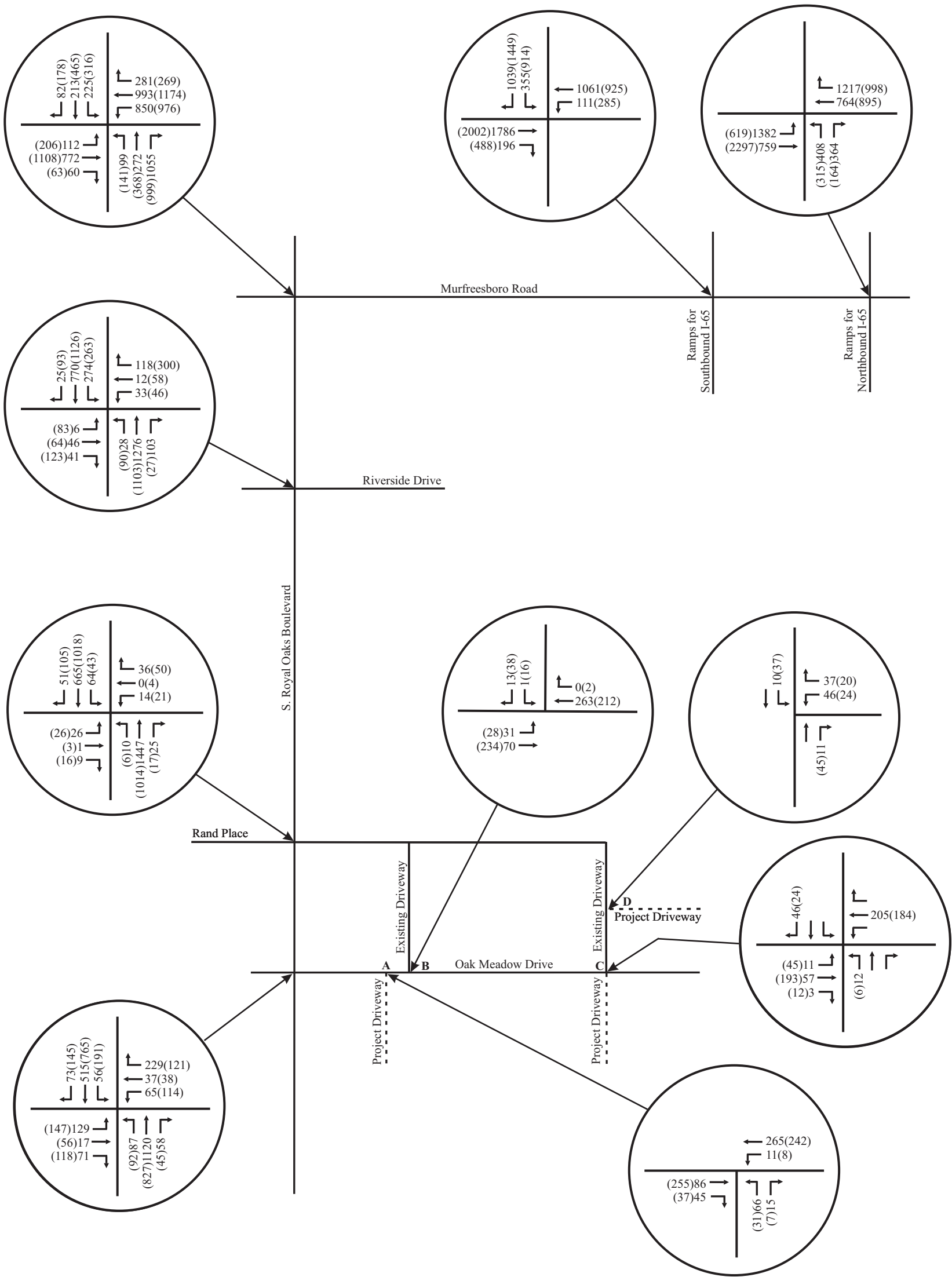
In order to identify the projected peak hour traffic volumes at the completion of the proposed project, the trips generated by the project were added to the background peak hour traffic volumes. The resulting peak hour volumes are shown in [Figure 8](#).

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.



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 and Future Retail

TABLE 7. PROJECTED PEAK HOUR LEVELS OF SERVICE

INTERSECTION	TURNING MOVEMENT	AM PEAK HOUR		PM PEAK HOUR	
		LEVEL OF SERVICE	95 TH %-ILE QUEUE	LEVEL OF SERVICE	95 TH %-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 been 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.**

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

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

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

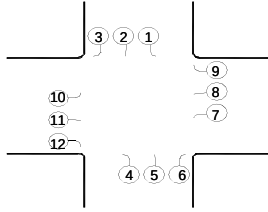
Property Owner Title:

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	
6:45-7:00								54			13	
7:00-7:15								50			13	
7:15-7:30								36			12	
7:30-7:45								43			7	
7:45-8:00								41			7	
8:00-8:15								33			10	
8:15-8:30								29			9	
4:30-4:45								46			33	
4:45-5:00								33			49	
5:00-5:15								41			48	
5:15-5:30								48			46	
5:30-5:45								33			38	
5:45-6:00								34			58	
6:00-6:15								25			47	
6:15-6:30								32			42	
TOTAL								602			439	
AM PK HR								183			45	
PM PK HR								168			176	

209 31

228 67

209 63

189 48

179 50

48

43

38

344 79

336 82

346 89

329 94

309 71

92

72

74

6:45-7:45

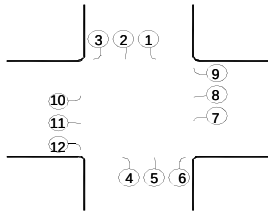
4:30-5:30

AM PK PHF								0.85			0.87	
PM PK PHF								0.88			0.90	

0.85

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	
6:45-7:00								54			13	
7:00-7:15								50		1	13	
7:15-7:30			1					36		1	12	
7:30-7:45	1							43			6	
7:45-8:00								41		1	7	
8:00-8:15	1							33			9	
8:15-8:30								29			9	
4:30-4:45	3							46		1	30	
4:45-5:00	4							33		1	45	
5:00-5:15	3		1					40	1	2	45	
5:15-5:30	5		1					47	1	1	41	
5:30-5:45	3							33		1	35	
5:45-6:00	6							34		2	52	
6:00-6:15	7							25		1	40	
6:15-6:30	5							32		1	37	
TOTAL	38		4					600	2	13	401	
AM PK HR	1		1					183		2	44	
PM PK HR	15		2					166	2	5	161	

213 32

231 67

213 64

192 50

180 50

49

43

38

351 80

343 83

354 92

335 96

314 72

94

73

75

6:45-7:45

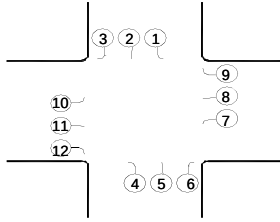
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AM PK PHF	0.25		0.25					0.85		0.50	0.85	
PM PK PHF	0.75		0.50					0.88	0.50	0.63	0.89	

0.86

0.91

INTERSECTION TRAFFIC VOLUME COUNTS

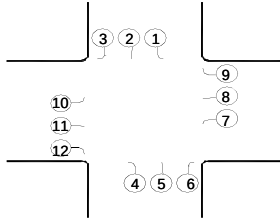


LOCATION: S. Royal Oaks Blvd and Oak Meadow Dr
DATE: 4-Feb-16 Thu
RECORDER: Burns
NOTES: signalized

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	
6:45-7:00	10	132	8	2	358	6	2		1	5		1
7:00-7:15	15	119	12		364	5	1		1	8	1	1
7:15-7:30	9	153	9	4	264	5	2		7	4		4
7:30-7:45	11	182	18	3	295	7	8		2	7		2
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
4:45-5:00	5	211	27	1	209	3	3		8	6	1	6
5:00-5:15	5	228	26	2	235	4	4	3	3	5		2
5:15-5:30	5	237	25	2	234	4	1	1	5	5	1	3
5:30-5:45	2	262	17	4	156	1	5	1	3	12		4
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
PM PK HR	20	883	97	6	896	16	19	4	22	24	3	15

1,934

2,048

2,029

1,968

1,986

2,005

1,987

1,967

1,888

1,720

6:45-7:45

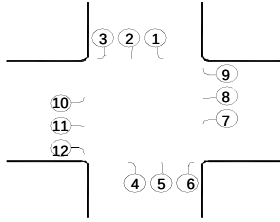
4:30-5:30

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
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

0.97

0.96

INTERSECTION TRAFFIC VOLUME COUNTS

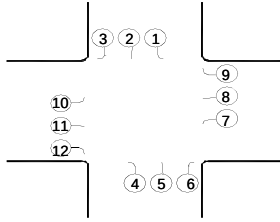


LOCATION: S. Royal Oaks Blvd and Center Point Pl and Riverside Dr
DATE: 4-Feb-16 Thu
RECORDER: Burns
NOTES: signalized

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

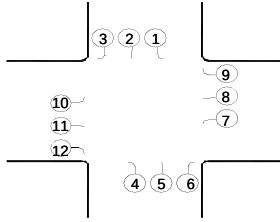


LOCATION: Murfreesboro Road and Royal Oaks Blvd
DATE: 11-Feb-16 Thu
RECORDER: Burns
NOTES: signalized

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
6:45-7:00	69		181				31				406	47
7:00-7:15	66		139				30				471	49
7:15-7:30	73		196				37				452	57
7:30-7:45	61		237				32				432	46
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
4:45-5:00	222		322				48				388	95
5:00-5:15	197		298				76				470	119
5:15-5:30	222		374				69				469	118
5:30-5:45	175		319				56				385	102
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
PM PK HR	846		1,293				264				1,807	446

2,929

3,112

3,159

3,168

3,140

4,656

4,524

4,499

4,376

4,089

7:15-8:15

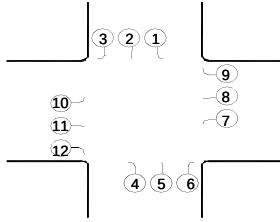
4:30-5:30

AM PK PHF	0.85		0.92				0.91				0.96	1.03
PM PK PHF	0.95		0.86				0.87				0.94	0.94

0.97

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		
6:45-7:00				109		94		150	306	319		
7:00-7:15				65		66		183	306	331		
7:15-7:30				94		92		154	267	299		
7:30-7:45				107		85		213	248	284		
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		
4:45-5:00				75		39		231	134	187		
5:00-5:15				63		39		251	123	208		
5:15-5:30				66		34		213	143	204		
5:30-5:45				49		40		200	105	193		
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		
PM PK HR				284		152		814	924	538		

3,695

3,772

3,689

3,592

3,508

2,712

2,597

2,490

2,376

2,230

6:45-7:45

4:30-5:30

AM PK PHF				0.86		0.90		0.82	0.92	0.93	#DIV/0!	
PM PK PHF				0.89		0.95		0.95	0.92	0.94	#DIV/0!	

0.96

0.97

**APPENDIX C
CAPACITY ANALYSES**

EXISTING CONDITIONS

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

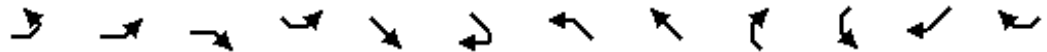
5/17/2016

												
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	

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/17/2016



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 Effect 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

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/17/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
14 s	50 s	12 s	27 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	50 s	12 s	27 s

Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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 Effect 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	

Lanes, Volumes, Timings

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

5/17/2016

												
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

 Ø1	 Ø2 (R)	 Ø4
17 s	73 s	50 s
 Ø5	 Ø6 (R)	 Ø8
17 s	73 s	50 s

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/17/2016

												
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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/17/2016

												
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 Effect 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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/17/2016

												
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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
21 s	66 s	21 s	32 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
45 s	42 s	21 s	32 s

Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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					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 Effect 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

Lanes, Volumes, Timings

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

5/17/2016

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

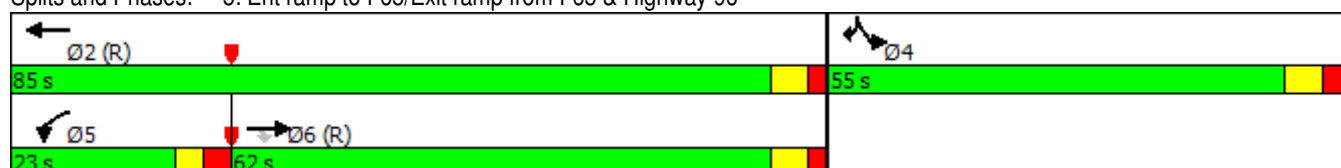
Analysis Period (min) 15

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



Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

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

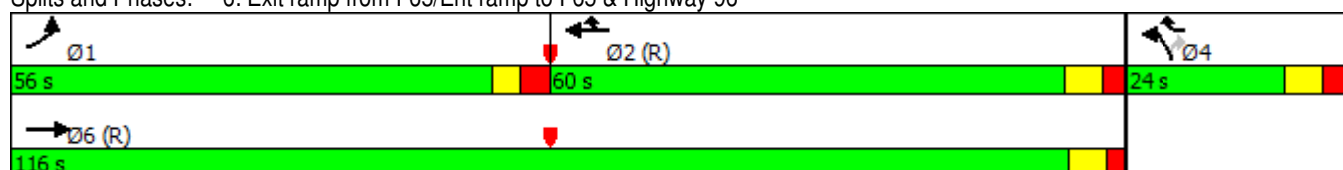
~ Volume exceeds capacity, queue is theoretically infinite.

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



Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/17/2016

												
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	

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/17/2016

												
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 Effect 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												

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/17/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
18 s	53 s	14 s	35 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	57 s	14 s	35 s

Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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 Effect 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	

Lanes, Volumes, Timings

3: S Royal Oaks & Riverside Dr/Center Point PI

5/17/2016

												
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 PI



Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/17/2016

												
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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/17/2016

												
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 Effect 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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/17/2016

												
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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
25 s	69 s	22 s	34 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
42 s	52 s	22 s	34 s

Lanes, Volumes, Timings

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

5/17/2016

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												

Lanes, Volumes, Timings

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

5/17/2016

												
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)		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 Effect 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

Lanes, Volumes, Timings

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

5/17/2016

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.

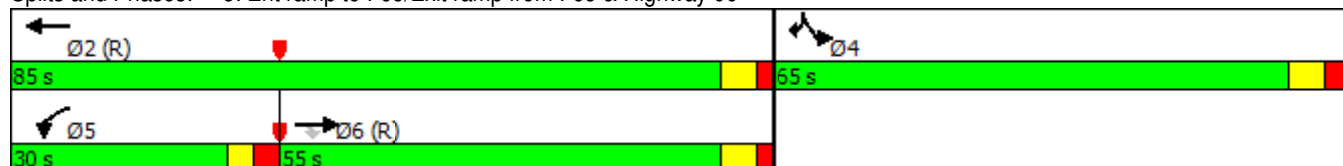
Queue shown is maximum after two cycles.

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



Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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

Lanes, Volumes, Timings

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

5/17/2016

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

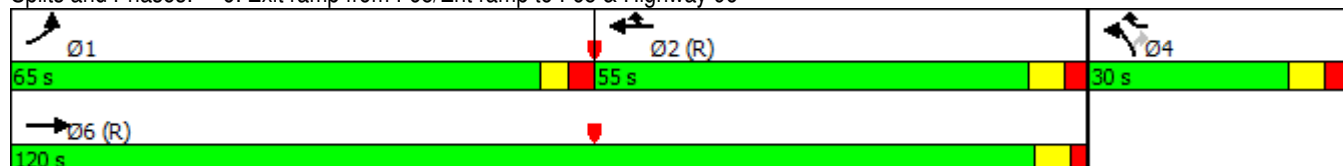
Intersection Capacity Utilization 79.1%

ICU Level of Service D

Analysis Period (min) 15

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

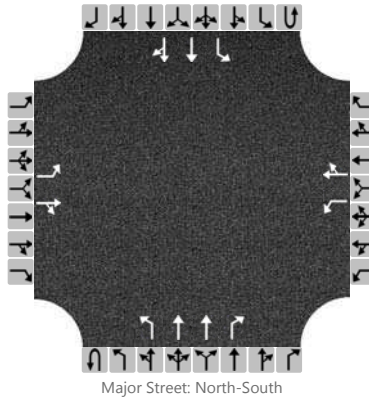
Splits and Phases: 6: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	S. Royal Oaks and Rand
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	Mar 2016	East/West Street	Rand Pl / Home Depot
Analysis Year	2016	North/South Street	S. Royal Oaks Blvd
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.97
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Existing)		

Lanes



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															

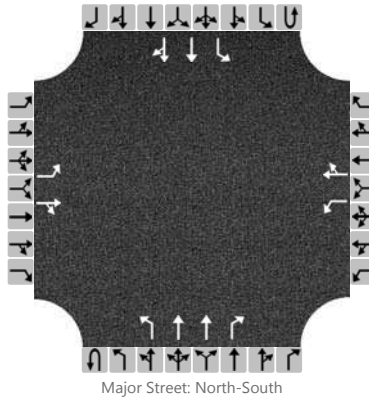
Delay, Queue Length, and Level of Service

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			

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	S. Royal Oaks and Rand
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	Mar 2016	East/West Street	Rand Pl / Home Depot
Analysis Year	2016	North/South Street	S. Royal Oaks Blvd
Time Analyzed	PM Peak Hour	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Existing)		

Lanes



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															

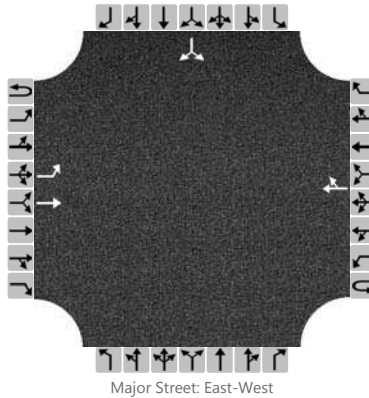
Delay, Queue Length, and Level of Service

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			

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	AM Peak Hour	Peak Hour Factor	0.80
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	10728 (Existing)		

Lanes



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															

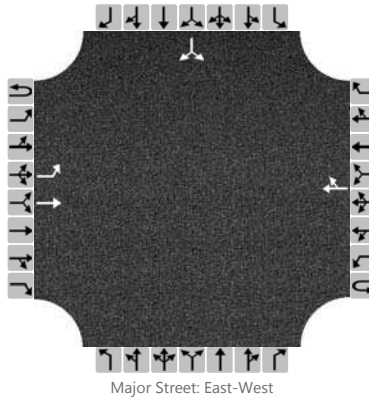
Delay, Queue Length, and Level of Service

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			

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 (Existing)		

Lanes



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			

BACKGROUND CONDITIONS

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

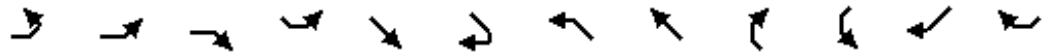
5/17/2016

												
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	

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/17/2016



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 Effect 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

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/17/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
14 s	50 s	12 s	27 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	50 s	12 s	27 s

Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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 Effect 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	

Lanes, Volumes, Timings

3: S Royal Oaks & Riverside Dr/Center Point PI

5/17/2016

												
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 PI



Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/17/2016

												
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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/17/2016

												
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 Effect 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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/17/2016

												
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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
21 s	66 s	21 s	32 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
45 s	42 s	21 s	32 s

Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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					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 Effect 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

Lanes, Volumes, Timings

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

5/17/2016

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.

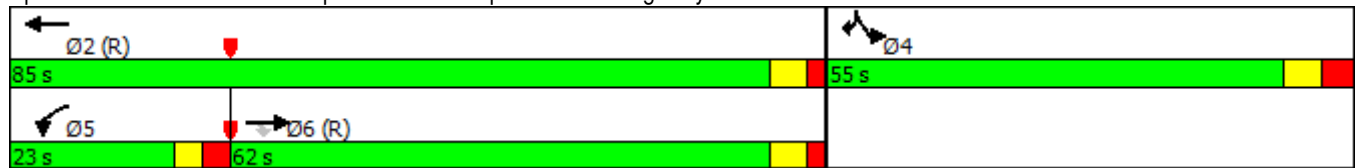
Queue shown is maximum after two cycles.

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



Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

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

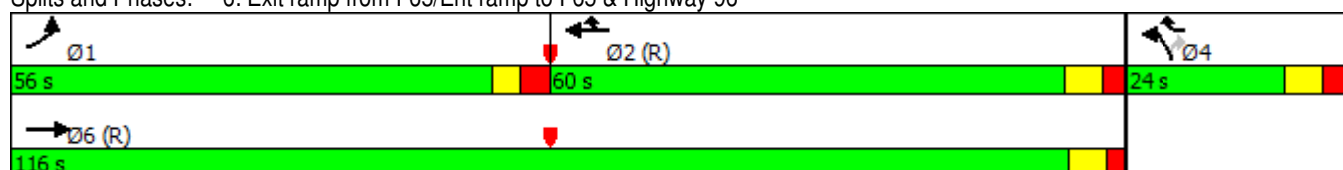
~ Volume exceeds capacity, queue is theoretically infinite.

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



Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

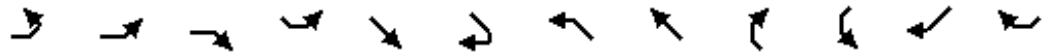
5/17/2016

												
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	

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/17/2016



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 Effect 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

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/17/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
18 s	53 s	14 s	35 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	57 s	14 s	35 s

Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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 Effect 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	

Lanes, Volumes, Timings

3: S Royal Oaks & Riverside Dr/Center Point PI

5/17/2016

												
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.

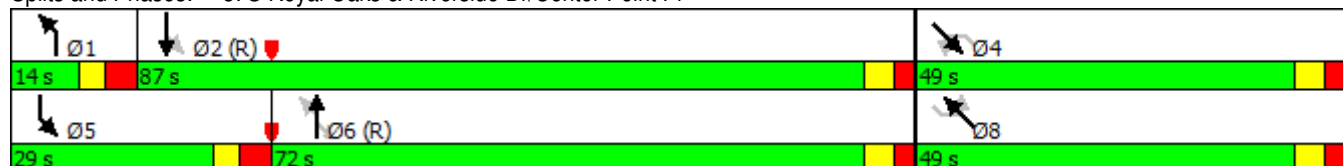
Queue shown is maximum after two cycles.

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 PI



Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

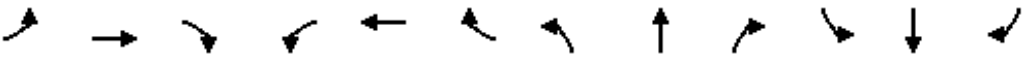
5/17/2016

												
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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/17/2016

												
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 Effect 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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/17/2016

												
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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
25 s	69 s	22 s	34 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
42 s	52 s	22 s	34 s

Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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)		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 Effect 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

Lanes, Volumes, Timings

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

5/17/2016

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



Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

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

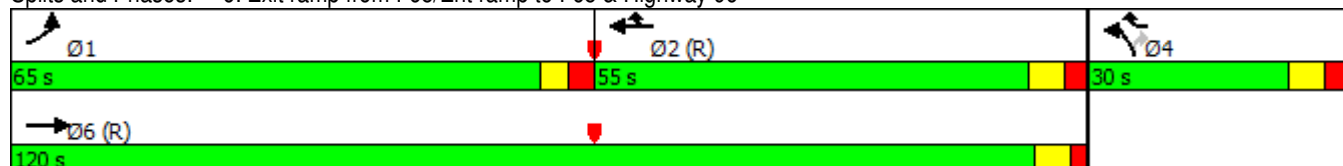
Intersection Capacity Utilization 84.7%

ICU Level of Service E

Analysis Period (min) 15

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

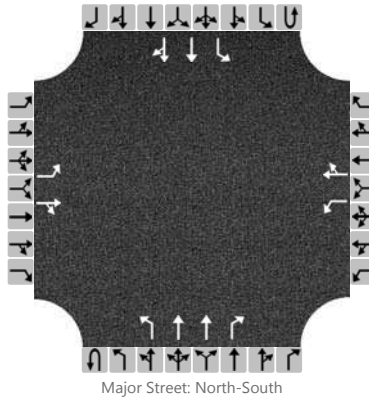
Splits and Phases: 6: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	S. Royal Oaks and Rand
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	Mar 2016	East/West Street	Rand Pl / Home Depot
Analysis Year	2016	North/South Street	S. Royal Oaks Blvd
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.97
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Background)		

Lanes



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															

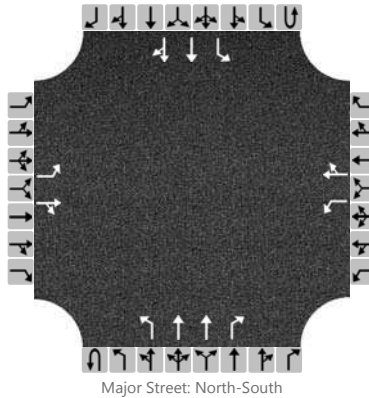
Delay, Queue Length, and Level of Service

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			

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	S. Royal Oaks and Rand
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	Mar 2016	East/West Street	Rand Pl / Home Depot
Analysis Year	2016	North/South Street	S. Royal Oaks Blvd
Time Analyzed	PM Peak Hour	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Background)		

Lanes



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															

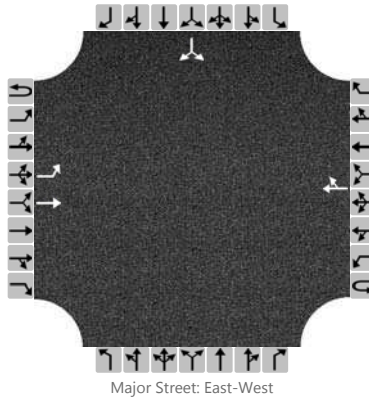
Delay, Queue Length, and Level of Service

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			

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	AM Peak Hour	Peak Hour Factor	0.80
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	10728 (Background)		

Lanes



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															

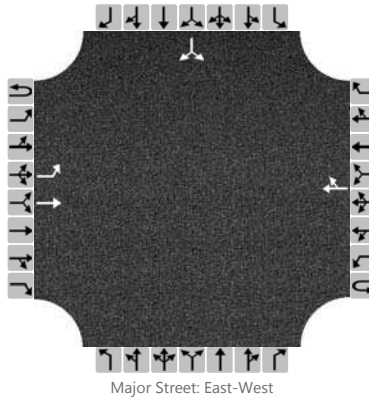
Delay, Queue Length, and Level of Service

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			

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



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			

TOTAL PROJECTED CONDITIONS

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/25/2016

												
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	

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/25/2016

												
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 Effect 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												

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/25/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
14 s	50 s	12 s	27 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	50 s	12 s	27 s

Lanes, Volumes, Timings

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

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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 Effect 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	

Lanes, Volumes, Timings

3: S Royal Oaks & Riverside Dr/Center Point PI

5/25/2016

												
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 PI



Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

												
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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

												
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 Effect 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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

												
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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
21 s	66 s	21 s	32 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
45 s	42 s	21 s	32 s

Lanes, Volumes, Timings

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

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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					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 Effect 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

Lanes, Volumes, Timings

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

5/25/2016

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.

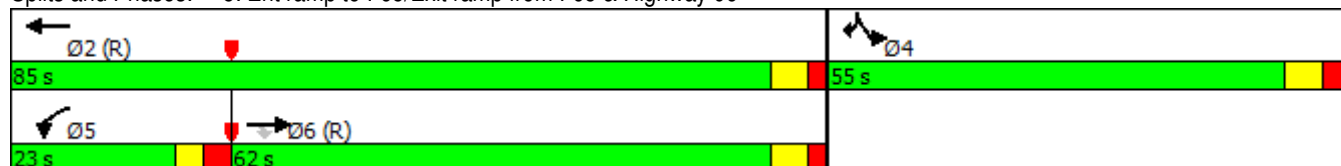
Queue shown is maximum after two cycles.

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



Lanes, Volumes, Timings

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

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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

Lanes, Volumes, Timings

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

5/25/2016

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

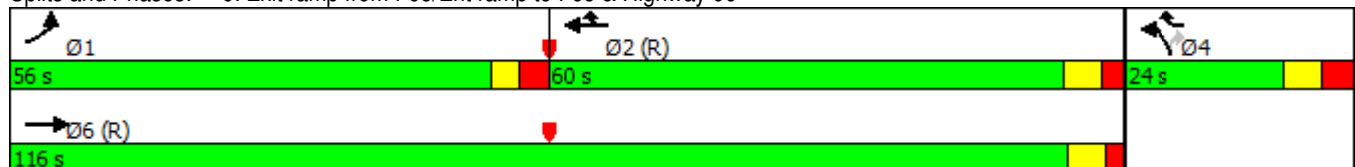
~ Volume exceeds capacity, queue is theoretically infinite.

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



Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/25/2016

												
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	

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/25/2016

												
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 Effect 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												

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/25/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
18 s	53 s	14 s	35 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	57 s	14 s	35 s

Lanes, Volumes, Timings

3: S Royal Oaks & Riverside Dr/Center Point PI

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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 Effect 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	

Lanes, Volumes, Timings

3: S Royal Oaks & Riverside Dr/Center Point PI

5/25/2016

												
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 PI



Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

												
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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

												
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 Effect 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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

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

Ø1	Ø2 (R)	Ø3	Ø4
25 s	69 s	22 s	34 s
Ø5	Ø6 (R)	Ø7	Ø8
42 s	52 s	22 s	34 s

Lanes, Volumes, Timings

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

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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)		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 Effect 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

Lanes, Volumes, Timings

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

5/25/2016

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.

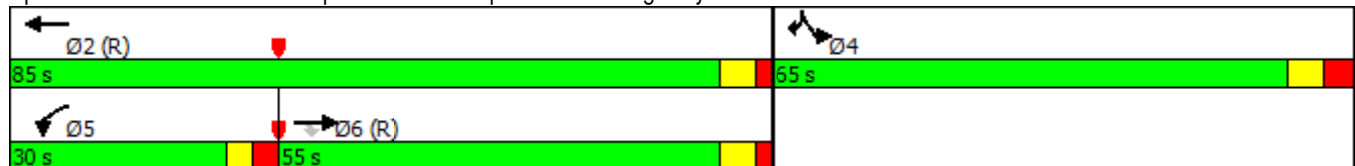
Queue shown is maximum after two cycles.

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



Lanes, Volumes, Timings

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

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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

Lanes, Volumes, Timings

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

5/25/2016

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

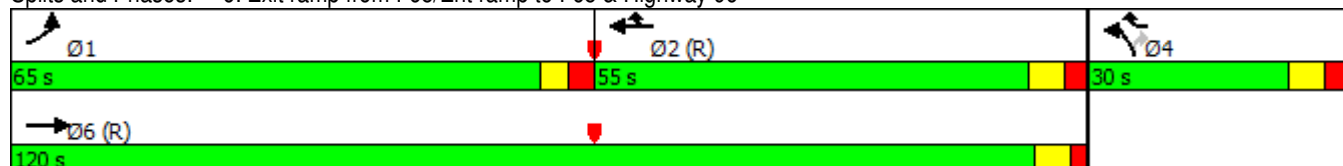
Intersection Capacity Utilization 84.9%

ICU Level of Service E

Analysis Period (min) 15

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

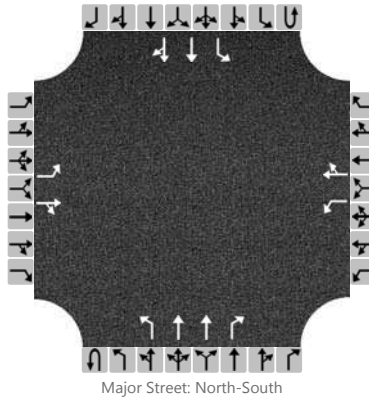
Splits and Phases: 6: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	S. Royal Oaks and Rand
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	May 2016	East/West Street	Rand Pl / Home Depot
Analysis Year	2016	North/South Street	S. Royal Oaks Blvd
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.97
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Total)		

Lanes



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															

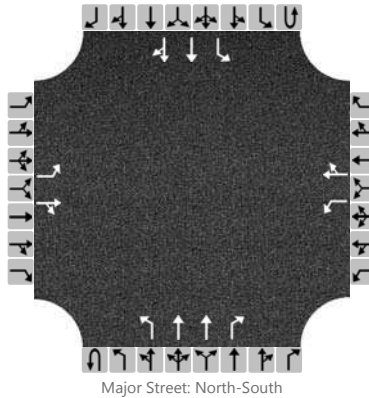
Delay, Queue Length, and Level of Service

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			

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	S. Royal Oaks and Rand
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	May 2016	East/West Street	Rand Pl / Home Depot
Analysis Year	2016	North/South Street	S. Royal Oaks Blvd
Time Analyzed	PM Peak Hour	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Total)		

Lanes



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															

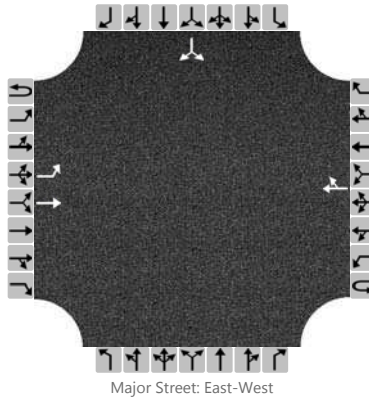
Delay, Queue Length, and Level of Service

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			

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	May 2016	East/West Street	Oak Meadow Drive
Analysis Year	2016	North/South Street	Western Home Depot dwy
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.80
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	10728 (Total)		

Lanes



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															

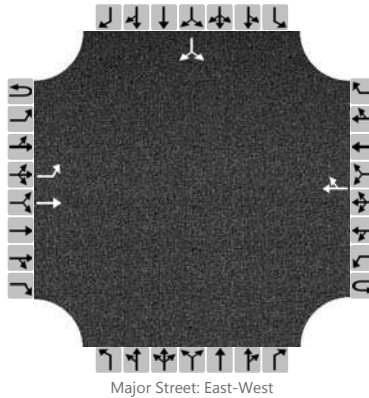
Delay, Queue Length, and Level of Service

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			

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	May 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 (Total)		

Lanes



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															

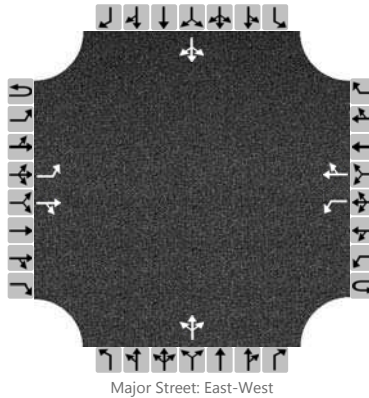
Delay, Queue Length, and Level of Service

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			

HCS 2010 Two-Way Stop Control Summary Report

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

Lanes



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															

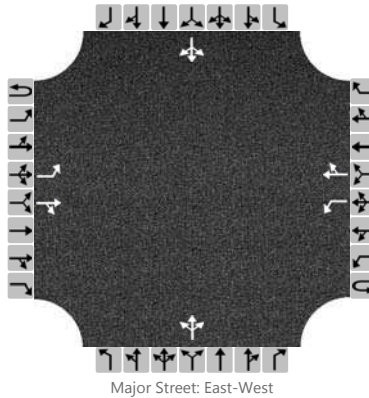
Delay, Queue Length, and Level of Service

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			

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	Oak Meadow Dr and east dw
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	May 2016	East/West Street	Oak Meadow Drive
Analysis Year	2016	North/South Street	Eastern 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 (Total)		

Lanes



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															

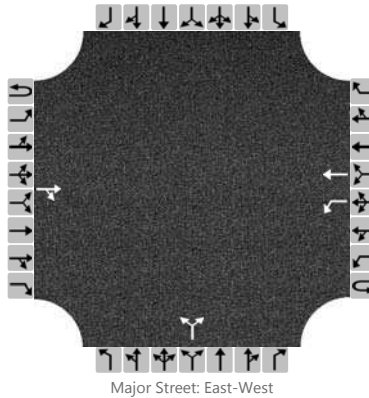
Delay, Queue Length, and Level of Service

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			

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	Oak Meadow Dr and west dw
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	May 2016	East/West Street	Oak Meadow Drive
Analysis Year	2016	North/South Street	Western project dwy
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.80
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	10728 (Total)		

Lanes



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															

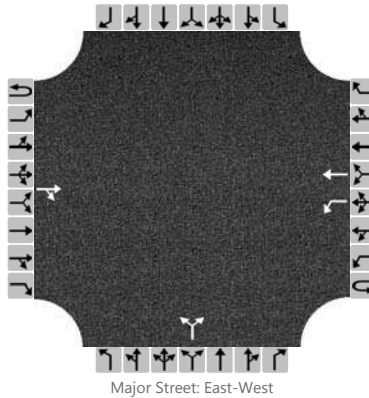
Delay, Queue Length, and Level of Service

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							

HCS 2010 Two-Way Stop Control Summary Report

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

Lanes



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															

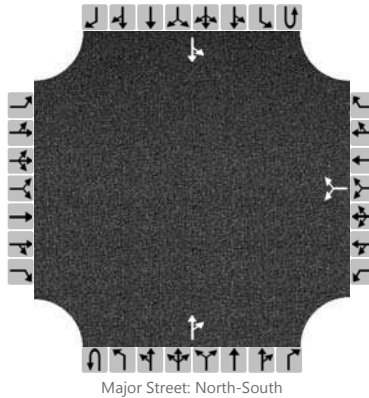
Delay, Queue Length, and Level of Service

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							

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	Home Depot and Apt Dwy
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	May 2016	East/West Street	Project Driveway
Analysis Year	2016	North/South Street	Home Depot Access
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.80
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Total)		

Lanes



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																

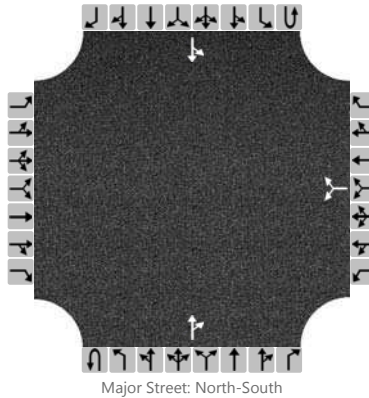
Delay, Queue Length, and Level of Service

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			

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	Home Depot and Apt Dwy
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	May 2016	East/West Street	Project Driveway
Analysis Year	2016	North/South Street	Home Depot Access
Time Analyzed	PM Peak Hour	Peak Hour Factor	0.80
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Total)		

Lanes



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				

TOTAL PROJECTED CONDITIONS
With a third northbound through lane

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/25/2016

												
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	

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/25/2016

												
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 Effect 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												

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/25/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
14 s	50 s	12 s	27 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	50 s	12 s	27 s

Lanes, Volumes, Timings

3: S Royal Oaks & Riverside Dr/Center Point PI

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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 Effect 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	

Lanes, Volumes, Timings

3: S Royal Oaks & Riverside Dr/Center Point PI

5/25/2016

												
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 PI

 Ø1	 Ø2 (R)	 Ø3	 Ø4
17 s	73 s	10 s	50 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
17 s	73 s	10 s	50 s

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

												
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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

												
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 Effect 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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

												
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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
21 s	66 s	21 s	32 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
45 s	42 s	21 s	32 s

Lanes, Volumes, Timings

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

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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					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 Effect 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

Lanes, Volumes, Timings

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

5/25/2016

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.

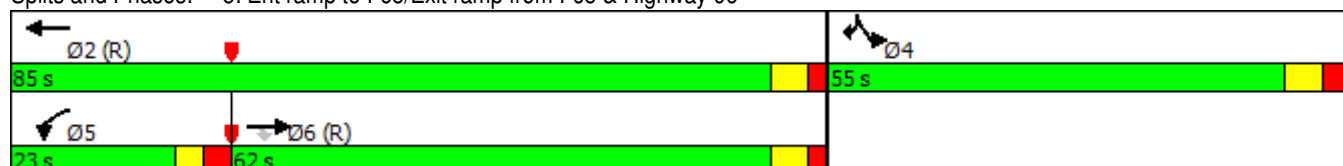
Queue shown is maximum after two cycles.

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



Lanes, Volumes, Timings

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

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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

Lanes, Volumes, Timings

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

5/25/2016

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

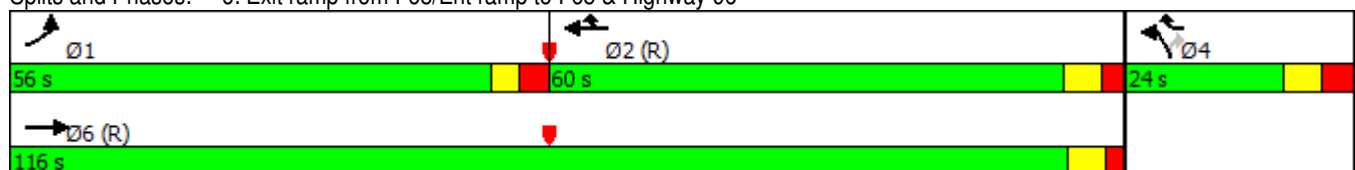
~ Volume exceeds capacity, queue is theoretically infinite.

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



Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

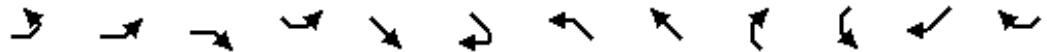
5/25/2016

												
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	

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/25/2016



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 Effect 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

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/25/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
18 s	53 s	14 s	35 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	57 s	14 s	35 s

Lanes, Volumes, Timings

3: S Royal Oaks & Riverside Dr/Center Point PI

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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 Effect 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	

Lanes, Volumes, Timings

3: S Royal Oaks & Riverside Dr/Center Point PI

5/25/2016

												
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 PI

 Ø1	 Ø2 (R)	 Ø3	 Ø4
14 s	87 s	10 s	49 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
29 s	72 s	10 s	49 s

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

												
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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

												
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 Effect 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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

												
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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
25 s	69 s	22 s	34 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
42 s	52 s	22 s	34 s

Lanes, Volumes, Timings

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

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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)		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 Effect 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

Lanes, Volumes, Timings

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

5/25/2016

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.

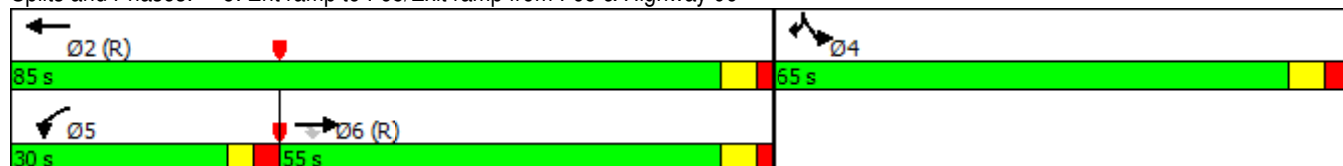
Queue shown is maximum after two cycles.

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



Lanes, Volumes, Timings

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

5/25/2016

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												

Lanes, Volumes, Timings

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

5/25/2016

												
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

Lanes, Volumes, Timings

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

5/25/2016

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

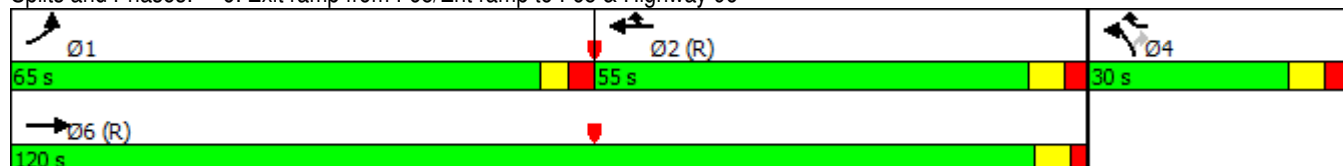
Intersection Capacity Utilization 84.9%

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

$$T = 2.74 (X)$$

$$T = 2.74 (208)$$

$$T = 570 \text{ vehicles}$$

$$\text{Enter} = 0.50 (570) = 285 \text{ vehicles}$$

$$\text{Exit} = 0.50 (570) = 285 \text{ vehicles}$$

AM traffic during peak hour of adjacent street

$$T = 0.23 (X)$$

$$T = 0.23 (208)$$

$$T = 47 \text{ vehicles}$$

$$\text{Enter} = 0.72 (47) = 34 \text{ vehicles}$$

$$\text{Exit} = 0.28 (47) = 13 \text{ vehicles}$$

PM traffic during peak hour of adjacent street

$$T = 0.37 (X)$$

$$T = 0.37 (208)$$

$$T = 77 \text{ vehicles}$$

$$\text{Enter} = 0.39 (77) = 30 \text{ vehicles}$$

$$\text{Exit} = 0.61 (77) = 47 \text{ vehicles}$$

TRIP GENERATION CALCULATIONS – Multi-Family (South)

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

Average Daily Traffic

$$T = 6.65 (X)$$

$$T = 6.65 (98)$$

$$T = 652 \text{ vehicle-trips}$$

$$\text{Enter} = 0.50 (652) = 326 \text{ vehicles}$$

$$\text{Exit} = 0.50 (652) = 326 \text{ vehicles}$$

A.M. traffic during peak hour of adjacent street

$$T = 0.51 (X)$$

$$T = 0.51 (98)$$

$$T = 50 \text{ vehicle-trips}$$

$$\text{Enter} = 0.20 (50) = 10 \text{ vehicles}$$

$$\text{Exit} = 0.80 (50) = 40 \text{ vehicles}$$

P.M. traffic during peak hour of adjacent street

$$T = 0.62 (X)$$

$$T = 0.62 (98)$$

$$T = 60 \text{ vehicle-trips}$$

$$\text{Enter} = 0.65 (60) = 39 \text{ vehicles}$$

$$\text{Exit} = 0.35 (60) = 21 \text{ vehicles}$$

TRIP GENERATION CALCULATIONS – Multi-Family (North)

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

Average Daily Traffic

$$T = 6.65 (X)$$

$$T = 6.65 (204)$$

$$T = 1,356 \text{ vehicle-trips}$$

$$\text{Enter} = 0.50 (1,356) = 678 \text{ vehicles}$$

$$\text{Exit} = 0.50 (1,356) = 678 \text{ vehicles}$$

A.M. traffic during peak hour of adjacent street

$$T = 0.51 (X)$$

$$T = 0.51 (204)$$

$$T = 104 \text{ vehicle-trips}$$

$$\text{Enter} = 0.20 (104) = 21 \text{ vehicles}$$

$$\text{Exit} = 0.80 (104) = 83 \text{ vehicles}$$

P.M. traffic during peak hour of adjacent street

$$T = 0.62 (X)$$

$$T = 0.62 (204)$$

$$T = 126 \text{ vehicle-trips}$$

$$\text{Enter} = 0.65 (126) = 82 \text{ vehicles}$$

$$\text{Exit} = 0.35 (126) = 44 \text{ vehicles}$$

TRIP GENERATION CALCULATIONS – Specialty Retail

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

Average Daily Traffic

$$T = 44.32 (X)$$

$$T = 44.32 (15.000)$$

$$T = 664 \text{ vehicle-trips}$$

$$\text{Enter} = 0.50 (664) = 332 \text{ vehicles}$$

$$\text{Exit} = 0.50 (664) = 332 \text{ vehicles}$$

A.M. traffic during peak hour of adjacent street

$$T = 6.84 (X)$$

$$T = 6.84 (15.000)$$

$$T = 102 \text{ vehicle-trips}$$

$$\text{Enter} = 0.48 (102) = 49 \text{ vehicles}$$

$$\text{Exit} = 0.52 (102) = 53 \text{ vehicles}$$

P.M. traffic during peak hour of adjacent street

$$T = 2.71 (X)$$

$$T = 2.71 (15.000)$$

$$T = 41 \text{ vehicle-trips}$$

$$\text{Enter} = 0.44 (41) = 18 \text{ vehicles}$$

$$\text{Exit} = 0.56 (41) = 23 \text{ vehicles}$$

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.

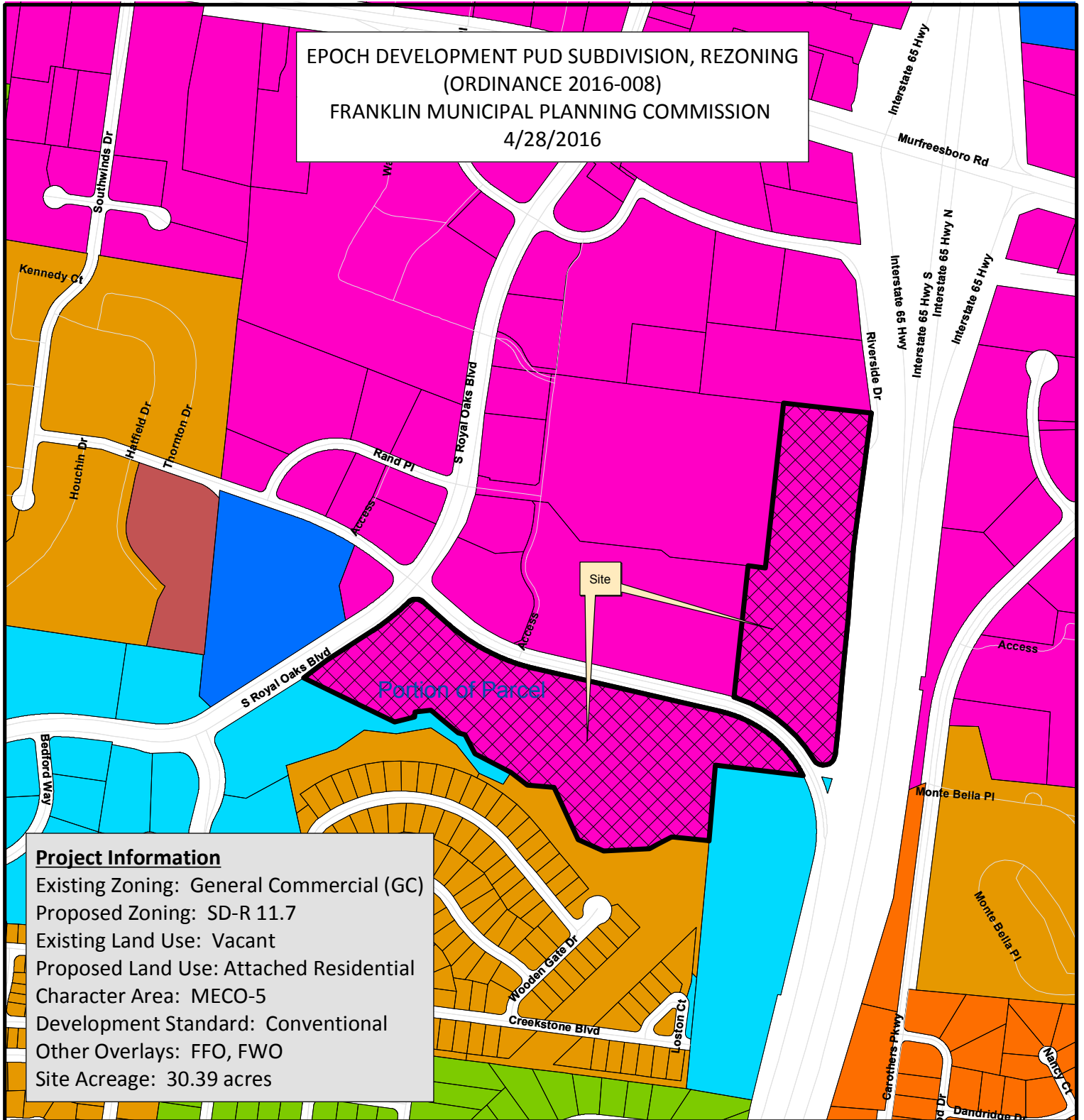
..end

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

- | | |
|--|---------------------------------------|
| Epoch Development PUD | SD-R Specific Development-Residential |
| AG Agricultural District | SD-X Specific Development-Variety |
| ER Estate Residential | OR Office Residential District |
| R-1 Residential District | GO General Office District |
| R-2 Residential District | CC Central Commercial District |
| R-3 Residential District | NC Neighborhood Commercial District |
| R-6 Historic Core Residential District | GC General Commercial District |
| RM-10 Attached 10 Residential District | LI Light Industrial District |
| RM-15 Attached 15 Residential District | HI Heavy Industrial District |
| RM-20 Attached 20 Residential District | CI Civic and Institutional District |



0 250 500 1,000
Feet

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It was compiled from the most authentic information available.
The City is not responsible for any errors or omissions contained hereon.
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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 PROCEEDING 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.

SUBDIVISION, 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.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 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, REVISION 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 PROCEEDING 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, REVISION 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:

CITY OF FRANKLIN, TENNESSEE:

By: _____
Eric Stuckey
City Administrator/Recorder

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
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Phone: (615) 771-8022
FTG Project Number: 10728

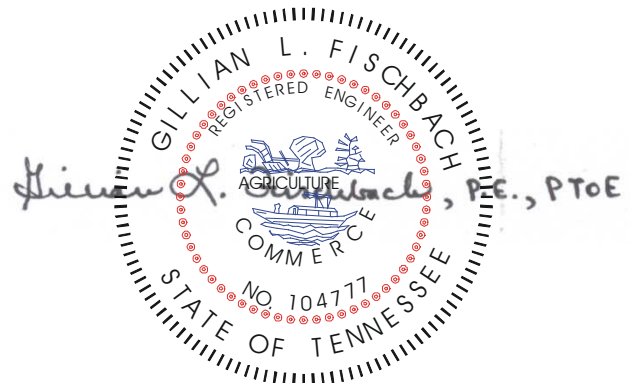


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1. INTRODUCTION

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](#).

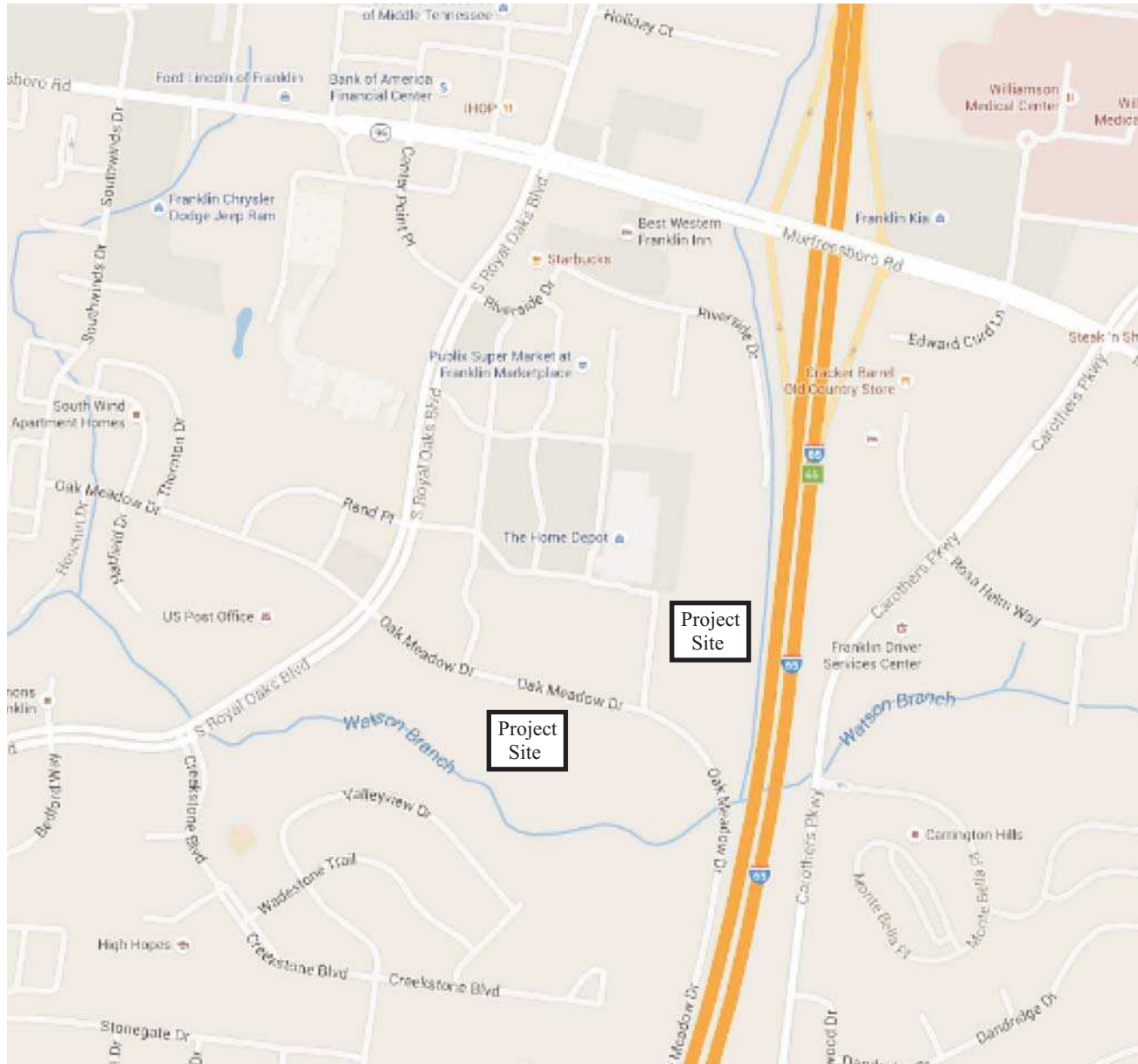
2. PROJECT DESCRIPTION

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.

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



No Scale

Figure 1.
Location of the Project Site

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.

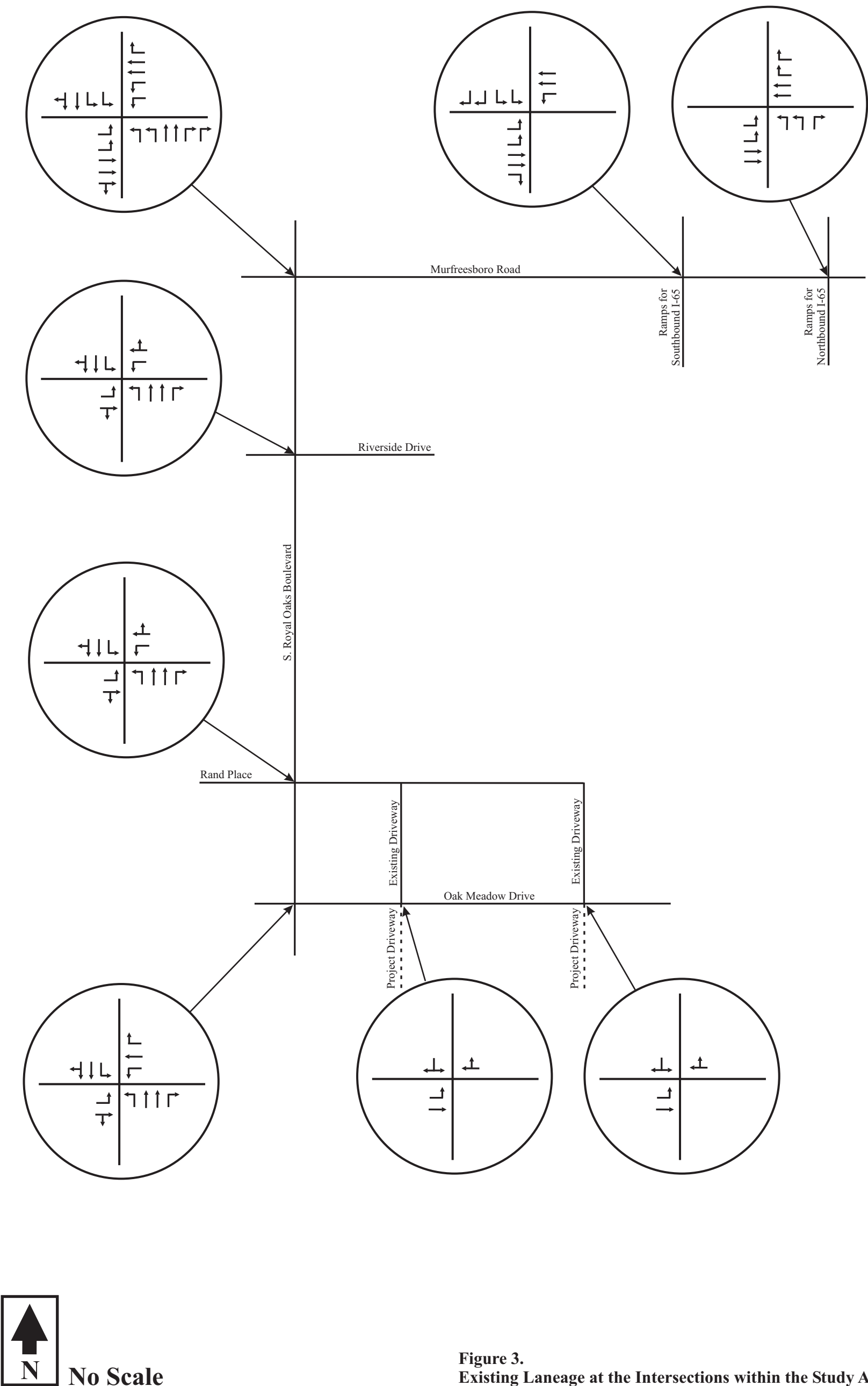
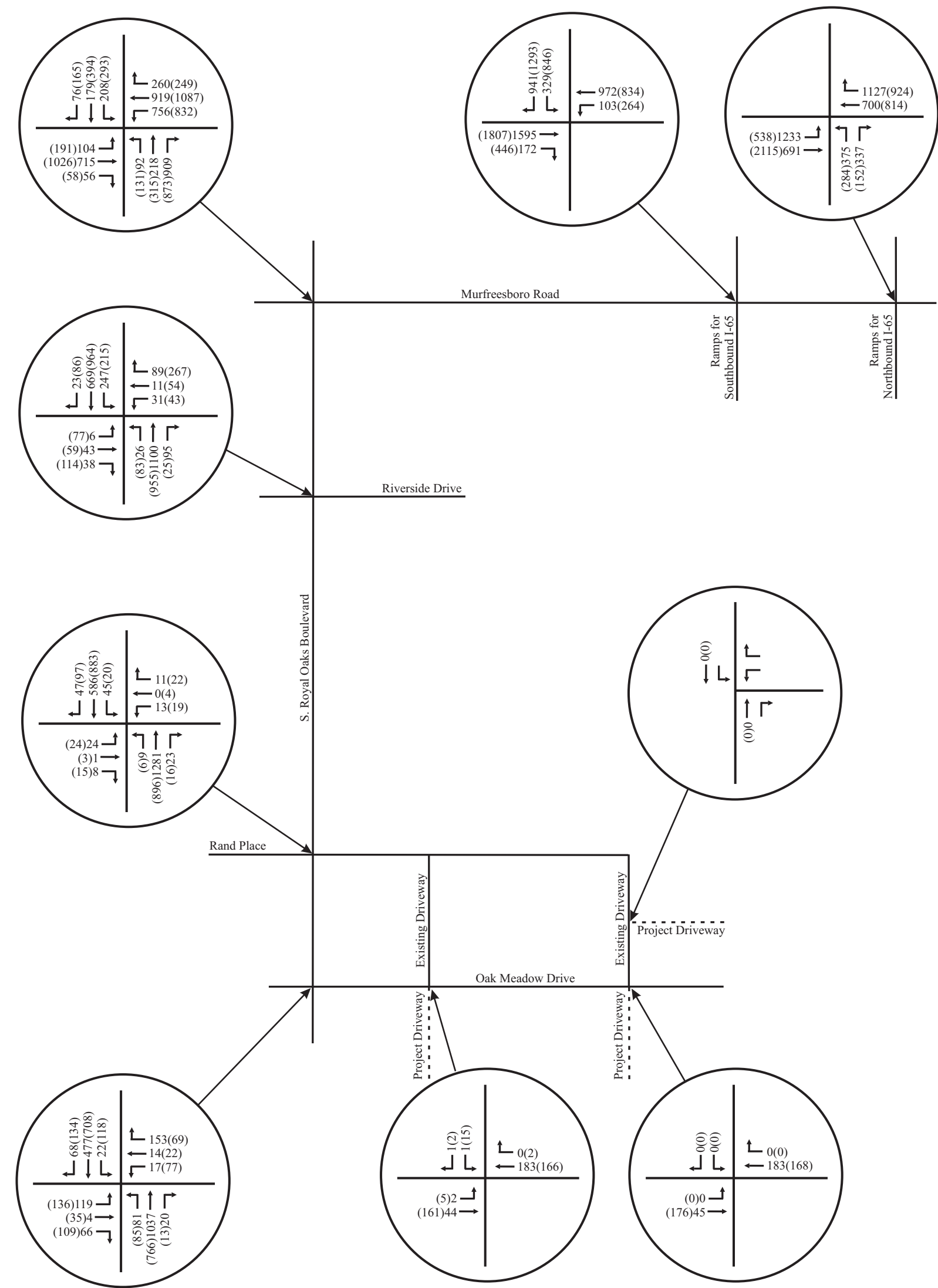


Figure 3.
Existing Laneage at the Intersections within the Study Area



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	95 TH %-ILE QUEUE	LEVEL OF SERVICE	95 TH %-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

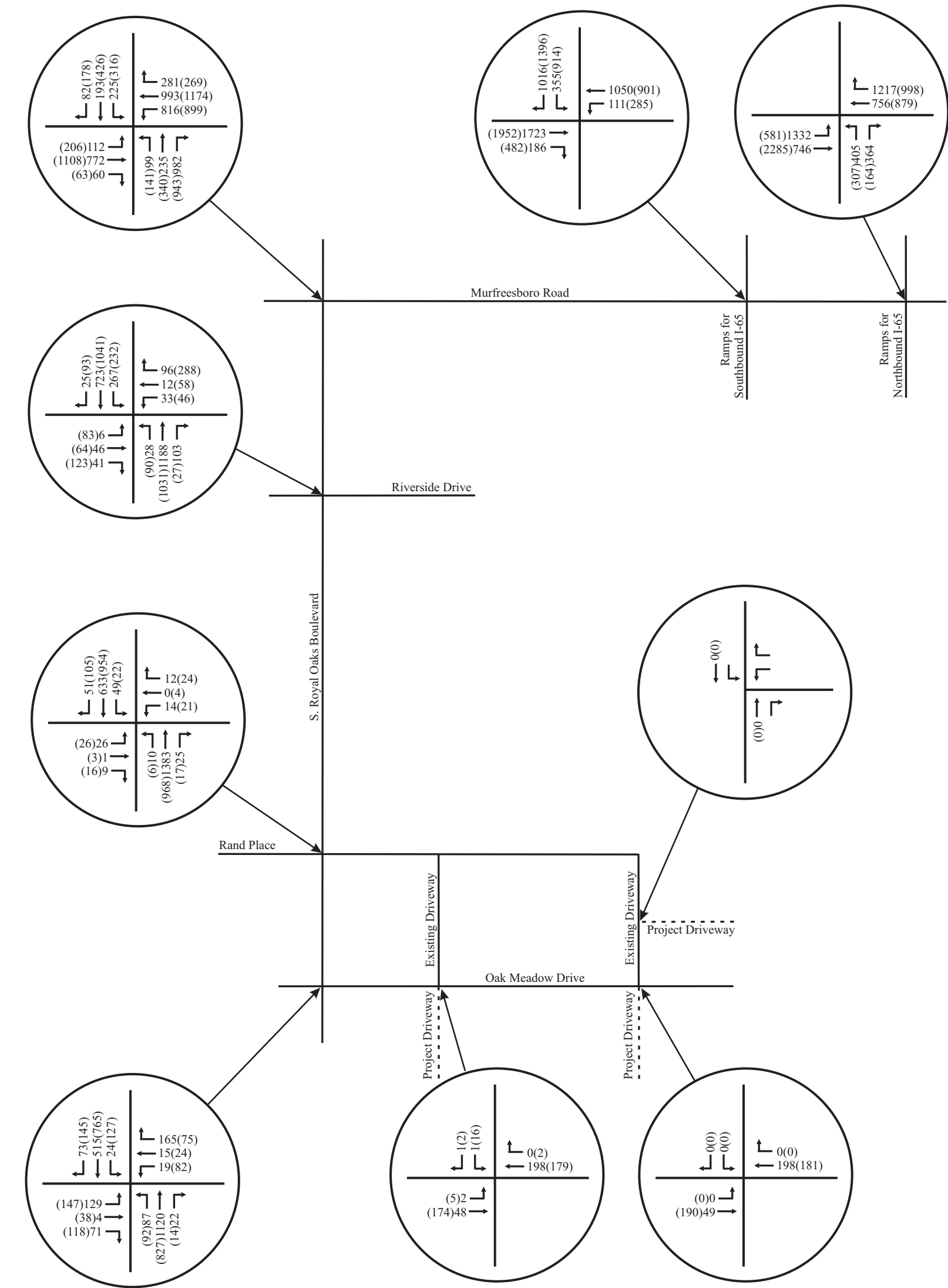
	Southbound Thrus / Right Turns	LOS D	141 feet	LOS E	398 feet
	Overall Intersection	LOS D		LOS E	
Murfreesboro Road and Ramps for Southbound I-65 (signalized)	Eastbound Thrus	LOS C	346 feet	LOS E	612 feet
	Eastbound Right Turns	LOS A	51 feet	LOS C	265 feet
	Westbound Left Turns	LOS E	156 feet	LOS F	465 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%	
2015	22,638	2.35%	
			Overall Growth
			2.65%



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.

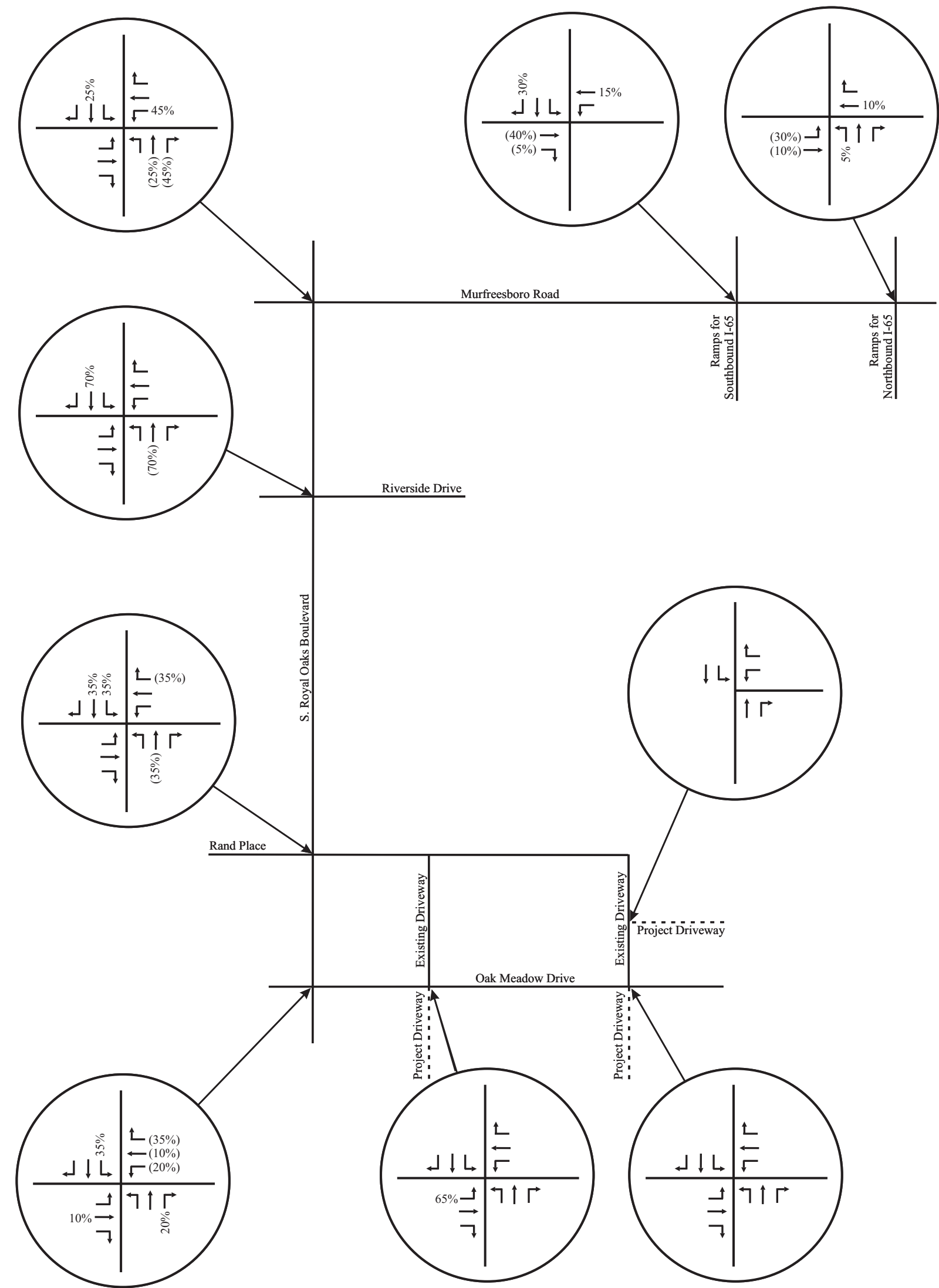
Also, it is important to note that an assisted living facility with 208 beds is under construction on the north side of Oak Meadow Drive, opposite the southern project site for the proposed project. For the purposes of this study, trip generation calculations were conducted in order to identify how much 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.

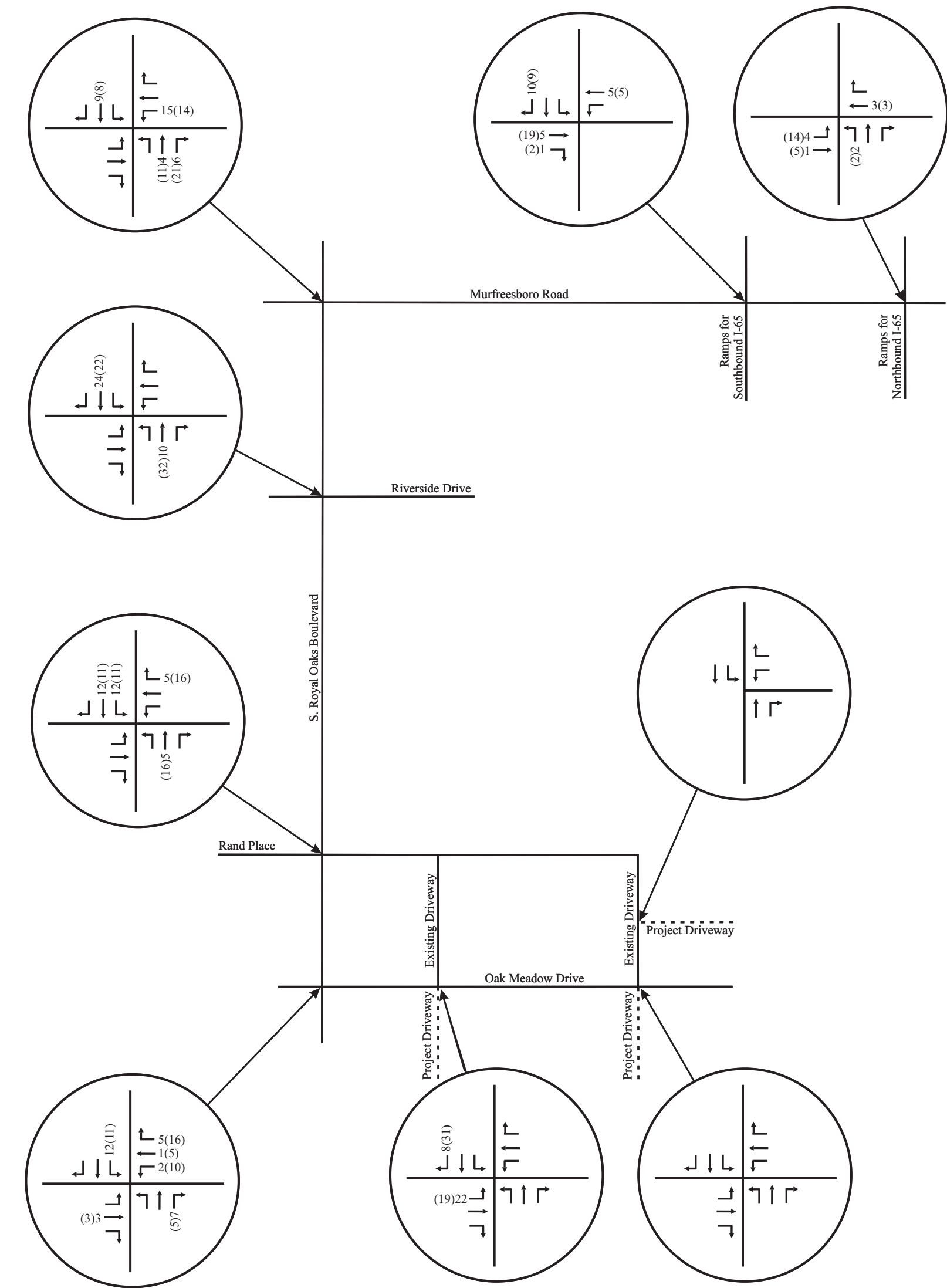
The peak hour traffic volumes shown in [Figures 5B and 5C](#) were added to the traffic volumes shown in [Figure 5A](#) in order to establish the final background traffic volumes shown in [Figure 5D](#). Using the background peak hour traffic volumes, capacity analyses were conducted for the intersections 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.



No Scale

XX - Entering Volumes
(XX) - Exiting Volumes

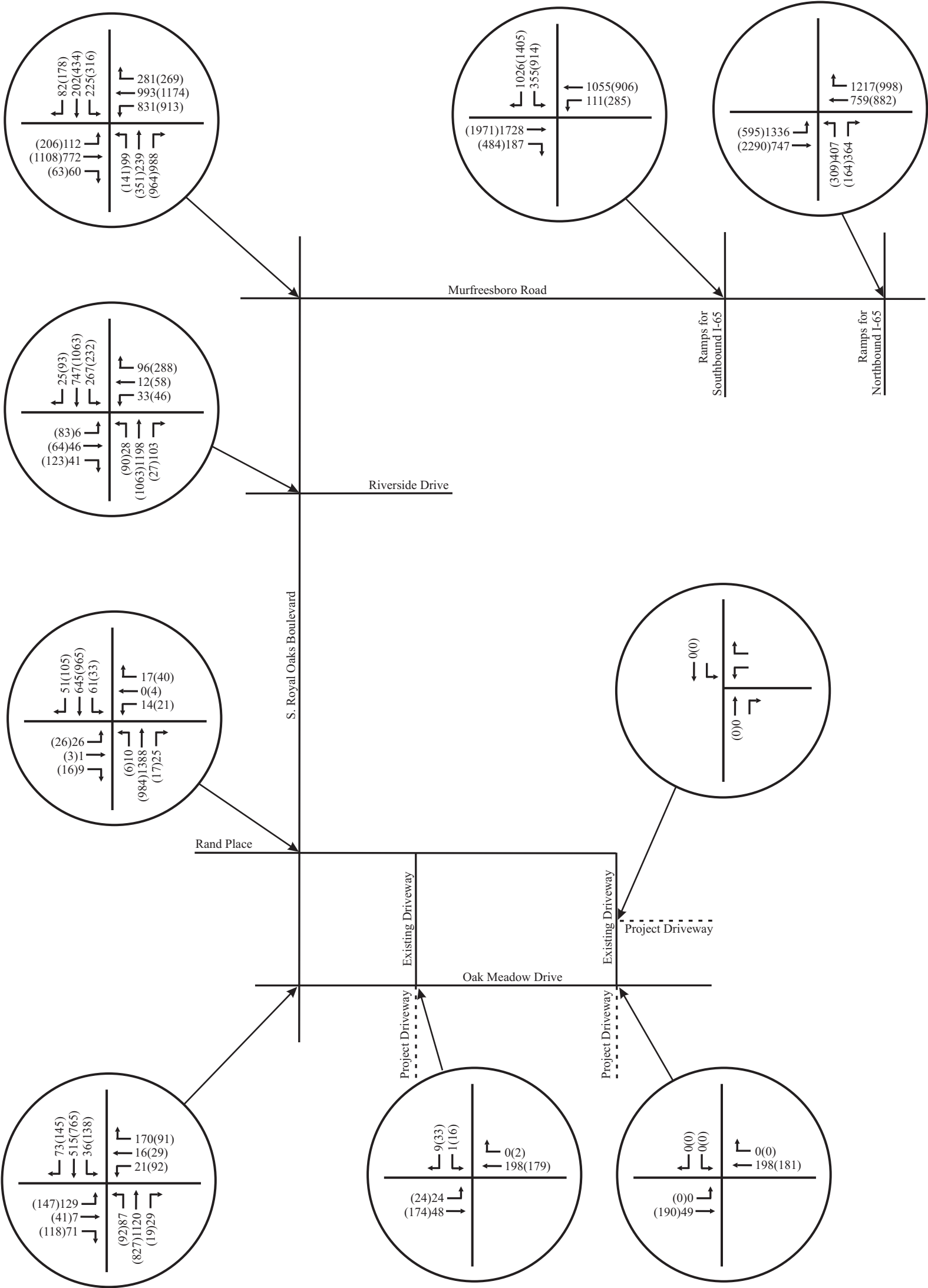
Figure 5B.
Directional Distribution of Peak Hour Traffic Generated by
the Somerby Assisted Living Facility



No Scale

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

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



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	95 TH %-ILE QUEUE	LEVEL OF SERVICE	95 TH %-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

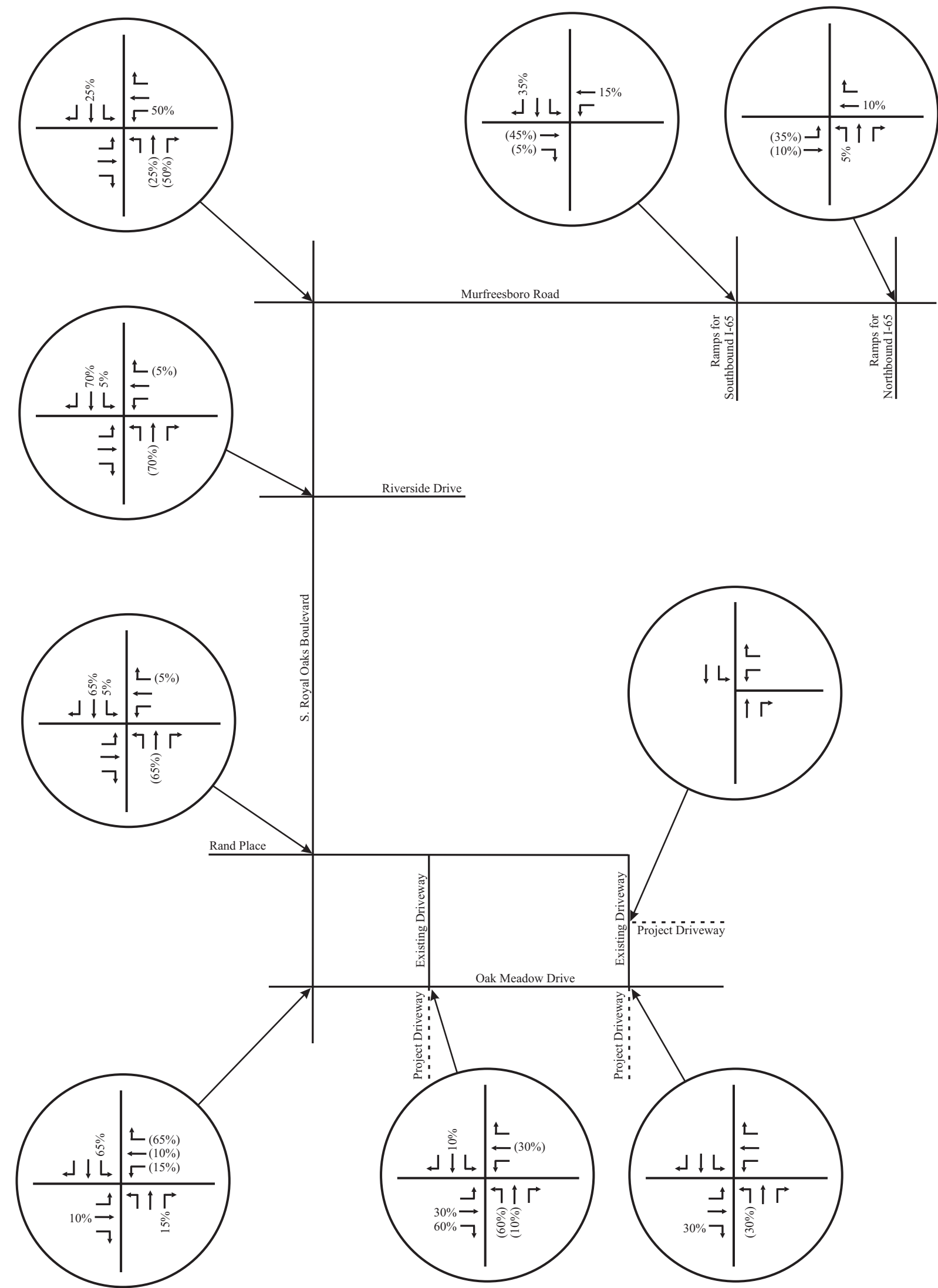
LAND USE	SIZE	DAILY TRAFFIC	GENERATED TRAFFIC			
			AM PEAK HOUR		PM PEAK HOUR	
			ENTER	EXIT	ENTER	EXIT
Multi-Family (LUC 220) South Site	115 units	764	12	47	46	25
Multi-Family (LUC 220) North Site	240 units	1,596	24	98	97	52
TOTAL	355 units	2,360	36	145	143	77

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.

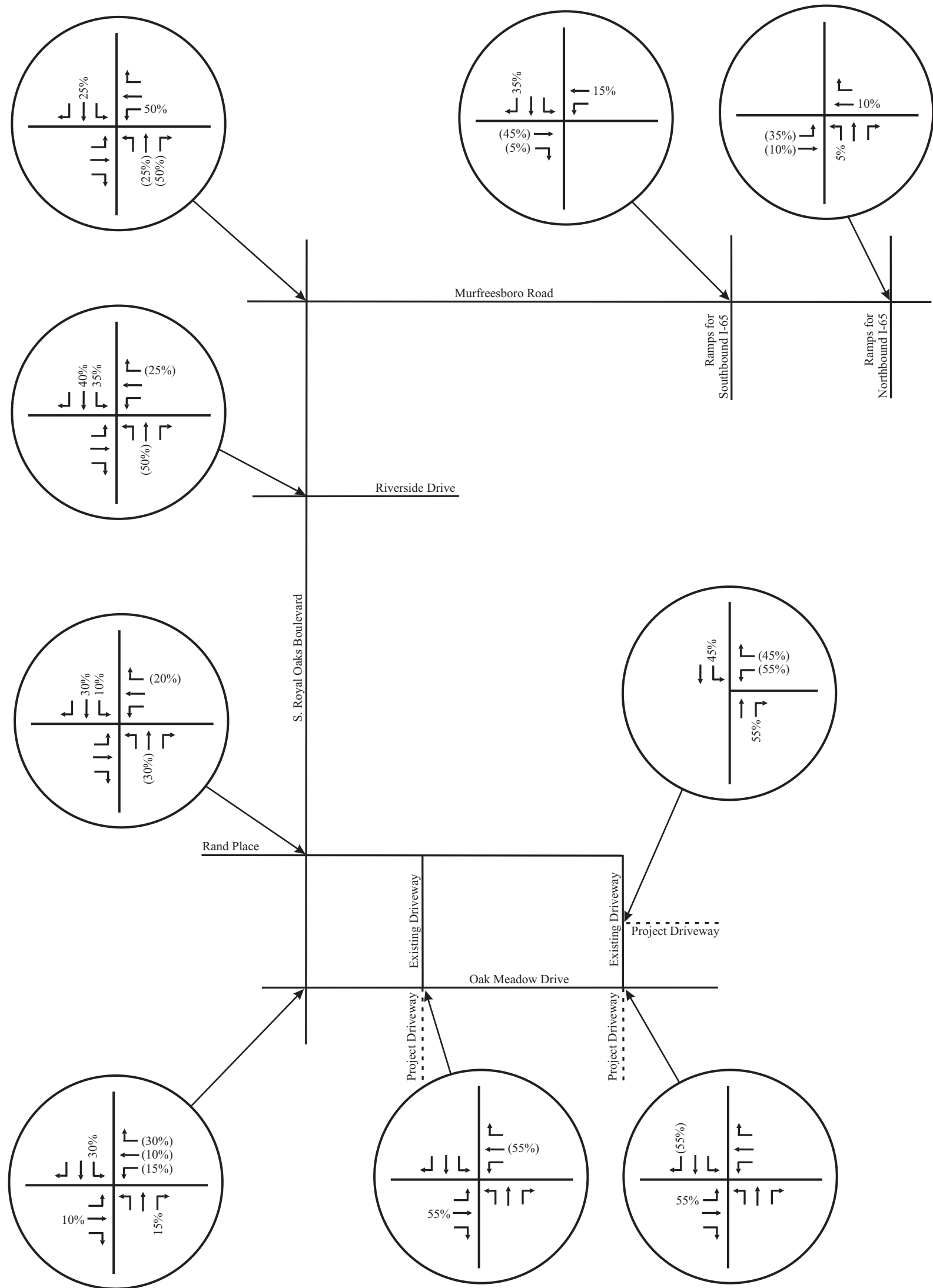
The peak hour trip generations and directional distributions were used to add the site-generated trips to the roadway system. [Figures 7A, 7B, and 7C](#) include the peak hour traffic volumes that are expected to be generated by the proposed project.



No Scale

XX - Entering Volumes
(XX) - Exiting Volumes

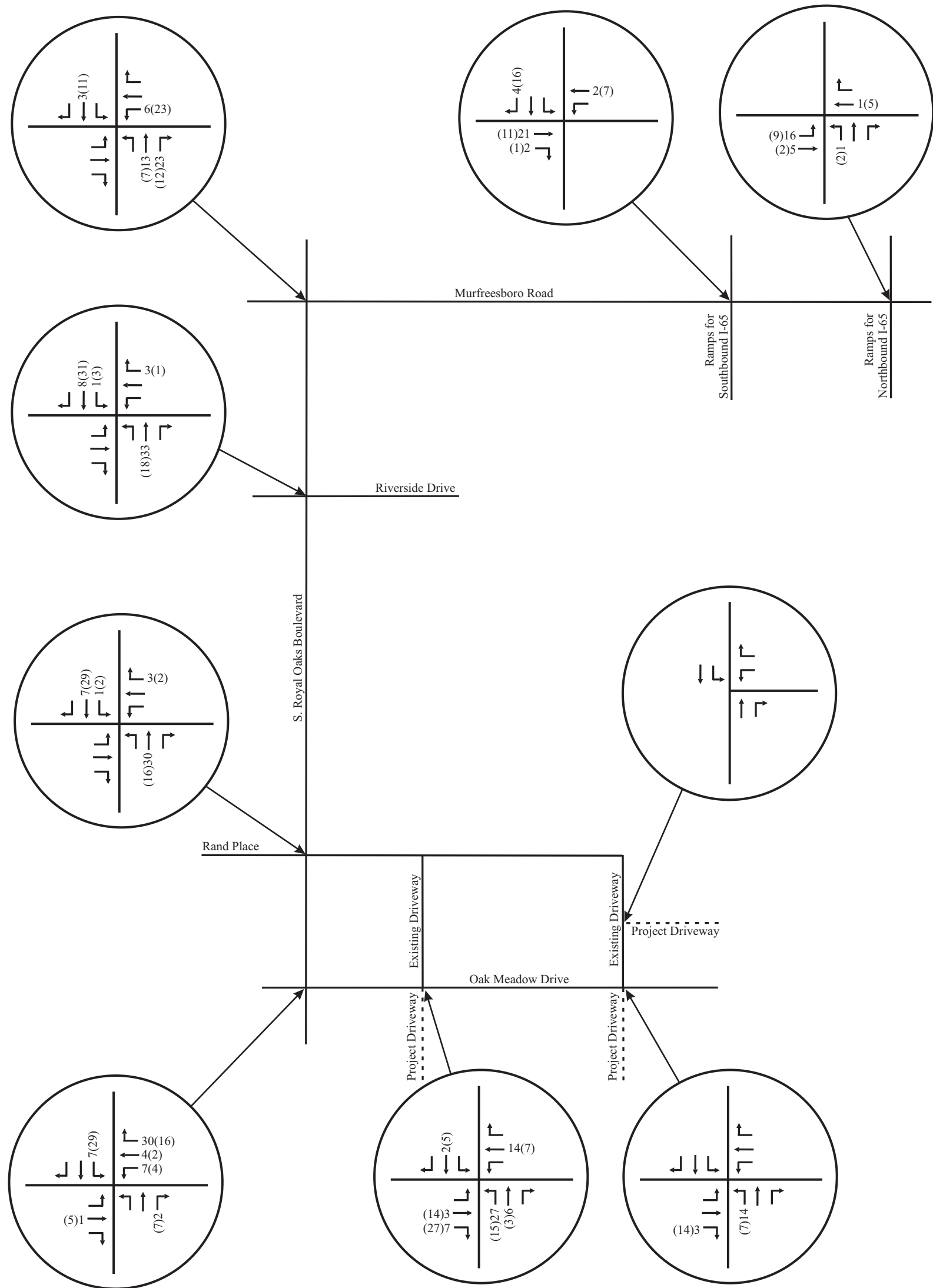
Figure 6A.
Directional Distribution of Peak Hour Traffic Volumes
Generated by the Proposed Apartments (Southern Site)



No Scale

XX - Entering Volumes
(XX) - Exiting Volumes

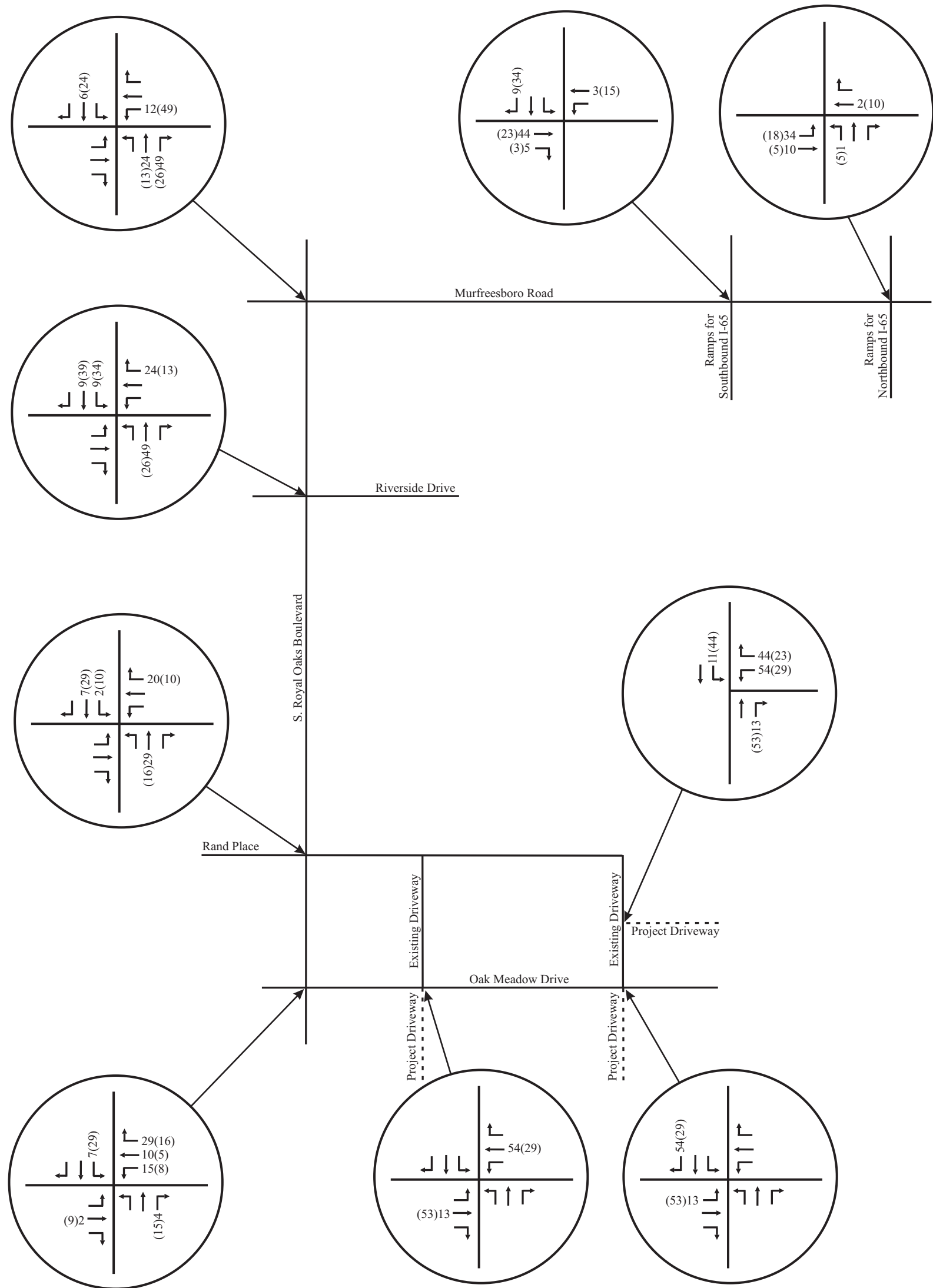
Figure 6B.
Directional Distribution of Peak Hour Traffic Volumes
Generated by the Proposed Apartments (Northern Site)



No Scale

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

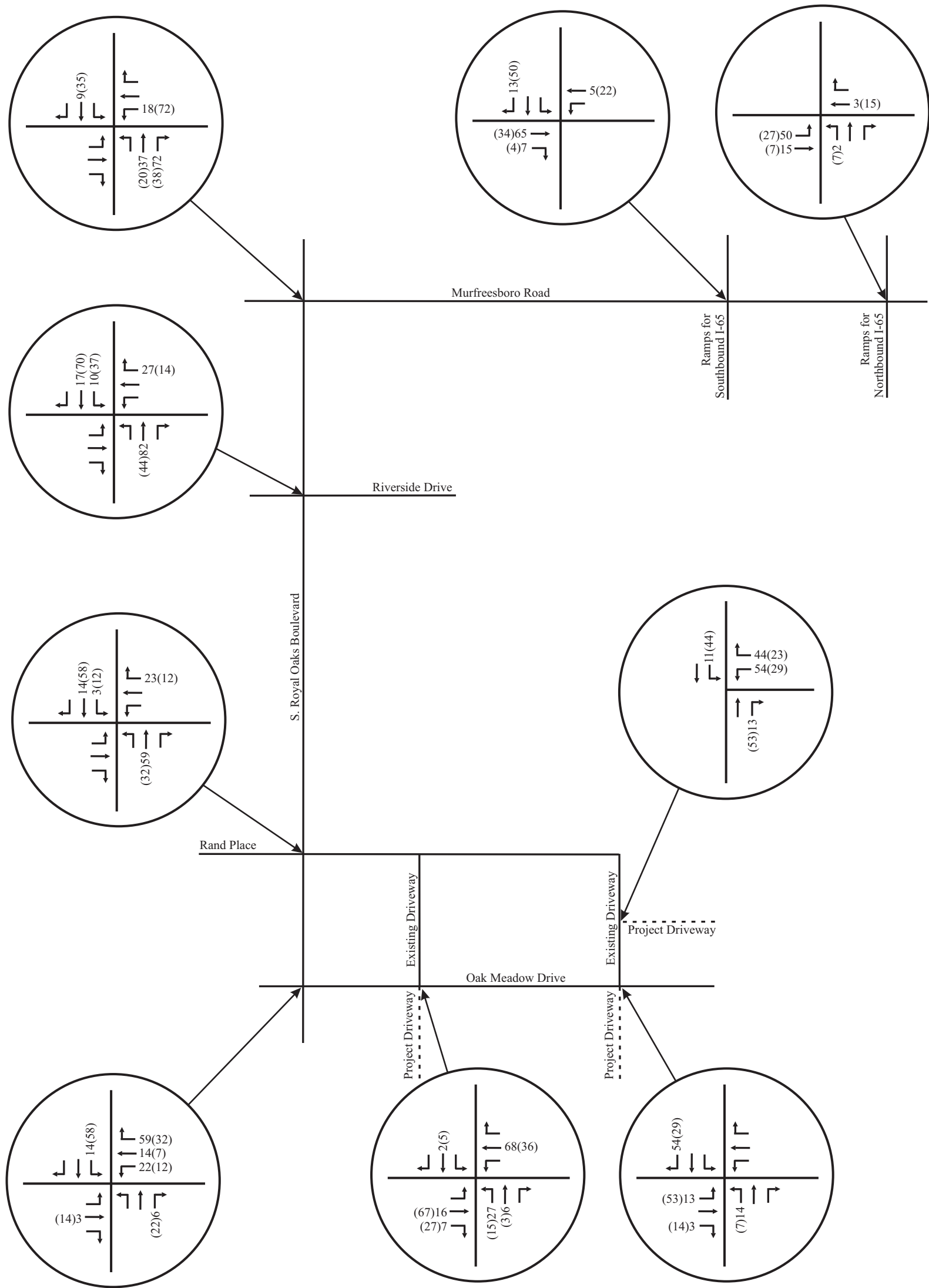
Figure 7A.
Peak Hour Traffic Volumes
Generated by the Proposed Apartments (Southern Site)



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)



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)

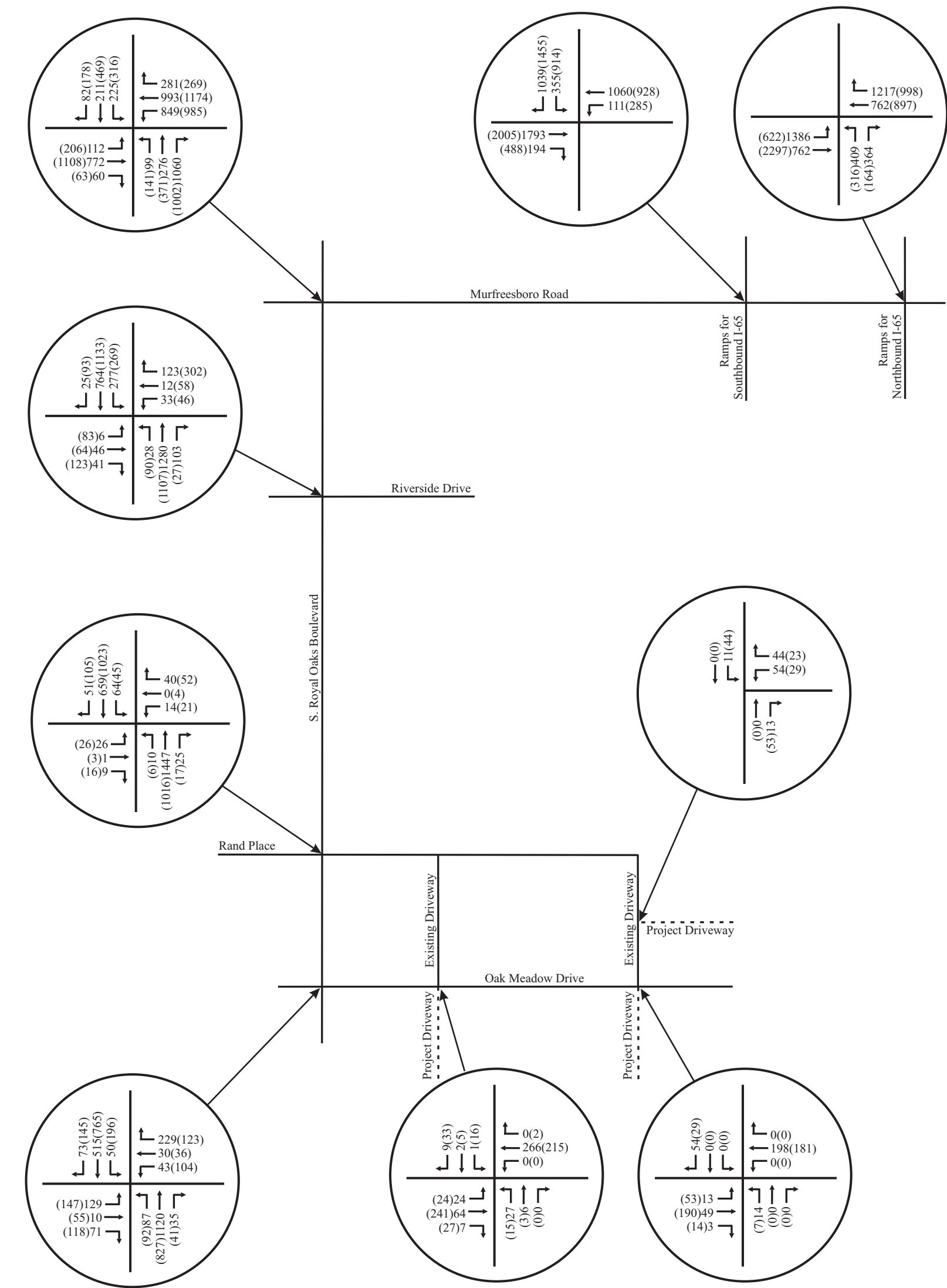
5.3 CAPACITY ANALYSES

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.



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	95 TH %-ILE QUEUE	LEVEL OF SERVICE	95 TH %-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.**

City of Franklin
Engineering Department
APPLICATION FORM
REQUEST FOR APPROVED TRANSPORTATION IMPACT ANALYSIS
REPORT

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

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

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

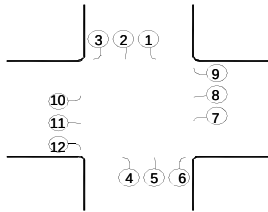
Property Owner Title: _____

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	
6:45-7:00								54			13	
7:00-7:15								50			13	
7:15-7:30								36			12	
7:30-7:45								43			7	
7:45-8:00								41			7	
8:00-8:15								33			10	
8:15-8:30								29			9	
4:30-4:45								46			33	
4:45-5:00								33			49	
5:00-5:15								41			48	
5:15-5:30								48			46	
5:30-5:45								33			38	
5:45-6:00								34			58	
6:00-6:15								25			47	
6:15-6:30								32			42	
TOTAL								602			439	
AM PK HR								183			45	
PM PK HR								168			176	

209 31
 228 67
 209 63
 189 48
 179 50
 48
 43
 38
 344 79
 336 82
 346 89
 329 94
 309 71
 92
 72
 74

6:45-7:45
 4:30-5:30

AM PK PHF								0.85			0.87	
PM PK PHF								0.88			0.90	

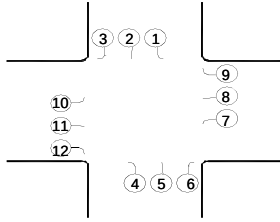
0.85
 0.91

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	
6:45-7:00								54			13	
7:00-7:15								50		1	13	
7:15-7:30			1					36		1	12	
7:30-7:45	1							43			6	
7:45-8:00								41		1	7	
8:00-8:15	1							33			9	
8:15-8:30								29			9	
4:30-4:45	3							46		1	30	
4:45-5:00	4							33		1	45	
5:00-5:15	3		1					40	1	2	45	
5:15-5:30	5		1					47	1	1	41	
5:30-5:45	3							33		1	35	
5:45-6:00	6							34		2	52	
6:00-6:15	7							25		1	40	
6:15-6:30	5							32		1	37	
TOTAL	38		4					600	2	13	401	
AM PK HR	1		1					183		2	44	
PM PK HR	15		2					166	2	5	161	

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

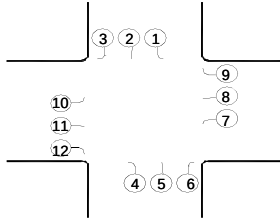


LOCATION: S. Royal Oaks Blvd and Oak Meadow Dr
DATE: 4-Feb-16 Thu
RECORDER: Burns
NOTES: signalized

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
6:45-7:00	4	88	17	17	270	7	1	4	49	31	2	12
7:00-7:15	6	115	15	14	300	6	5	2	43	26	2	16
7:15-7:30	9	117	15	23	242	4	4		33	34		17
7:30-7:45	3	157	21	27	225	3	7	8	28	28		21
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
4:45-5:00	29	179	29	18	200	6	17	2	14	25	11	31
5:00-5:15	32	170	33	28	222	5	19	5	17	35	10	29
5:15-5:30	32	172	32	22	175	2	21	6	21	32	8	23
5:30-5:45	27	150	29	16	188	4	14	3	16	33	5	28
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
PM PK HR	118	708	134	85	766	13	77	22	69	136	35	109

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	
6:45-7:00	10	132	8	2	358	6	2		1	5		1
7:00-7:15	15	119	12		364	5	1		1	8	1	1
7:15-7:30	9	153	9	4	264	5	2		7	4		4
7:30-7:45	11	182	18	3	295	7	8		2	7		2
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
4:45-5:00	5	211	27	1	209	3	3		8	6	1	6
5:00-5:15	5	228	26	2	235	4	4	3	3	5		2
5:15-5:30	5	237	25	2	234	4	1	1	5	5	1	3
5:30-5:45	2	262	17	4	156	1	5	1	3	12		4
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
PM PK HR	20	883	97	6	896	16	19	4	22	24	3	15

1,934

2,048

2,029

1,968

1,986

2,005

1,987

1,967

1,888

1,720

6:45-7:45

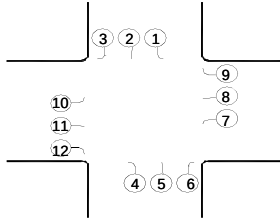
4:30-5:30

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
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

0.97

0.96

INTERSECTION TRAFFIC VOLUME COUNTS

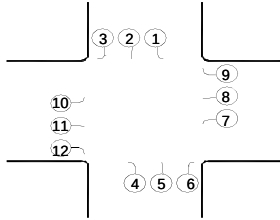


LOCATION: S. Royal Oaks Blvd and Center Point Pl and Riverside Dr
DATE: 4-Feb-16 Thu
RECORDER: Burns
NOTES: signalized

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

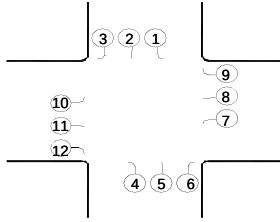


LOCATION: Murfreesboro Road and Royal Oaks Blvd
DATE: 11-Feb-16 Thu
RECORDER: Burns
NOTES: signalized

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
6:45-7:00	69		181				31				406	47
7:00-7:15	66		139				30				471	49
7:15-7:30	73		196				37				452	57
7:30-7:45	61		237				32				432	46
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
4:45-5:00	222		322				48				388	95
5:00-5:15	197		298				76				470	119
5:15-5:30	222		374				69				469	118
5:30-5:45	175		319				56				385	102
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
PM PK HR	846		1,293				264				1,807	446

2,929

3,112

3,159

3,168

3,140

4,656

4,524

4,499

4,376

4,089

7:15-8:15

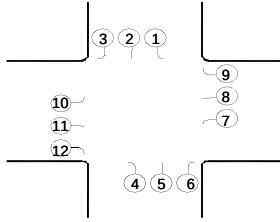
4:30-5:30

AM PK PHF	0.85		0.92				0.91				0.96	1.03
PM PK PHF	0.95		0.86				0.87				0.94	0.94

0.97

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

Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/7/2016

												
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	

Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/7/2016

												
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 Effect 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	

Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/7/2016

												
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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
21 s	66 s	21 s	32 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
45 s	42 s	21 s	32 s

Lanes, Volumes, Timings

8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96

3/7/2016

												
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												

Lanes, Volumes, Timings

8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96

3/7/2016

												
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					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 Effect 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												

Lanes, Volumes, Timings

8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96

3/7/2016

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

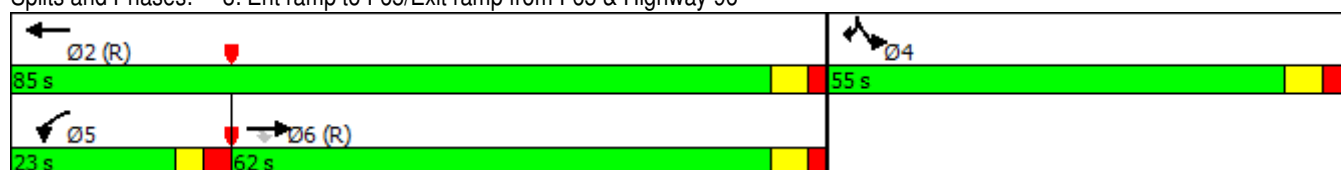
Analysis Period (min) 15

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



Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/7/2016

												
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												

Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/7/2016

												
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

Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/7/2016

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

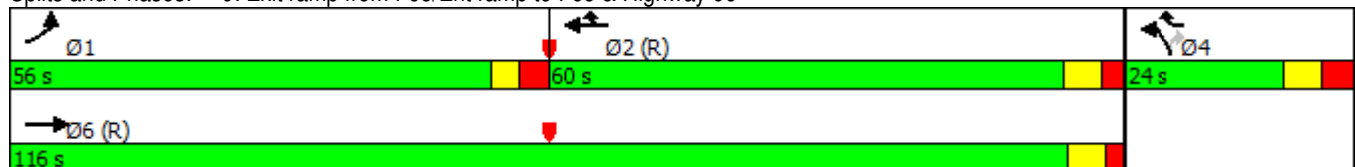
~ Volume exceeds capacity, queue is theoretically infinite.

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



Lanes, Volumes, Timings
23: Oak Meadow Dr. & S Royal Oaks

3/7/2016

												
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	

Lanes, Volumes, Timings
23: Oak Meadow Dr. & S Royal Oaks

3/7/2016

												
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 Effect 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												

Lanes, Volumes, Timings

23: Oak Meadow Dr. & S Royal Oaks

3/7/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
14 s	50 s	12 s	27 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	50 s	12 s	27 s

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/7/2016

	↑	↗	↖	↘	↙	↓	↘	↖	↗	↘	↙	↗
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												

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/7/2016

	↑	↗	↖	↘	↙	↓	↘	↖	↗	↘	↙	↗
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 Effect 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	

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/7/2016

	↑	↗	↖	↘	↙	↓	↘	↖	↗	↘	↙	↗
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

↑ Ø1	↘ Ø2 (R)	↘ Ø4
17 s	73 s	50 s
↘ Ø5	↑ Ø6 (R)	↘ Ø8
17 s	73 s	50 s

Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/7/2016

												
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	

Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/7/2016

												
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 Effect 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	

Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/7/2016

												
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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
25 s	69 s	22 s	34 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
42 s	52 s	22 s	34 s

Lanes, Volumes, Timings

8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96

3/7/2016

												
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												

Lanes, Volumes, Timings

8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96

3/7/2016

												
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)		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 Effect 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

Lanes, Volumes, Timings

8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96

3/7/2016

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.

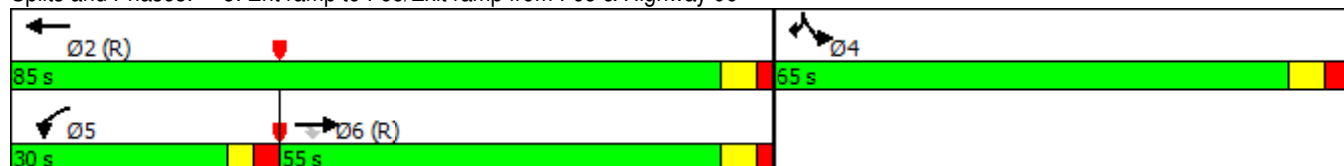
Queue shown is maximum after two cycles.

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



Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/7/2016

												
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												

Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/7/2016

												
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												

Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/7/2016

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

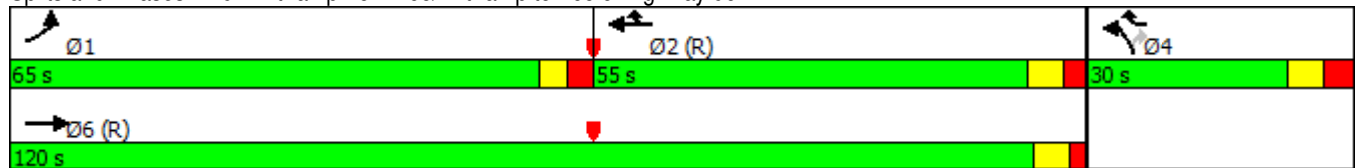
Intersection Capacity Utilization 79.1%

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



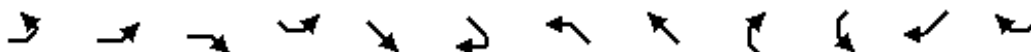
Lanes, Volumes, Timings
23: Oak Meadow Dr. & S Royal Oaks

3/7/2016

												
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	

Lanes, Volumes, Timings
23: Oak Meadow Dr. & S Royal Oaks

3/7/2016



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 Effect 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

Lanes, Volumes, Timings

23: Oak Meadow Dr. & S Royal Oaks

3/7/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
18 s	53 s	14 s	35 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	57 s	14 s	35 s

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/7/2016

	↑	↗	↖	↘	↙	↓	↘	↖	↗	↘	↙	↗
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												

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/7/2016

	↑	↗	↖	↘	↙	↓	↘	↖	↗	↘	↙	↗
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 Effect 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	

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/7/2016

	↑	↗	↖	↘	↙	↓	↘	↗	↖	↘	↙	↗
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.

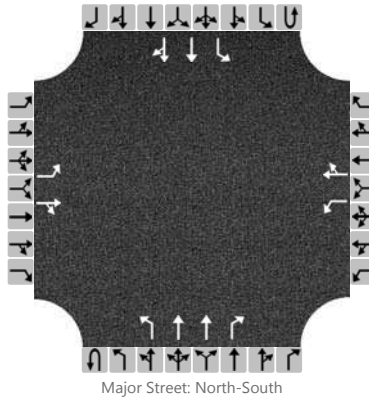
Splits and Phases: 24: S Royal Oaks & Riverside Dr & Center Point Pl

↑ Ø1	↓ Ø2 (R)	↓ Ø4
14 s	87 s	49 s
↖ Ø5	↖ Ø6 (R)	↖ Ø8
29 s	72 s	49 s

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	S. Royal Oaks and Rand
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	Mar 2016	East/West Street	Rand Pl / Home Depot
Analysis Year	2016	North/South Street	S. Royal Oaks Blvd
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.97
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Existing)		

Lanes



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															

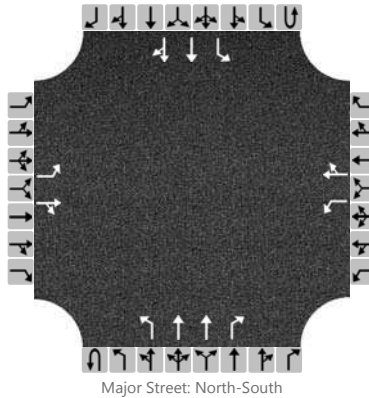
Delay, Queue Length, and Level of Service

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			

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	S. Royal Oaks and Rand
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	Mar 2016	East/West Street	Rand Pl / Home Depot
Analysis Year	2016	North/South Street	S. Royal Oaks Blvd
Time Analyzed	PM Peak Hour	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Existing)		

Lanes



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															

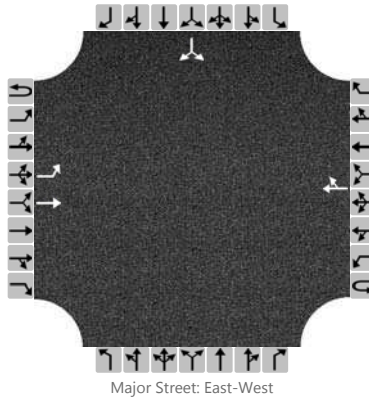
Delay, Queue Length, and Level of Service

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			

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	AM Peak Hour	Peak Hour Factor	0.80
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	10728 (Existing)		

Lanes



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															

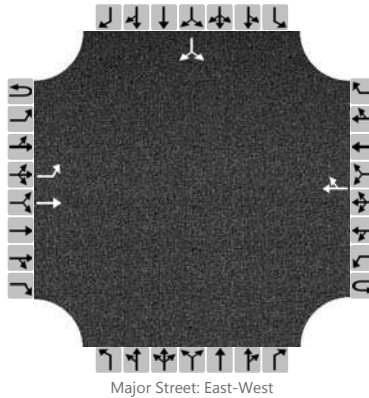
Delay, Queue Length, and Level of Service

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			

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 (Existing)		

Lanes



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			

BACKGROUND CONDITIONS

Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/10/2016

												
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	

Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/10/2016

												
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 Effect 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	

Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/10/2016

												
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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
21 s	66 s	21 s	32 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
45 s	42 s	21 s	32 s

Lanes, Volumes, Timings

8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96

3/10/2016

												
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												

Lanes, Volumes, Timings

8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96

3/10/2016

												
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					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 Effect 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

Lanes, Volumes, Timings

8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96

3/10/2016

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.

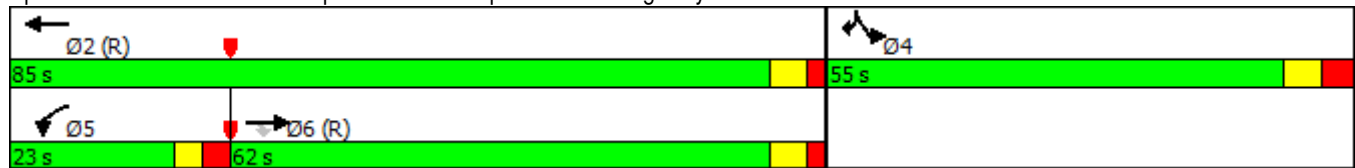
Queue shown is maximum after two cycles.

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



Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/10/2016

												
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												

Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/10/2016

												
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

Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/10/2016

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

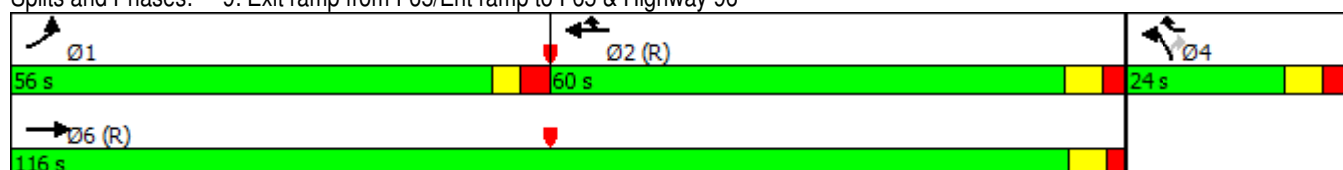
~ Volume exceeds capacity, queue is theoretically infinite.

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



Lanes, Volumes, Timings
23: Oak Meadow Dr. & S Royal Oaks

3/10/2016

												
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	

Lanes, Volumes, Timings
23: Oak Meadow Dr. & S Royal Oaks

3/10/2016

												
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 Effect 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												

Lanes, Volumes, Timings

23: Oak Meadow Dr. & S Royal Oaks

3/10/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
14 s	50 s	12 s	27 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	50 s	12 s	27 s

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/10/2016

	↑	↗	↖	↘	↙	↓	↘	↖	↗	↘	↙	↗
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												

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/10/2016

	↑	↗	↖	↘	↙	↓	↘	↖	↗	↘	↙	↗
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 Effect 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	

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/10/2016

	↑	↗	↖	↘	↙	↓	↘	↖	↗	↘	↙	↗
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



Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/10/2016

												
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	

Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/10/2016

												
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 Effect 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	

Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/10/2016

												
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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
25 s	69 s	22 s	34 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
42 s	52 s	22 s	34 s

Lanes, Volumes, Timings

8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96

3/10/2016

												
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												

Lanes, Volumes, Timings

8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96

3/10/2016

												
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)		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 Effect 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

Lanes, Volumes, Timings

8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96

3/10/2016

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.

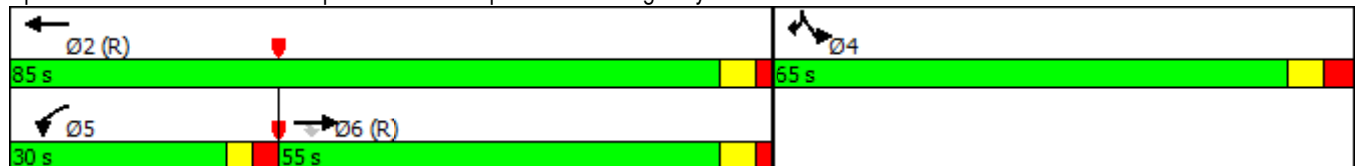
Queue shown is maximum after two cycles.

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



Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/10/2016

												
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												

Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/10/2016

												
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												

Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/10/2016

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

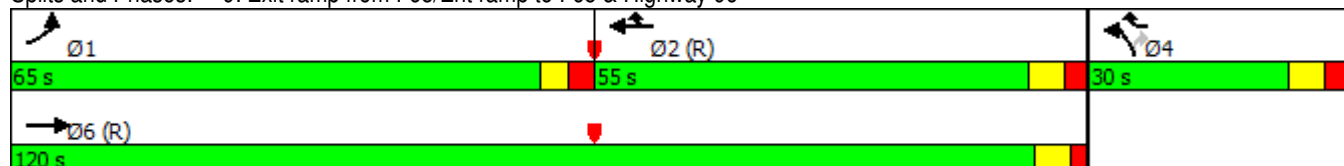
Intersection Capacity Utilization 84.7%

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



Lanes, Volumes, Timings
23: Oak Meadow Dr. & S Royal Oaks

3/10/2016

												
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	

Lanes, Volumes, Timings
23: Oak Meadow Dr. & S Royal Oaks

3/10/2016

												
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 Effect 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												

Lanes, Volumes, Timings

23: Oak Meadow Dr. & S Royal Oaks

3/10/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
18 s	53 s	14 s	35 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	57 s	14 s	35 s

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/10/2016

	↑	↗	↖	↘	↙	↓	↘	↖	↗	↘	↙	↗
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												

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/10/2016

	↑	↗	↖	↘	↙	↓	↘	↖	↗	↘	↙	↗
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 Effect 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	

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/10/2016

	↑	↗	↖	↘	↙	↓	↘	↖	↗	↘	↙	↗
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.

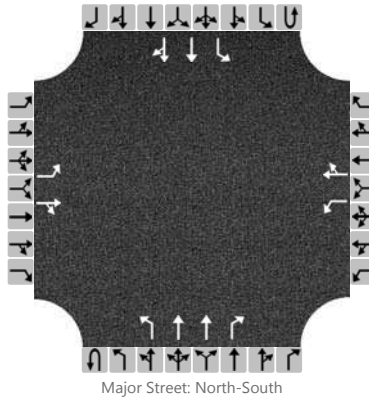
Splits and Phases: 24: S Royal Oaks & Riverside Dr & Center Point Pl

↑ Ø1	↓ Ø2 (R)	↓ Ø4
14 s	87 s	49 s
↙ Ø5	↘ Ø6 (R)	↗ Ø8
29 s	72 s	49 s

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	S. Royal Oaks and Rand
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	Mar 2016	East/West Street	Rand Pl / Home Depot
Analysis Year	2016	North/South Street	S. Royal Oaks Blvd
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.97
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Background)		

Lanes



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															

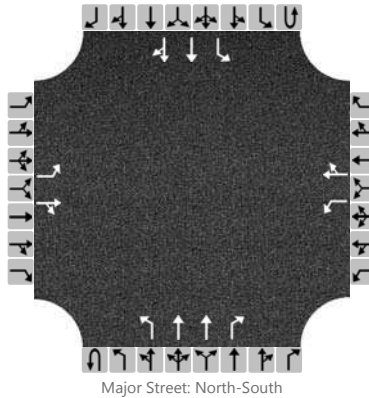
Delay, Queue Length, and Level of Service

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			

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	S. Royal Oaks and Rand
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	Mar 2016	East/West Street	Rand Pl / Home Depot
Analysis Year	2016	North/South Street	S. Royal Oaks Blvd
Time Analyzed	PM Peak Hour	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Background)		

Lanes



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															

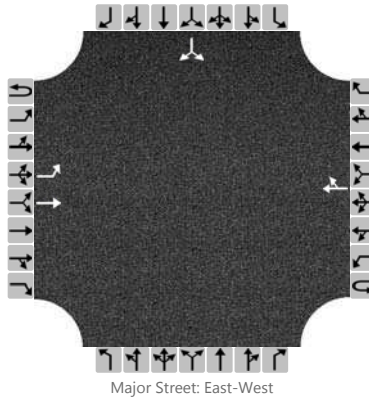
Delay, Queue Length, and Level of Service

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			

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	AM Peak Hour	Peak Hour Factor	0.80
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	10728 (Background)		

Lanes



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															

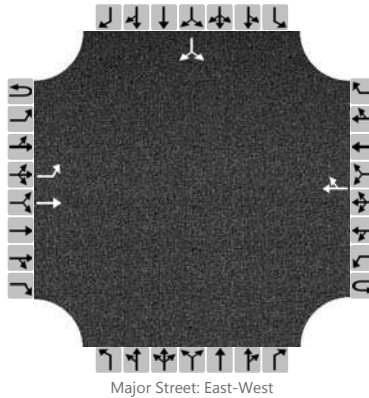
Delay, Queue Length, and Level of Service

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			

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



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			

TOTAL PROJECTED CONDITIONS

Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/10/2016

												
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	

Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/10/2016

												
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 Effect 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	

Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/10/2016

												
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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
21 s	66 s	21 s	32 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
45 s	42 s	21 s	32 s

Lanes, Volumes, Timings

8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96

3/10/2016

												
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												

Lanes, Volumes, Timings

8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96

3/10/2016

												
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					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 Effect 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

Lanes, Volumes, Timings

8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96

3/10/2016

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.

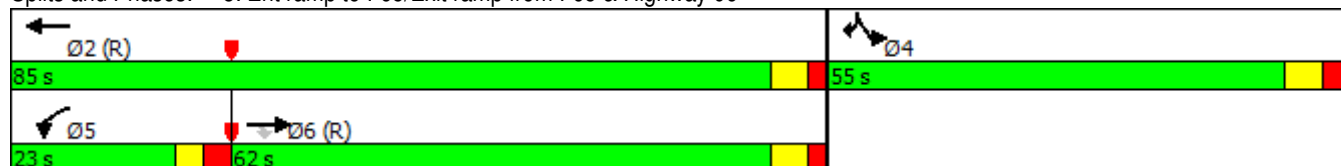
Queue shown is maximum after two cycles.

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



Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/10/2016

												
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												

Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/10/2016

												
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

Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/10/2016

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

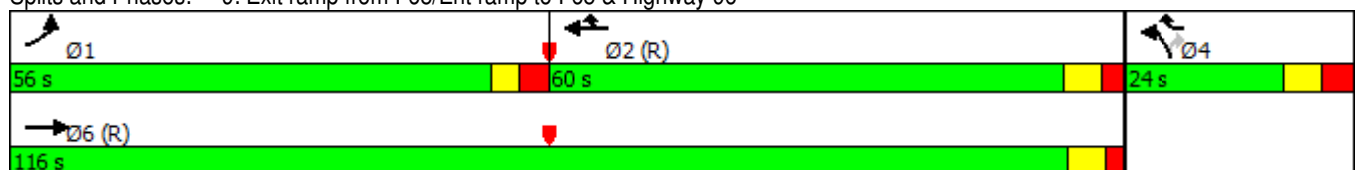
~ Volume exceeds capacity, queue is theoretically infinite.

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



Lanes, Volumes, Timings
23: Oak Meadow Dr. & S Royal Oaks

3/10/2016

												
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	

Lanes, Volumes, Timings
23: Oak Meadow Dr. & S Royal Oaks

3/10/2016

												
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 Effect 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												

Lanes, Volumes, Timings

23: Oak Meadow Dr. & S Royal Oaks

3/10/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
14 s	50 s	12 s	27 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	50 s	12 s	27 s

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/10/2016

	↑	↗	↖	↘	↙	↓	↘	↖	↗	↘	↙	↗
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												

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/10/2016

	↑	↗	↖	↘	↙	↓	↘	↖	↗	↘	↙	↗
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 Effect 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	

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/10/2016

	↑	↗	↖	↘	↙	↓	↘	↗	↖	↘	↙	↗
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

↑ Ø1	↘ Ø2 (R)	↘ Ø4
17 s	73 s	50 s
↘ Ø5	↗ Ø6 (R)	↗ Ø8
17 s	73 s	50 s

Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/10/2016

												
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	

Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/10/2016

												
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 Effect 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	

Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/10/2016

												
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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
25 s	69 s	22 s	34 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
42 s	52 s	22 s	34 s

Lanes, Volumes, Timings

8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96

3/10/2016

												
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												

Lanes, Volumes, Timings

8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96

3/10/2016

												
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)		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 Effect 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

Lanes, Volumes, Timings

8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96

3/10/2016

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.

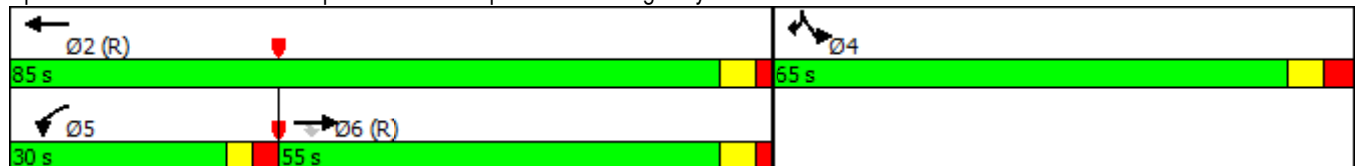
Queue shown is maximum after two cycles.

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



Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/10/2016

												
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												

Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/10/2016

												
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												

Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/10/2016

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

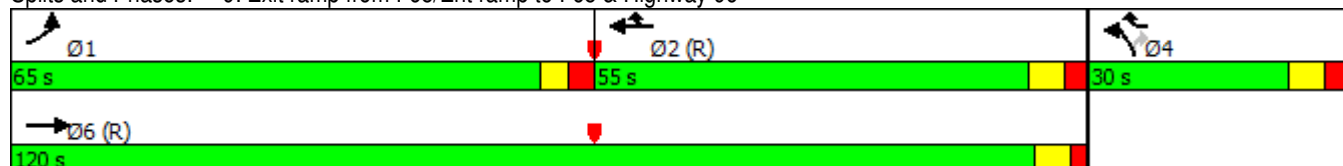
Intersection Capacity Utilization 84.9%

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



Lanes, Volumes, Timings
23: Oak Meadow Dr. & S Royal Oaks

3/10/2016

												
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	

Lanes, Volumes, Timings
23: Oak Meadow Dr. & S Royal Oaks

3/10/2016

												
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 Effect 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												

Lanes, Volumes, Timings

23: Oak Meadow Dr. & S Royal Oaks

3/10/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
18 s	53 s	14 s	35 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	57 s	14 s	35 s

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/10/2016

												
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												

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/10/2016

	↑	↗	↖	↘	↙	↓	↘	↖	↗	↘	↙	↗
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 Effect 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	

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/10/2016

	↑	↗	↖	↘	↙	↓	↘	↖	↗	↘	↙	↗
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.

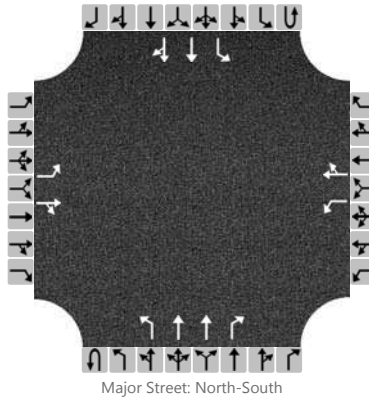
Splits and Phases: 24: S Royal Oaks & Riverside Dr & Center Point Pl

↑ Ø1	↓ Ø2 (R)	↓ Ø4
14 s	87 s	49 s
↖ Ø5	↗ Ø6 (R)	↖ Ø8
29 s	72 s	49 s

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	S. Royal Oaks and Rand
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	Mar 2016	East/West Street	Rand Pl / Home Depot
Analysis Year	2016	North/South Street	S. Royal Oaks Blvd
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.97
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Total)		

Lanes



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															

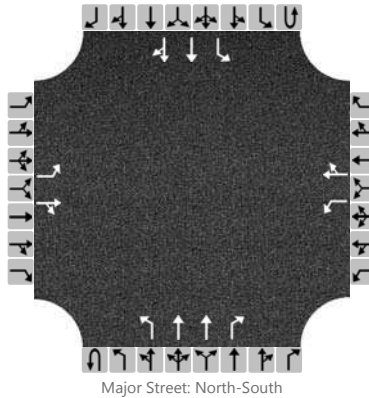
Delay, Queue Length, and Level of Service

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			

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	S. Royal Oaks and Rand
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	Mar 2016	East/West Street	Rand Pl / Home Depot
Analysis Year	2016	North/South Street	S. Royal Oaks Blvd
Time Analyzed	PM Peak Hour	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Total)		

Lanes



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															

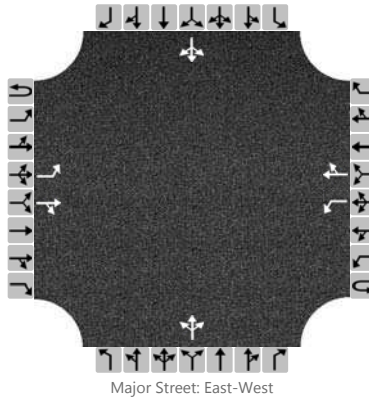
Delay, Queue Length, and Level of Service

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			

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	AM Peak Hour	Peak Hour Factor	0.80
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	10728 (Total)		

Lanes



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															

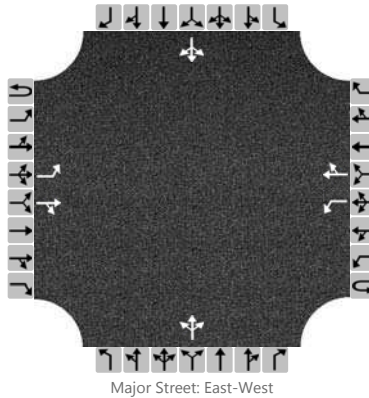
Delay, Queue Length, and Level of Service

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			

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 (Total)		

Lanes



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															

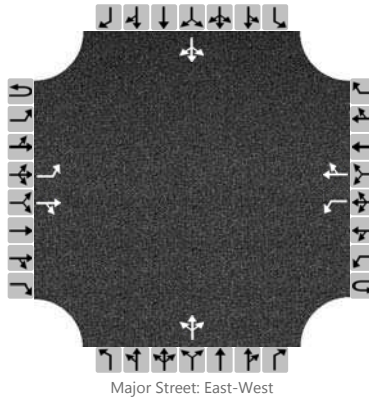
Delay, Queue Length, and Level of Service

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			

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	Eastern Home Depot dwy
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.80
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	10728 (Total)		

Lanes



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															

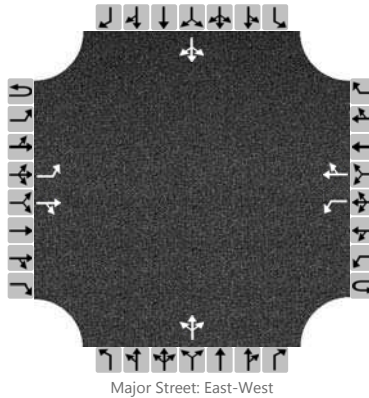
Delay, Queue Length, and Level of Service

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			

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	Eastern 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 (Total)		

Lanes



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															

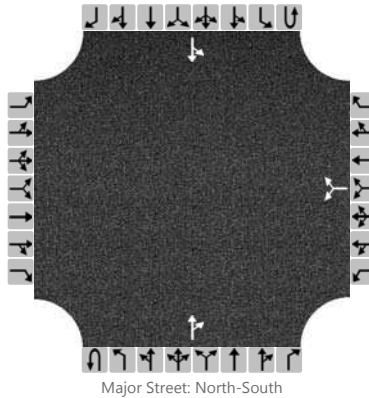
Delay, Queue Length, and Level of Service

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			

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	Home Depot dwy and projec
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	Mar 2016	East/West Street	Project Access
Analysis Year	2016	North/South Street	Eastern Home Depot dwy
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.80
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Total)		

Lanes



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																

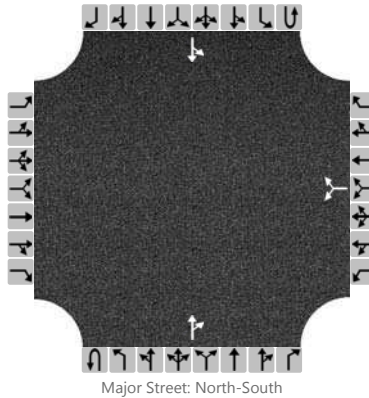
Delay, Queue Length, and Level of Service

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			

HCS 2010 Two-Way Stop Control Summary Report

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

Lanes



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			

TOTAL PROJECTED CONDITIONS
With a third northbound through lane

Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/31/2016

												
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	

Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/31/2016

												
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 Effect 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											

Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/31/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
21 s	76 s	21 s	32 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
52 s	45 s	21 s	32 s

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
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 Effect 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

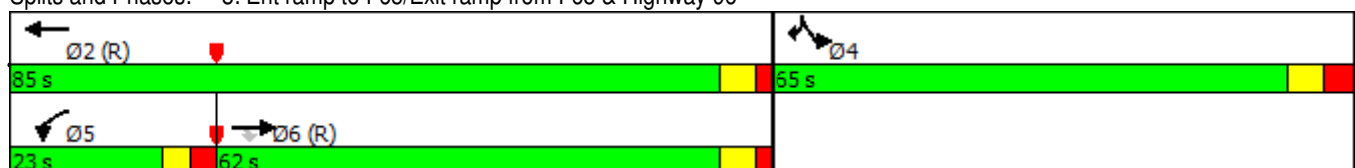
Analysis Period (min) 15

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



Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/31/2016

												
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												

Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/31/2016

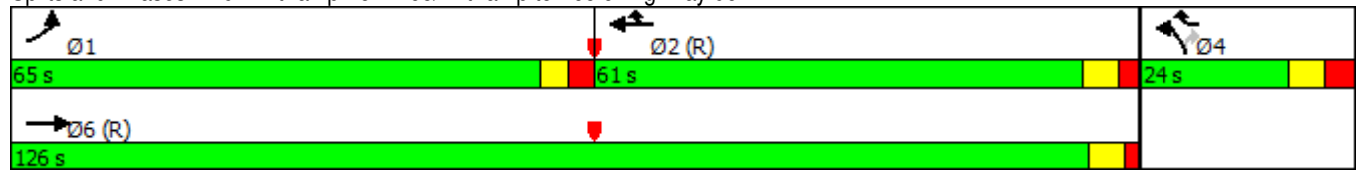
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	12.0	18.0			18.0		7.0		7.0			
Minimum Split (s)	56.0	116.0			60.0		24.0		24.0			
Total Split (s)	65.0	126.0			61.0		24.0		24.0			
Total Split (%)	43.3%	84.0%			40.7%		16.0%		16.0%			
Maximum Green (s)	59.0	120.0			54.5		16.5		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.												

Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/31/2016

Splits and Phases: 9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



Lanes, Volumes, Timings
23: Oak Meadow Dr. & S Royal Oaks

3/31/2016

												
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	

Lanes, Volumes, Timings

23: Oak Meadow Dr. & S Royal Oaks

3/31/2016

												
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 Effect 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

			
Ø1	Ø2	Ø3	Ø4
14 s	33.4 s	12.6 s	20 s
			
Ø5	Ø6	Ø7	Ø8
13 s	34.4 s	12.6 s	20 s

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/31/2016

	↑	↗	↖	↘	↙	↓	↘	↖	↗	↘	↙	↗
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												

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/31/2016

	↑	↗	↖	↘	↙	↓	↘	↗	↖	↘	↙	↗
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 Effect 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



Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/31/2016

												
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	

Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/31/2016

												
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 Effect 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					

Lanes, Volumes, Timings

7: S Royal Oaks/N Royal Oaks & Highway 96

3/31/2016

Intersection Capacity Utilization 90.4%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

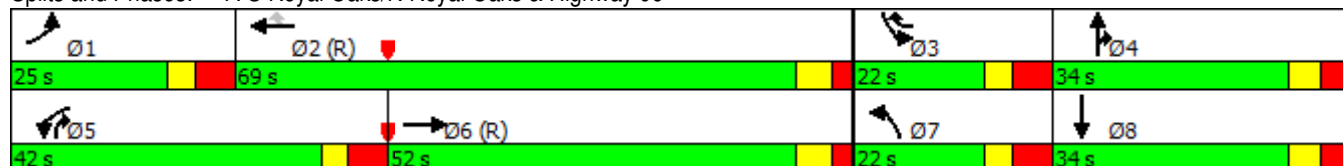
Queue shown is maximum after two cycles.

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



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
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												

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)		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 Effect 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.

Lanes, Volumes, Timings

8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96

3/31/2016

Splits and Phases: 8: Ent ramp to I-65/Exit ramp from I-65 & Highway 96



Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/31/2016

												
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												

Lanes, Volumes, Timings

9: Exit ramp from I-65/Ent ramp to I-65 & Highway 96

3/31/2016

													
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

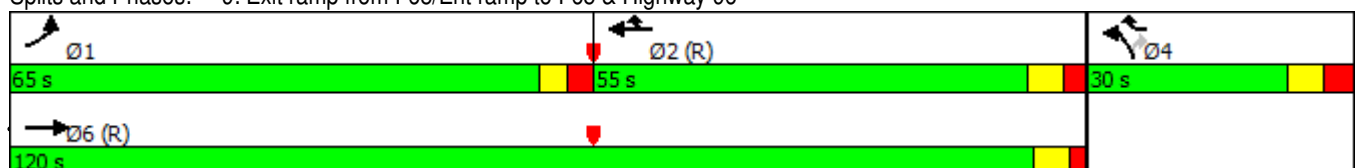
Intersection Capacity Utilization 84.9%

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



HGB

Lanes, Volumes, Timings
23: Oak Meadow Dr. & S Royal Oaks

3/31/2016

												
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	

Lanes, Volumes, Timings

23: Oak Meadow Dr. & S Royal Oaks

3/31/2016

												
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 Effect 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

			
Ø1	Ø2 (R)	Ø3	Ø4
19 s	82 s	14 s	35 s
			
Ø5	Ø6 (R)	Ø7	Ø8
24 s	77 s	14 s	35 s

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/31/2016

	↑	↗	↖	↘	↙	↓	↘	↖	↗	↘	↙	↗
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												

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/31/2016

	↑	↗	↖	↘	↙	↓	↘	↗	↖	↘	↙	↗
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 Effect 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.

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

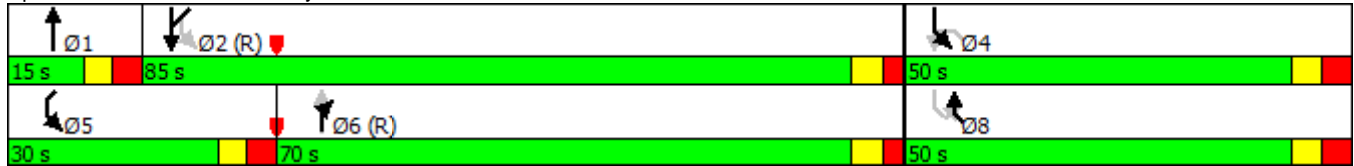
3/31/2016

Queue shown is maximum after two cycles.

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

! Phase conflict between lane groups.

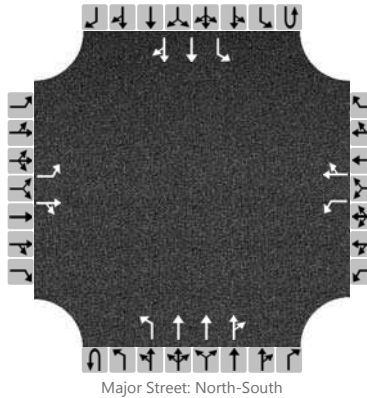
Splits and Phases: 24: S Royal Oaks & Riverside Dr & Center Point Pl



HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	S. Royal Oaks and Rand
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	Mar 2016	East/West Street	Rand Pl / Home Depot
Analysis Year	2016	North/South Street	S. Royal Oaks Blvd
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.97
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Total)		

Lanes



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															

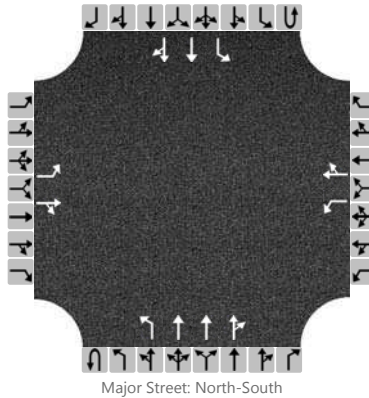
Delay, Queue Length, and Level of Service

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			

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	S. Royal Oaks and Rand
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	Mar 2016	East/West Street	Rand Pl / Home Depot
Analysis Year	2016	North/South Street	S. Royal Oaks Blvd
Time Analyzed	PM Peak Hour	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Total)		

Lanes



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			

**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

$$T = 2.74 (X)$$

$$T = 2.74 (208)$$

$$T = 570 \text{ vehicles}$$

$$\text{Enter} = 0.50 (570) = 285 \text{ vehicles}$$

$$\text{Exit} = 0.50 (570) = 285 \text{ vehicles}$$

AM traffic during peak hour of adjacent street

$$T = 0.23 (X)$$

$$T = 0.23 (208)$$

$$T = 47 \text{ vehicles}$$

$$\text{Enter} = 0.72 (47) = 34 \text{ vehicles}$$

$$\text{Exit} = 0.28 (47) = 13 \text{ vehicles}$$

PM traffic during peak hour of adjacent street

$$T = 0.37 (X)$$

$$T = 0.37 (208)$$

$$T = 77 \text{ vehicles}$$

$$\text{Enter} = 0.39 (77) = 30 \text{ vehicles}$$

$$\text{Exit} = 0.61 (77) = 47 \text{ vehicles}$$

TRIP GENERATION CALCULATIONS – Multi-Family (North)

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

Average Daily Traffic

$$T = 6.65 (X)$$

$$T = 6.65 (240)$$

$$T = 1,596 \text{ vehicle-trips}$$

$$\text{Enter} = 0.50 (1,596) = 798 \text{ vehicles}$$

$$\text{Exit} = 0.50 (1,596) = 798 \text{ vehicles}$$

A.M. traffic during peak hour of adjacent street

$$T = 0.51 (X)$$

$$T = 0.51 (240)$$

$$T = 122 \text{ vehicle-trips}$$

$$\text{Enter} = 0.20 (122) = 24 \text{ vehicles}$$

$$\text{Exit} = 0.80 (122) = 98 \text{ vehicles}$$

P.M. traffic during peak hour of adjacent street

$$T = 0.62 (X)$$

$$T = 0.62 (240)$$

$$T = 149 \text{ vehicle-trips}$$

$$\text{Enter} = 0.65 (149) = 97 \text{ vehicles}$$

$$\text{Exit} = 0.35 (149) = 52 \text{ vehicles}$$

TRIP GENERATION CALCULATIONS – Multi-Family (South)

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

Average Daily Traffic

$$T = 6.65 (X)$$

$$T = 6.65 (115)$$

$$T = 764 \text{ vehicle-trips}$$

$$\text{Enter} = 0.50 (764) = 382 \text{ vehicles}$$

$$\text{Exit} = 0.50 (764) = 382 \text{ vehicles}$$

A.M. traffic during peak hour of adjacent street

$$T = 0.51 (X)$$

$$T = 0.51 (115)$$

$$T = 59 \text{ vehicle-trips}$$

$$\text{Enter} = 0.20 (59) = 12 \text{ vehicles}$$

$$\text{Exit} = 0.80 (59) = 47 \text{ vehicles}$$

P.M. traffic during peak hour of adjacent street

$$T = 0.62 (X)$$

$$T = 0.62 (115)$$

$$T = 71 \text{ vehicle-trips}$$

$$\text{Enter} = 0.65 (71) = 46 \text{ vehicles}$$

$$\text{Exit} = 0.35 (71) = 25 \text{ vehicles}$$

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:
 - o 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)
 - o 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.
 - o 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:
 - o Recommendation of re-application of pavement markings on the Home Depot access road, including double-yellow centerline
 - o 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:
 - o Recommendation for re-application of the westbound approach pavement markings as noted in our original review
 - o 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.

April 14, 2016
Review of Updated Traffic Impact Study
Epoch Apartments – Oak Meadow Drive
Page 3

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.

A handwritten signature in black ink, appearing to read "Greg Judy", with a stylized flourish at the end.

Gregory Judy, P.E., PTOE
Engineer Manager



Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point PI

3/10/2016

												
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												

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/10/2016

	↑	↗	↖	↘	↙	↓	↘	↖	↗	↘	↙	↗
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 Effect 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	

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/10/2016

	↑	↗	↖	↘	↙	↓	↘	↗	↖	↘	↙	↗
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



Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/10/2016

												
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												

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/10/2016

	↑	↗	↖	↘	↙	↓	↘	↖	↗	↘	↙	↗
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 Effect 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	

Lanes, Volumes, Timings

24: S Royal Oaks & Riverside Dr & Center Point Pl

3/10/2016

	↑	↗	↖	↘	↙	↓	↘	↗	↖	↘	↙	↗
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

↑ Ø1 14 s	↓ Ø2 (R) 87 s	↘ Ø4 49 s
↖ Ø5 29 s	↗ Ø6 (R) 72 s	↖ Ø8 49 s

SITE DATA

PROJECT NAME: OAK MEADOWS EPOCH DEVELOPMENT
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
FRANKLIN, TN 37067
PHONE NO.: 615.873.1795
E-MAIL ADDRESS: adam@crunkeng.com
CONTACT NAME: MR. ADAM CRUNK, P.E.

DENSITY: 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: 6 STORIES MAXIMUM
ALLOWABLE: NORTH PARCEL - 4 STORIES
PROPOSED: 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: 0
REQUIRED (1.5/1BR + 2.5/2BR + 3/3BR)
NORTH SITE: 18R - 104 UNITS * 1.5 = 156 SPACES
28R - 112 UNITS * 2.5 = 280 SPACES
38R - 24 UNITS * 3.0 = 72 SPACES
TOTAL REQUIRED = 508 SPACES
INCLUDING 9 ADA SPACES
SOUTH SITE: 18R - 45 UNITS * 1.5 = 68 SPACES
28R - 50 UNITS * 2.5 = 125 SPACES
38R - 20 UNITS * 3.0 = 60 SPACES
TOTAL REQUIRED = 253 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: 329
REGULAR SPACES: 84
ADA SPACES: 16
TOTAL PROVIDED: 429
SOUTH SITE (APTS. ONLY): 198
REGULAR SPACES: 19
ADA SPACES: 8
TOTAL PROVIDED: 225
SOUTH SITE (AMENITY CTR.): 24
REGULAR SPACES: 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%

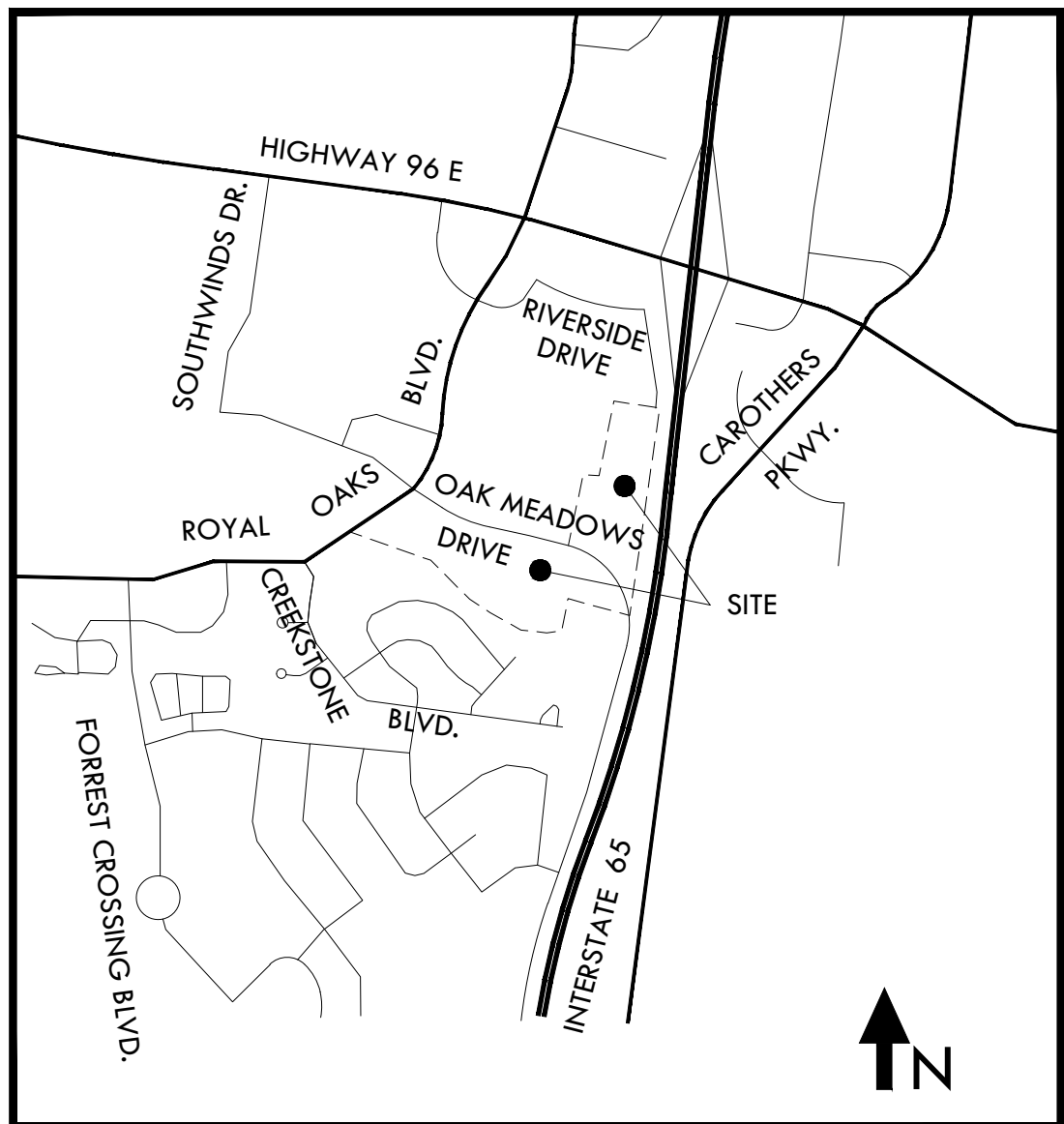
PARKLAND DEDICATION: FEE IN LIEU OF FOR 5.37 ACRES, 355 TOTAL UNITS PROPOSED

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.
INFORMAL OPEN SPACE REQUIRED (67% OF OPEN SPACE REQUIRED) 3.04 AC.
TOTAL PROVIDED: 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 northerly 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



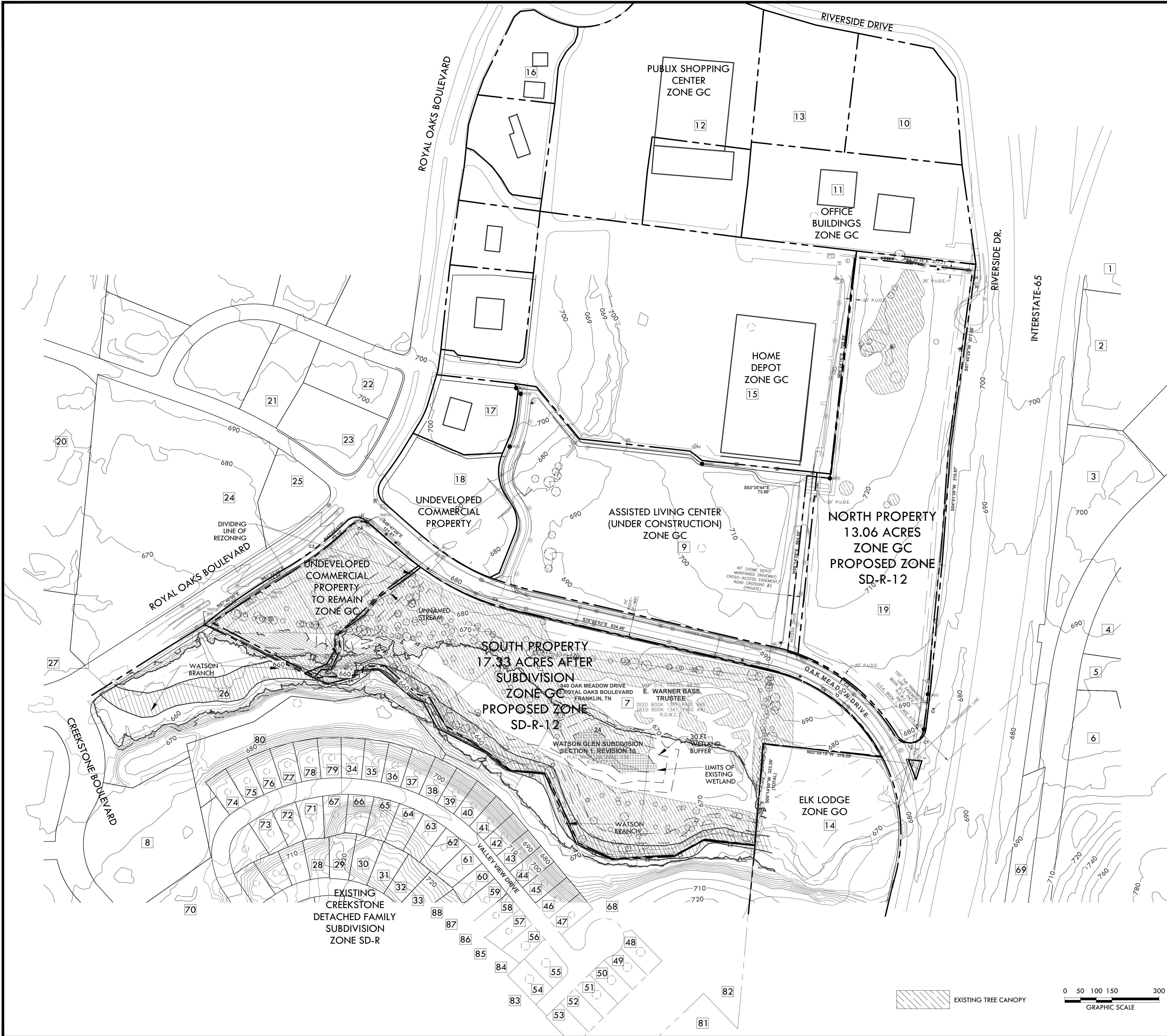
THE EPOCH DEVELOPMENT
REZONING SUBMITTAL
COF #6085
FRANKLIN, TN

REVISONS	DATE	
	No.	

04/07/16 15001

C0.0

COVER SHEET



ID	PRECID	DEED / PLAT	LAND USE	OWNER	ZONING
1	079-09005	DB 344 DP 639 PB35 PP114	HOTEL	BRE/LO PROP LLC	GC
2	079-09005	DB 296 DP 435 PB22 PP11	AUTO DLR	ADRIKS RODNEY G	GC
3	079-07000	DB 4341 DP 763 PB22 PP11	CHURCH	CHURCH GATE THE	GC
4	079-08000	DB 337 DP 701 PB61 PP69	REC	SOAR ADVENTURE TOWER LLC	GC
5	079-08000	DB 336 DP 555	UNDEV	NICHOLS I DONALD	SD-R
6	079-08000	DB 139 DP 525	ATTACHED RESID	UNITED DOMINION REALTY LP	GC
7	079-08000	DB 1347 DP 645 PB29 PP139	UNDEV	BASS E WARNER TR	GC
8	079-10001	DB 232 DP 130 PB31 PP12	DAYCARE	WOOD & WOOD LLC	GO
9	079-10100	DB 633 DP 243 PB62 PP45	ASST. LYG	DOMINION SENIOR LIVING OF FRANKLIN L	GC
10	079-10101	DB 44 DP 660	OFFICE	S207 LLC	GC
11	079-10102	DB 200 DP 199 PB19 PP59	OFFICE	UN DON REALTY LLC	GC
12	079-10103	DB 44 DP 660 PB59 PP3	RETAIL	PUBLIC TENNESSEE LLC	GC
13	079-10104	DB 638 DP 806 PB22 PP10	ASST. LYG	FRANKLIN TN SENIOR CARE PROPERTY LLC	GC
14	079-10105	DB 44 DP 792 PB29 PP19	REC	NASHVILLE LODGE #72 BPO ELKS	GO
15	079-10110	DB 44 DP 792 PB29 PP19	RETAIL	HD DEVELOPMENT OF MARYLAND INC	GC
16	079-10114	DB 44 DP 792 PB29 PP19	RETAIL	PUBLIC TENNESSEE LLC	GC
17	079-10116	DB 44 DP 792 PB29 PP19	RETAIL	FIRST-CITIZENS BANK AND TR CO	GC
18	079-10117	DB 44 DP 792 PB29 PP19	UNDEV	BASS E WARNER TR	GC
19	079-10119	DB 44 DP 792 PB29 PP19	UNDEV	BASS E WARNER TR	GC
20	079-10140	DB 437 DP 993 PB41 PP33	UNDEV	SW2 TENNESSEE LLC	RM-20
21	0790-A0000	DB 44 DP 792 PB29 PP19	INSTIT	CHURCH CORNERSTONE MINISTRIES INC	GC
22	0790-A0001	DB 44 DP 792 PB29 PP19	RETAIL	MAGUI CHERYL S FAMILY TRUST	GC
23	0790-A0002	DB 44 DP 792 PB29 PP19	RETAIL	LCJ LLC	GC
24	0790-A0004	DB 44 DP 792 PB29 PP19	RETAIL	UNITED STATES POSTAL SERV	C1
25	0790-A0001	DB 44 DP 792 PB29 PP19	RETAIL	COMMUNITY BANK	GC
26	0790-C0250	DB 136 DP 628	UNDEV	CADENCE BANK NA	GO
27	0790-C0260	DB 136 DP 628	UNDEV	ROYAL OAKS PARK SOUTH	GO
28	0790-D0010	DB 44 DP 792 PB29 PP19	RESIDENTIAL	THURM DAVID M	SD-R
29	0790-D0020	DB 44 DP 792 PB29 PP19	RESIDENTIAL	HAMILTON MALORY	SD-R
30	0790-D0030	DB 44 DP 792 PB29 PP19	RESIDENTIAL	LYLE JORDAN WILLIAM	SD-R
31	0790-D0040	DB 44 DP 792 PB29 PP19	RESIDENTIAL	LYANGLISTA BERNARDINO JR	SD-R
32	0790-D0050	DB 44 DP 792 PB29 PP19	RESIDENTIAL	CASANDREA ONESTES	SD-R
33	0790-D0060	DB 44 DP 792 PB29 PP19	RESIDENTIAL	VOSS STEPHEN H	SD-R
34	0790-D0070	DB 44 DP 792 PB29 PP19	RESIDENTIAL	KHOT SOHAM	SD-R
35	0790-D0080	DB 44 DP 792 PB29 PP19	RESIDENTIAL	GOOCH RYAN M	SD-R
36	0790-D0090	DB 44 DP 792 PB29 PP19	RESIDENTIAL	SULLIVAN JOHN	SD-R
37	0790-D0100	DB 44 DP 792 PB29 PP19	RESIDENTIAL	CULLEN ROBERT BARRY	SD-R
38	0790-D0110	DB 44 DP 792 PB29 PP19	RESIDENTIAL	MILLER ROBERT FRANK	SD-R
39	0790-D0120	DB 44 DP 792 PB29 PP19	RESIDENTIAL	OHARANI KHARUNISSA	SD-R
40	0790-D0130	DB 44 DP 792 PB29 PP19	RESIDENTIAL	KNOX CONSUELA S	SD-R
41	0790-D0140	DB 44 DP 792 PB29 PP19	RESIDENTIAL	DAWKINS BRETON GUY	SD-R
42	0790-D0150	DB 44 DP 792 PB29 PP19	RESIDENTIAL	CONKALUX MARGARET A	SD-R
43	0790-D0160	DB 44 DP 792 PB29 PP19	RESIDENTIAL	SMITH CHRISTOPHER S	SD-R
44	0790-D0170	DB 44 DP 792 PB29 PP19	RESIDENTIAL	DANIELS THOMAS	SD-R
45	0790-D0180	DB 44 DP 792 PB29 PP19	RESIDENTIAL	SUNDARAM BARATH SHANNUGA	SD-R
46	0790-D0190	DB 44 DP 792 PB29 PP19	RESIDENTIAL	HOSSAIN MOHAMMAD	SD-R
47	0790-D0200	DB 44 DP 792 PB29 PP19	RESIDENTIAL	MARLEEN LAWRENCE	SD-R
48	0790-D0210	DB 44 DP 792 PB29 PP19	RESIDENTIAL	BECHARD BRIAN	SD-R
49	0790-D0220	DB 44 DP 792 PB29 PP19	RESIDENTIAL	VIJAYAM SATHESH	SD-R
50	0790-D0230	DB 44 DP 792 PB29 PP19	RESIDENTIAL	RUSSO JOHN M	SD-R
51	0790-D0240	DB 44 DP 792 PB29 PP19	RESIDENTIAL	QUIGLEY J PATRICK	SD-R
52	0790-D0250	DB 44 DP 792 PB29 PP19	RESIDENTIAL	BONHAM SYDNEY	SD-R
53	0790-D0260	DB 44 DP 792 PB29 PP19	RESIDENTIAL	BURGER JORDAN	SD-R
54	0790-D0270	DB 44 DP 792 PB29 PP19	RESIDENTIAL	NOLAN MICHAEL S TRUST	SD-R
55	0790-D0280	DB 44 DP 792 PB29 PP19	RESIDENTIAL	PARIS SREEKANTH	SD-R
56	0790-D0290	DB 44 DP 792 PB29 PP19	RESIDENTIAL	KOLLI MURALI KRISHNA	SD-R
57	0790-D0300	DB 44 DP 792 PB29 PP19	RESIDENTIAL	RAMAN VENKATESH	SD-R
58	0790-D0310	DB 44 DP 792 PB29 PP19	RESIDENTIAL	RAJENDRAN THAMIL S	SD-R
59	0790-D0320	DB 44 DP 792 PB29 PP19	RESIDENTIAL	DOPPALAIDU SRIKANTH	SD-R
60	0790-D0330	DB 44 DP 792 PB29 PP19	RESIDENTIAL	CHINTAKIND VARUN K	SD-R
61	0790-D0340	DB 44 DP 792 PB29 PP19	RESIDENTIAL	KRISHNAN JAGADEESWARAN	SD-R
62	0790-D0350	DB 44 DP 792 PB29 PP19	RESIDENTIAL	MOHAMED ABDEL R J	SD-R
63	0790-D0360	DB 44 DP 792 PB29 PP19	RESIDENTIAL	PICHAMUTHU NARAYANAN	SD-R
64	0790-D0370	DB 44 DP 792 PB29 PP19	RESIDENTIAL	ZELLER JAMES S JR	SD-R
65	0790-D0380	DB 44 DP 792 PB29 PP19	RESIDENTIAL	MURRAY KIMBERLY	SD-R
66	0790-D0390	DB 44 DP 792 PB29 PP19	RESIDENTIAL	DIPPER NATHAN M	SD-R
67	0790-D0400	DB 44 DP 792 PB29 PP19	RESIDENTIAL	VIGIL MARIO G	SD-R
68	0790-D0410	DB 44 DP 792 PB29 PP19	RESIDENTIAL	CREEKSTONES HOMEOWNERS ASSOCIATION I	SD-R
69	089-02609	DB 44 DP 792 PB29 PP19	RESIDENTIAL	A T & T CORP BY & THROUGH	R-2
70	089-04200	DB 44 DP 792 PB29 PP19	RESIDENTIAL	CREEKSTONE HOMEOWNERS ASSOCIATION IN	SD-R
71	089-04600	DB 44 DP 792 PB29 PP19	RESIDENTIAL	BLACKSHER NICOLE E	SD-R
72	089-04700	DB 44 DP 792 PB29 PP19	RESIDENTIAL	GRUSE JONATHAN	SD-R
73	089-04800	DB 44 DP 792 PB29 PP19	RESIDENTIAL	KUMAR RATNA	SD-R
74	089-05000	DB 44 DP 792 PB29 PP19	RESIDENTIAL	BLANKENSHIP JON I	SD-R
75	089-05100	DB 44 DP 792 PB29 PP19	RESIDENTIAL	BURRELL GERALD MARK	SD-R
76	089-05200	DB 44 DP 792 PB29 PP19	RESIDENTIAL	BUCKNER RICHARD D	SD-R
77	089-05300	DB 44 DP 792 PB29 PP19	RESIDENTIAL	LERCHE MICHAEL	SD-R
78	089-05400	DB 44 DP 792 PB29 PP19	RESIDENTIAL	RUSSELL KAREN KINGSBURY	SD-R
79	089-05500	DB 44 DP 792 PB29 PP19	RESIDENTIAL	THEURER DAVID S	SD-R
80	089-05600	DB 44 DP 792 PB29 PP19	RESIDENTIAL	CREEKSTONE HOMEOWNERS ASSOCIATION IN	SD-R
81	089-P02500	DB 44 DP 792 PB29 PP19	RESIDENTIAL	BARLOW JOHN	SD-R
82	089-P02600	DB 44 DP 792 PB29 PP19	RESIDENTIAL	ERWIN DEVAN A	SD-R
83	089-P02700	DB 44 DP 792 PB29 PP19	RESIDENTIAL	PATEL NIKUNJ M	SD-R
84	089-P02800	DB 44 DP 792 PB29 PP19	RESIDENTIAL	JANI BHAVESHKUMAR	SD-R
85	089-P02900	DB 44 DP 792 PB29 PP19	RESIDENTIAL	HARRIS JOHN	SD-R
86	089-P03000	DB 44 DP 792 PB29 PP19	RESIDENTIAL	LEDGISTER KEVIN ARTHUR	SD-R
87	089-P03100	DB 44 DP 792 PB29 PP19	RESIDENTIAL	JOHANSEN MICHAEL	SD-R
88	089-P03200	DB 44 DP 792 PB29 PP19	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

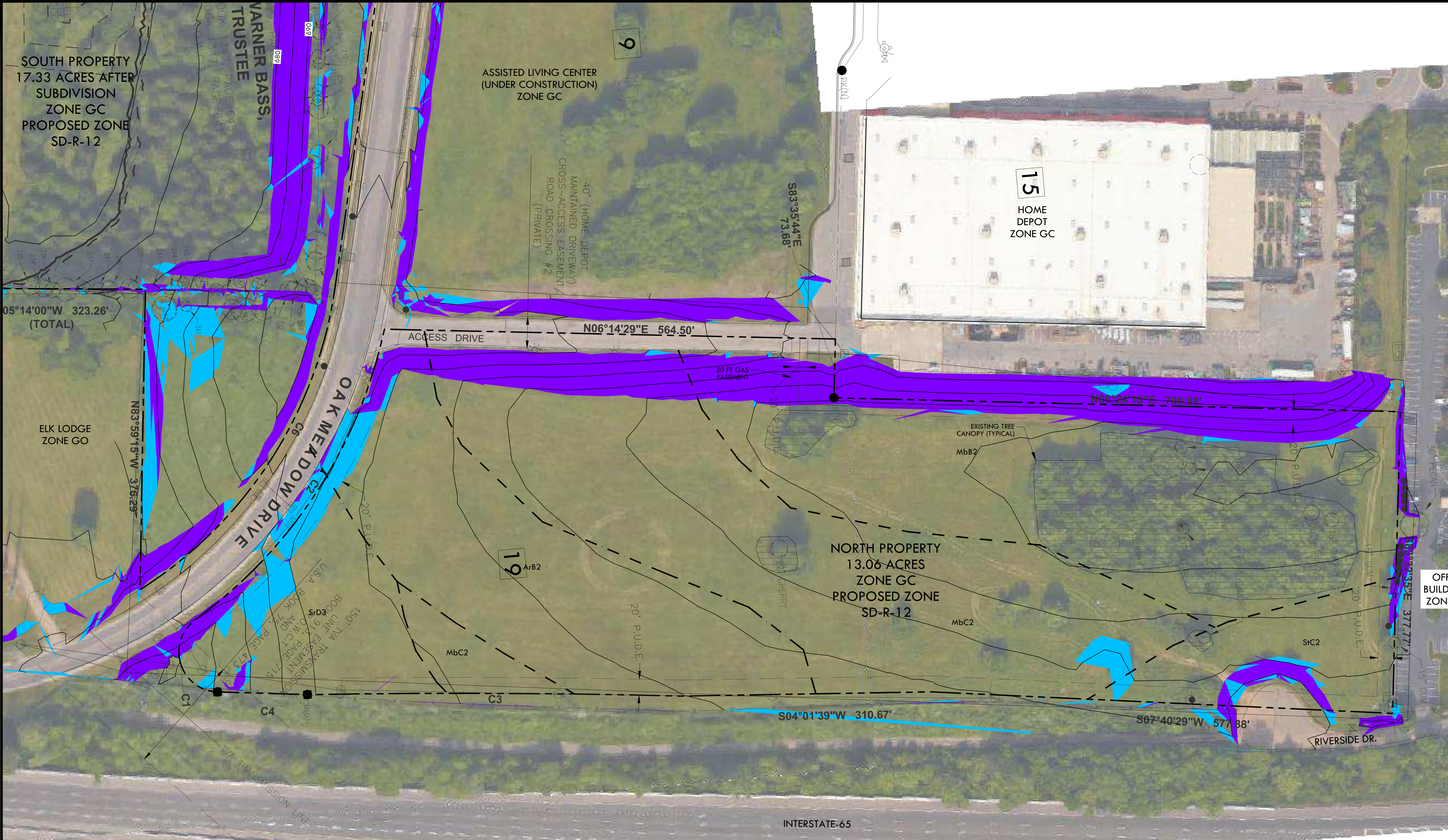
COF #6085 FRANKLIN, TN

REVISIONS	DATE	
No.		

04/07/16 15001

C1.0

OVERALL EXISTING CONDITIONS PLAN



SLOPE LEGEND

- GREATER THAN 1.4% AND LESS THAN 20% SLOPE
- GREATER THAN 20% SLOPE

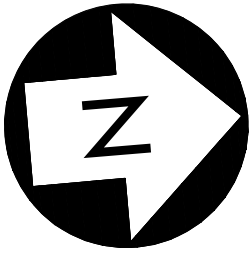
SOIL TYPES

- ArB2 Armour silt loam, 2% to 5 % slopes, eroded
- CaC2 Capling 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
- Sic3 Stiversville clay loam, 5% to 12% slopes, eroded
- SrD3 Stiversville clay loam, 12% to 20% slopes, severely eroded
- Sic2 Stiversville silt loam, 5% to 12% slopes, eroded

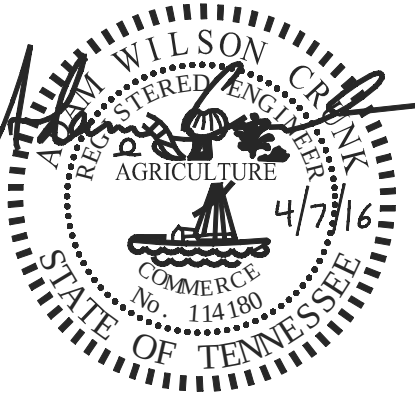
CURVE TABLE

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



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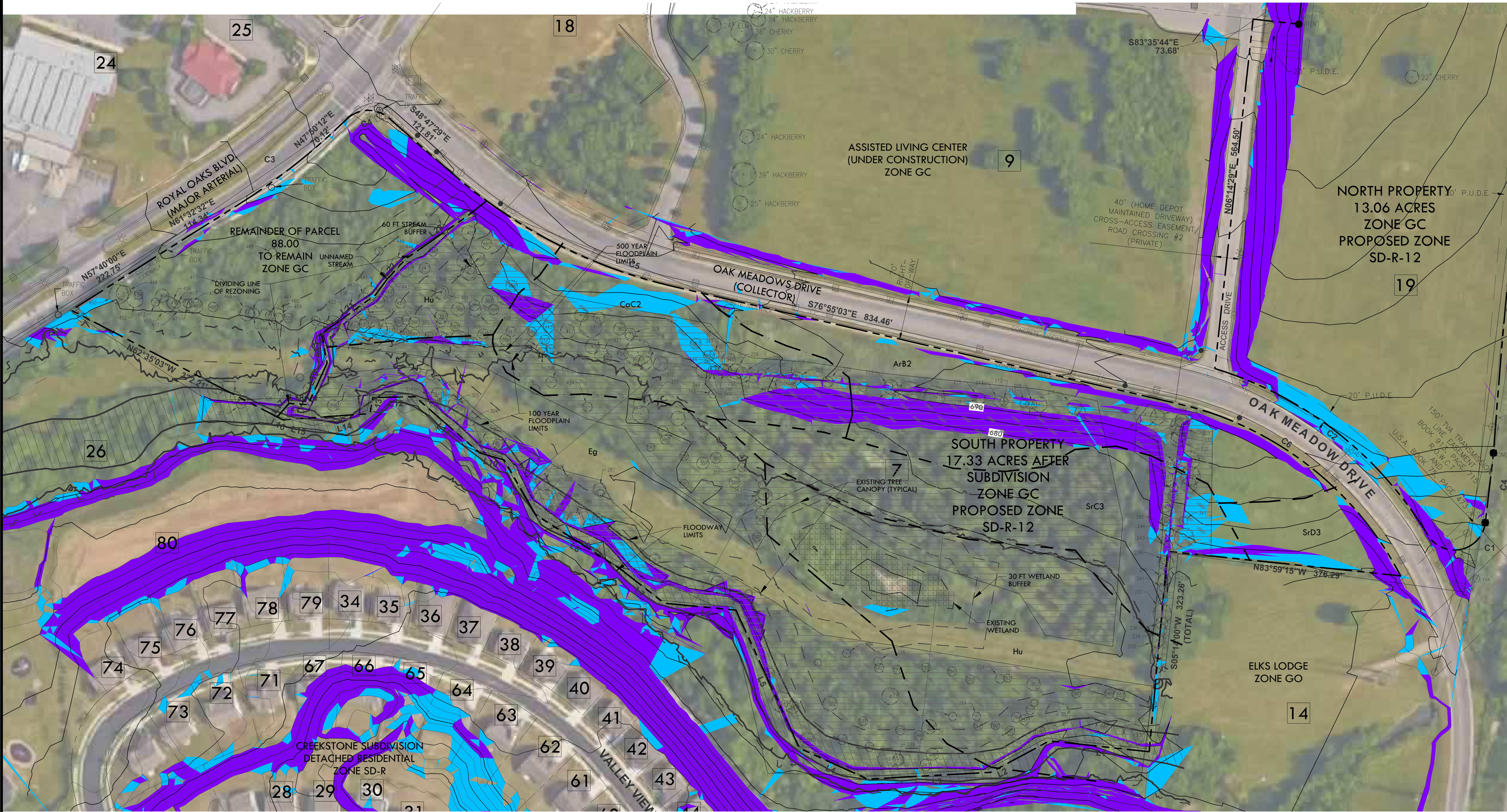
THE EPOCH DEVELOPMENT
REZONING SUBMITTAL
COF #6085 FRANKLIN, TN

REVISIONS	DATE	
	No.	

04/07/16 15001

C1.1

NORTH SITE
EXISTING
CONDITIONS PLAN

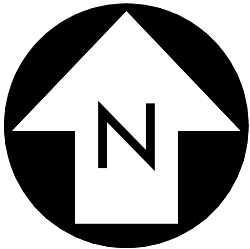
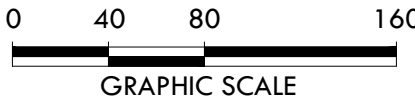


SLOPE LEGEND

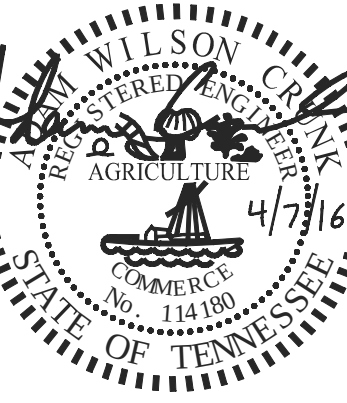
- GREATER THAN 1.4% AND LESS THAN 20% SLOPE
- GREATER THAN 20% SLOPE

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 Silversville clay loam, 5% to 12% slopes, eroded
- SrD3 Silversville clay loam, 12% to 20% slopes, severely eroded
- SrC2 Silversville silt loam, 5% to 12% slopes, eroded



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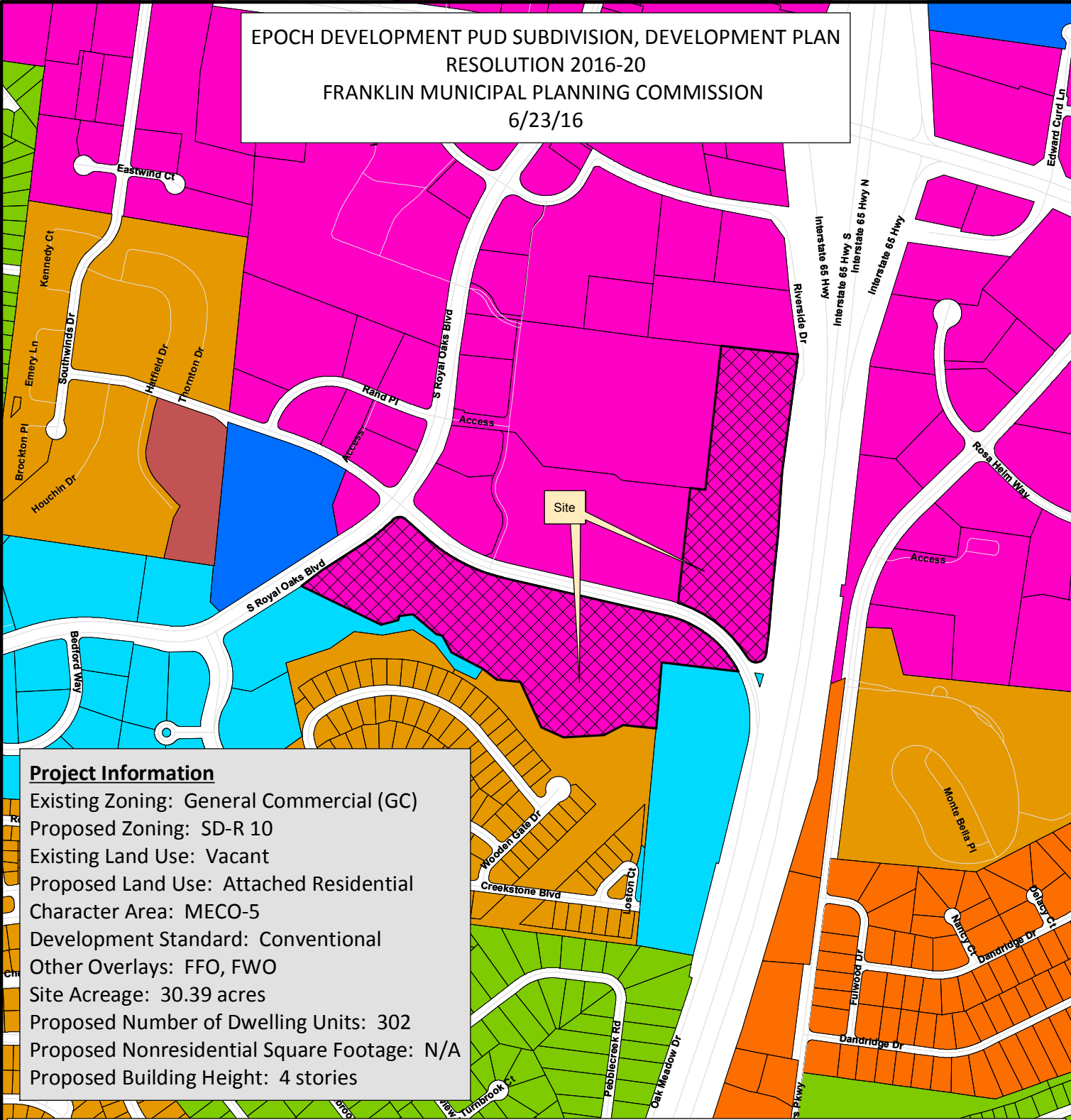
THE EPOCH DEVELOPMENT
REZONING SUBMITTAL
COF #6085 FRANKLIN, TN

REVISIONS	DATE				
	No.				

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 | SD-R Specific Development-Residential |
| AG Agricultural District | SD-X Specific Development-Variety |
| ER Estate Residential | OR Office Residential District |
| R-1 Residential District | GO General Office District |
| R-2 Residential District | CC Central Commercial District |
| R-3 Residential District | NC Neighborhood Commercial District |
| R-6 Historic Core Residential District | GC General Commercial District |
| RM-10 Attached 10 Residential District | LI Light Industrial District |
| RM-15 Attached 15 Residential District | HI Heavy Industrial District |
| RM-20 Attached 20 Residential District | CI Civic and Institutional District |



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.
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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 PROCEEDING 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. SUBDIVISION, 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.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 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, REVISION 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 PROCEEDING 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, REVISION 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:

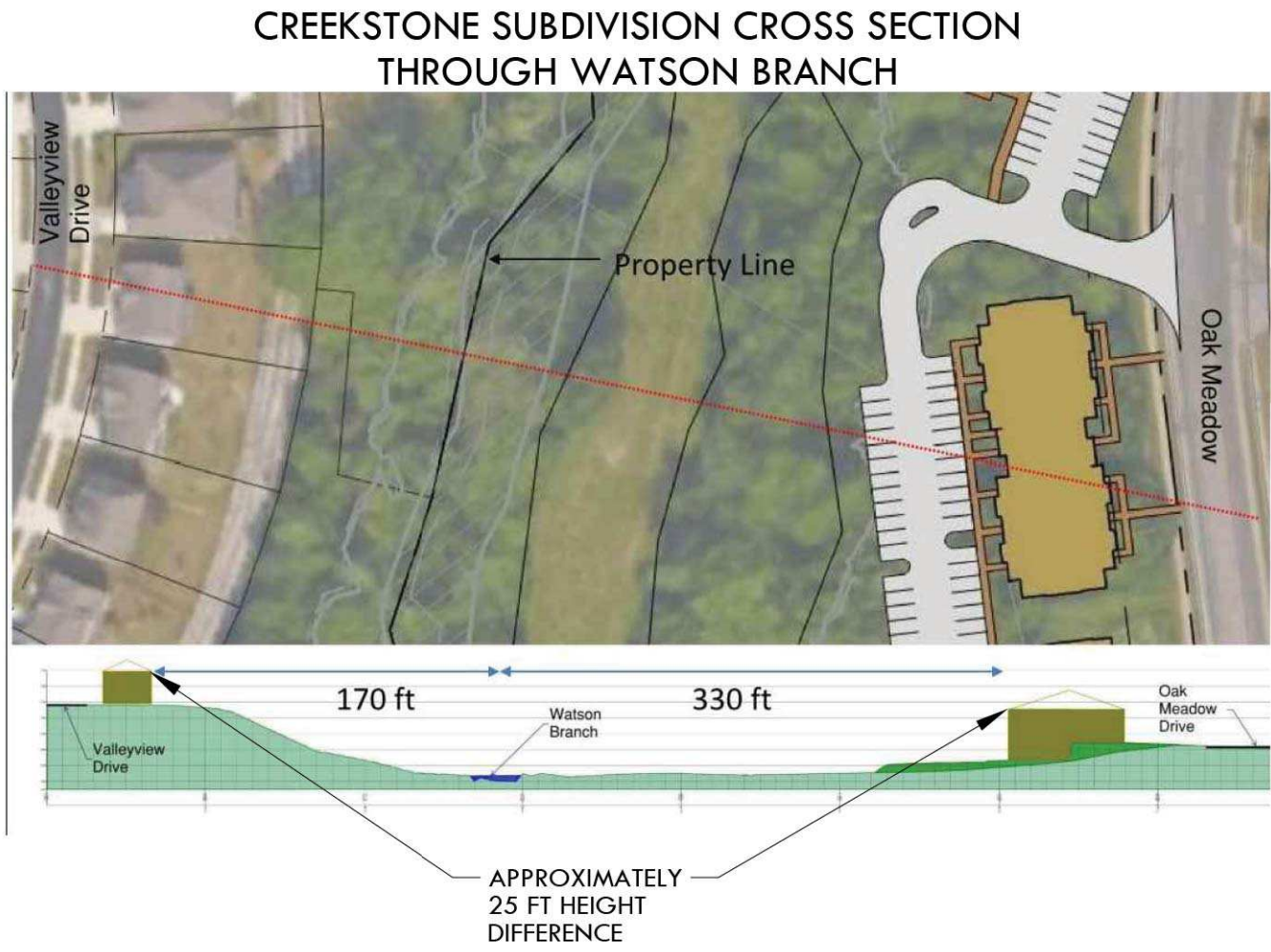
_____02/25/16_____

NEIGHBORHOOD MEETING:

_____03/02/16_____

PLANNING COMMISSION RECOMMENDED APPROVAL:

PUBLIC HEARING AND BOMA APPROVAL:



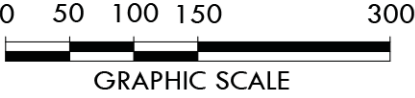
BRICK TRASH ENCLOSURE EXAMPLE

SITE DATA

PROJECT NAME	THE EPOCH DEVELOPMENT 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:	HAP 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
PHONE NO.:	FRANKLIN, TN 37067
E-MAIL ADDRESS:	615.873.1795
CONTACT NAME:	adam@crunkeng.com
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
	SOUTH PARCEL 2/3 STORIES (2 STORY FACING STREET)
PROPOSED LANDSCAPE SURFACE RATIO:	
MINIMUM LANDSCAPE SURFACE RATIO:	NORTH SITE - 0.53; SOUTH SITE - 0.76; COMBINED - 0.66
	0.20
PARKING:	
EXISTING:	0
REQUIRED (1.5/1BR + 2.5/2BR + 3/3BR):	
NORTH SITE:	
18R - 72 UNITS * 1.5 = 108 SPACES	
28R - 116 UNITS * 2.5 = 290 SPACES	
38R - 16 UNITS * 3.0 = 48 SPACES	
TOTAL REQUIRED = 446 SPACES	
INCLUDING 9 ADA SPACES	
SOUTH SITE:	
18R - 28 UNITS * 1.5 = 42 SPACES	
28R - 50 UNITS * 2.5 = 125 SPACES	
38R - 20 UNITS * 3.0 = 60 SPACES	
TOTAL REQUIRED = 227 SPACES	
INCLUDING 7 ADA SPACES	
MAXIMUM PARKING:	NORTH SITE - 536 SPACES; SOUTH SITE - 273 SPACES
PROPOSED:	
NORTH SITE:	
REGULAR SPACES	430
COMPACT SPACE (0 % OF TOTAL)	0
ADA SPACES	16
TOTAL PROVIDED	446
SOUTH SITE:	
REGULAR SPACES	186
COMPACT SPACES (14 % OF TOTAL)	31
ADA SPACES	10
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.
INFORMAL OPEN SPACE REQUIRED (67% OF OPEN SPACE REQUIRED)	2.4 AC. PROVIDED
	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)

PROJECT NOTES:

- The proposed project complies with the Land Use Plan as it was amended in December 2015 to allow for attached residential use 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.
 - 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.
 - 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.



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



THE EPOCH DEVELOPMENT
PUD SUBDIVISION, DEVELOPMENT PLAN
COF #6086 FRANKLIN, TN

REVISIONS	DATE	No.

06/02/16 15001

C2.0
OVERALL
DEVELOPMENT
PLAN

SOUTH PROPERTY
17.33 ACRES AFTER
SUBDIVISION
98 UNITS

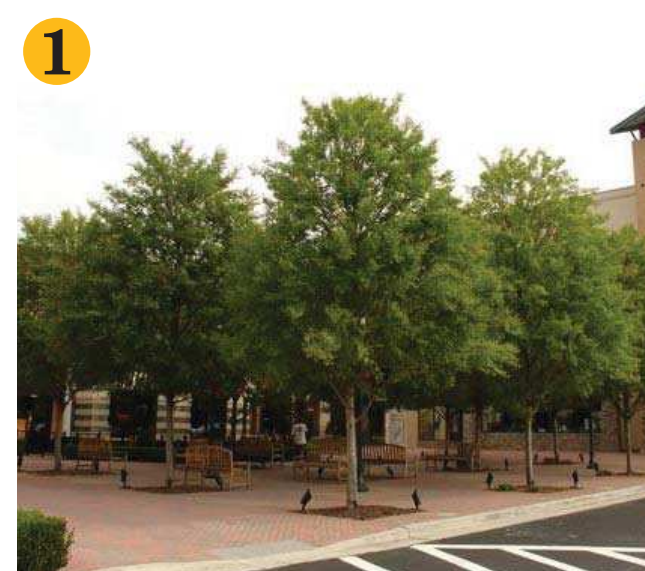
ASSISTED LIVING CENTER
(UNDER CONSTRUCTION)
ZONE GC

HOME
DEPOT
ZONE GC

ELK LODGE
ZONE GO

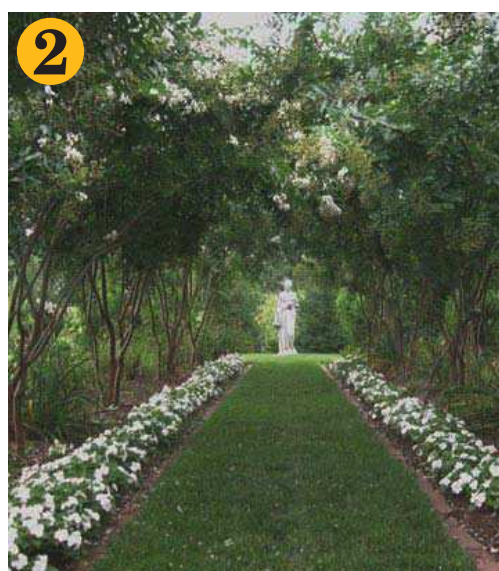


1



FORMAL OPEN SPACE - 0.75 ACRES

2



3



4



5



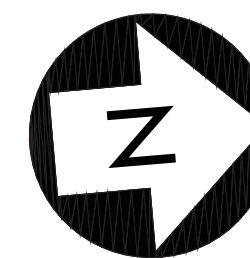
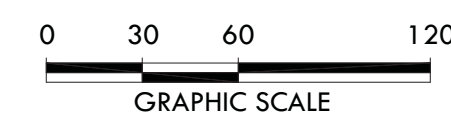
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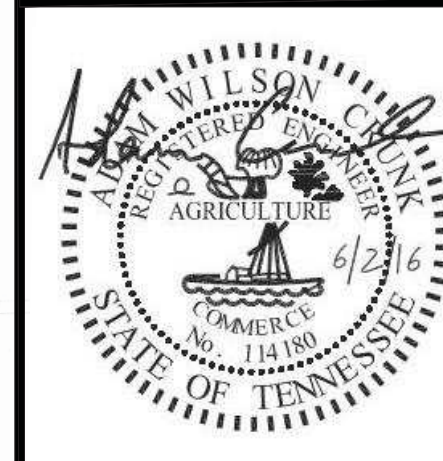
FORMAL OPEN SPACE (GRILL) - 0.15 ACRES

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



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THE EPOCH DEVELOPMENT
PUD SUBDIVISION, DEVELOPMENT PLAN
COF #6086 FRANKLIN, TN

REVISIONS	DATE	
	No.	

06/02/16 15001

C2.1
NORTH SITE
DEVELOPMENT
PLAN

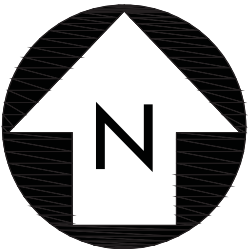
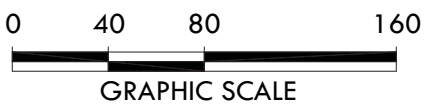


LINE TABLE		
LINE	BEARING	DISTANCE
L1	N83°48'10"W	161.22'
L2	S61°46'08"W	106.65'
L3	S86°48'30"W	198.12'
L4	N65°28'52"W	120.02'
L5	N24°43'04"W	244.21'
L6	N84°36'00"W	115.35'
L7	N52°04'01"W	87.70'
L8	N57°18'12"W	163.19'
L9	N29°52'55"W	101.80'
L10	N74°02'09"W	41.15'
L11	N48°56'27"W	137.25'
L12	S88°57'25"W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

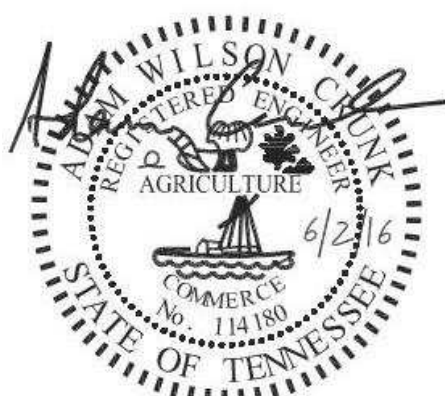
LINE TABLE		
LINE	BEARING	DISTANCE
L14	S74°19'35"W	89.75'
L15	N75°22'06"W	55.08'
L16	N62°35'03"W	10.27'
L17	N39°40'55"E	27.30'
L18	S89°07'57"E	31.47'
L19	N25°32'12"E	70.78'
L20	N10°00'40"W	49.37'
L21	N54°59'41"E	103.02'
L22	N40°36'36"E	74.71'
L23	N53°28'05"E	164.68'

CURVE TABLE					
CURVE	RADIUS	LENGTH	DELTA	TANGENT	CHORD
C5	820.00'	330.94'	23°07'24"	167.75	328.69'
C6	537.96'	464.57'	49°28'46"	247.89	450.27'

TOTAL OF 98 UNITS ON SOUTH PARCEL



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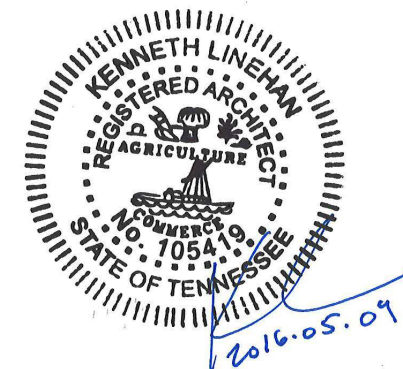


THE EPOCH DEVELOPMENT
PUD SUBDIVISION, DEVELOPMENT PLAN
COF #6086 FRANKLIN, TN

REVISIONS	DATE	
	No.	

06/02/16 15001

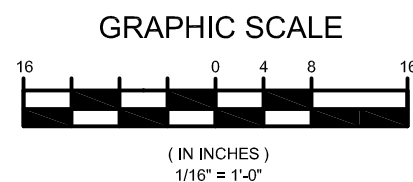
C2.2
SOUTH SITE
DEVELOPMENT
PLAN



UNIT ENTRY DOOR

UNIT ENTRY DOOR

NORTH ELEVATION
(OAK MEADOW DRIVE)
SOUTH PARCEL



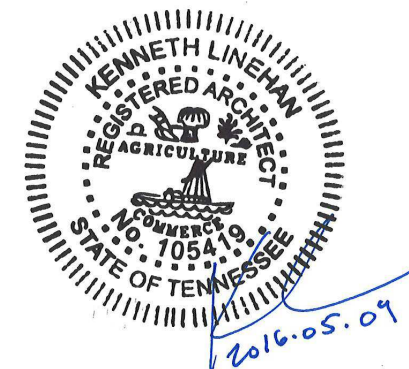
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FUGLEBERG KOCH

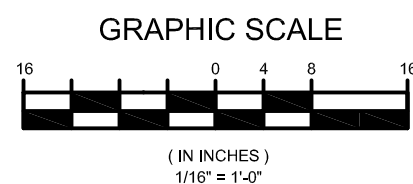
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2016-05-09

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FRANKLIN, TENNESSEE



SOUTH ELEVATION



SOUTH PARCEL

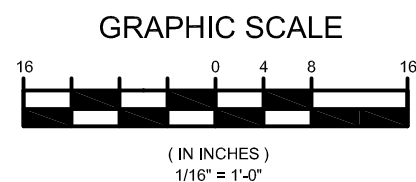
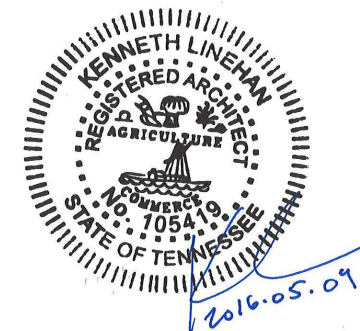
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ELEVATION

NORTH PARCEL

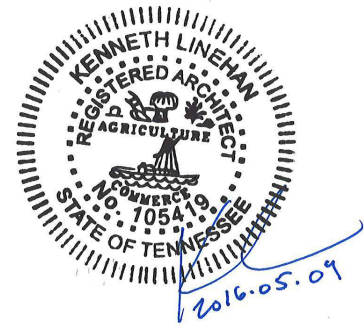
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2016-05-09

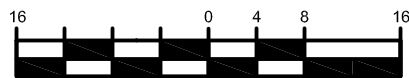
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SIDE ELEVATION

NORTH PARCEL

GRAPHIC SCALE



(IN INCHES)
1/16" = 1'-0"



FUGLEBERG KOCH

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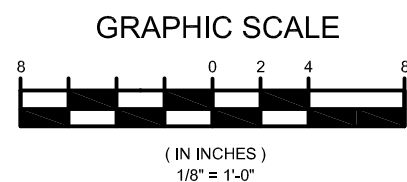
BUILDING ELEVATIONS

2016-05-09

THE EPOCH DEVELOPMENT

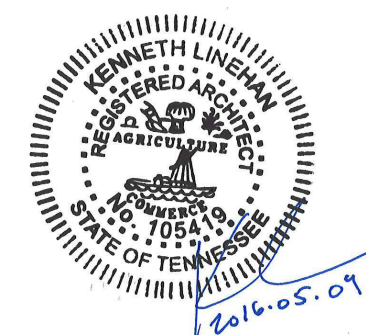
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AMENITY / CLUBHOUSE CENTER
ELEVATION

SOUTH PARCEL



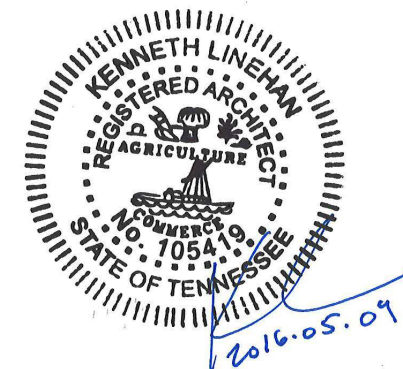
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FUGLEBERG KOCH

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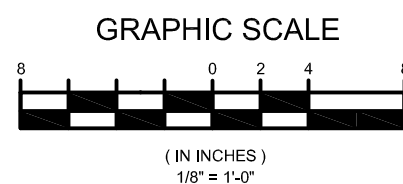
BUILDING ELEVATIONS
2016-05-09

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FRANKLIN, TENNESSEE



POOL PAVILION ELEVATION

NORTH PARCEL



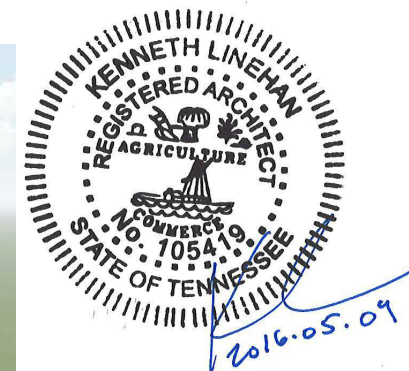
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BUILDING ELEVATIONS
2016-05-09

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VIEW LOOKING WEST

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EPOCH

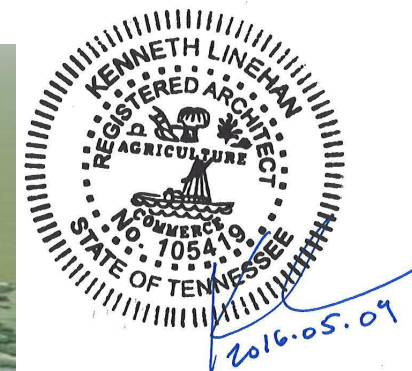
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PROJECT PERSPECTIVES

2016-05-09

THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE



VIEW LOOKING EAST

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EPOCH

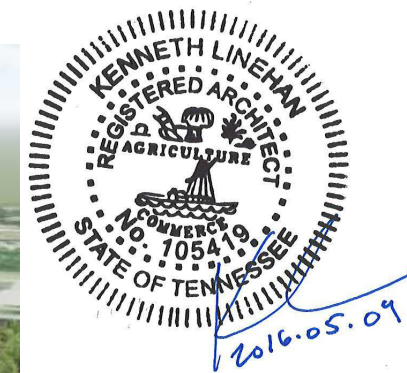
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PROJECT PERSPECTIVES

2016-05-09

THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE



VIEW LOOKING SOUTH

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EPOCH

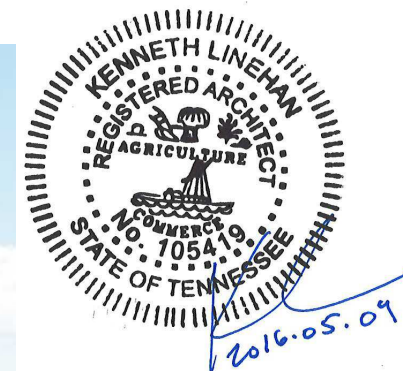
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PROJECT PERSPECTIVES

2016-05-09

THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE



VIEW LOOKING EAST

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PROJECT #6068



EPOCH

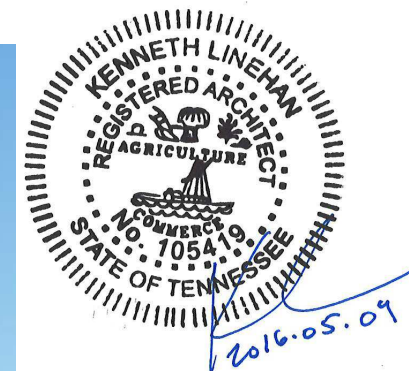
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PROJECT PERSPECTIVES

2016-05-09

THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE



VIEW LOOKING EAST ON OAK MEADOW DR.

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PROJECT #6068



EPOCH

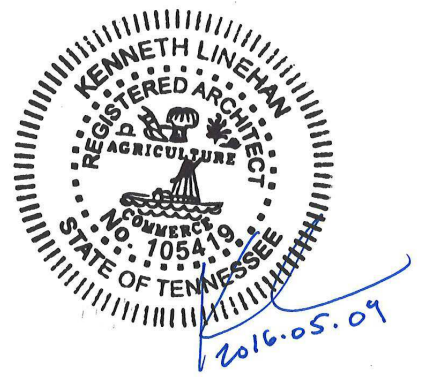
RESIDENTIAL™

PROJECT PERSPECTIVES

2016-05-09

THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE



VIEW LOOKING EAST ON OAK MEADOW DR.

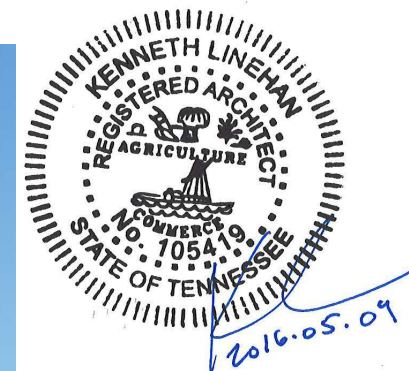
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PROJECT #6068



EPOCH RESIDENTIAL™ PROJECT PERSPECTIVES
2016-05-09

THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE



VIEW LOOKING SOUTHEAST ON OAK MEADOW DR.

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EPOCH

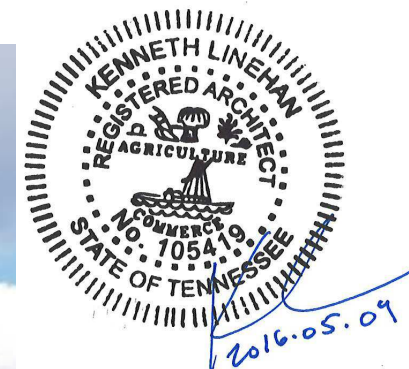
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PROJECT PERSPECTIVES

2016-05-09

THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE



VIEW LOOKING SOUTHWEST ON OAK MEADOW DR.

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EPOCH

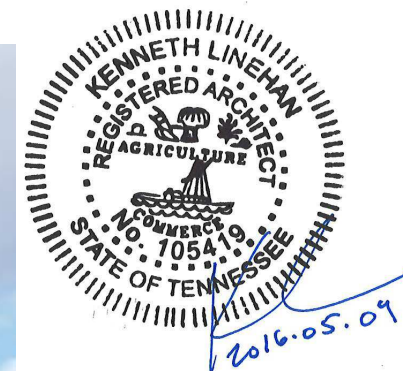
RESIDENTIAL™

PROJECT PERSPECTIVES

2016-05-09

THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE



VIEW LOOKING SOUTHWEST ON OAK MEADOW DR.

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EPOCH

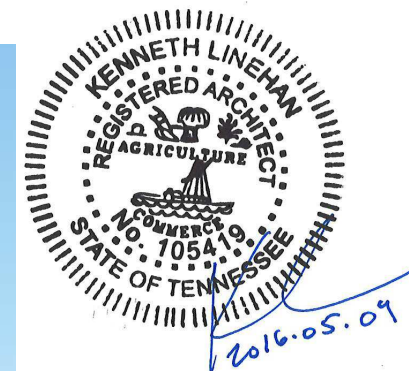
RESIDENTIAL™

PROJECT PERSPECTIVES

2016-05-09

THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE



VIEW LOOKING NORTHWEST ON OAK MEADOW DR.

MOVEABLE IMAGE WEBSITE: <http://view.mylumion.com/?p=89ufkq59>

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EPOCH

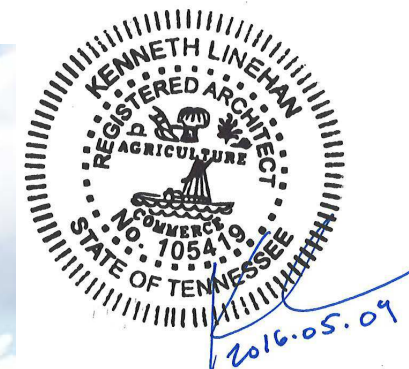
RESIDENTIAL™

PROJECT PERSPECTIVES

2016-05-09

THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE



VIEW LOOKING SOUTHWEST

MOVEABLE IMAGE WEBSITE: <http://view.mylumion.com/?p=89ufkq59>

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PROJECT #6068



EPOCH

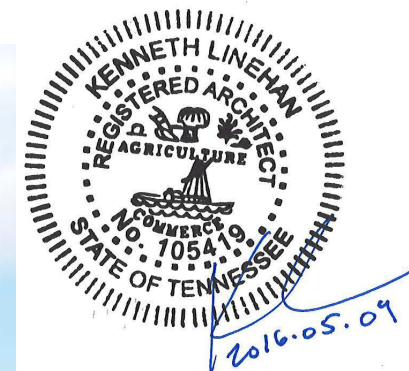
RESIDENTIAL™

PROJECT PERSPECTIVES

2016-05-09

THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE



VIEW LOOKING NORTH

MOVEABLE IMAGE WEBSITE: <http://view.mylumion.com/?p=89ufkq59>

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PROJECT #6068



EPOCH

RESIDENTIAL™

PROJECT PERSPECTIVES

2016-05-09

THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

SITE DATA

PROJECT NAME: THE EPOCH DEVELOPMENT
PROJECT NUMBER: 6086
REZONING & PUD APPLICATION
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: MECC-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
FRANKLIN, TN 37067
PHONE NO.: 615.873.1795
E-MAIL ADDRESS: adam@crunkeng.com
CONTACT NAME: MR. ADAM CRUNK, P.E.

DENSITY: 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: 6 STORIES MAXIMUM
ALLOWABLE: NORTH PARCEL - 4 STORIES
PROPOSED: 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: 0
REQUIRED (1.5/1BR + 2.5/2BR + 3/3BR)
NORTH SITE: 1BR - 72 UNITS * 1.5 = 108 SPACES
2BR - 114 UNITS * 2.5 = 290 SPACES
3BR - 16 UNITS * 3.0 = 48 SPACES
TOTAL REQUIRED = 446 SPACES
INCLUDING 9 ADA SPACES
MAXIMUM PARKING: NORTH SITE - 536 SPACES; SOUTH SITE - 273 SPACES

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

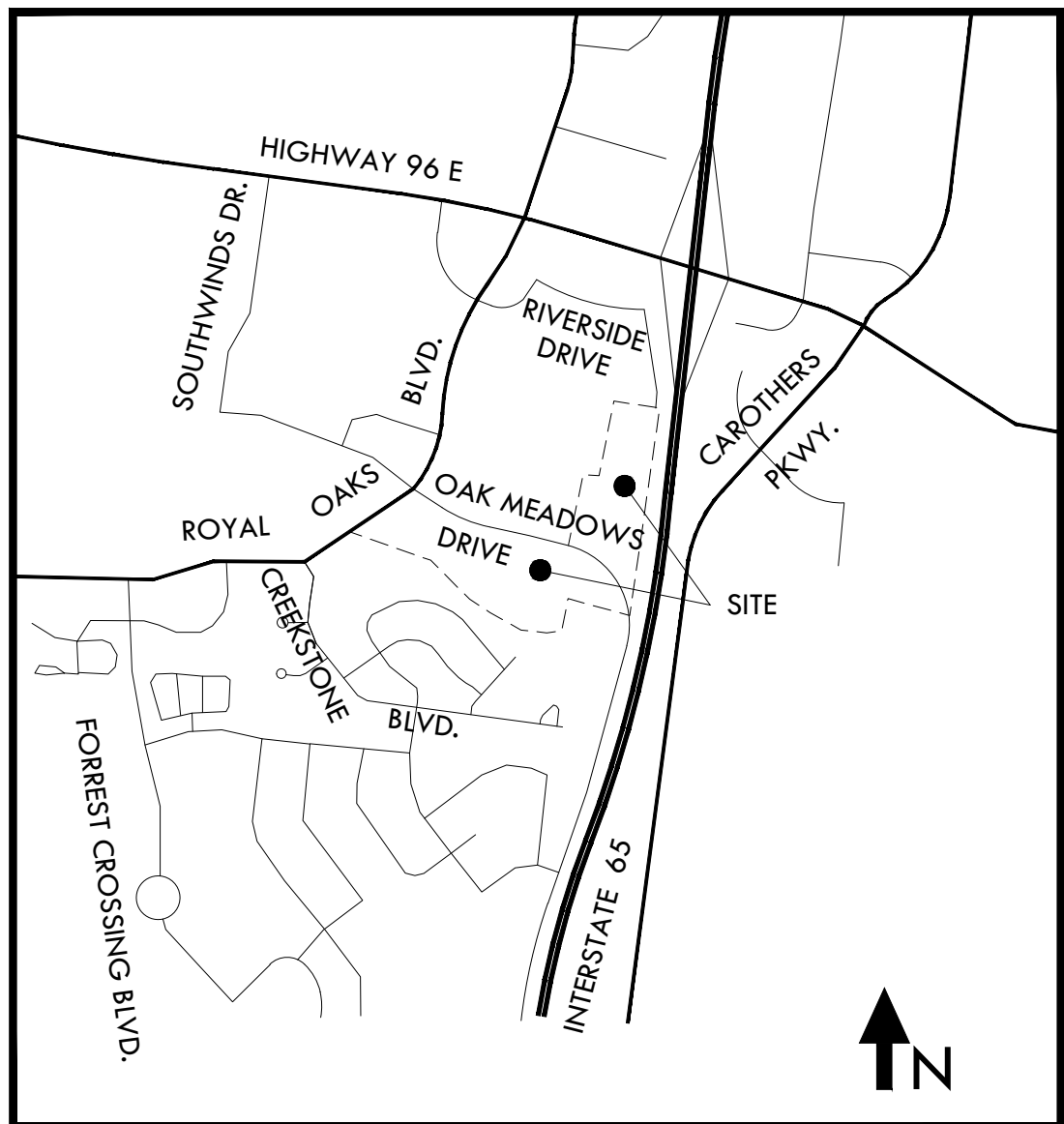
OPEN SPACE: 4.56 AC.
TOTAL OPEN SPACE REQ'D (15% OF 30.39 AC.)
FORMAL OPEN SPACE REQUIRED (33% OF OPEN SPACE REQUIRED)
INFORMAL OPEN SPACE REQUIRED (67% OF OPEN SPACE REQUIRED)
8.0 AC. PROVIDED

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:

- 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 UNGLAZED 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.
- 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.
- THE DESIGN MODIFICATION IS NECESSARY TO MAXIMIZE THE EFFICIENCY OF THE SITE AND PROVIDE VIABLE LIVING SPACES WITHIN THE PROPOSED DWELLING UNITS.
- 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:

- 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



ARCHITECT OF RECORD:

KENNETH LINEHAN, AIA, LEED AP
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2555 TEMPLE TRAIL
WINTER PARK, FL 32789
407-629-0595
keni@fuglebergkoch.com

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

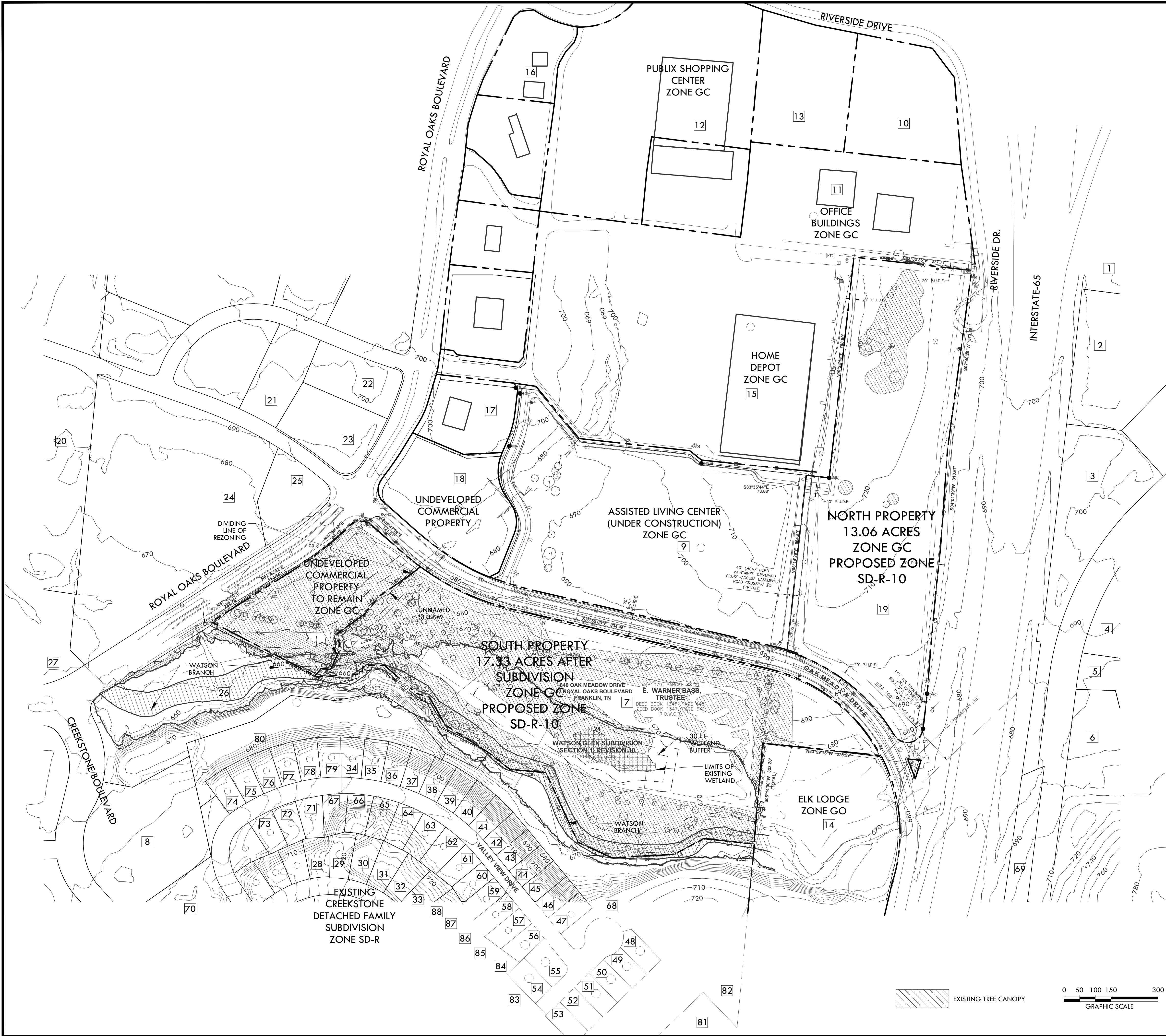


THE EPOCH DEVELOPMENT
PUD SUBDIVISION, DEVELOPMENT PLAN
COF #6086
FRANKLIN, TN

REVISIONS	DATE	
No.		

06/02/16 15001

C0.0
COVER SHEET



ID	PRELID	DEED / PLAT	LAND USE	OWNER	ZONING
1	079-08905	DB 344 DP 639 P818 PP114	HOTEL	BREAQ PROP LLC	GC
2	079-08906	DB 2966 DP 435 P822 PP11	AUTO DLR	ADKINS RODNEY G	GC
3	079-07000	DB 4341 DP 783 P822 PP11	CHURCH	CHURCH GATE THE	GC
4	079-08000	DB 4347 DP 710 P861 PP69	REC	SOAR ADVENTURE TOWER LLC	GC
5	079-08200	DB 5345 DP 555	UNDEV.	NICHOLS J DONALD	SD-R
6	079-08300	DB 1390 DP 525	ATTACHED RESID.	UNITED DOMINION REALTY LP	GC
7	079-08800	DB 1347 DP 645 P829 PP139	UNDEV.	BASS E WARNER TR	GC
8	079-10001	DB 2192 DP 320 P831 PP12	DAYCARE	WOOD & WOOD LLC	GO
9	079-10100	DB 6333 DP 243 P862 PP45	ASST. LVG	DOMINION SENIOR LIVING OF FRANKLIN L	GC
10	079-10201	DB 5440 DP 460	OFFICE	3071 LLC	GC
11	079-10202	DB 2200 DP 199 P819 PP59	OFFICE	LIN DON REALTY LLC	GC
12	079-10203	DB 5440 DP 460 P859 PP3	RETAIL	PUBLIX TENNESSEE LLC	GC
13	079-10204	DB 6148 DP 808 P822 PP120	ASST. LVG	FRANKLIN TN SENIOR CARE PROPERTY LLC	GC
14	079-10205	DB 4406 DP 792 P829 PP139	REC	NASHVILLE LODGE #72 BPO ELKS	GO
15	079-10210	DB 4559 DP 859 P829 PP139	RETAIL	HD DEVELOPMENT OF MARYLAND INC	GC
16	079-10214	DB 4559 DP 859 P829 PP139	RETAIL	PUBLIX TENNESSEE LLC	GC
17	079-10216	DB 4559 DP 859 P829 PP139	RETAIL	FIRST-CITIZENS BANK AND TR CO	GC
18	079-10217	DB 4559 DP 859 P829 PP139	UNDEV.	BASS E WARNER TR	GC
19	079-10219	DB 4559 DP 859 P829 PP139	UNDEV.	BASS E WARNER TR	GC
20	079-A01401	DB 4337 DP 993 P841 PP33	UNDEV.	SNV2 TENNESSEE LLC	RM-20
21	0790-A00000	DB 4040 DP 940 P827 PP4	INSTIT.	CHURCH CORNERSTONE MINISTRIES INC	GC
22	0790-A00001	DB 5790 DP 107 P829 PP10	RETAIL	MAGUI CHERYL'S FAMILY TRUST	GC
23	0790-A00002	DB 5871 DP 528 P826 PP10	RETAIL	LCI LLC	GC
24	0790-A00003	DB 74 DP 881 P812 PP76	RETAIL	UNITED STATES POSTAL SERV	CI
25	0790-A00004	DB 9146 DP 286 P822 PP12	RETAIL	COMMUNITY BANK	GC
26	0790-002500	DB 5136 DP 628 P847 PP142	UNDEV.	CADENCE BANK NA	GO
27	0790-002600	DB 5844 DP 115 P855 PP146	UNDEV.	ROYAL OAKS PARK SOUTH	GO
28	0790-000100	DB 5844 DP 115 P855 PP146	RESIDENTIAL	THURM DAVID M	SD-R
29	0790-000200	DB 5844 DP 115 P855 PP146	RESIDENTIAL	HAMILTON MALLORY	SD-R
30	0790-000300	DB 5844 DP 115 P855 PP146	RESIDENTIAL	LYLE JORDAN WILLIAM	SD-R
31	0790-000400	DB 5844 DP 115 P855 PP146	RESIDENTIAL	EVANGELISTA BERNARDINO JR	SD-R
32	0790-000500	DB 5844 DP 115 P855 PP146	RESIDENTIAL	CASTANEDA ORESTES	SD-R
33	0790-000600	DB 5844 DP 115 P855 PP146	RESIDENTIAL	VOSS STEPHEN M	SD-R
34	0790-000700	DB 5844 DP 115 P855 PP146	RESIDENTIAL	KHOT SOHAM	SD-R
35	0790-000800	DB 5844 DP 115 P855 PP146	RESIDENTIAL	DOODH RYAN M	SD-R
36	0790-000900	DB 5844 DP 115 P855 PP146	RESIDENTIAL	SULLIVAN JOHN	SD-R
37	0790-001000	DB 5844 DP 115 P855 PP146	RESIDENTIAL	CULLEN ROBERT BARRY	SD-R
38	0790-001100	DB 5844 DP 115 P855 PP146	RESIDENTIAL	MILLER ROBERT FRANK	SD-R
39	0790-001200	DB 5844 DP 115 P855 PP146	RESIDENTIAL	SHARANI KHARUNISSA	SD-R
40	0790-001300	DB 5844 DP 115 P855 PP146	RESIDENTIAL	KNOX CONSUELA S	SD-R
41	0790-001400	DB 5844 DP 115 P855 PP146	RESIDENTIAL	DOWKINS BRETTON GUY	SD-R
42	0790-001500	DB 5844 DP 115 P855 PP146	RESIDENTIAL	COMEAUX MARGARET A	SD-R
43	0790-001600	DB 5844 DP 115 P855 PP146	RESIDENTIAL	SMITH CHRISTOPHER S	SD-R
44	0790-001700	DB 5844 DP 115 P855 PP146	RESIDENTIAL	DANIELS THOMAS	SD-R
45	0790-001800	DB 5844 DP 115 P855 PP146	RESIDENTIAL	SUNDARAM BARATH SHANMUGA	SD-R
46	0790-001900	DB 5844 DP 115 P855 PP146	RESIDENTIAL	HOSSAIN MOHAMMAD	SD-R
47	0790-002000	DB 5844 DP 115 P855 PP146	RESIDENTIAL	MARLEEN LAURENCE	SD-R
48	0790-002100	DB 5844 DP 115 P855 PP146	RESIDENTIAL	BECHARD BRIAN	SD-R
49	0790-002200	DB 5844 DP 115 P855 PP146	RESIDENTIAL	VIDYASATHISH	SD-R
50	0790-002300	DB 5844 DP 115 P855 PP146	RESIDENTIAL	RUSSO JOHN M	SD-R
51	0790-002400	DB 5844 DP 115 P855 PP146	RESIDENTIAL	CLUGILEY J PATRICK	SD-R
52	0790-002500	DB 5844 DP 115 P855 PP146	RESIDENTIAL	BONHAM SYDNEY	SD-R
53	0790-002600	DB 5844 DP 115 P855 PP146	RESIDENTIAL	BURGER JORDAN	SD-R
54	0790-002700	DB 5844 DP 115 P855 PP146	RESIDENTIAL	NOLAN MICHAEL S TRUST	SD-R
55	0790-002800	DB 5844 DP 115 P855 PP146	RESIDENTIAL	PARIS SREKANTH	SD-R
56	0790-002900	DB 5844 DP 115 P855 PP146	RESIDENTIAL	KOLLI MURALI KRISHNA	SD-R
57	0790-003000	DB 5844 DP 115 P855 PP146	RESIDENTIAL	RAMAN VENKATESH	SD-R
58	0790-003100	DB 5844 DP 115 P855 PP146	RESIDENTIAL	HAJENDRAN THAMIL S	SD-R
59	0790-003200	DB 5844 DP 115 P855 PP146	RESIDENTIAL	DOPPALAJUDI SRIRANTH	SD-R
60	0790-003300	DB 5844 DP 115 P855 PP146	RESIDENTIAL	CHINTAKINDI VARUN K	SD-R
61	0790-003400	DB 5844 DP 115 P855 PP146	RESIDENTIAL	KRISHNAN JAGADESWARAN	SD-R
62	0790-003500	DB 5844 DP 115 P855 PP146	RESIDENTIAL	MOHAMED ABUL R J	SD-R
63	0790-003600	DB 5844 DP 115 P855 PP146	RESIDENTIAL	PICHAMUTHU NARAYANAN	SD-R
64	0790-003700	DB 5844 DP 115 P855 PP146	RESIDENTIAL	ZELLER JAMES S JR	SD-R
65	0790-003800	DB 5844 DP 115 P855 PP146	RESIDENTIAL	MURRAY KIMBERLY	SD-R
66	0790-003900	DB 5844 DP 115 P855 PP146	RESIDENTIAL	DIPPER NATHAN M	SD-R
67	0790-004000	DB 5844 DP 115 P855 PP146	RESIDENTIAL	VIGIL MARIO G	SD-R
68	0790-004100	DB 5844 DP 115 P855 PP146	RESIDENTIAL	CREEKSTONE HOMEOWNERS ASSOCIATION I	SD-R
69	089-00509	DB 1915 DP 891 P831 PP17	RESIDENTIAL	AT & T CORP BY & THROUGH	R-2
70	089-004200	DB 3530 DP 248 P854 PP20	RESIDENTIAL	CREEKSTONE HOMEOWNERS ASSOCIATION IN	SD-R
71	089-004600	DB 3530 DP 248 P854 PP20	RESIDENTIAL	BLANCHER NICOLE E	SD-R
72	089-004700	DB 3530 DP 248 P854 PP20	RESIDENTIAL	ORLUS JONATHAN	SD-R
73	089-004800	DB 3530 DP 248 P854 PP20	RESIDENTIAL	KUMAR RATNA	SD-R
74	089-005000	DB 3530 DP 248 P854 PP20	RESIDENTIAL	BLANKENSHIP JON I	SD-R
75	089-005100	DB 3530 DP 248 P854 PP20	RESIDENTIAL	BURRELL GERALD MARK	SD-R
76	089-005200	DB 3530 DP 248 P854 PP20	RESIDENTIAL	BUCKNER RICHARD D	SD-R
77	089-005300	DB 3530 DP 248 P854 PP20	RESIDENTIAL	LERCHE MICHAEL	SD-R
78	089-005400	DB 3530 DP 248 P854 PP20	RESIDENTIAL	RUSSELL KAREN KINGSBURY	SD-R
79	089-005500	DB 3530 DP 248 P854 PP20	RESIDENTIAL	THEURER DAVID S	SD-R
80	089-005600	DB 3530 DP 248 P854 PP20	RESIDENTIAL	CREEKSTONE HOMEOWNERS ASSOCIATION IN	SD-R
81	089-P01500	DB 6057 DP 780 P856 PP76	RESIDENTIAL	BARLOW JOHN	SD-R
82	089-P01600	DB 6057 DP 780 P856 PP76	RESIDENTIAL	ERWIN DEVAN A	SD-R
83	089-P02000	DB 6057 DP 780 P856 PP76	RESIDENTIAL	PATEL NIKUNJ M	SD-R
84	089-P02100	DB 6057 DP 780 P856 PP76	RESIDENTIAL	JANI BHAVESHKUMAR	SD-R
85	089-P02200	DB 6057 DP 780 P856 PP76	RESIDENTIAL	HARRIS JOHN	SD-R
86	089-P02300	DB 6057 DP 780 P856 PP76	RESIDENTIAL	LEDGISTER KEVIN ARTHUR	SD-R
87	089-P02400	DB 6057 DP 780 P856 PP76	RESIDENTIAL	JOHANSEN MICHAEL	SD-R
88	089-P02500	DB 6057 DP 780 P856 PP76	RESIDENTIAL	COLLIER EDWARD W III	SD-R

CRUNK ENGINEERING LLC
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THE EPOCH DEVELOPMENT

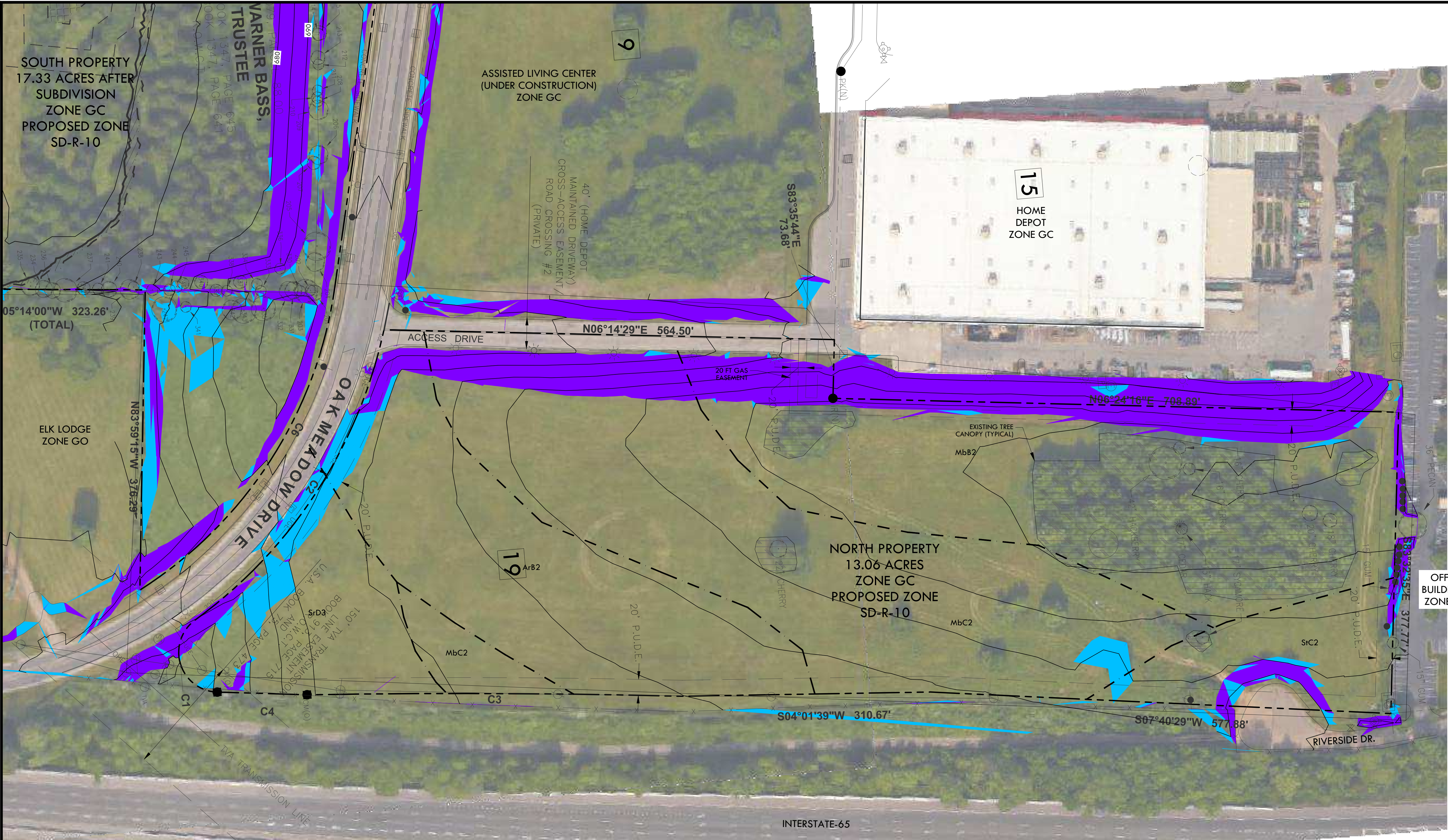
PUD SUBDIVISION, DEVELOPMENT PLAN

COF #6086 FRANKLIN, TN

REVISIONS	DATE	
No.		
06/02/16		15001

C1.0

OVERALL EXISTING CONDITIONS PLAN



SLOPE LEGEND

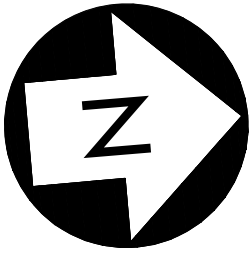
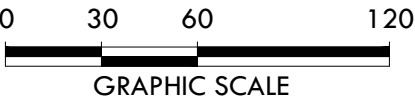
- GREATER THAN 1.4% AND LESS THAN 20% SLOPE
- GREATER THAN 20% SLOPE

SOIL TYPES

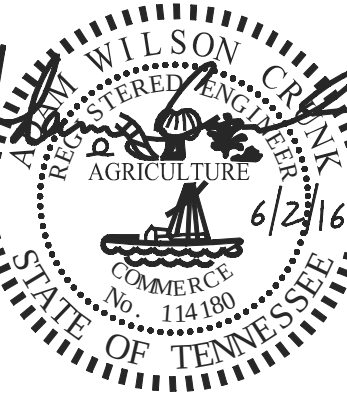
- ArB2 Armour silt loam, 2% to 5% slopes, eroded
- CaC2 Capling silt loam, phosphatic, 5% to 12% slopes, eroded
- Eg Egam silt loam, phosphatic
- Hu Huntington silt loam, phosphatic
- InE3 Inman silty clay loam, 20% to 30% slopes, severely eroded
- MbB2 Maury silt loam, 2% to 5% slopes, eroded
- MbC2 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
- SrC2 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



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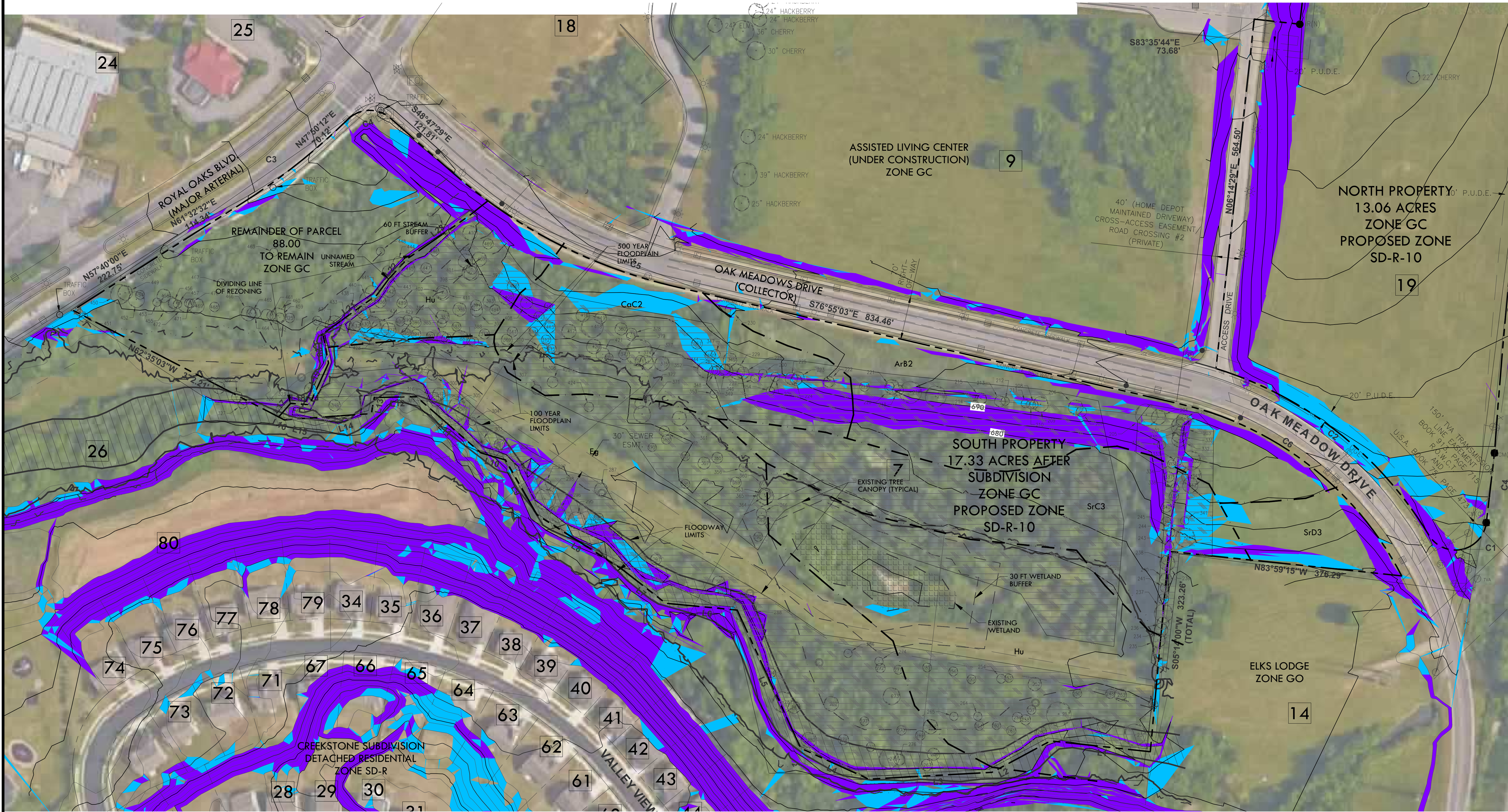


THE EPOCH DEVELOPMENT
PUD SUBDIVISION, DEVELOPMENT PLAN
COF #6086 FRANKLIN, TN

REVISIONS	DATE
No.	

06/02/16 15001

C1.1
NORTH SITE
EXISTING
CONDITIONS PLAN

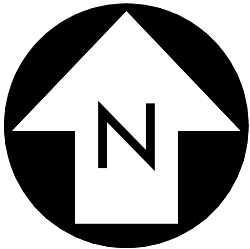
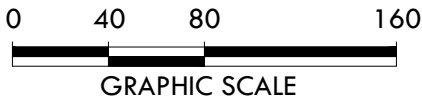


SLOPE LEGEND

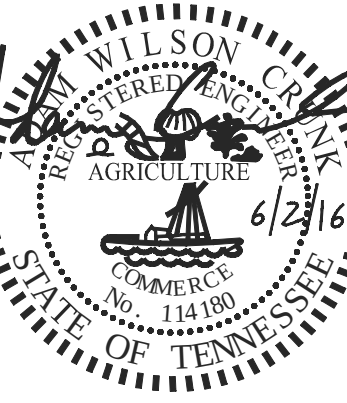
-  GREATER THAN 1.4% AND LESS THAN 20% SLOPE
-  GREATER THAN 20% SLOPE

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 Silversville clay loam, 5% to 12% slopes, eroded
- SrD3 Silversville clay loam, 12% to 20% slopes, severely eroded
- SrC2 Silversville silt loam, 5% to 12% slopes, eroded



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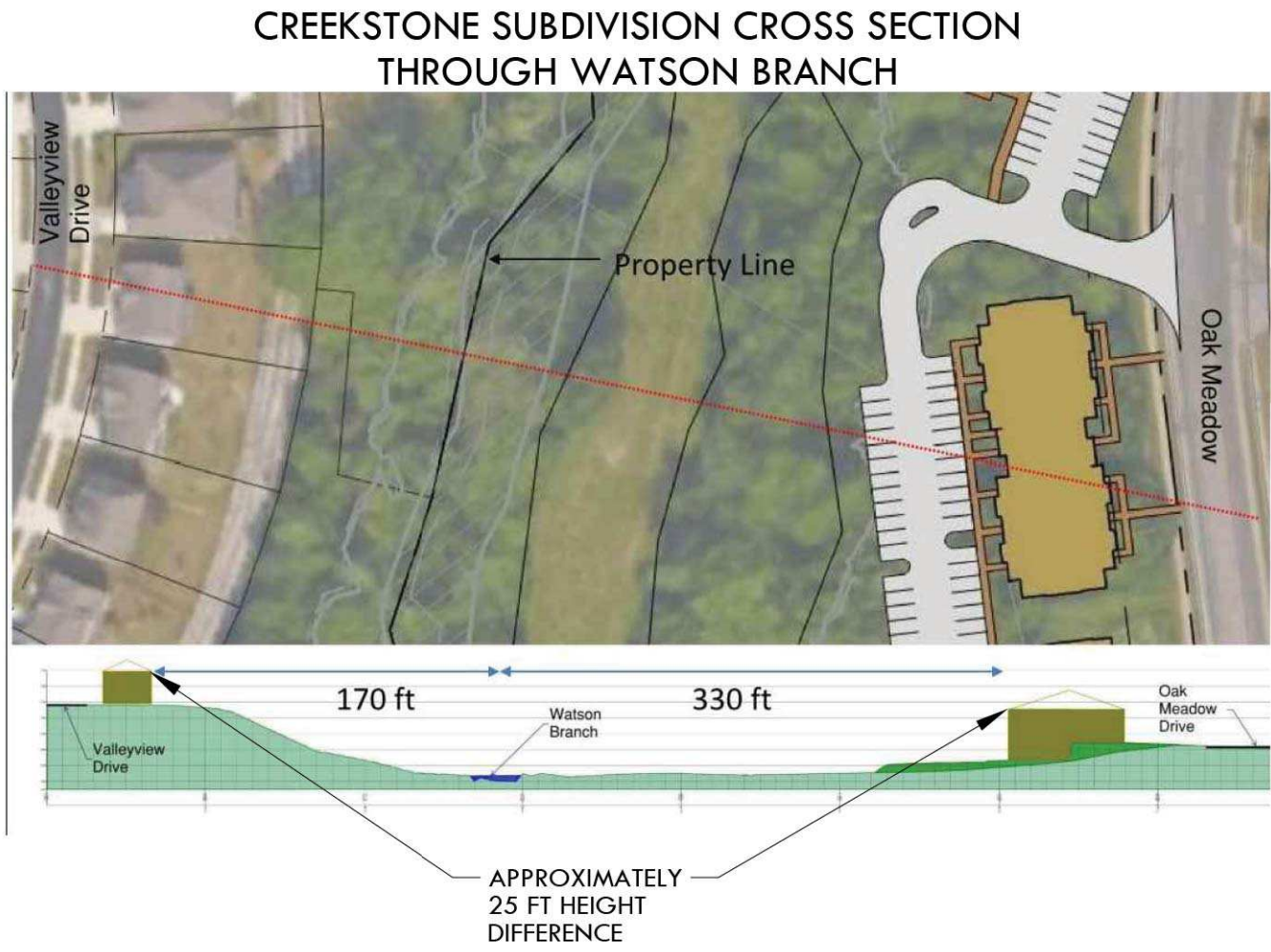


THE EPOCH DEVELOPMENT
PUD SUBDIVISION, DEVELOPMENT PLAN
COF #6086 FRANKLIN, TN

REVISIONS	DATE	
	No.	

06/02/16 15001

C1.2
SOUTH SITE
EXISTING
CONDITIONS PLAN



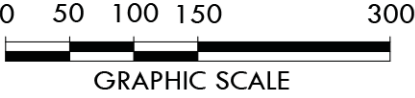
BRICK TRASH ENCLOSURE EXAMPLE

SITE DATA

PROJECT NAME	THE EPOCH DEVELOPMENT 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:	HAP 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 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 SOUTH PARCEL 2/3 STORIES (2 STORY FACING STREET)
PROPOSED LANDSCAPE SURFACE RATIO:	
MINIMUM LANDSCAPE SURFACE RATIO:	NORTH SITE - 0.53; SOUTH SITE - 0.76; COMBINED - 0.66 0.20
PARKING	
EXISTING	0
REQUIRED (1.5/1BR + 2.5/2BR + 3/3BR)	
NORTH SITE	
18R - 72 UNITS * 1.5 = 108 SPACES	
28R - 116 UNITS * 2.5 = 290 SPACES	
38R - 16 UNITS * 3.0 = 48 SPACES	
TOTAL REQUIRED	446 SPACES
INCLUDING 9 ADA SPACES	
SOUTH SITE	
18R - 28 UNITS * 1.5 = 42 SPACES	
28R - 50 UNITS * 2.5 = 125 SPACES	
38R - 20 UNITS * 3.0 = 60 SPACES	
TOTAL REQUIRED	227 SPACES
INCLUDING 7 ADA SPACES	
MAXIMUM PARKING	NORTH SITE - 536 SPACES; SOUTH SITE - 273 SPACES
PROPOSED	
NORTH SITE	
REGULAR SPACES	430
COMPACT SPACE (0 % OF TOTAL)	0
ADA SPACES	16
TOTAL PROVIDED	446
SOUTH SITE	
REGULAR SPACES	186
COMPACT SPACES (14 % OF TOTAL)	31
ADA SPACES	10
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.
INFORMAL OPEN SPACE REQUIRED (67% OF OPEN SPACE REQUIRED)	2.4 AC. PROVIDED 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)

PROJECT NOTES:

- The proposed project complies with the Land Use Plan as it was amended in December 2015 to allow for attached residential use 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.
 - 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.
 - 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.



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THE EPOCH DEVELOPMENT
PUD SUBDIVISION, DEVELOPMENT PLAN
COF #6086
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C2.0
OVERALL
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

52 UNITS
4 STORY

44 UNITS
4 STORY

44 UNITS
4 STORY

60 UNITS
4 STORY

2 UNITS
2 STORY

2 UNITS
2 STORY

OFFICE
BUILDINGS
ZONE GC

NORTH PROPERTY
13.06 ACRES
204 UNITS
2.4 ACRES FORMAL OPEN SPACE

INTERSTATE-65

RIVERSIDE DR.

EXISTING 20' PUDE
40 FT FRONT
SETBACK

EXISTING TVA
EASEMENT

STORMWATER
DETENTION/TREATMENT
AREA

40 FT INTERSTATE
BUFFER

PROPOSED
RETAINING WALL
SEE GRADING PLAN
FOR HEIGHT

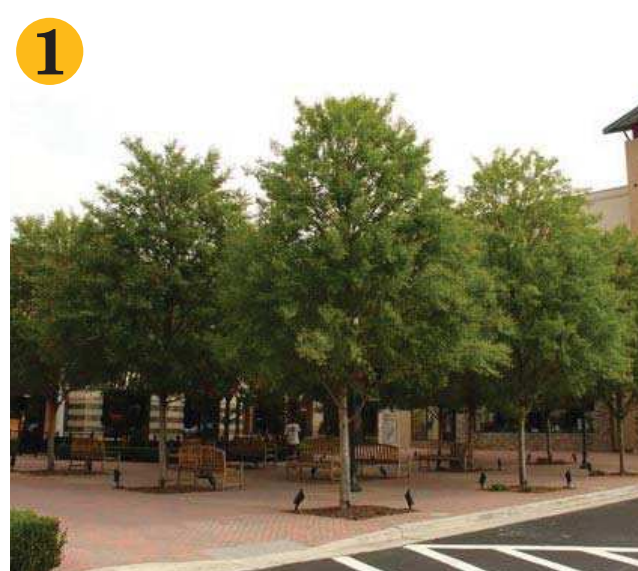
EXISTING 20' PUDE
FORMAL OPEN
SPACE 0.15 ACRES

FORMAL OPEN
SPACE 0.75 ACRES

FORMAL OPEN
SPACE 1.5 ACRES

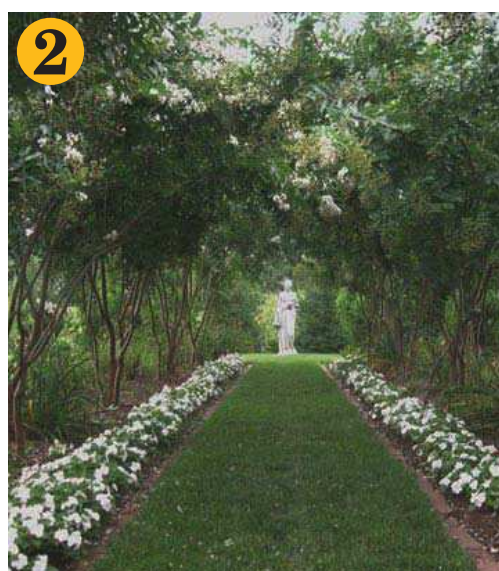
TRASH
COMPACTOR AND
ENCLOSURE
MAINTENANCE
BUILDING

1



FORMAL OPEN SPACE - 0.75 ACRES

2



3



4



5



6



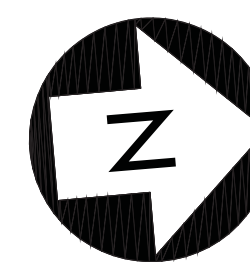
FORMAL OPEN SPACE (GRILL) - 0.15 ACRES

TOTAL OF 204 UNITS ON NORTH PARCEL

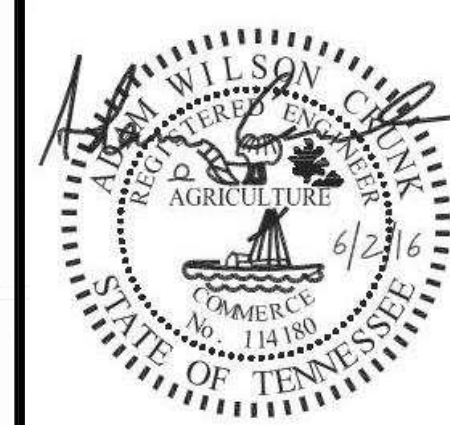
CURVE TABLE

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



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C2.1
NORTH SITE
DEVELOPMENT
PLAN

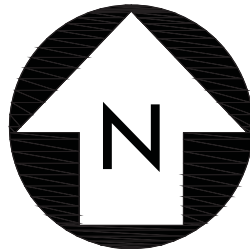
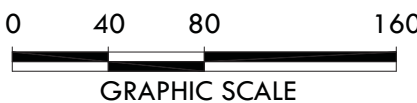


LINE TABLE		
LINE	BEARING	DISTANCE
L1	N83°48'10"W	161.22'
L2	S61°46'08"W	106.65'
L3	S86°48'30"W	198.12'
L4	N65°28'52"W	120.02'
L5	N24°43'04"W	244.21'
L6	N84°36'00"W	115.35'
L7	N52°04'01"W	87.70'
L8	N57°18'12"W	163.19'
L9	N29°52'55"W	101.80'
L10	N74°02'09"W	41.15'
L11	N48°56'27"W	137.25'
L12	S88°57'25"W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

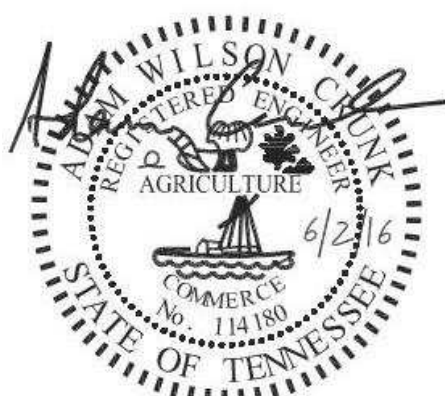
LINE TABLE		
LINE	BEARING	DISTANCE
L14	S74°19'35"W	89.75'
L15	N75°22'06"W	55.08'
L16	N62°35'03"W	10.27'
L17	N39°40'55"E	27.30'
L18	S89°07'57"E	31.47'
L19	N25°32'12"E	70.78'
L20	N10°00'40"W	49.37'
L21	N54°59'41"E	103.02'
L22	N40°36'36"E	74.71'
L23	N53°28'05"E	164.68'

CURVE TABLE					
CURVE	RADIUS	LENGTH	DELTA	TANGENT	CHORD
C5	820.00'	330.94'	23°07'24"	167.75	328.69'
C6	537.96'	464.57'	49°28'46"	247.89	450.27'

TOTAL OF 98 UNITS ON SOUTH PARCEL



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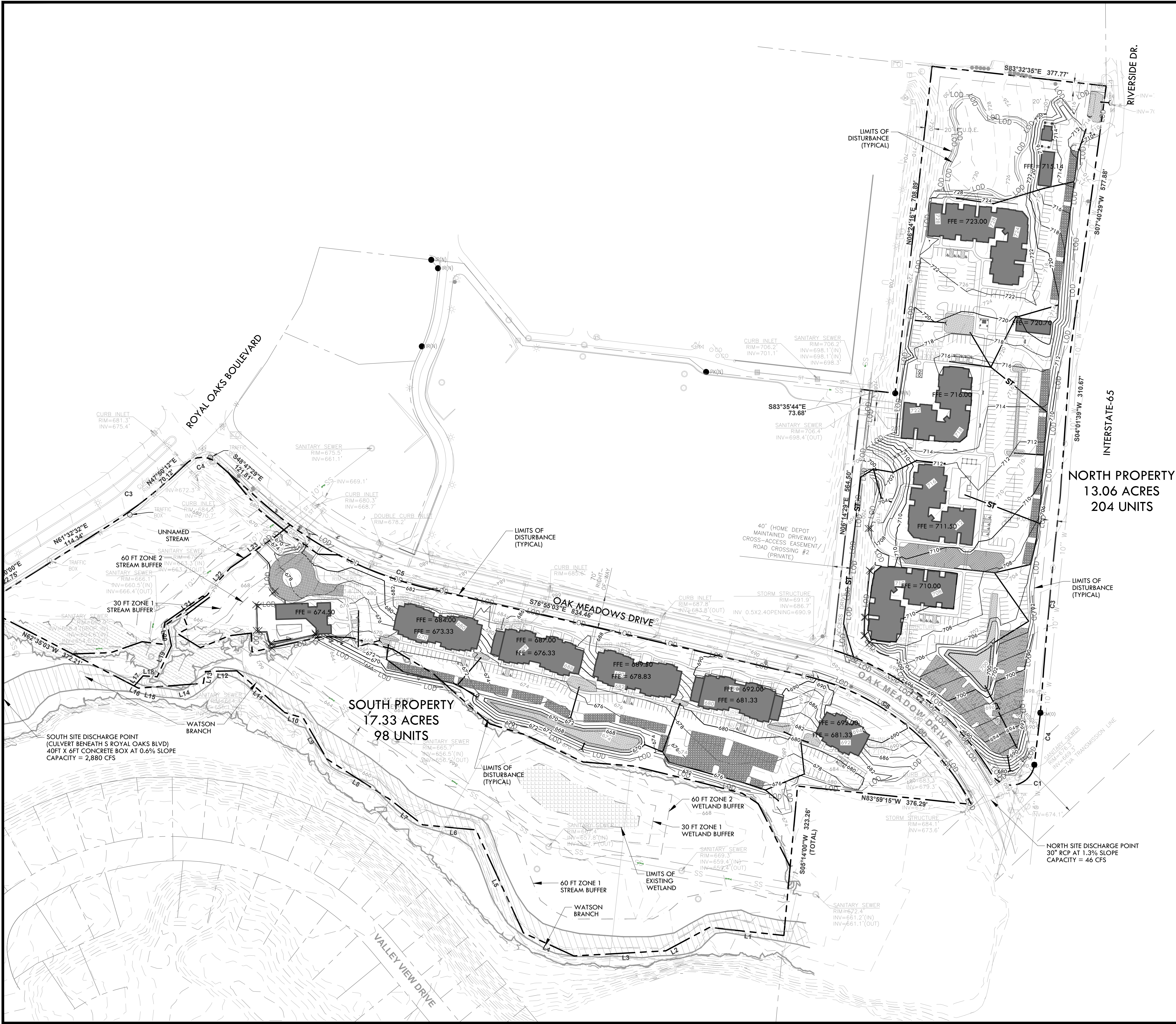


THE EPOCH DEVELOPMENT
PUD SUBDIVISION, DEVELOPMENT PLAN
COF #6086 FRANKLIN, TN

REVISIONS	DATE	
	No.	

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C2.2
SOUTH SITE
DEVELOPMENT
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 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

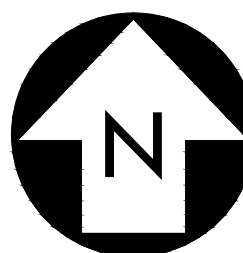
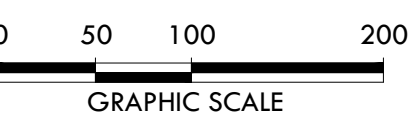
*PROPOSED DEVELOPMENT WILL COMPLY WITH CITY OF FRANKLIN STORMWATER REQUIREMENTS TO PROVIDE A TREATED Rv VALUE OF LESS THAN OR EQUAL TO 0.200. THE PROPOSED DEVELOPMENT WILL DETAIN THE PEAK FLOWS FOR THE 2 YEAR THROUGH 100 YEAR STROM EVENTS.

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 AC1522.1-13. 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.



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THE EPOCH DEVELOPMENT

PUD SUBDIVISION, DEVELOPMENT PLAN

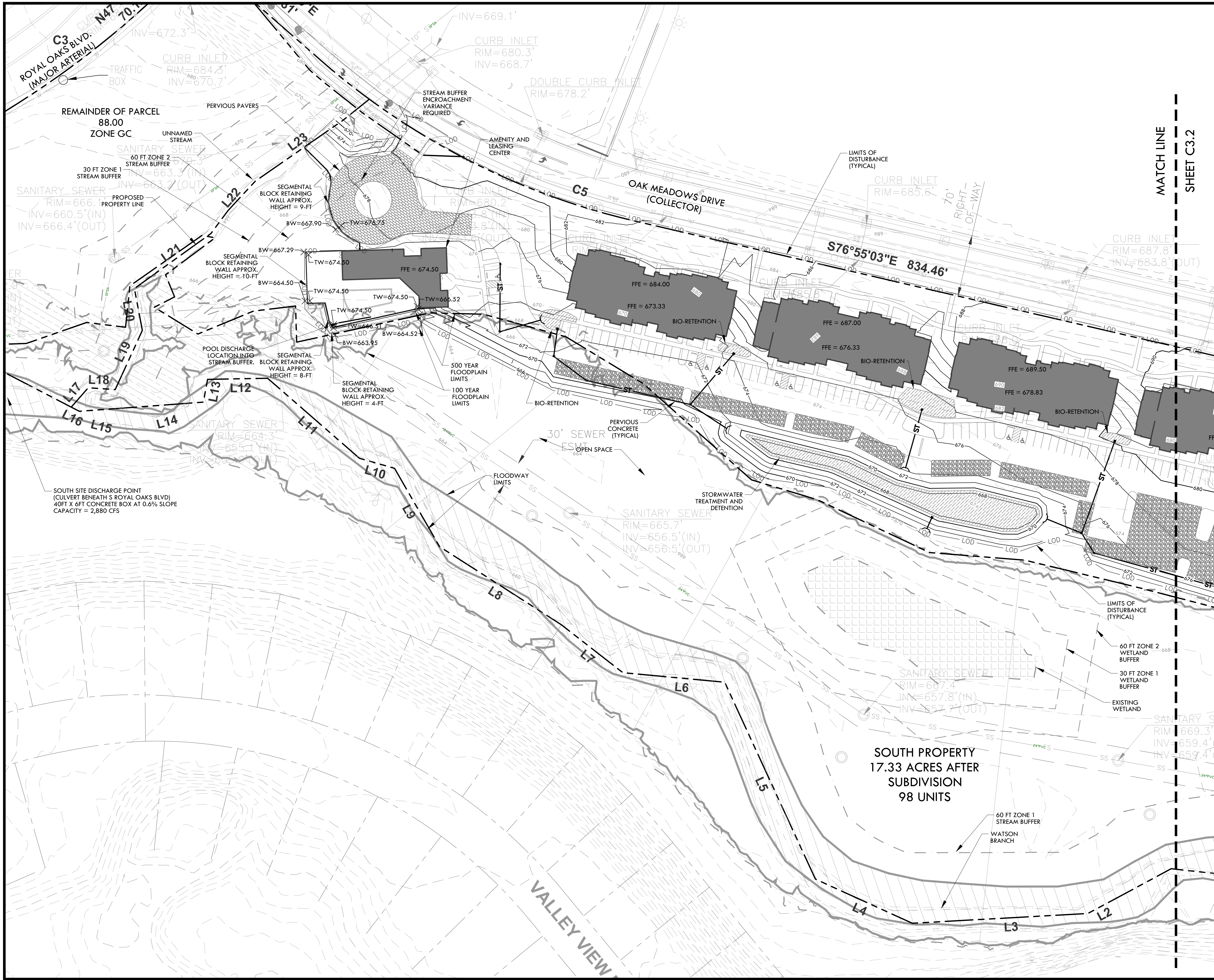
COF #6086 FRANKLIN, TN

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C3.0

OVERALL
GRADING
PLAN



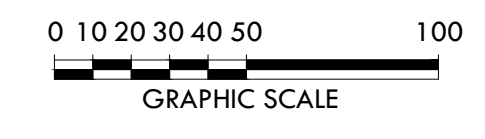
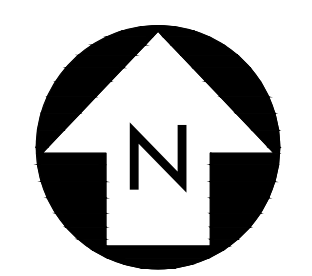
GRADING & DRAINAGE DATA CHART

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TOTAL = 8.43 AC
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TOTAL = 17.8 AC
- R_v VALUE = 0.406*
- PEAK FLOW RUNOFF *
T.B.D

*PROPOSED DEVELOPMENT WILL COMPLY WITH CITY OF FRANKLIN STORMWATER REQUIREMENTS TO PROVIDE A TREATED R_v 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:

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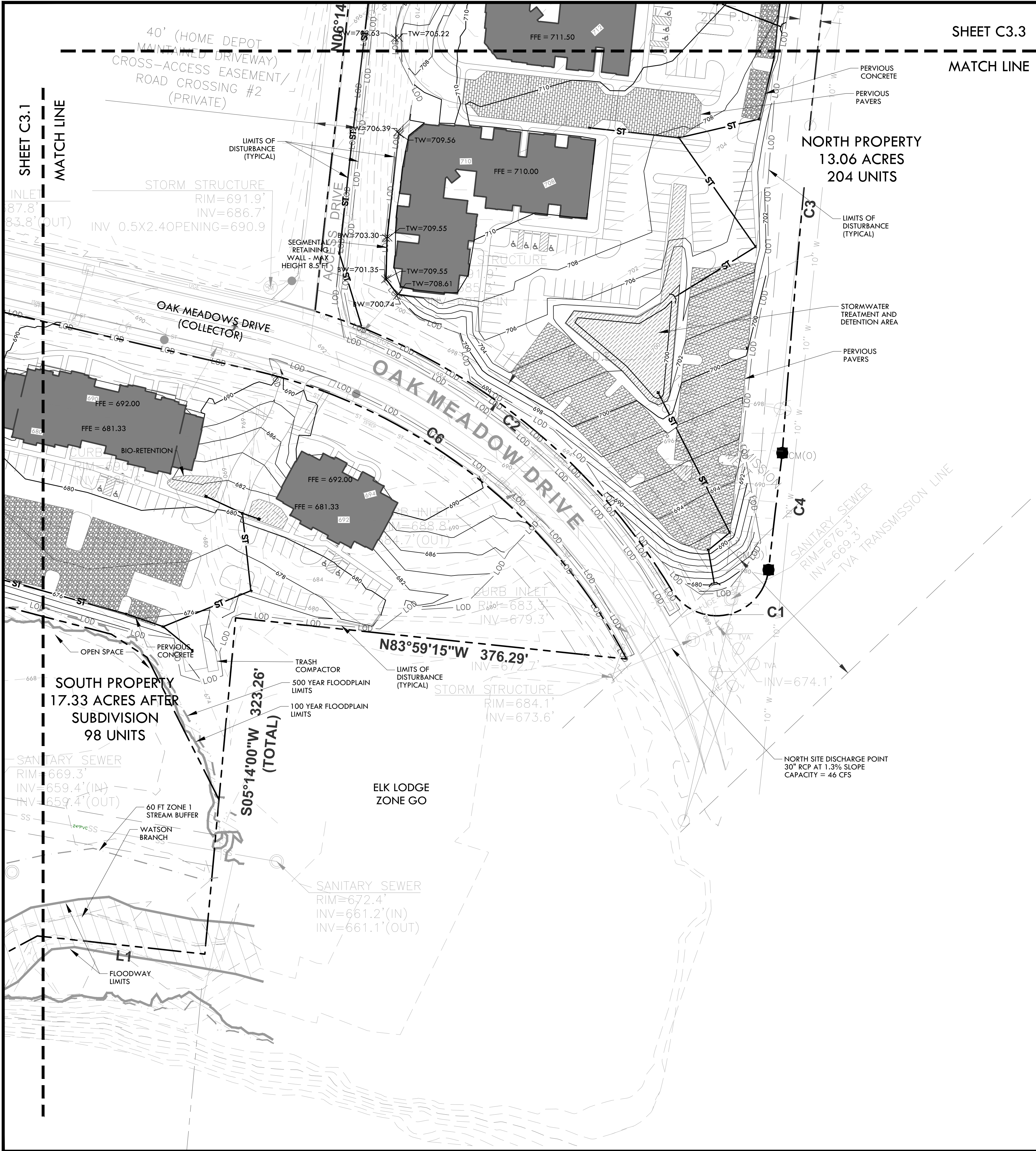


THE EPOCH DEVELOPMENT
PUD SUBDIVISION, DEVELOPMENT PLAN
COF #6086 **FRANKLIN, TN**

REVISIONS	DATE	
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C3.1
SOUTH SITE
GRADING
PLAN



SHEET C3.3

MATCH LINE

NORTH PROPERTY
13.06 ACRES
204 UNITS

SOUTH PROPERTY
17.33 ACRES AFTER
SUBDIVISION
98 UNITS

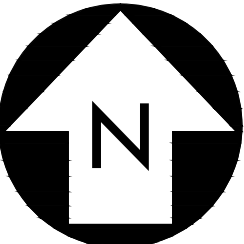
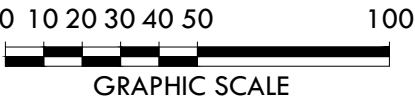
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PERVIOUS CONCRETE NOTE:

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C3.2
SOUTH & 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 Meadows 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 northerly 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-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.
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.

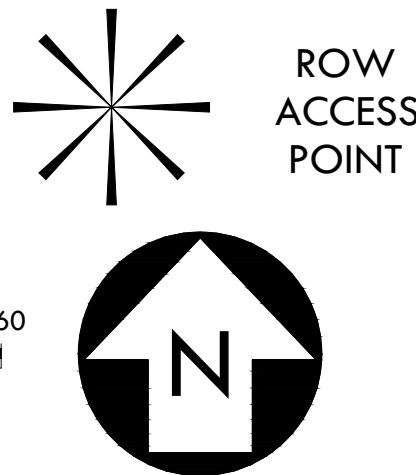
The Epoch Development R.O.W. & Access Data Chart

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

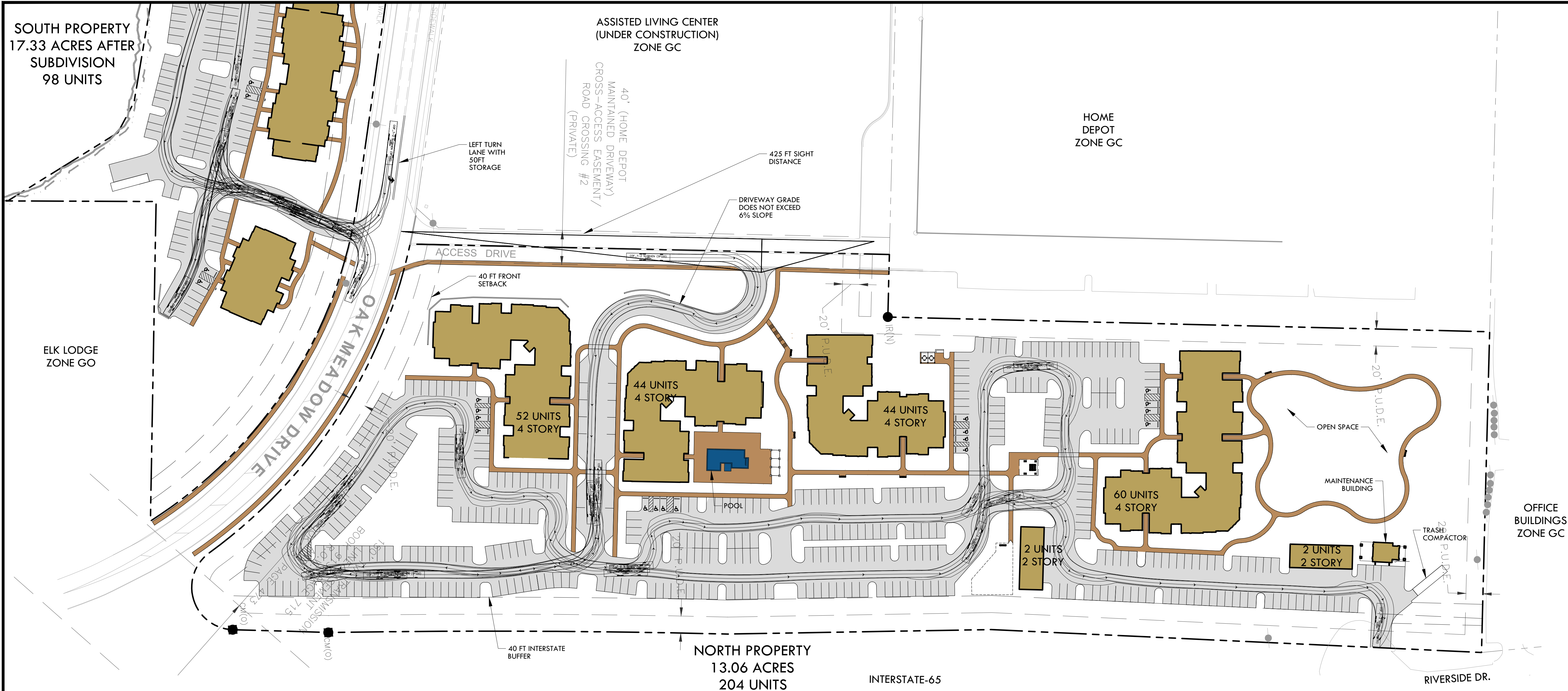


THE EPOCH DEVELOPMENT
PUD SUBDIVISION, DEVELOPMENT PLAN
COF #6086 FRANKLIN, TN

REVISIONS	DATE	
	No.	

06/02/16 15001

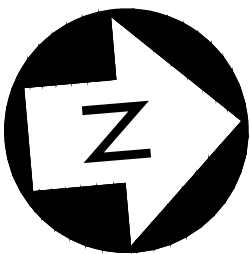
C4.0
OVERALL
ACCESS PLAN



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



THE EPOCH DEVELOPMENT
PUD SUBDIVISION, DEVELOPMENT PLAN

COF #6086 FRANKLIN, TN

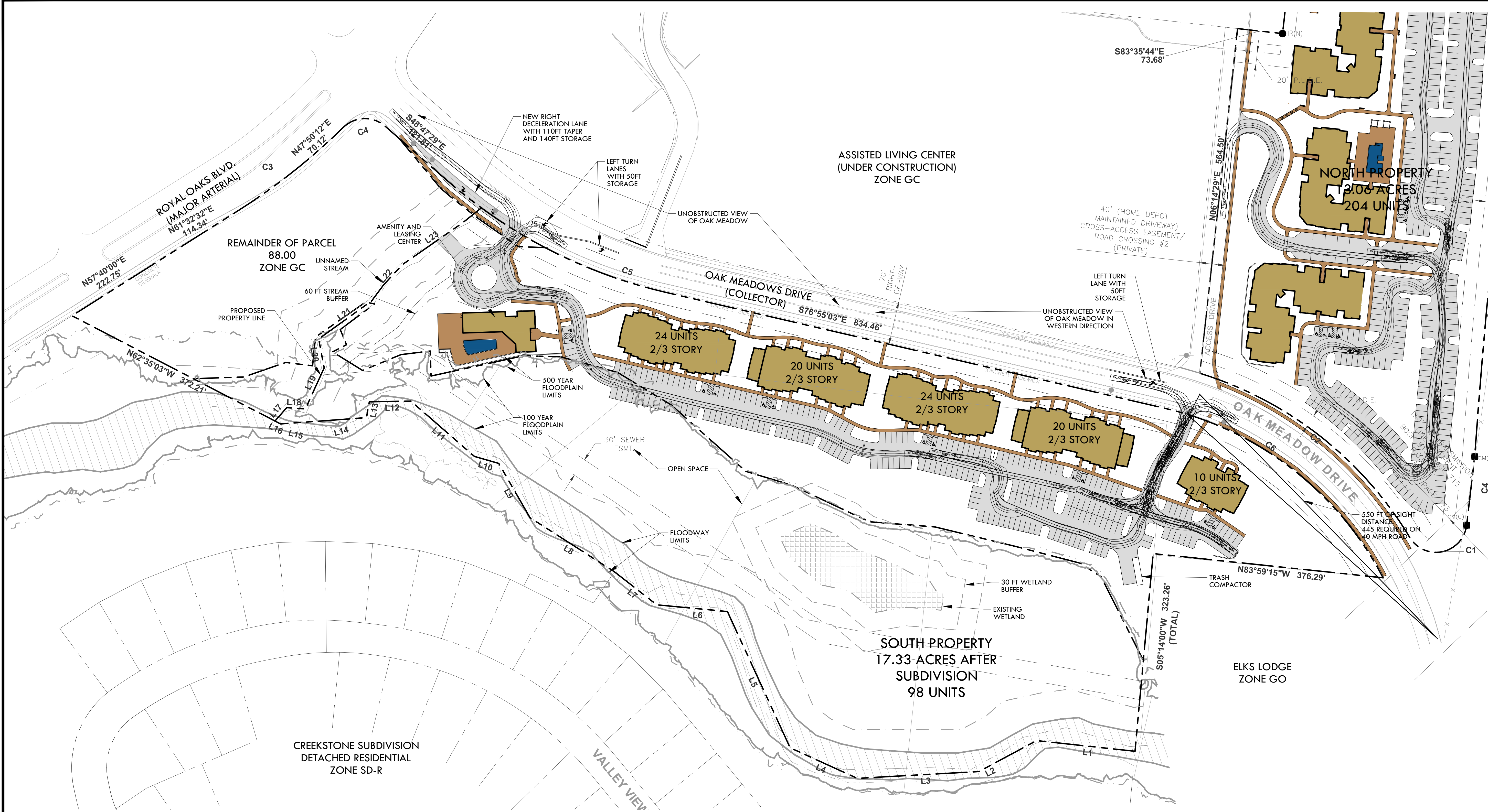
REVISIONS	DATE	No.

06/02/16 15001

C4.1
NORTH SITE
ACCESS
PLAN

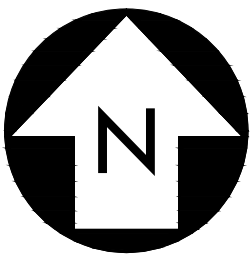
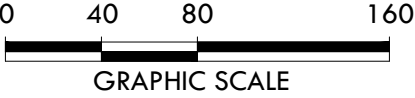


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FIRE TRUCK TURNING MOVEMENT INFORMATION

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Body Style = Fire Truck
Turning Radius Wall to Wall = 42'



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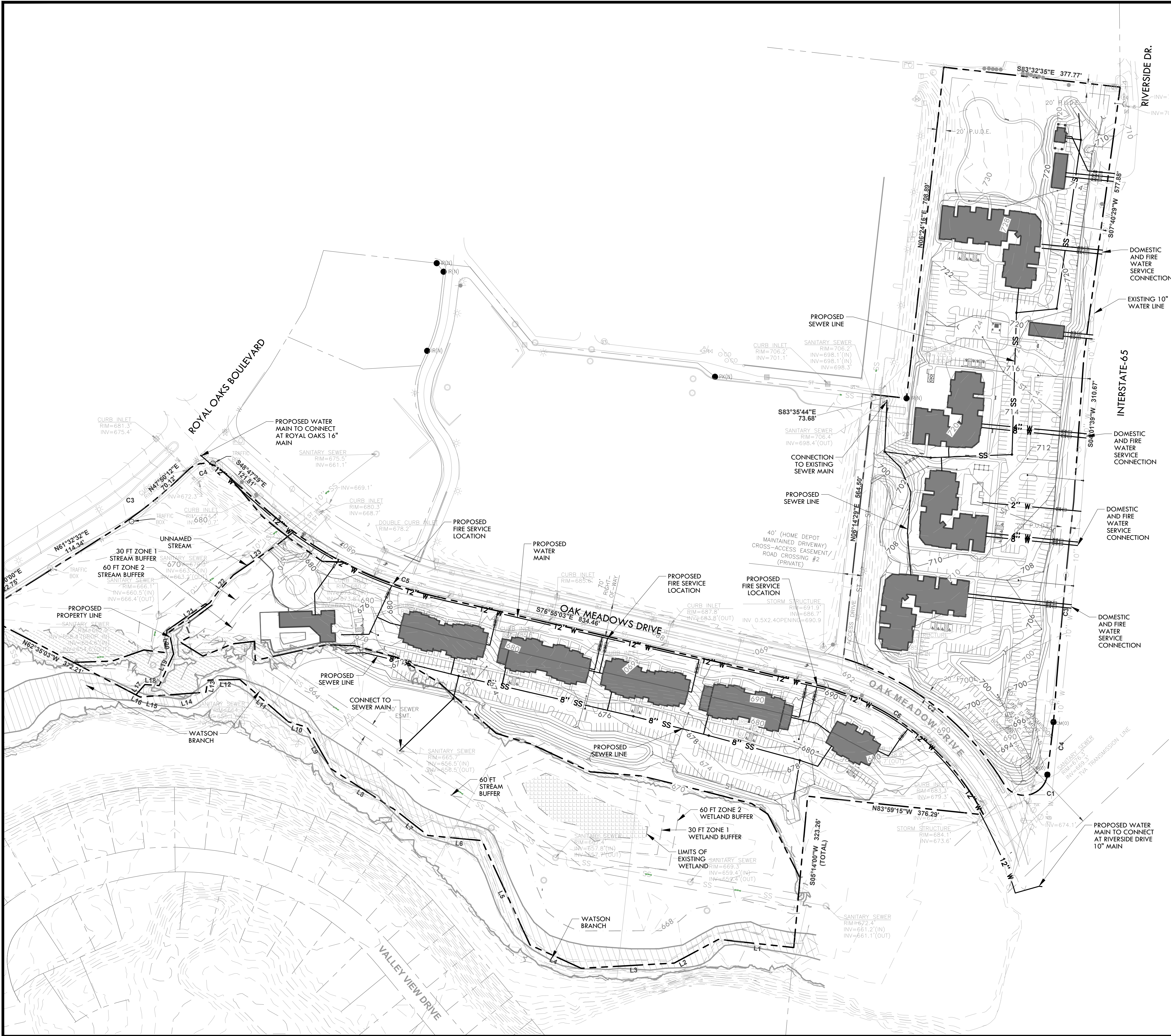


THE EPOCH DEVELOPMENT
PUD SUBDIVISION, DEVELOPMENT PLAN
COF #6086 FRANKLIN, TN

REVISIONS	DATE		No.				

06/02/16 15001

C4.2
SOUTH SITE
ACCESS
PLAN

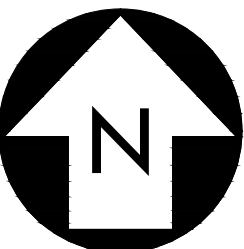
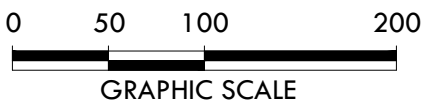


STATEMENT OF IMPACTS
The proposed project is the construction of 302 new attached dwelling units with a mixture of one, two, and three bedroom units. The project will result in a projected flow of 87,400 GPD. The Northern site will be served by water off of the existing 10" main in the old Riverside 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.

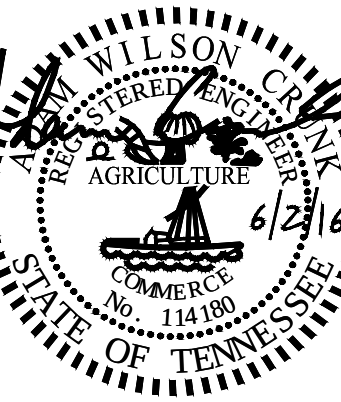
- Water & Sewer General Notes**
- All persons who undertake the construction of water, sewer and/or reclaimed water lines located in, or affecting services provided by the City of Franklin shall comply with the requirements and regulations set forth in the "General Requirements & Technical Specifications, 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.
 - 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.
 - Contractor shall obtain and keep all of the following items on the jobsite at all times during construction:
 - Approved, Stamped and Signed Water and/or Sewer Plans
 - Water & Sewer Infrastructure Installation Permit, with all steps completed and signed by appropriate City employees.
 - Copy of approved availability request response letter.
 - A copy of all approved Cut Sheets.
 - 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.
 - 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.
 - 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.
 - 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.
 - 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



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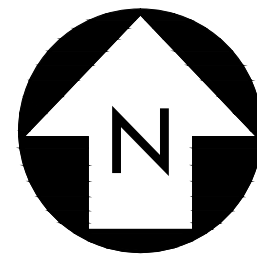
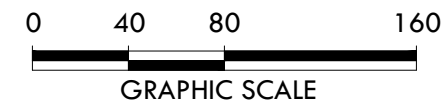
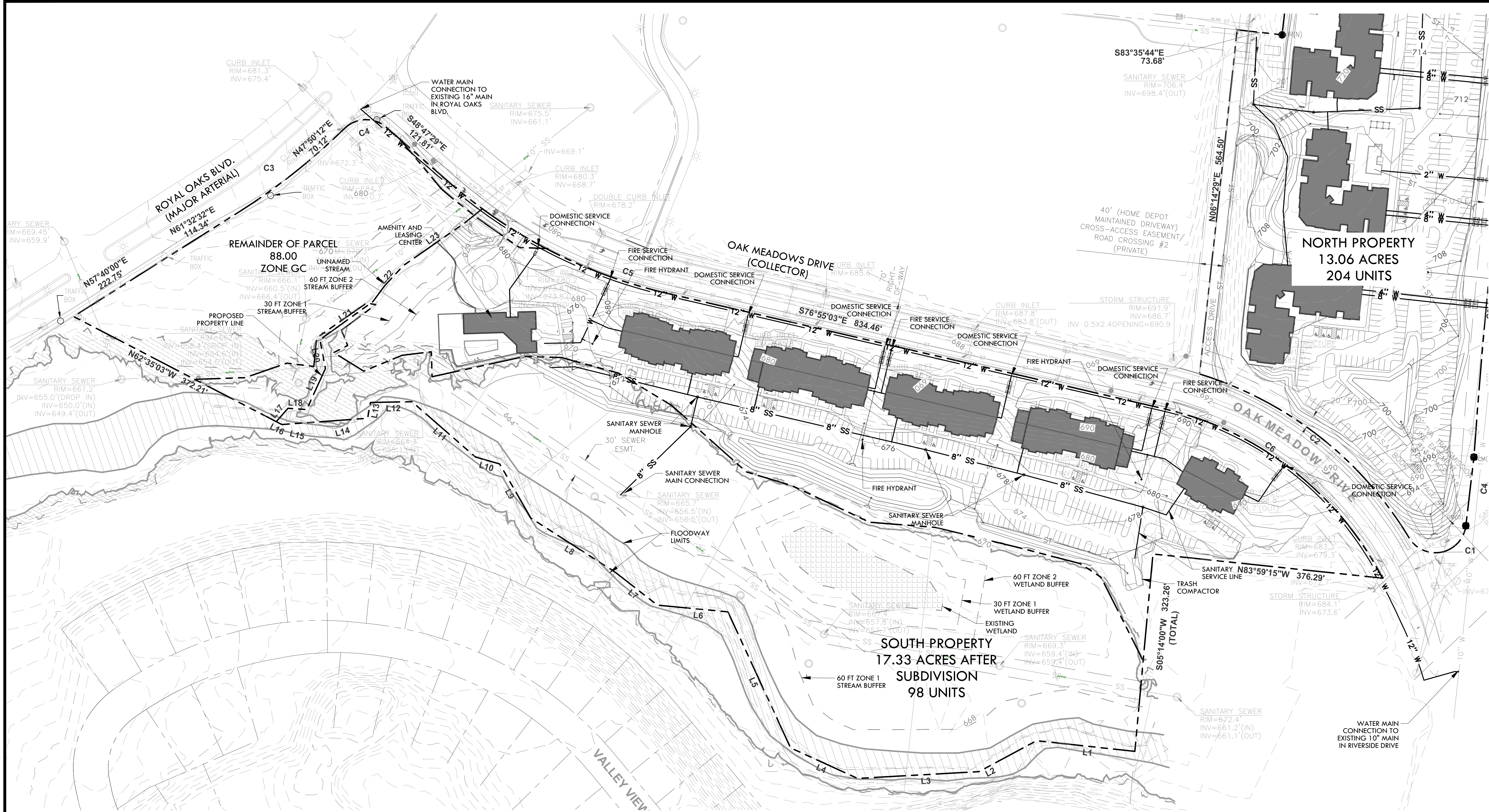


THE EPOCH DEVELOPMENT
PUD SUBDIVISION, DEVELOPMENT PLAN
COF #6086 FRANKLIN, TN

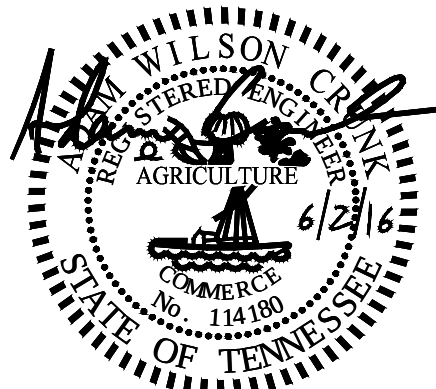
REVISIONS	DATE	
	No.	

06/02/16 15001

C5.0
OVERALL
UTILITY
PLAN



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THE EPOCH DEVELOPMENT
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COF #6086 FRANKLIN, TN

No.	REVISIONS	
	DATE	

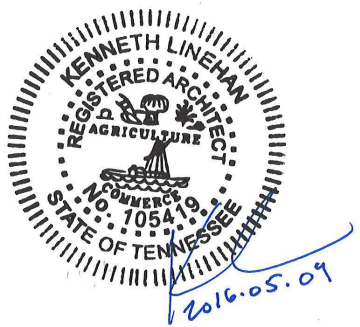
06/02/16 15001

C5.2
SOUTH SITE
UTILITY
PLAN

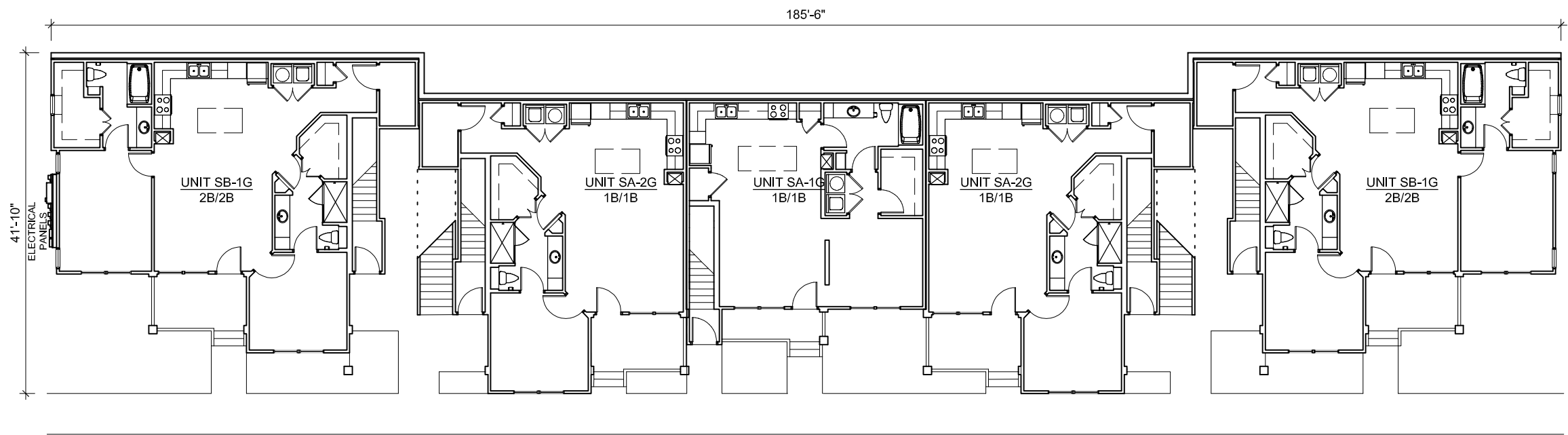
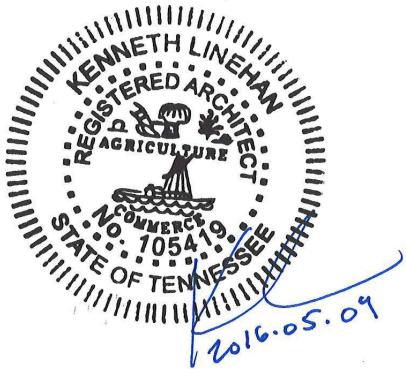


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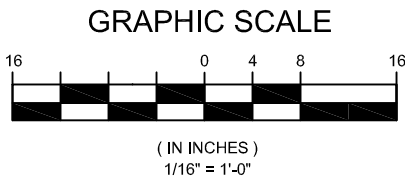
1	COVER PAGE
2	BUILDING PLAN - SOUTH PARCEL BLDG S1 LOWER LEVEL
3	BUILDING PLAN - SOUTH PARCEL BLDG S1 GROUND LEVEL
4	BUILDING PLAN - SOUTH PARCEL BLDG S1 SECOND LEVEL
5	BUILDING PLAN - SOUTH PARCEL BLDG S2 LOWER LEVEL
6	BUILDING PLAN - SOUTH PARCEL BLDG S2 GROUND LEVEL
7	BUILDING PLAN - SOUTH PARCEL 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
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16	BUILDING ELEVATION - SOUTH PARCEL
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19	BUILDING PLAN - NORTH PARCEL BLDG N2
20	BUILDING PLAN - NORTH PARCEL BLDG N3
21	BUILDING PLAN - NORTH PARCEL BLDG N4 GROUND
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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



AREA
1ST FLOOR: 6,128 SF
2ND FLOOR: 11,961 SF
3RD FLOOR: 9,672 SF
TOTAL: 27,761 SF



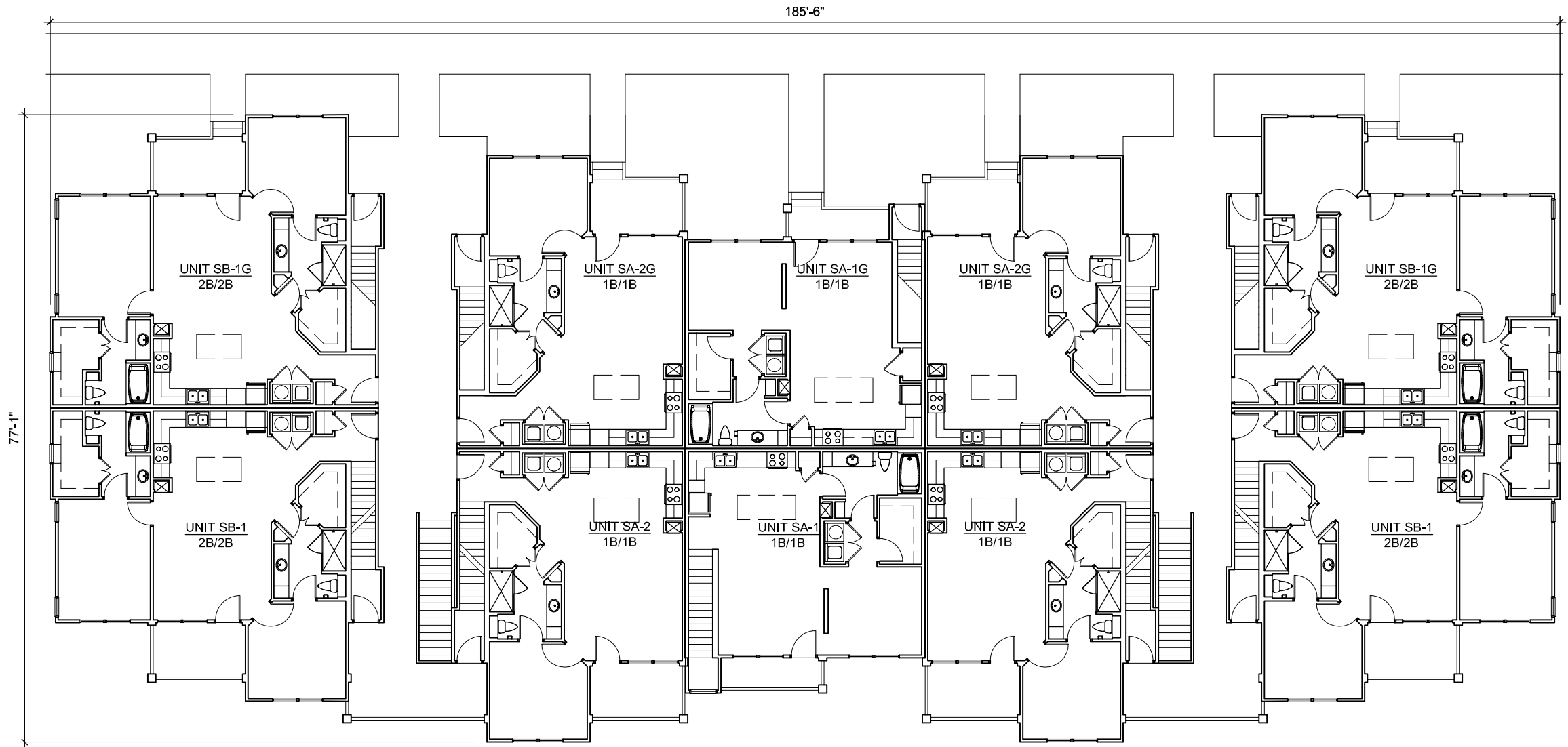
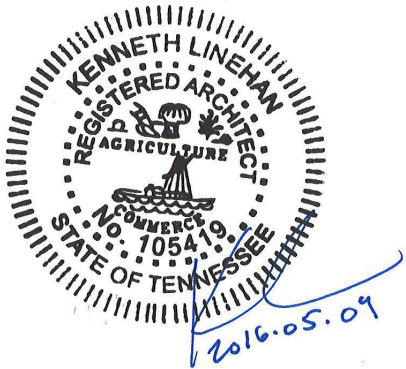
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(BUILDINGS #1 & #3)
SOUTH PARCEL



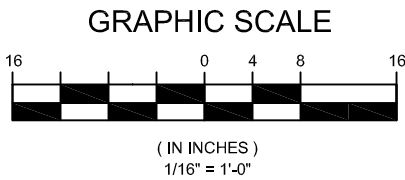
BUILDING PLANS
2016-05-09

THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

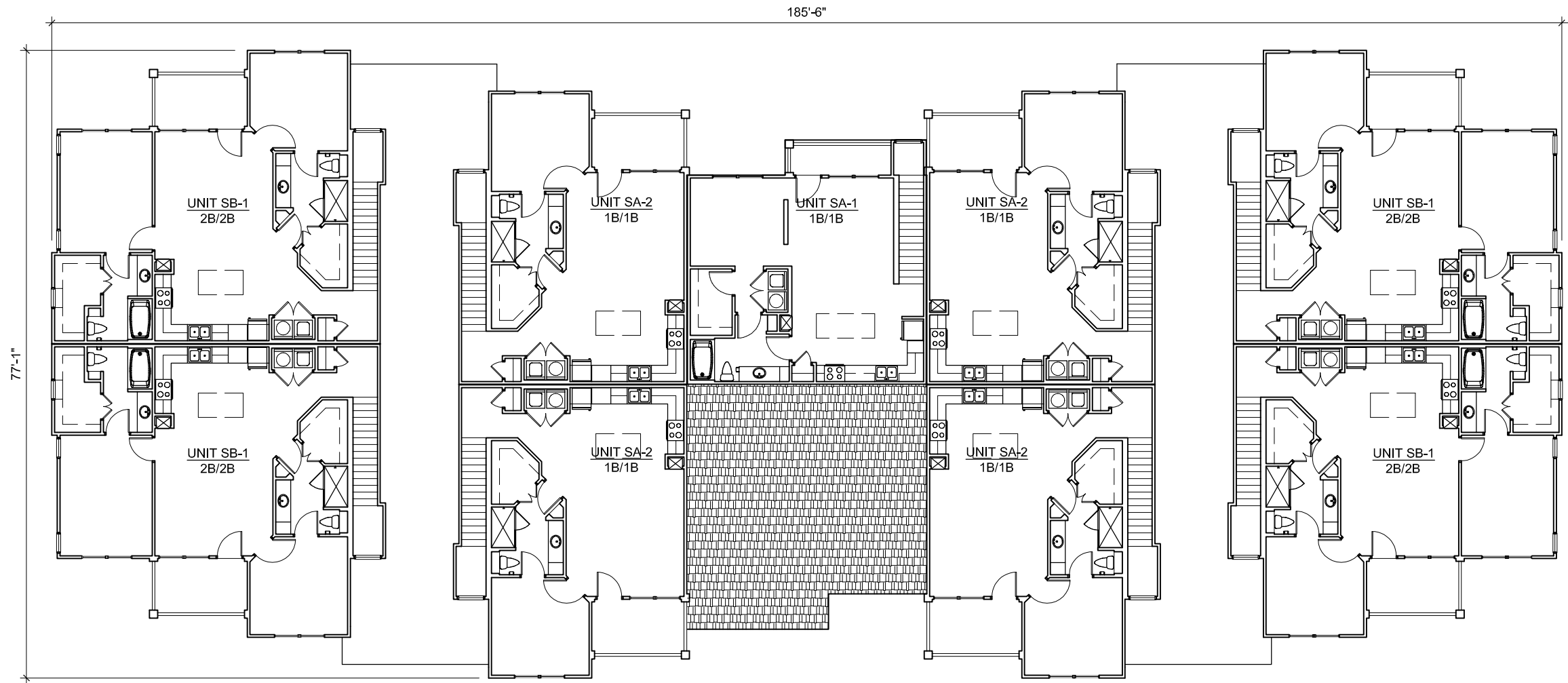
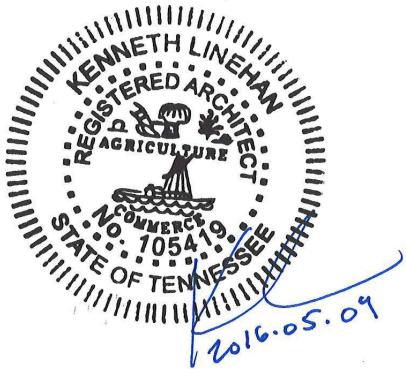
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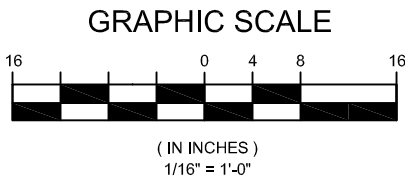
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(BUILDINGS #1 & #3)
SOUTH PARCEL



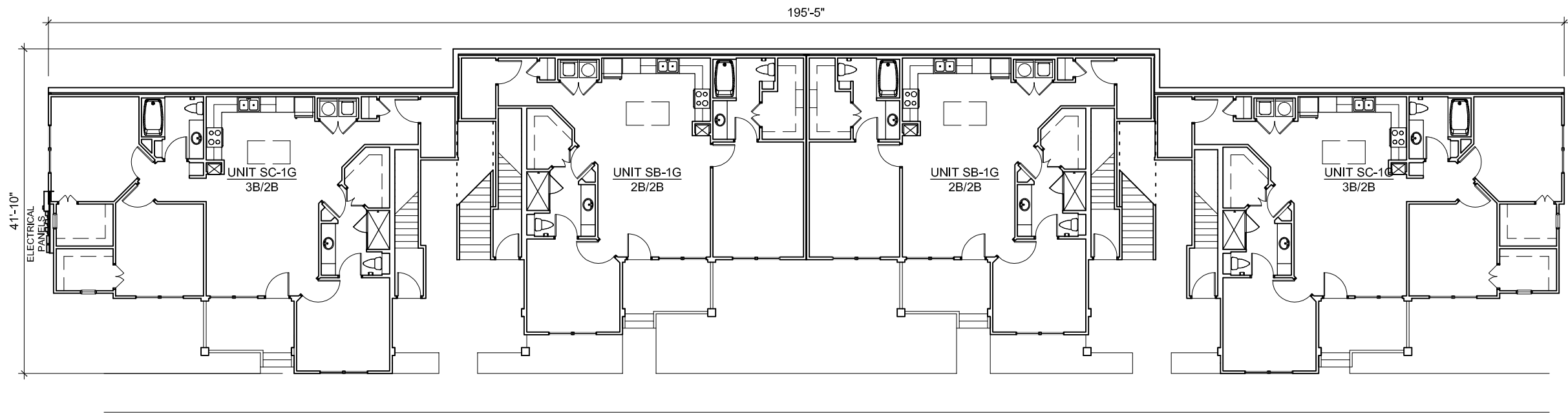
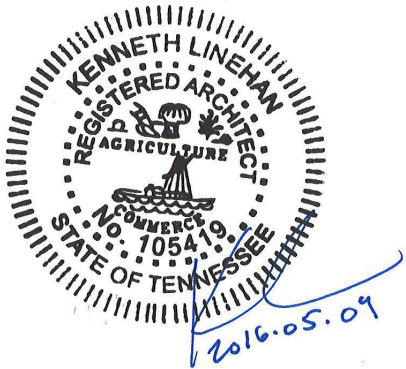
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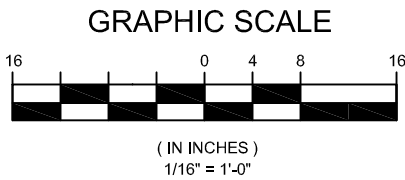
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(BUILDINGS #1 & #3)
SOUTH PARCEL



AREA	
1ST FLOOR:	6,349 SF
2ND FLOOR:	12,371 SF
3RD FLOOR:	8,872 SF
TOTAL:	27,592 SF



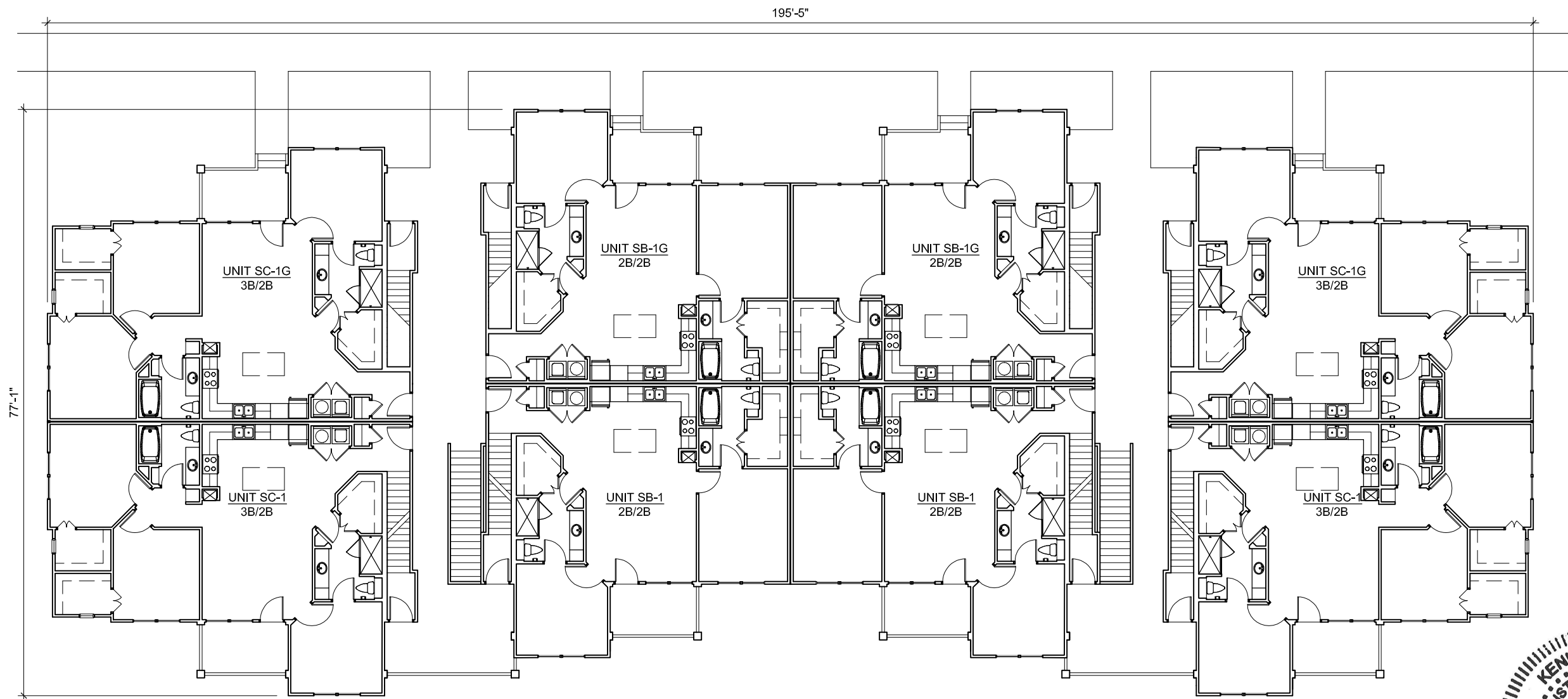
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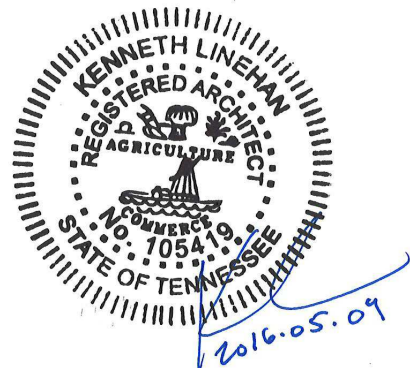
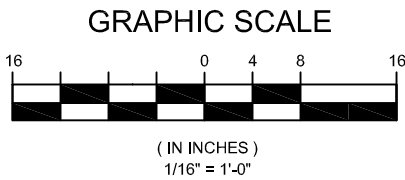
BUILDING PLANS
2016-05-09

THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

AREA
1ST FLOOR: 6,349 SF
2ND FLOOR: 12,371 SF
3RD FLOOR: 8,872 SF
TOTAL: 27,592 SF



BUILDING TYPE S2 - GROUND FLOOR
(BUILDINGS #2 & #4)
SOUTH PARCEL



PAGE 6

PROJECT #6068

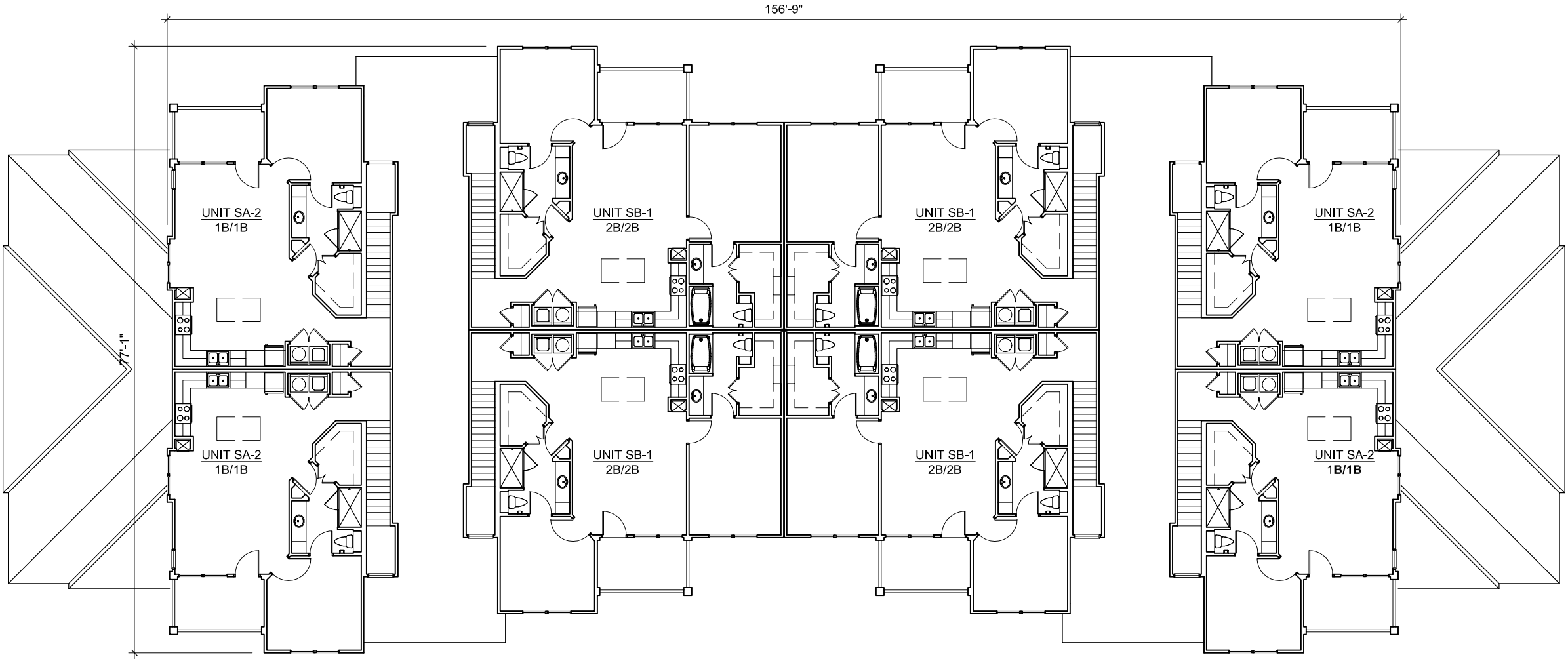
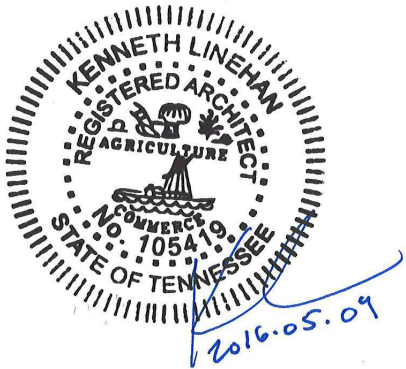


EPOCH RESIDENTIAL™

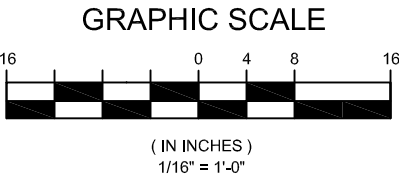
BUILDING PLANS
2016-05-09

THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

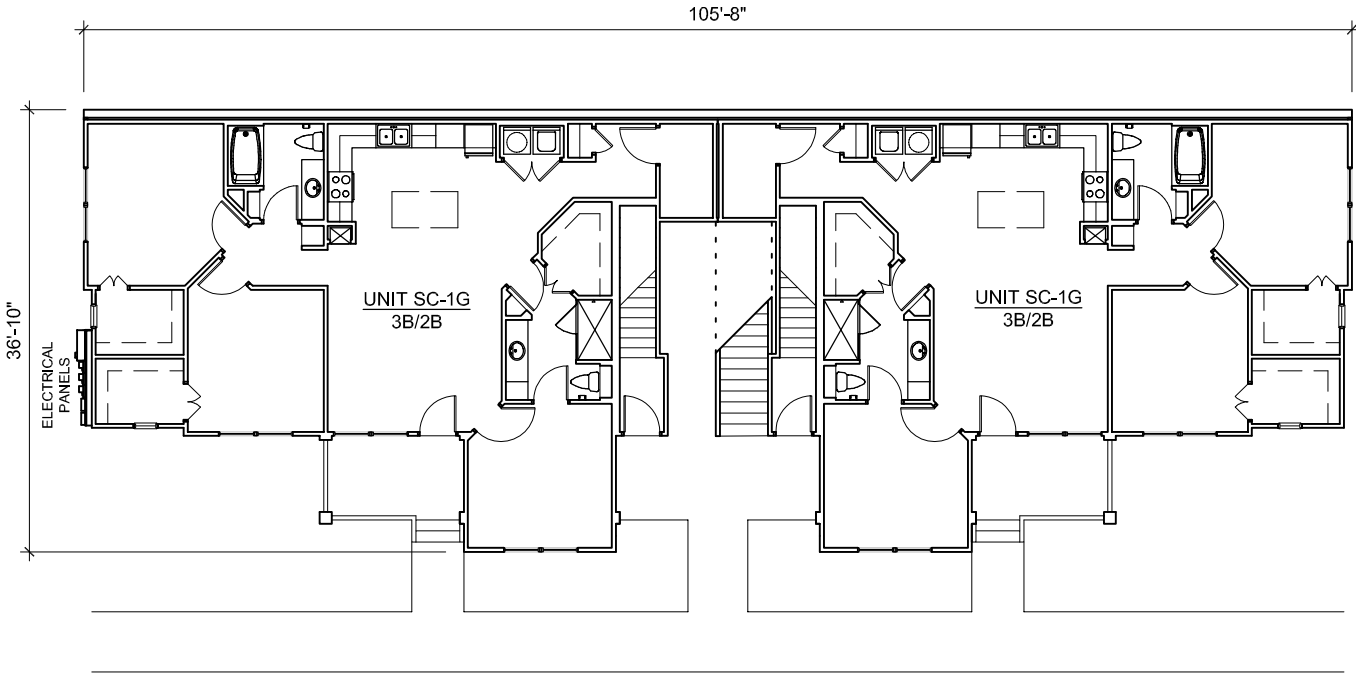
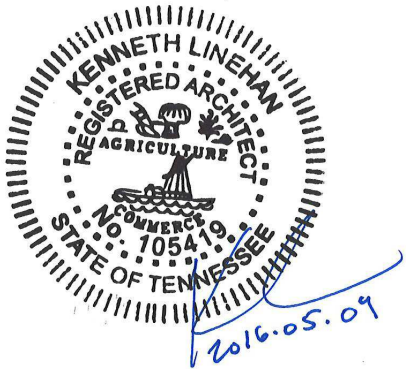
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3RD FLOOR: 8,872 SF
TOTAL: 27,592 SF



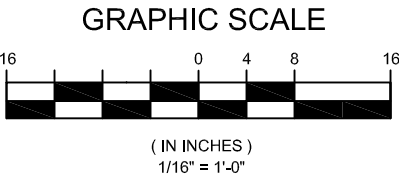
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(BUILDINGS #2 & #4)
SOUTH PARCEL



AREA	
1ST FLOOR:	3,264 SF
2ND FLOOR:	6,528 SF
3RD FLOOR:	4,386 SF
TOTAL:	14,178 SF



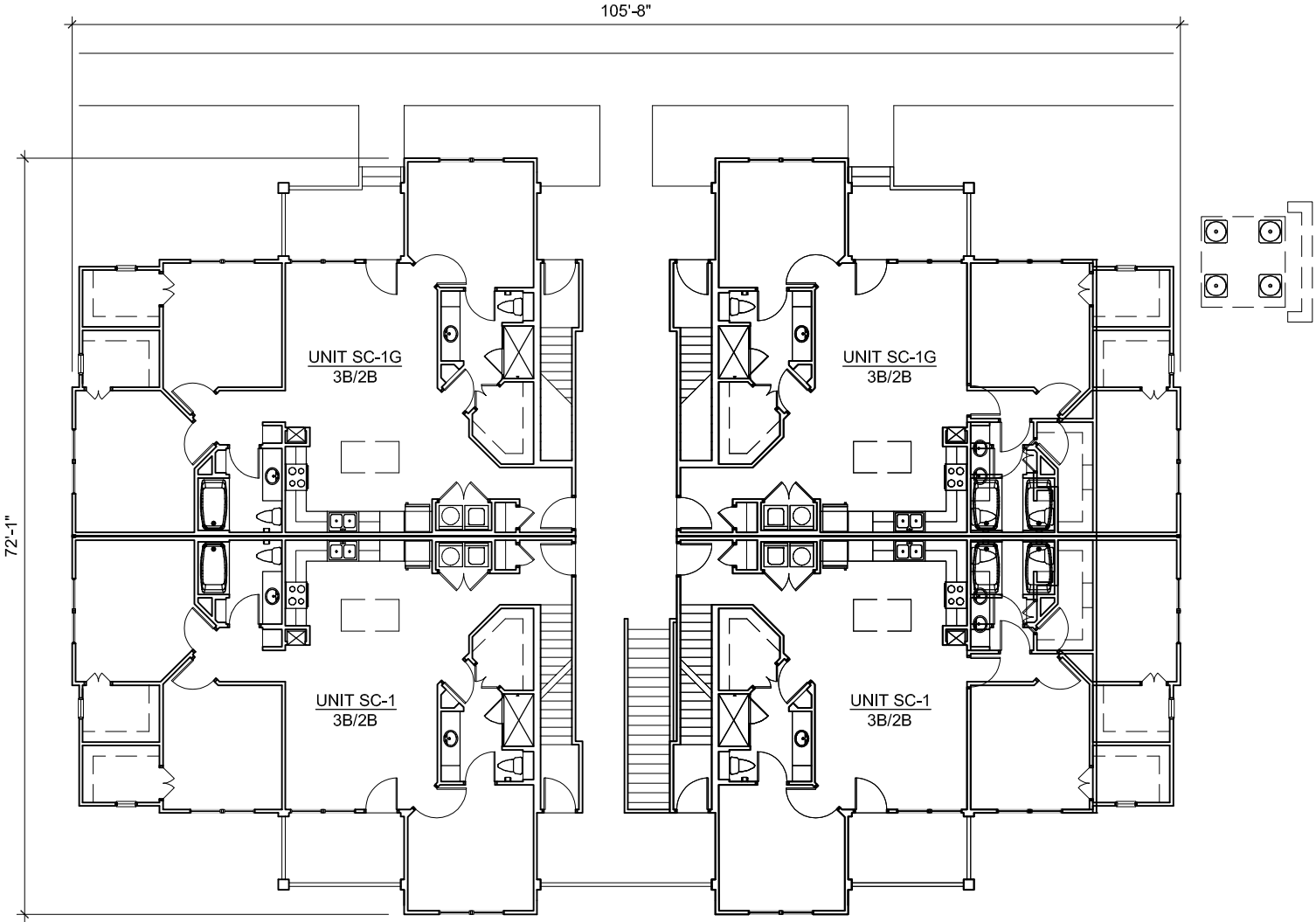
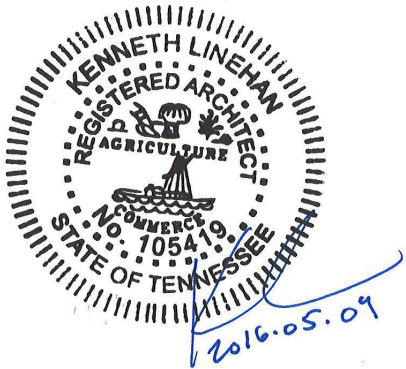
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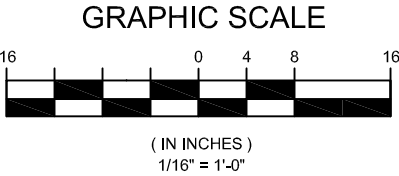
BUILDING PLANS
2016-05-09

THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

AREA	
1ST FLOOR:	3,264 SF
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TOTAL:	14,178 SF



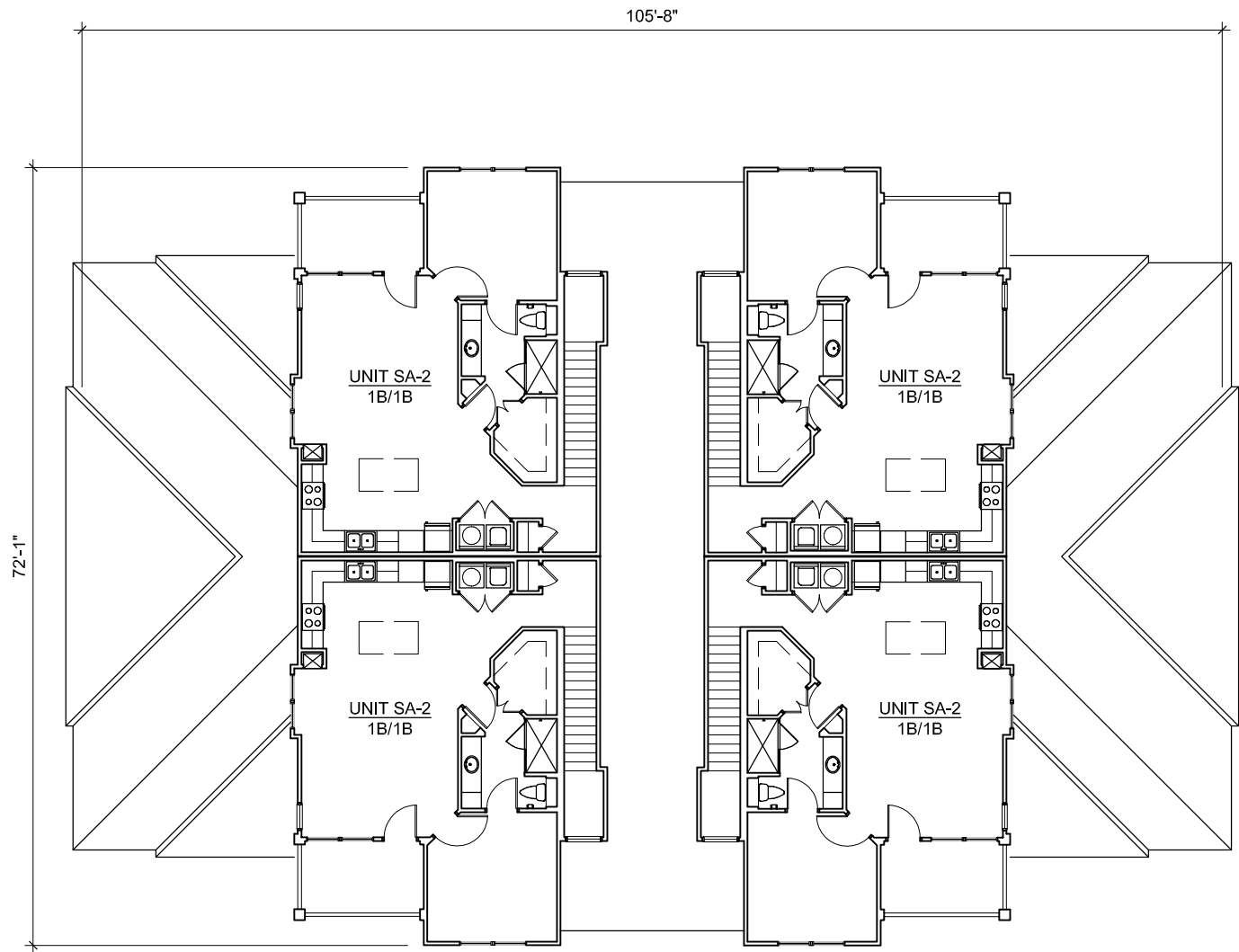
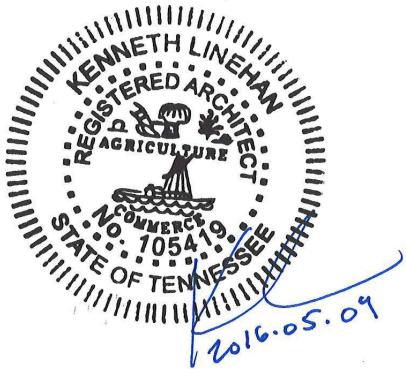
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(BUILDING #5)
SOUTH PARCEL



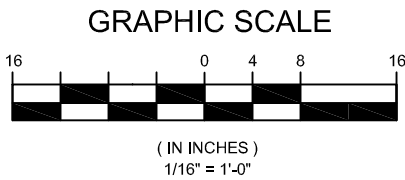
BUILDING PLANS
2016-05-09

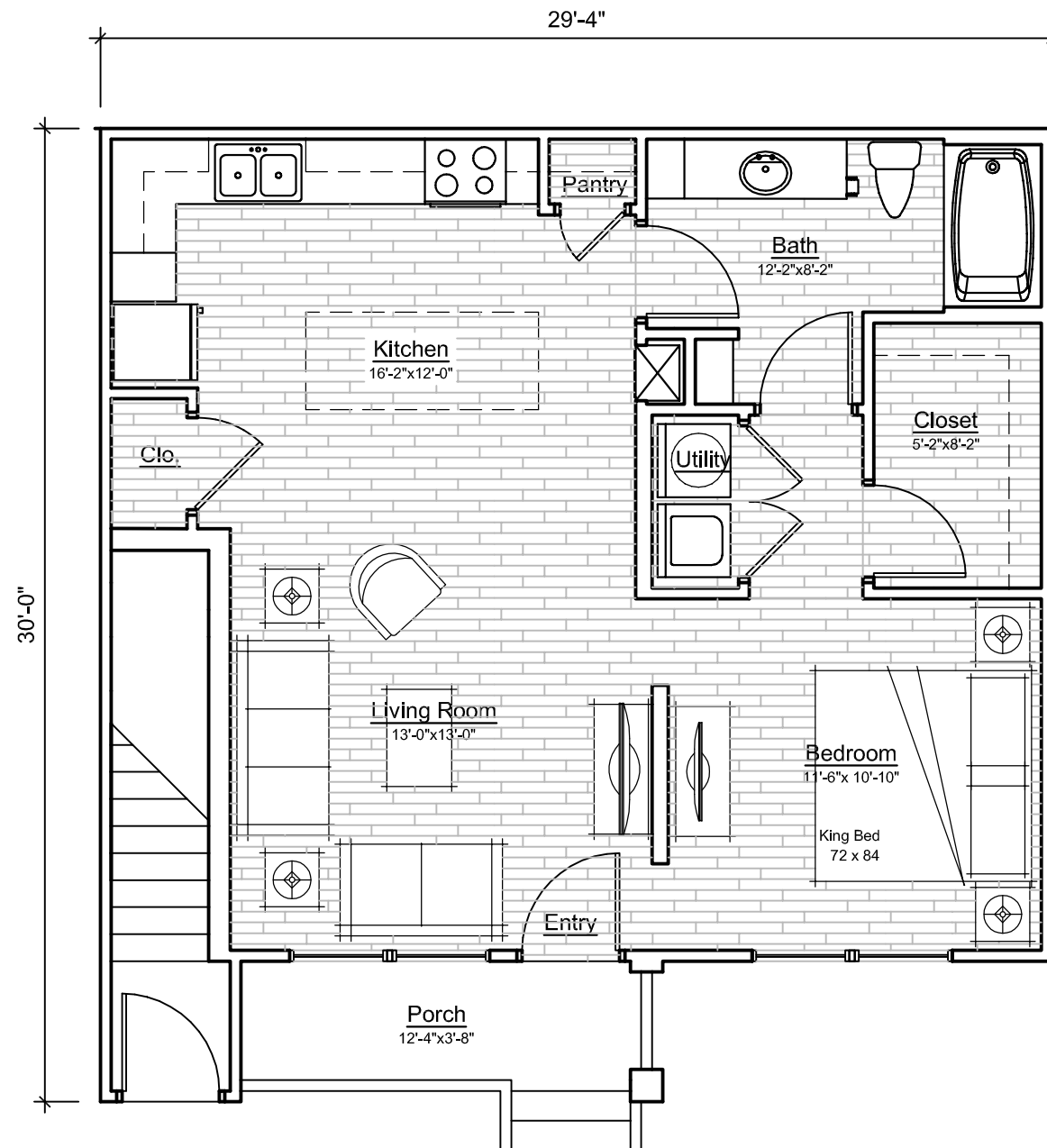
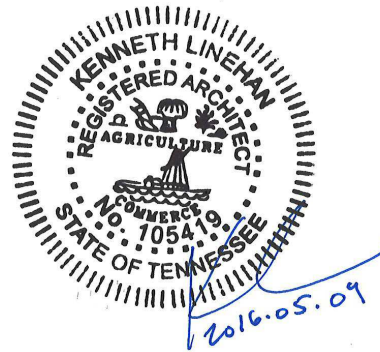
THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

AREA	
1ST FLOOR:	3,264 SF
2ND FLOOR:	6,528 SF
3RD FLOOR:	4,386 SF
TOTAL:	14,178 SF



BUILDING TYPE S3 - SECOND FLOOR
(BUILDING #5)
SOUTH PARCEL

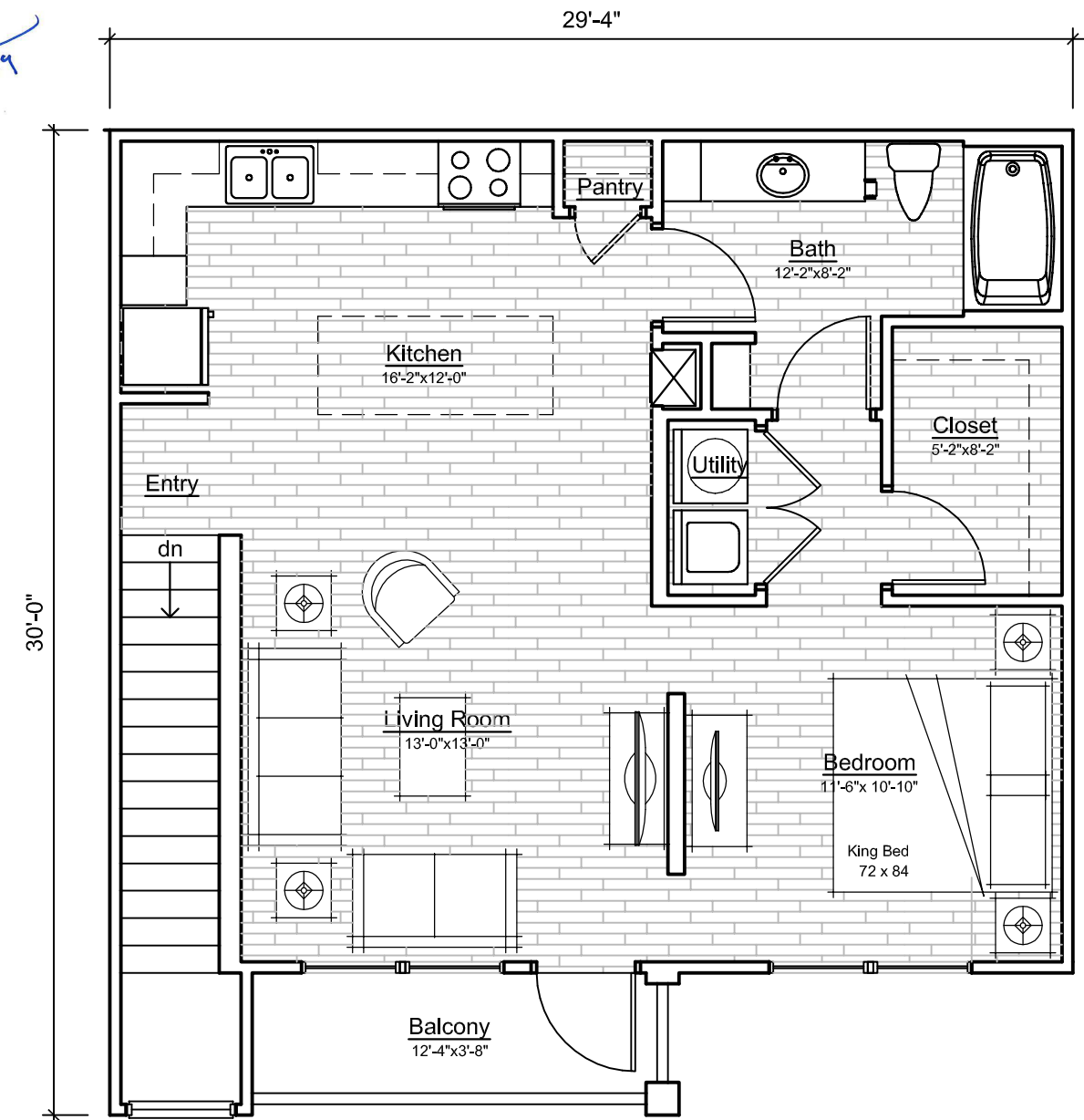




UNIT SA-1G - 1 BED / 1 BATH W/ PORCH

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.

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PROJECT #6068


FUGLEBERG KOCH

EPOCH

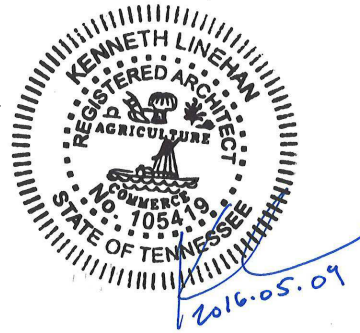
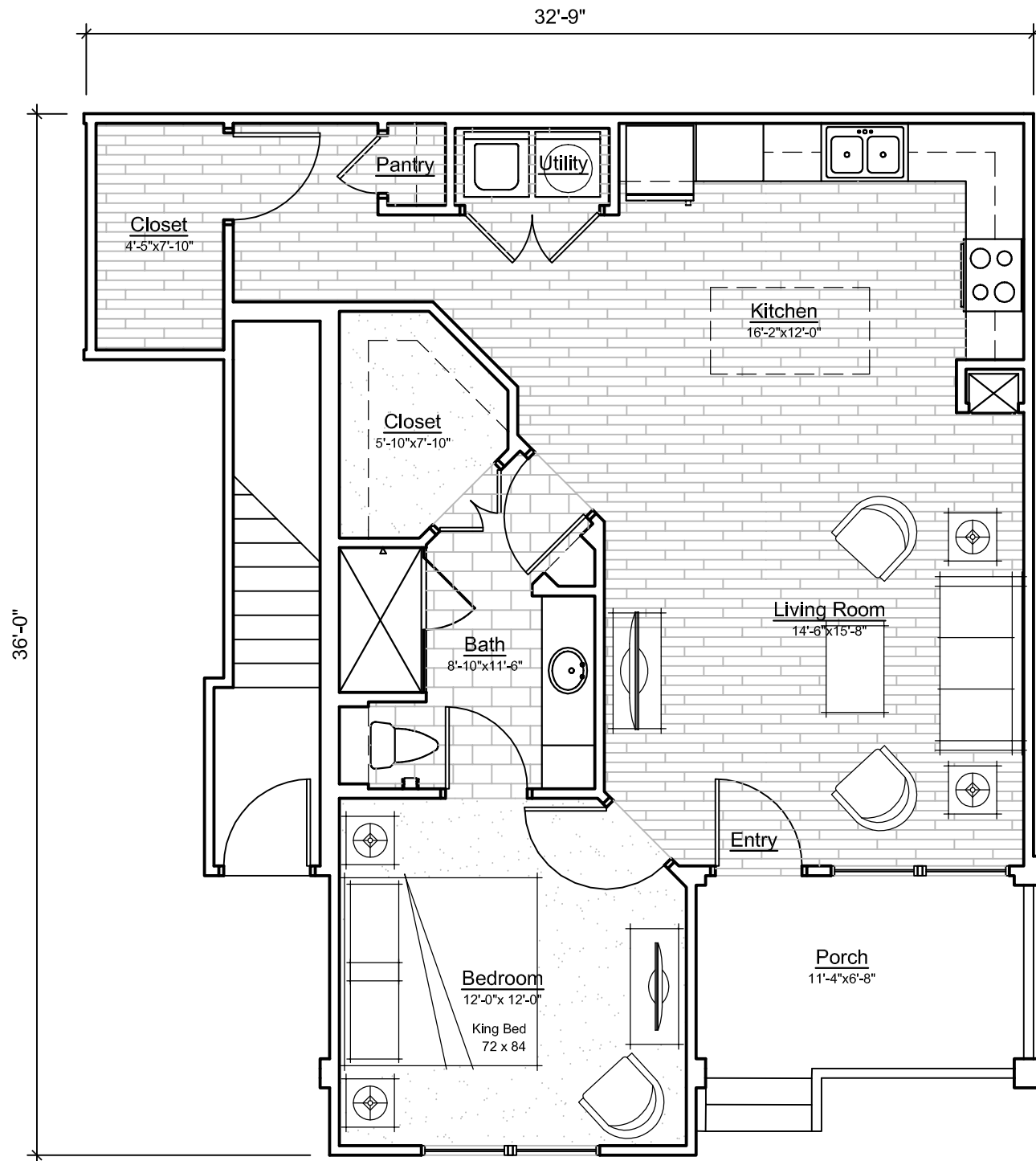
RESIDENTIAL™

SOUTH PARCEL UNIT PLANS

THE EPOCH DEVELOPMENT

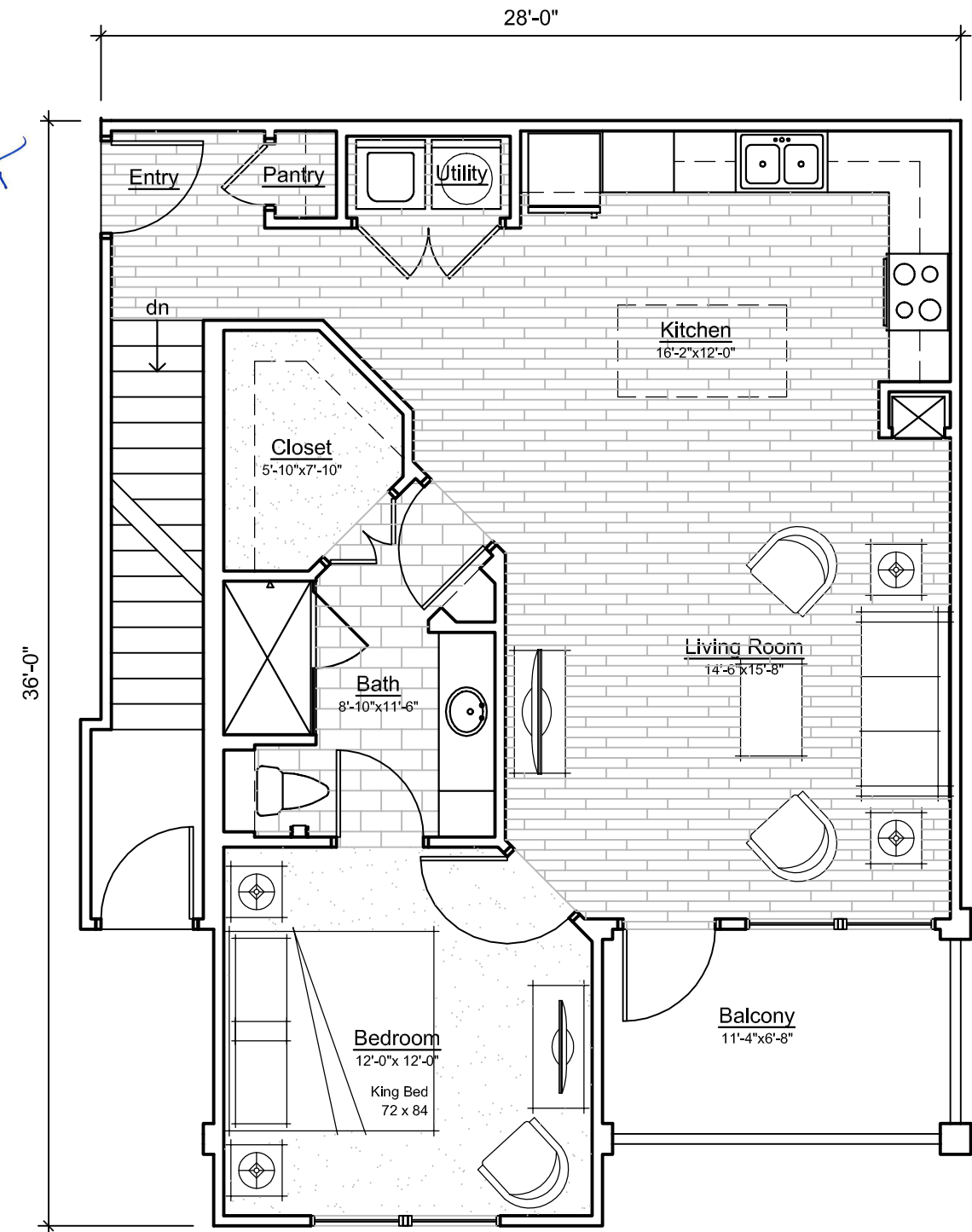
2016-05-09

FRANKLIN, TENNESSEE



UNIT SA-2G - 1 BED / 1 BATH W/ PORCH
SCALE: 3/16" = 1'-0"

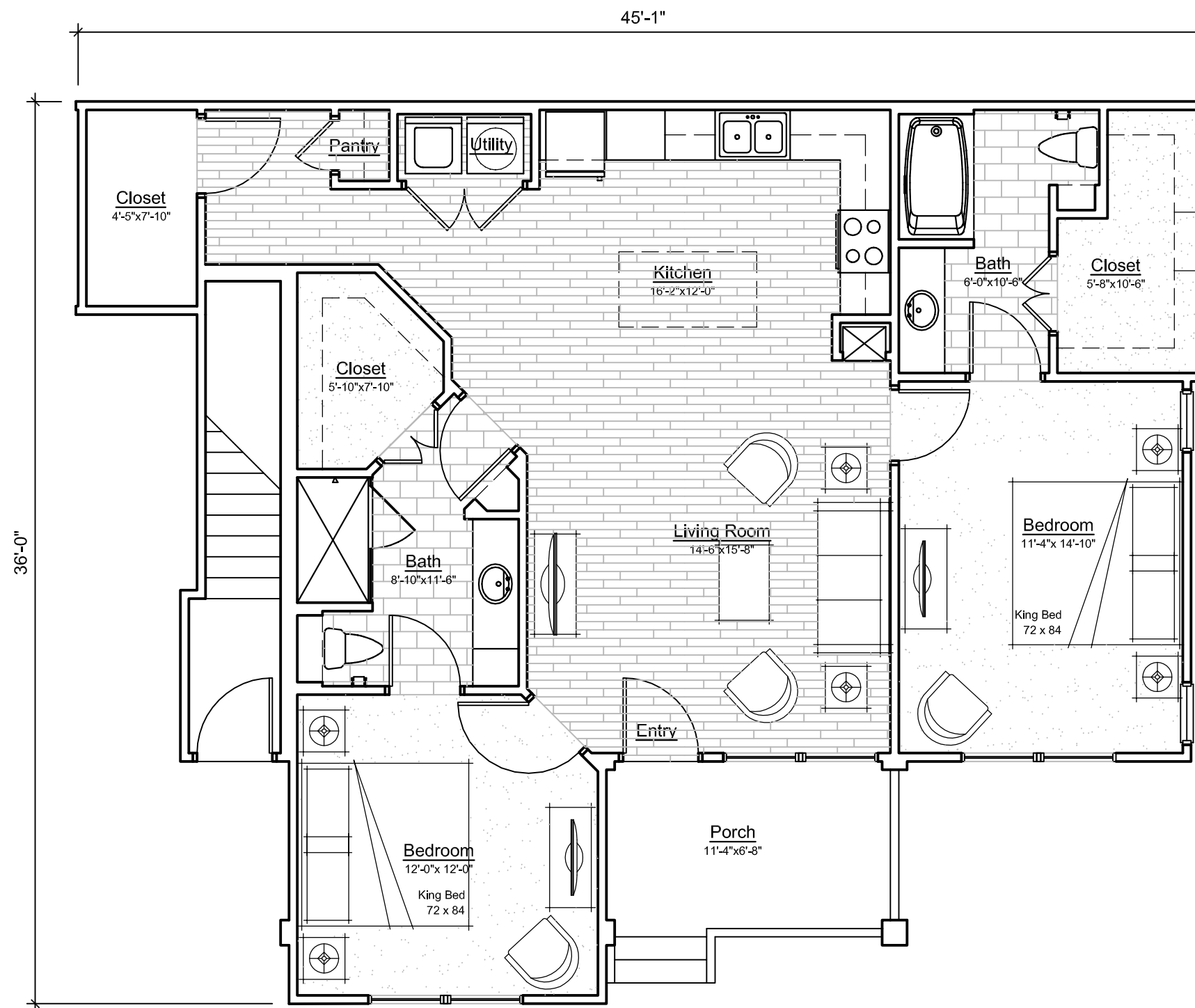
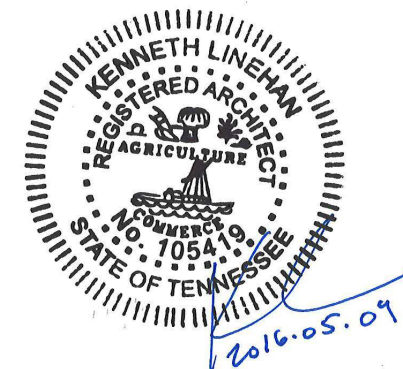
LIVING = 829 S.F.
PORCH = 88 S.F.
TOTAL = 917 S.F.



UNIT SA-2 - 1 BED / 1 BATH W/ BALCONY

LIVING = 866 S.F.
BALCONY = 88 S.F.
TOTAL = 954 S.F.

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PROJECT #6068



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.

PAGE 13

PROJECT #6068



EPOCH

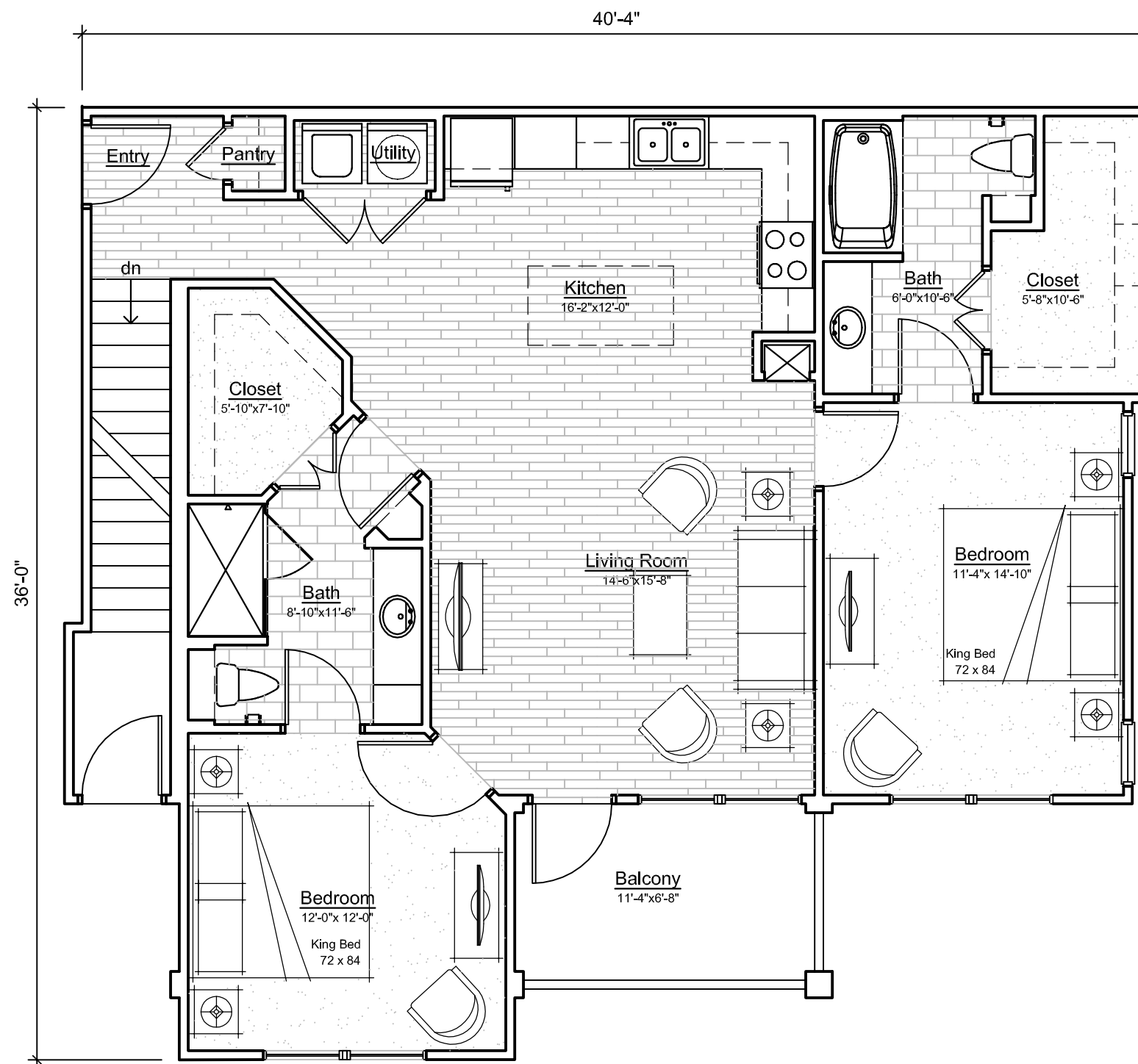
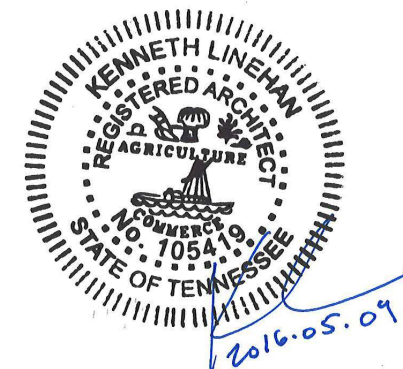
RESIDENTIAL™

SOUTH PARCEL UNIT PLANS

THE EPOCH DEVELOPMENT

2016-05-09

FRANKLIN, TENNESSEE



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.

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PROJECT #6068



EPOCH

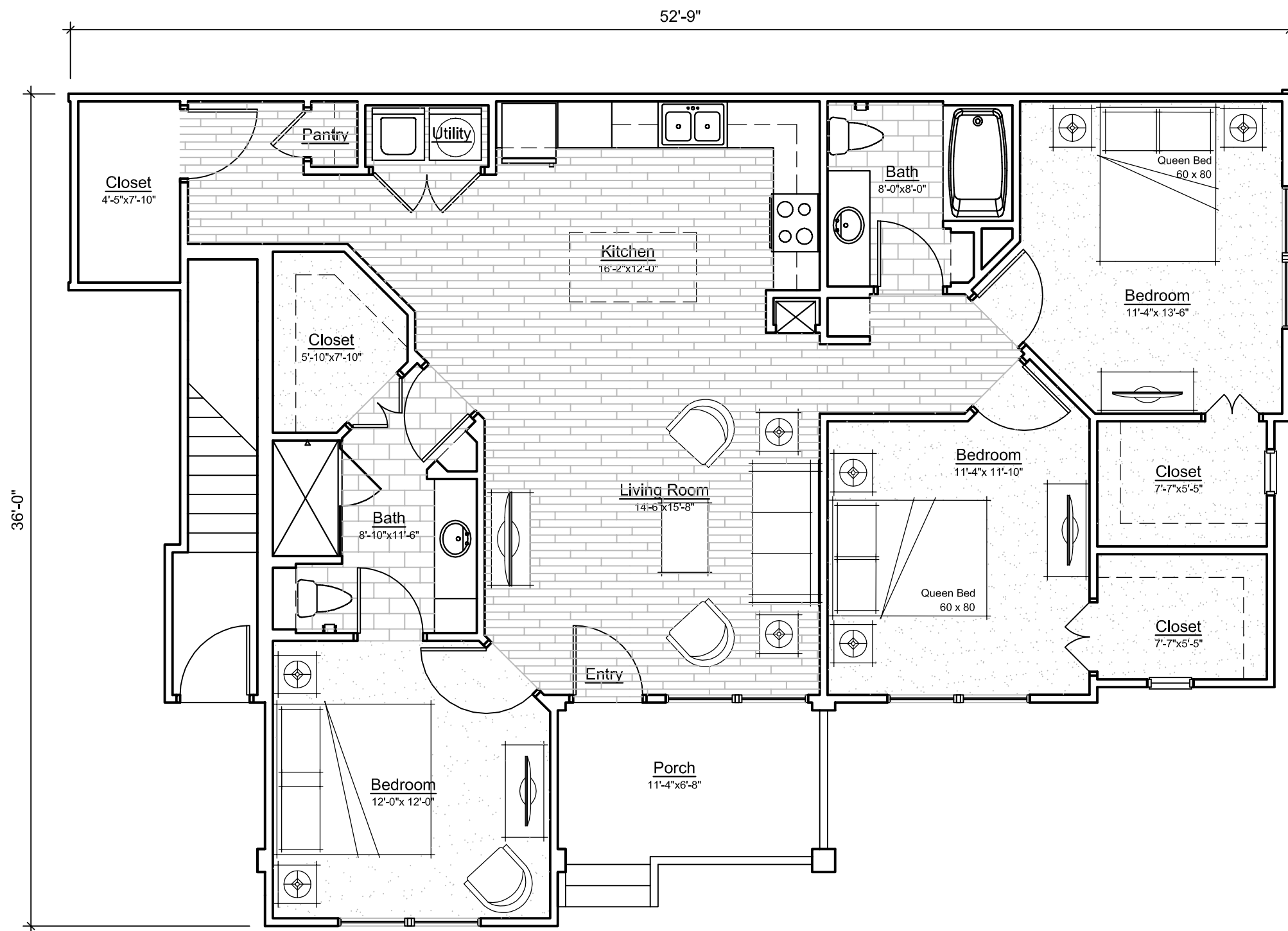
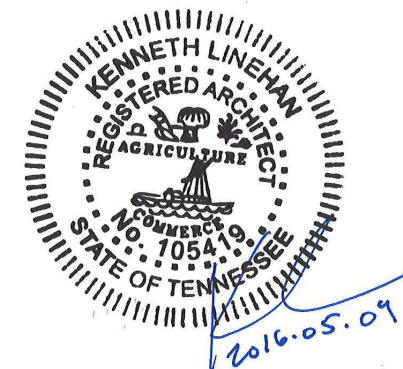
RESIDENTIAL™

SOUTH PARCEL UNIT PLANS

THE EPOCH DEVELOPMENT

2016-05-09

FRANKLIN, TENNESSEE



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.

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PROJECT #6068



EPOCH

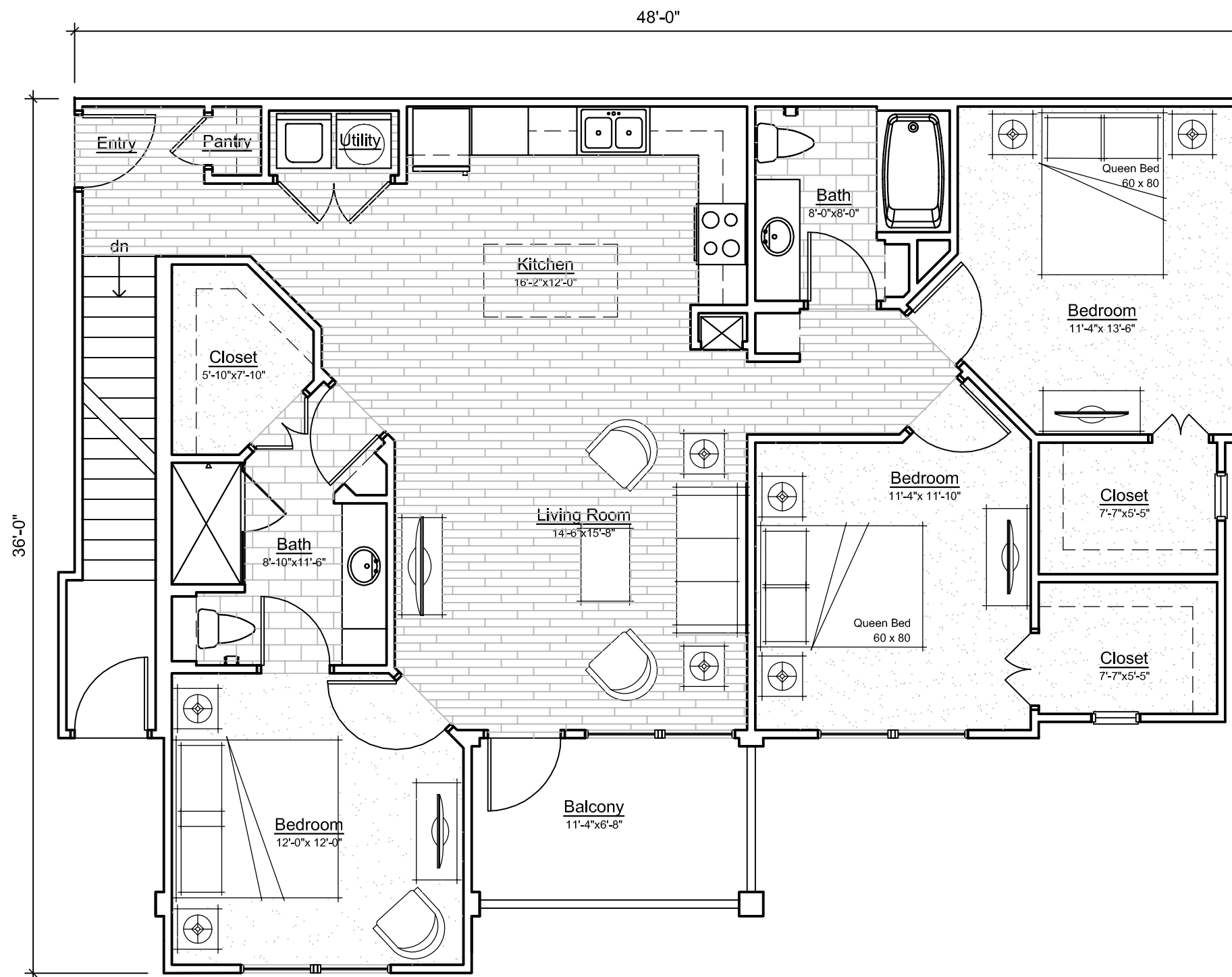
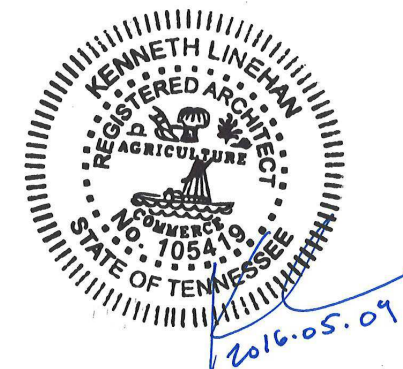
RESIDENTIAL™

SOUTH PARCEL UNIT PLANS

THE EPOCH DEVELOPMENT

2016-05-09

FRANKLIN, TENNESSEE



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.

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PROJECT #6068



EPOCH

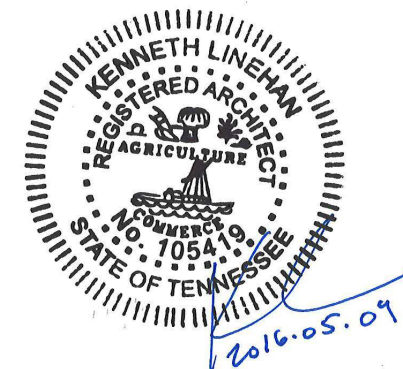
RESIDENTIAL™

SOUTH PARCEL UNIT PLANS

THE EPOCH DEVELOPMENT

2016-05-09

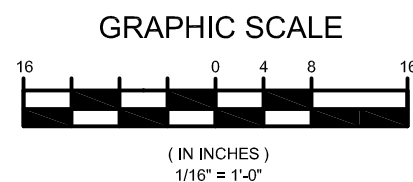
FRANKLIN, TENNESSEE



UNIT ENTRY DOOR

UNIT ENTRY DOOR

NORTH ELEVATION
(OAK MEADOW DRIVE)
SOUTH PARCEL



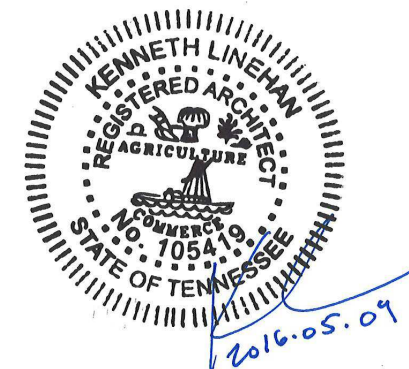

FUGLEBERG KOCH

EPOCH RESIDENTIAL™

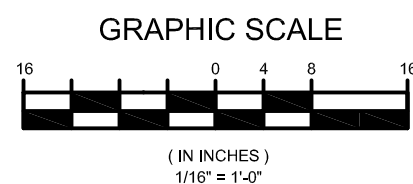
BUILDING ELEVATIONS
2016-05-09

THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

PAGE 17
PROJECT #6068



SOUTH ELEVATION



SOUTH PARCEL

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PROJECT #6068

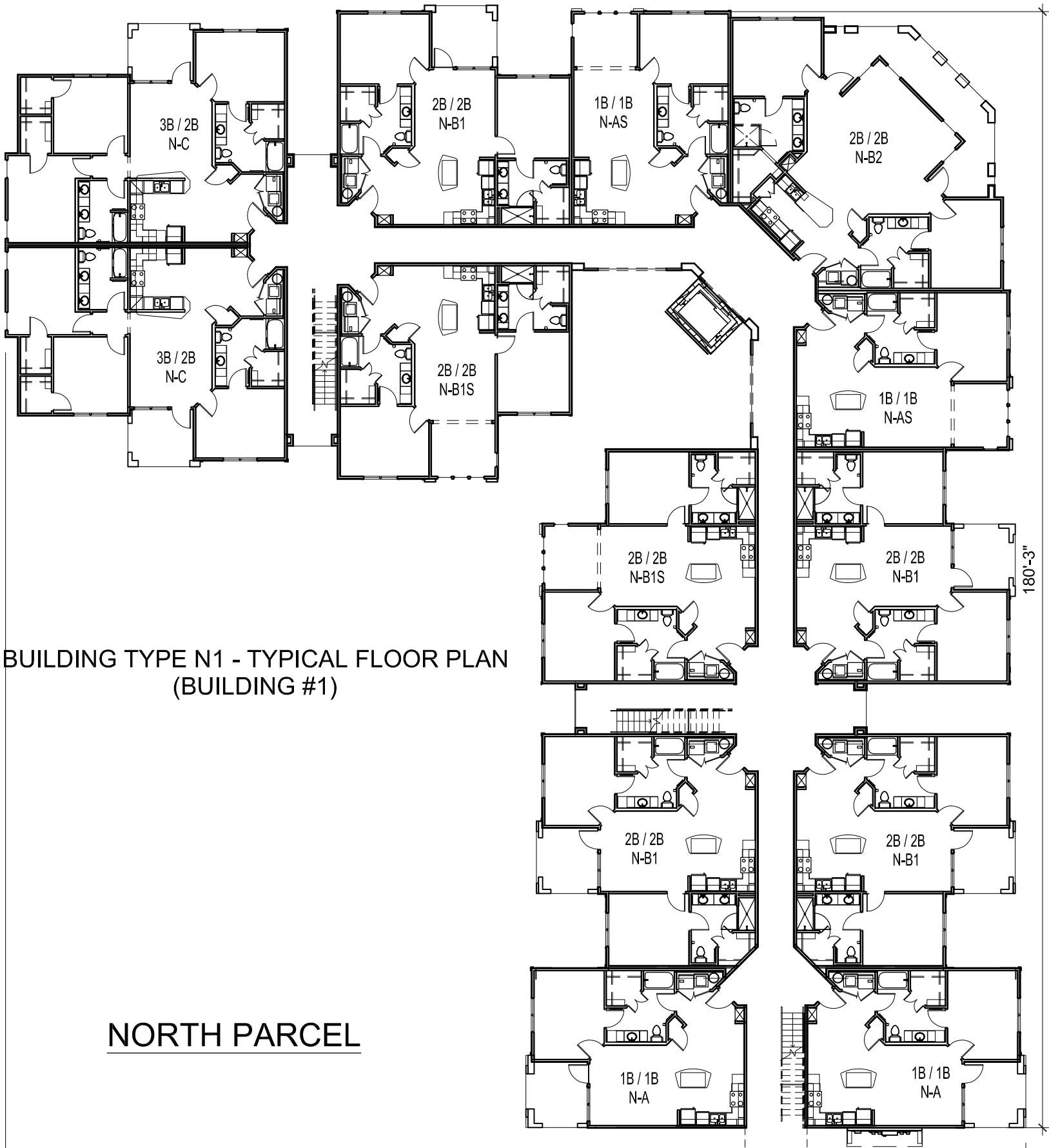
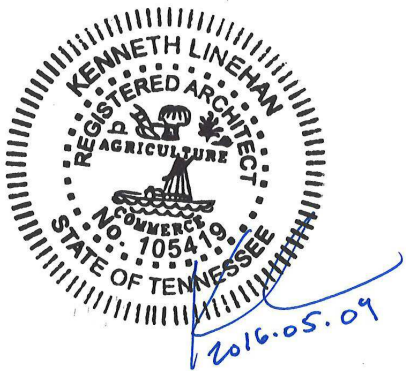


EPOCH RESIDENTIAL™

BUILDING ELEVATIONS
2016-05-09

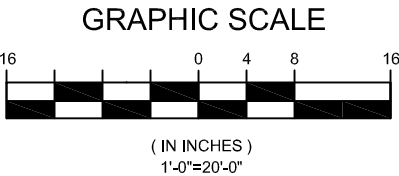
THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

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. 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	



EPOCH RESIDENTIAL™

164'-10"

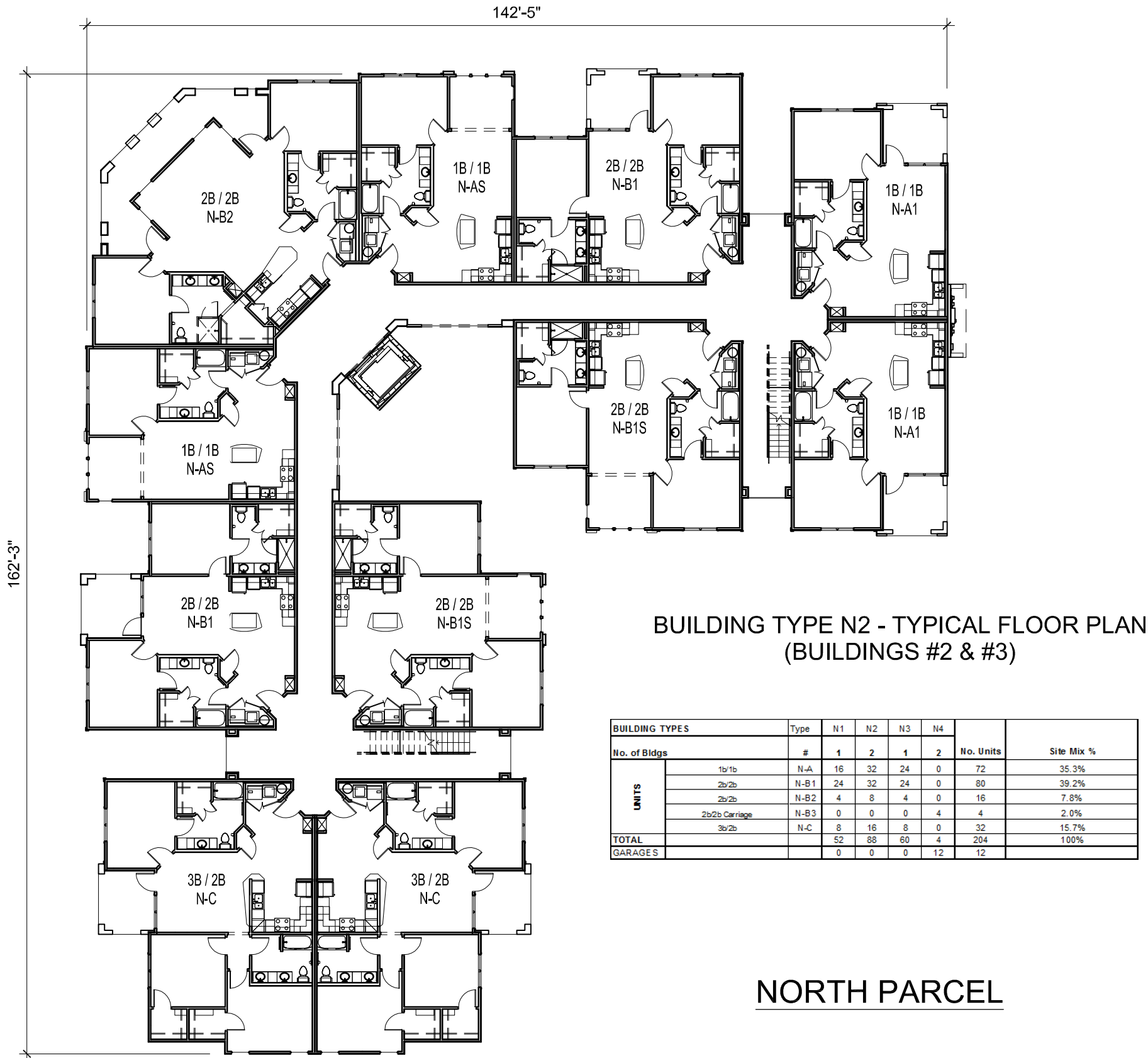
BUILDING PLANS

2016-05-09

THE EPOCH DEVELOPMENT

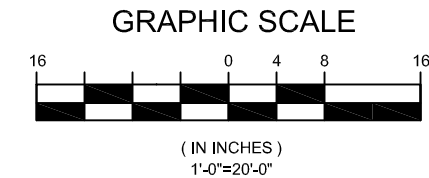
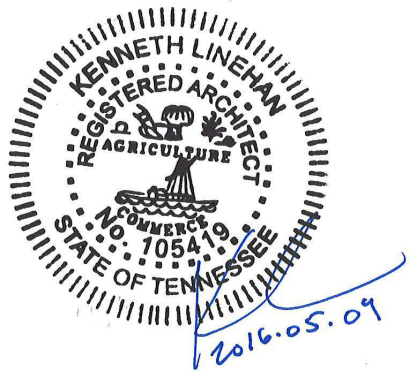
FRANKLIN, TENNESSEE

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 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



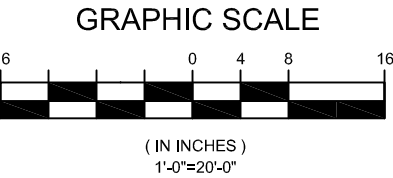
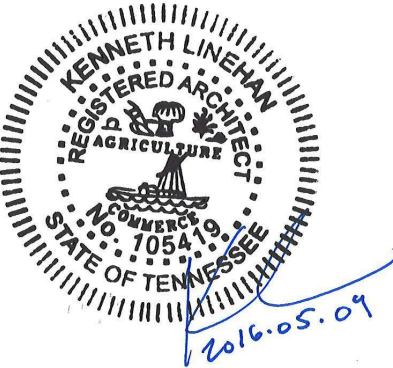
AREA	
1ST FLOOR:	19,637 SF
2ND FLOOR:	19,637 SF
3RD FLOOR:	19,637 SF
4TH FLOOR:	19,637 SF
TOTAL:	78,548 SF



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	

NORTH PARCEL

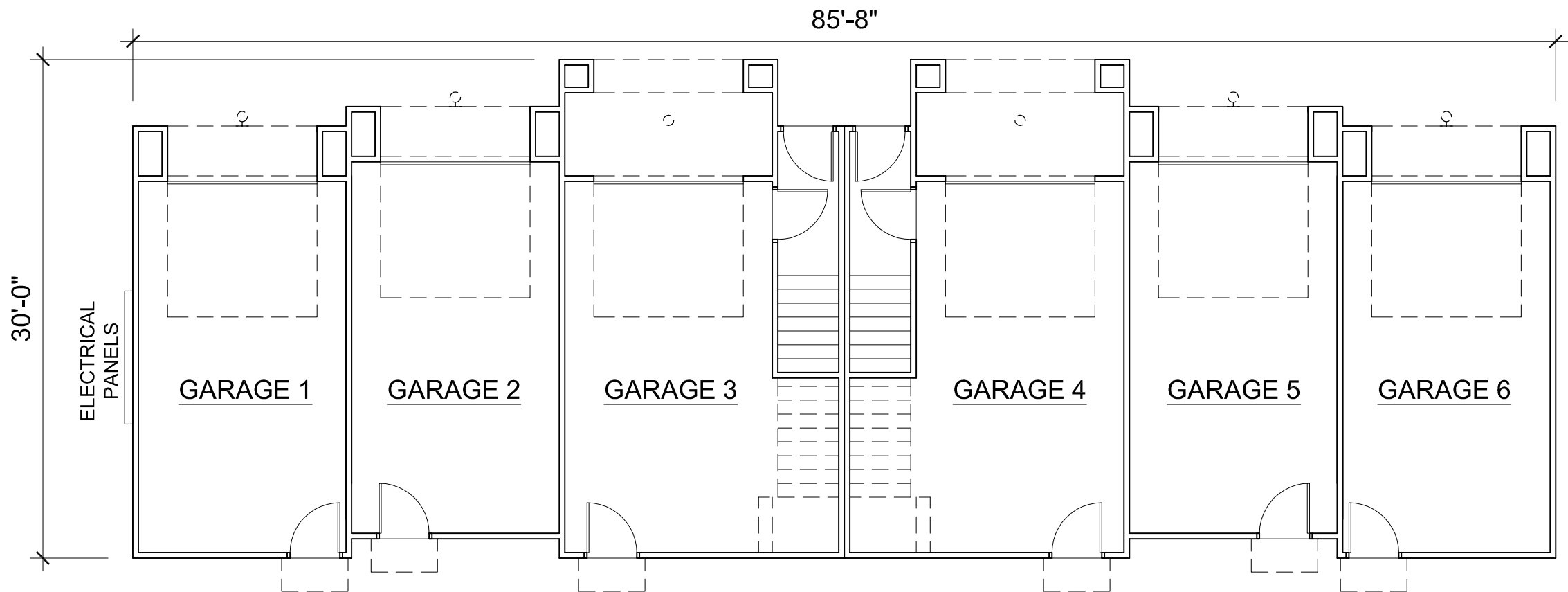
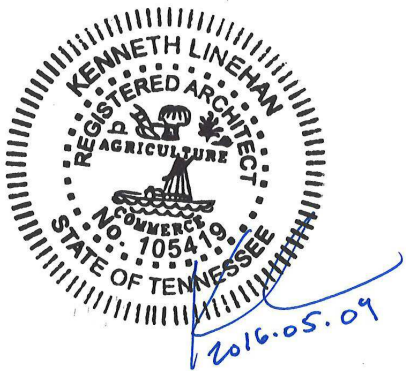


EPOCH RESIDENTIAL™

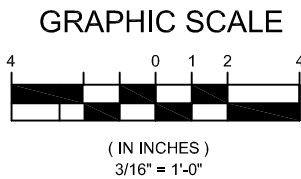
BUILDING PLANS
2016-05-09

THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

AREA
1ST FLOOR: 1,998 SF
2ND FLOOR: 2,233 SF
TOTAL: 4,231 SF



BUILDING TYPE N4- GROUND FLOOR PLAN
(BUILDINGS #5 & #6)

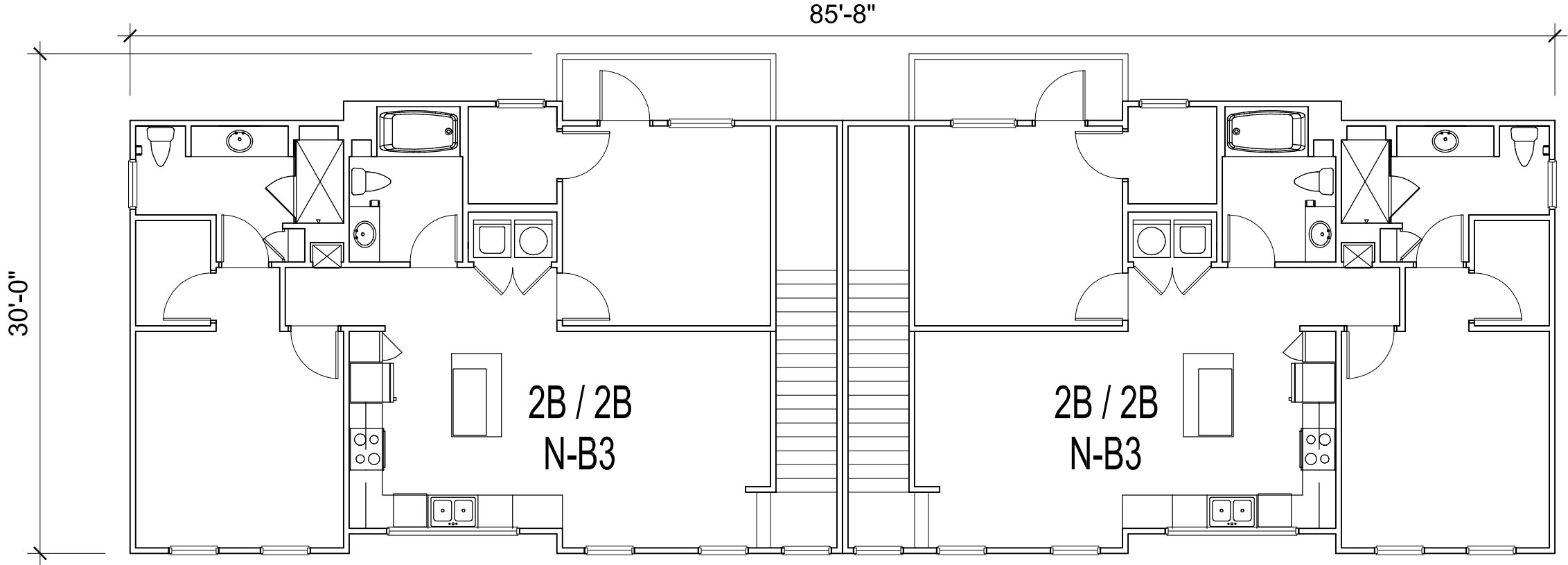
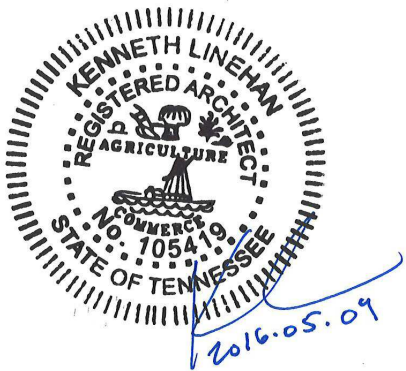


BUILDING TYPES		Type	N1	N2	N3	N4	No. Units	Site Mix %
No. of Bldgs		#	1	2	1	2		
UNITS	1b/1b	N-A	16	32	24	0	72	35.3%
	2b/2b	N-B1	24	32	24	0	80	39.2%
	2b/2b	N-B2	4	8	4	0	16	7.8%
	2b/2b Carriage	N-B3	0	0	0	4	4	2.0%
	3b/2b	N-C	8	16	8	0	32	15.7%
TOTAL			52	88	60	4	204	100%
GARAGES			0	0	0	12	12	

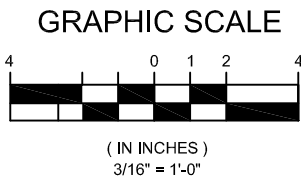
NORTH PARCEL



AREA
1ST FLOOR: 1,998 SF
2ND FLOOR: 2,233 SF
TOTAL: 4,231 SF



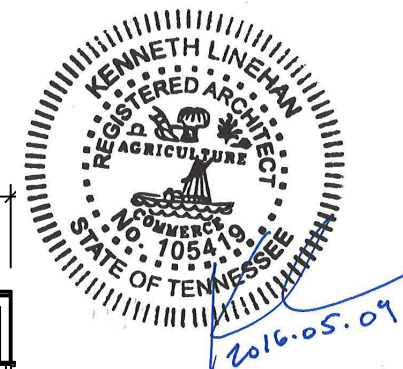
BUILDING TYPE N4- SECOND FLOOR PLAN
(BUILDINGS #5 & #6)



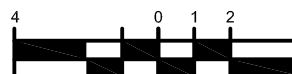
BUILDING TYPES		Type	N1	N2	N3	N4	No. Units	Site Mix %
No. of Bldgs		#	1	2	1	2		
UNITS	1b/1b	N-A	16	32	24	0	72	35.3%
	2b/2b	N-B1	24	32	24	0	80	39.2%
	2b/2b	N-B2	4	8	4	0	16	7.8%
	2b/2b Carriage	N-B3	0	0	0	4	4	2.0%
	3b/2b	N-C	8	16	8	0	32	15.7%
TOTAL			52	88	60	4	204	100%
GARAGES			0	0	0	12	12	

NORTH PARCEL

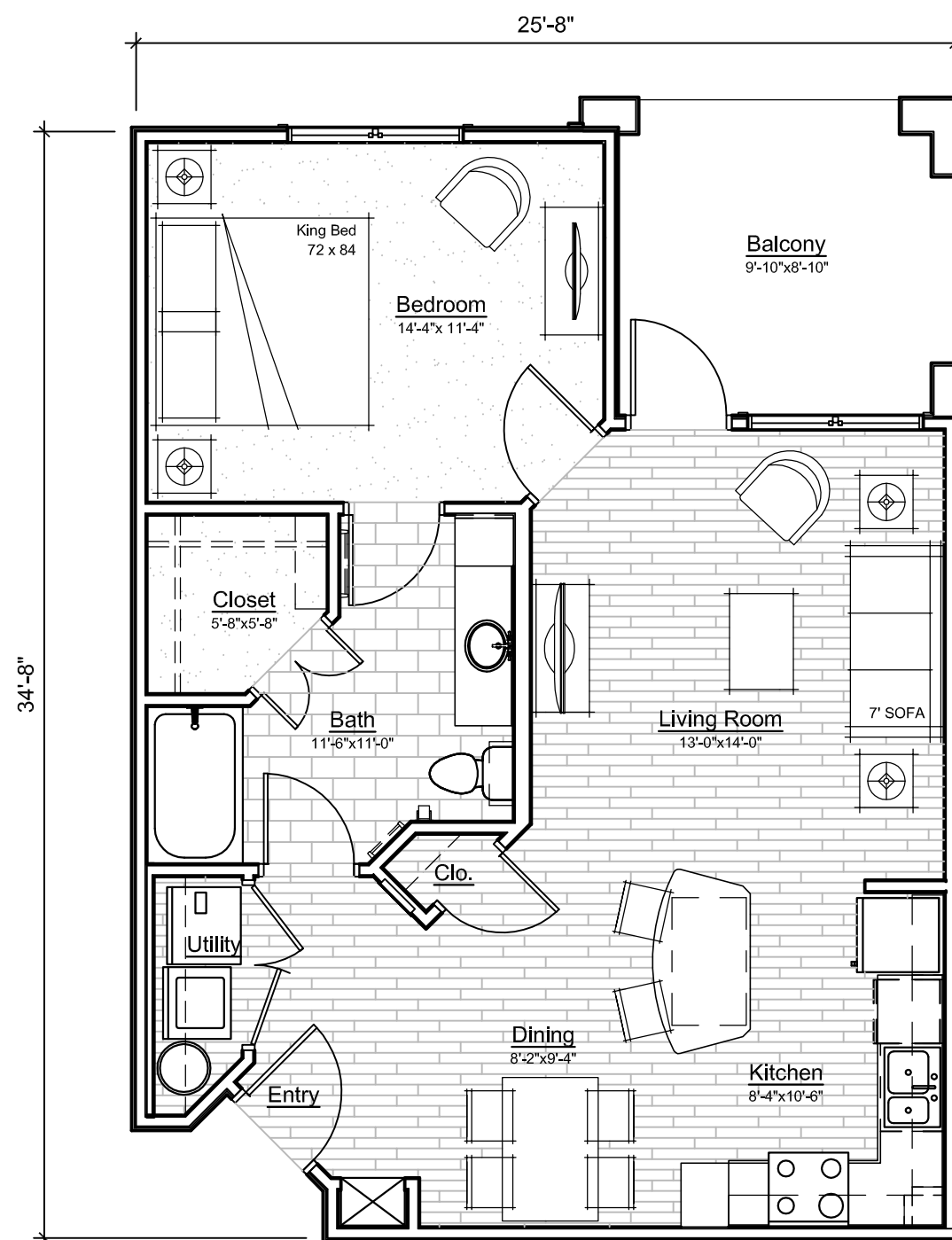




GRAPHIC SCALE



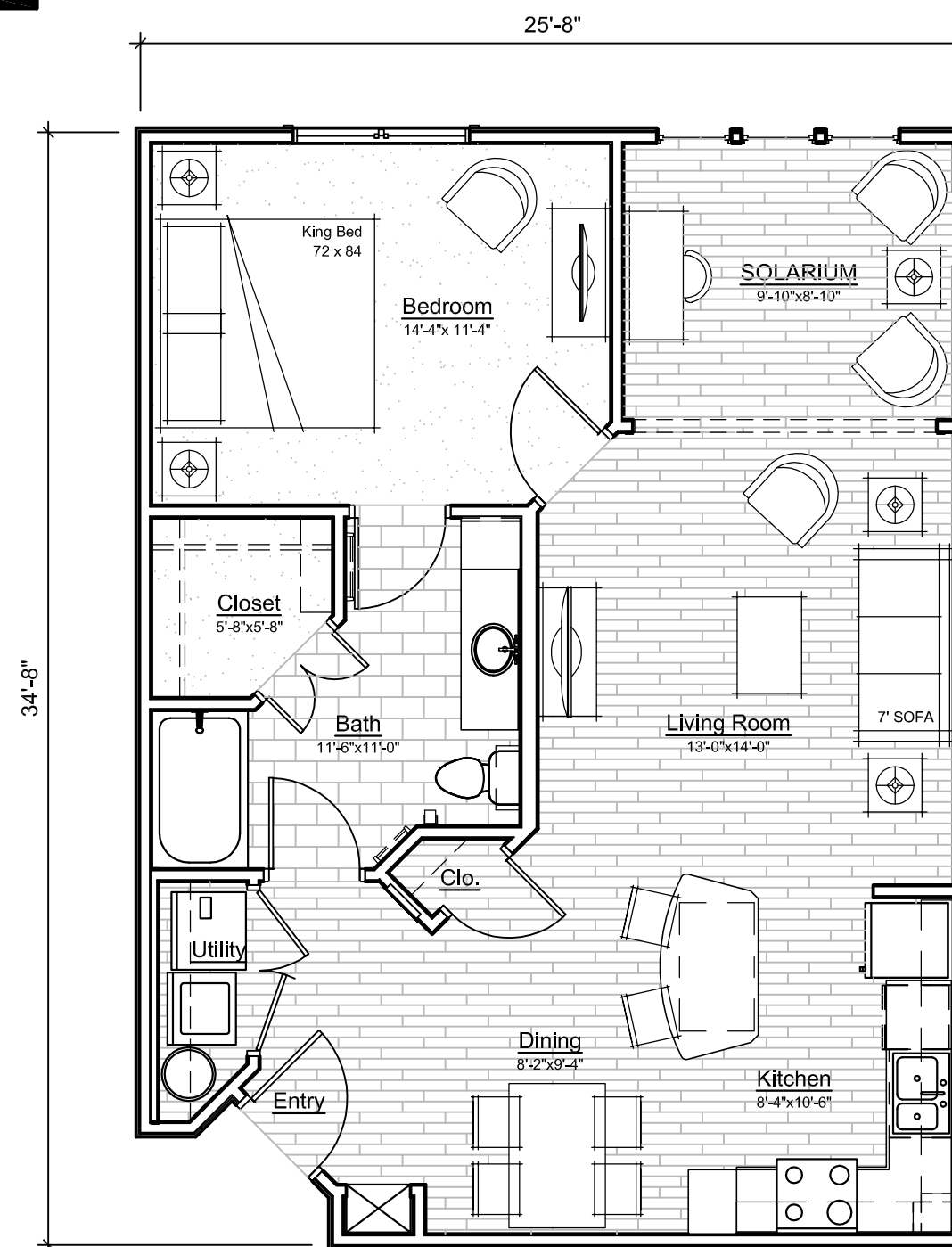
(IN INCHES)
3/16" = 1'-0"



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.



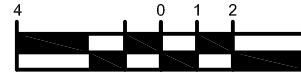
UNIT N-AS - 1 BED / 1 BATH W/ SOLARIUM

SCALE: 3/16" = 1'-0"

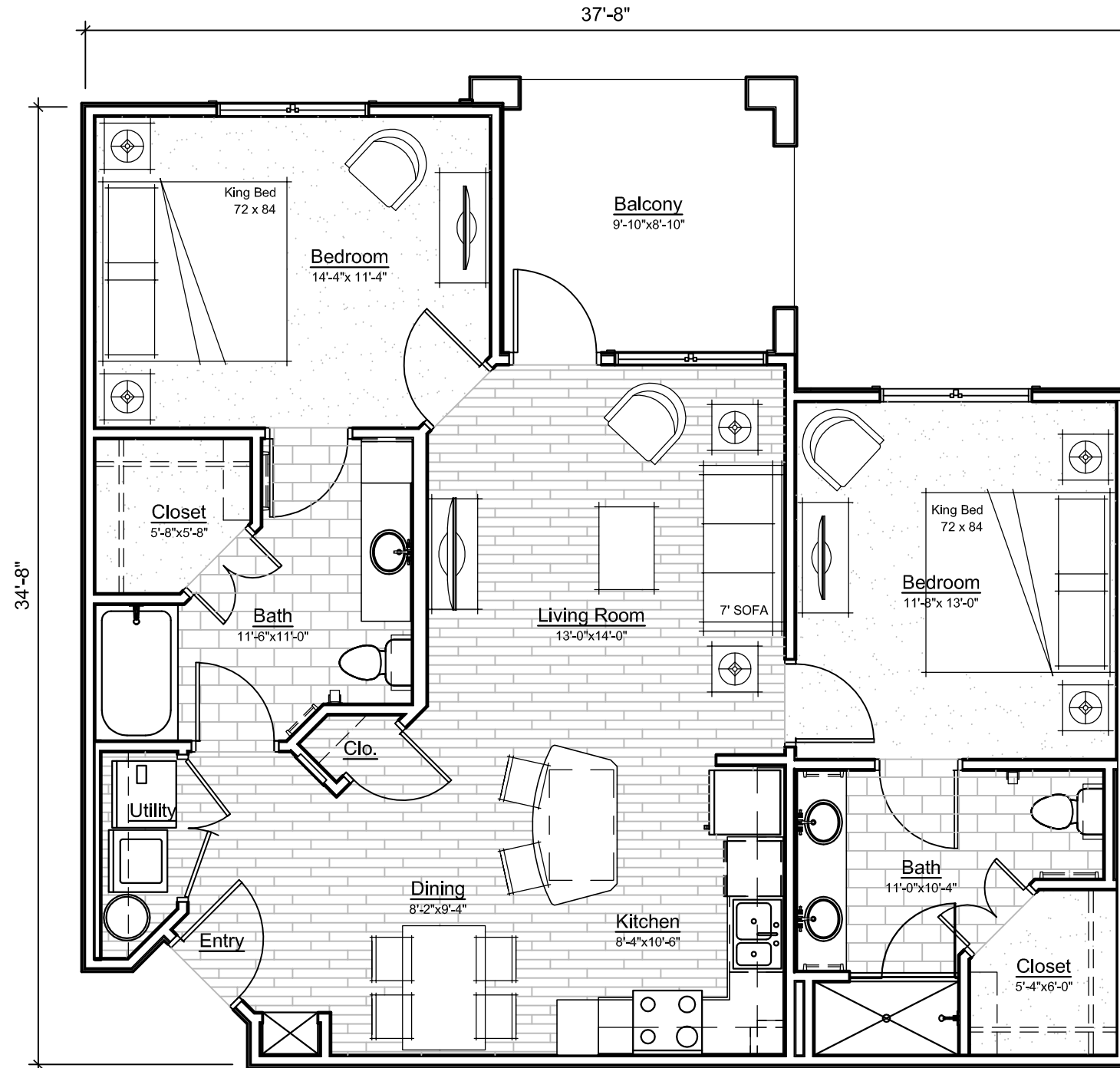
LIVING = 891 S.F.

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PROJECT #6068

GRAPHIC SCALE



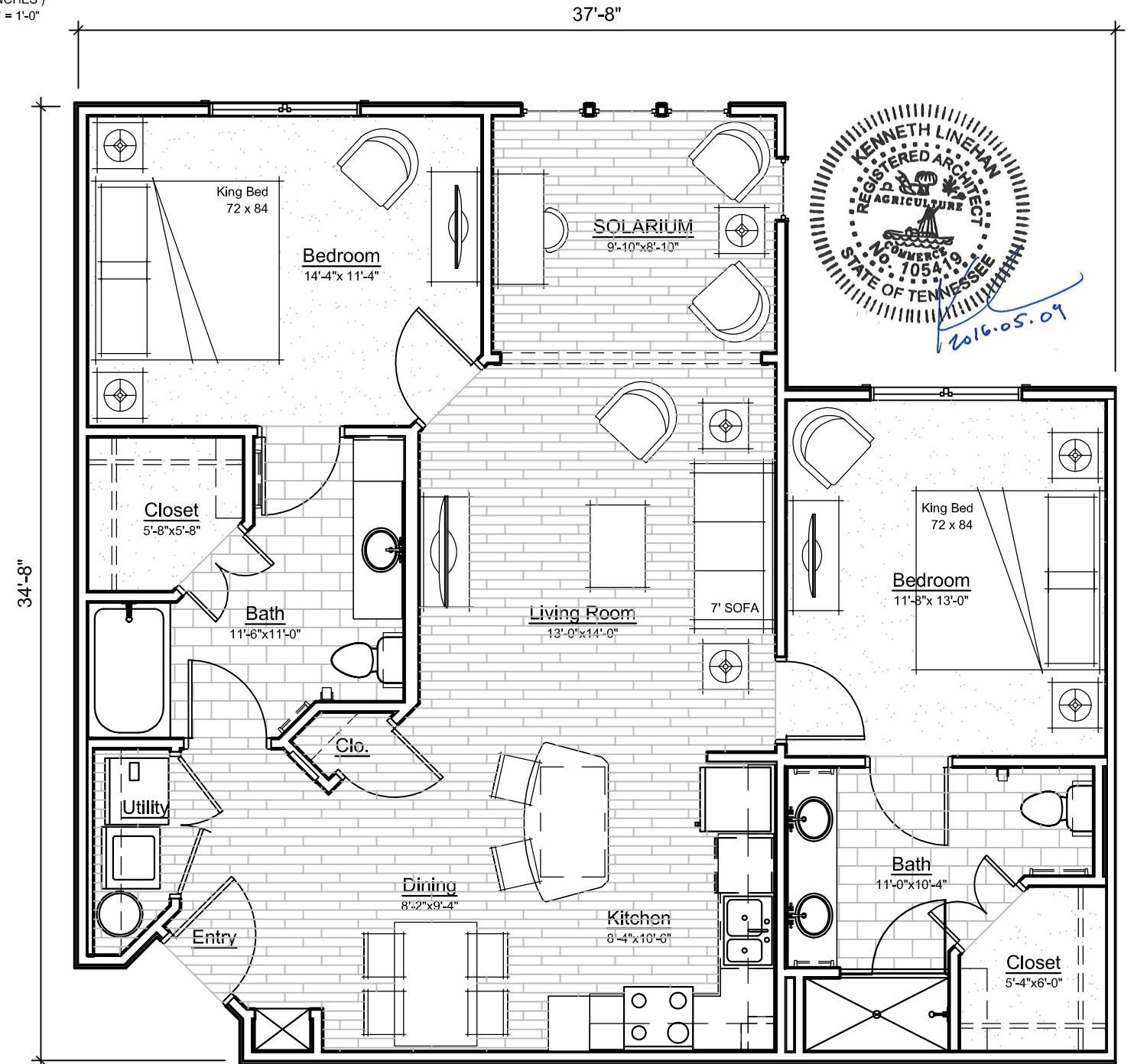
(IN INCHES)
3/16" = 1'-0"



UNIT N-B1 - 2 BED / 2 BATH W/ BALCONY

SCALE: 3/16" = 1'-0"

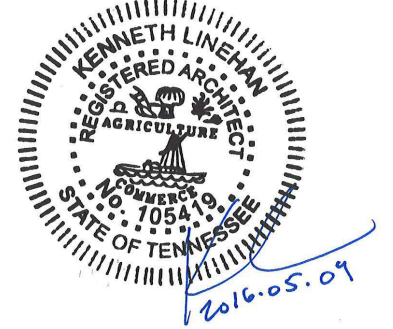
LIVING = 1,072 S.F.
BALCONY = 108 S.F.
TOTAL = 1,180 S.F.



UNIT N-B1S - 2 BED / 2 BATH W/ SOLARIUM

SCALE: 3/16" = 1'-0"

LIVING = 1,180 S.F.



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PROJECT #6068



FUGLEBERG KOCH

EPOCH

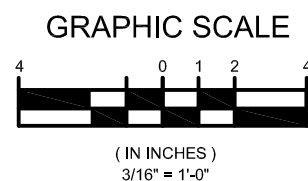
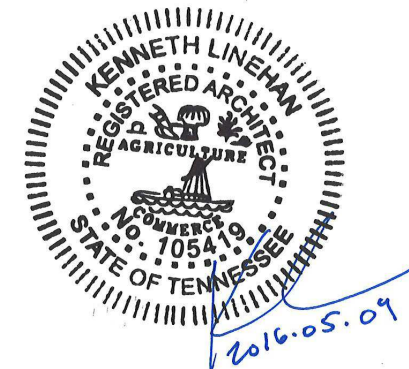
RESIDENTIAL™

NORTH PARCEL UNIT PLANS

THE EPOCH DEVELOPMENT

2016-05-09

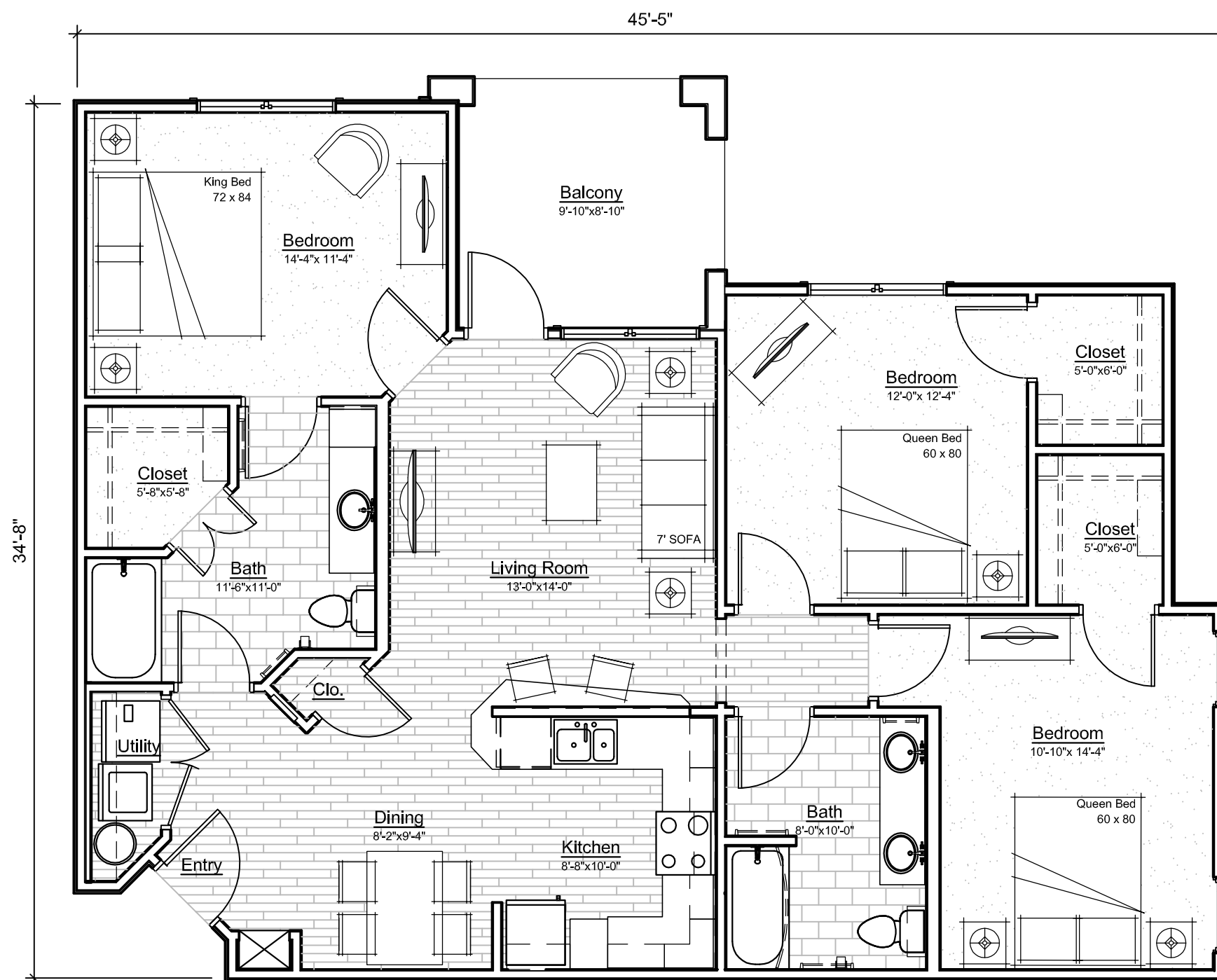
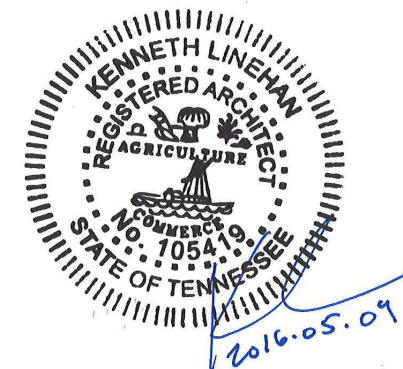
FRANKLIN, TENNESSEE



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.

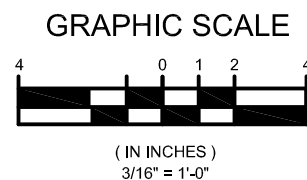
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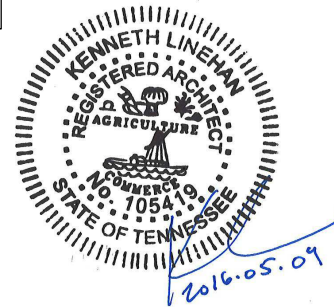
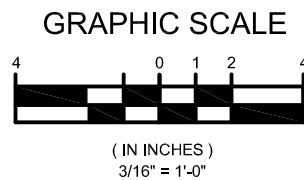
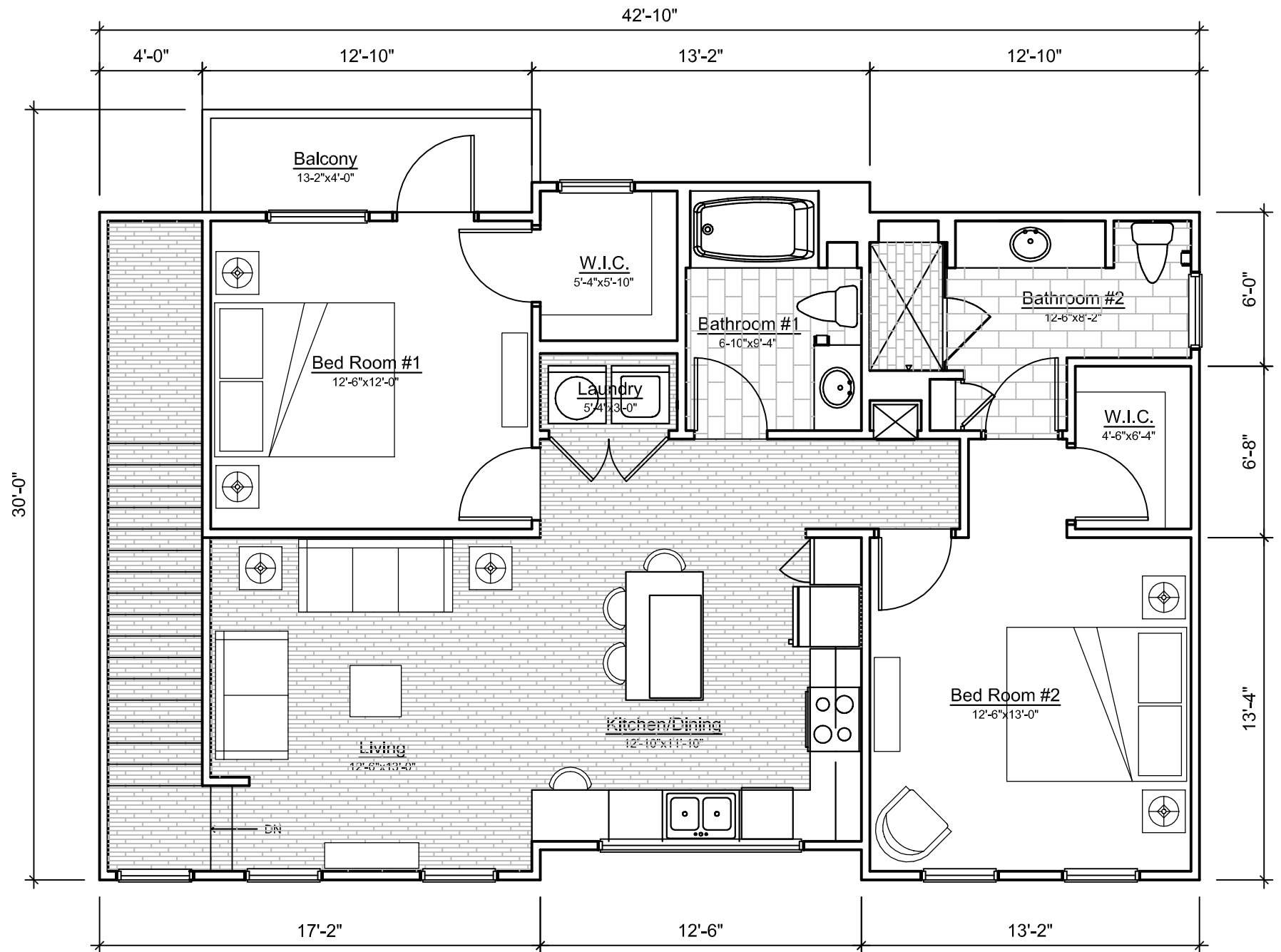
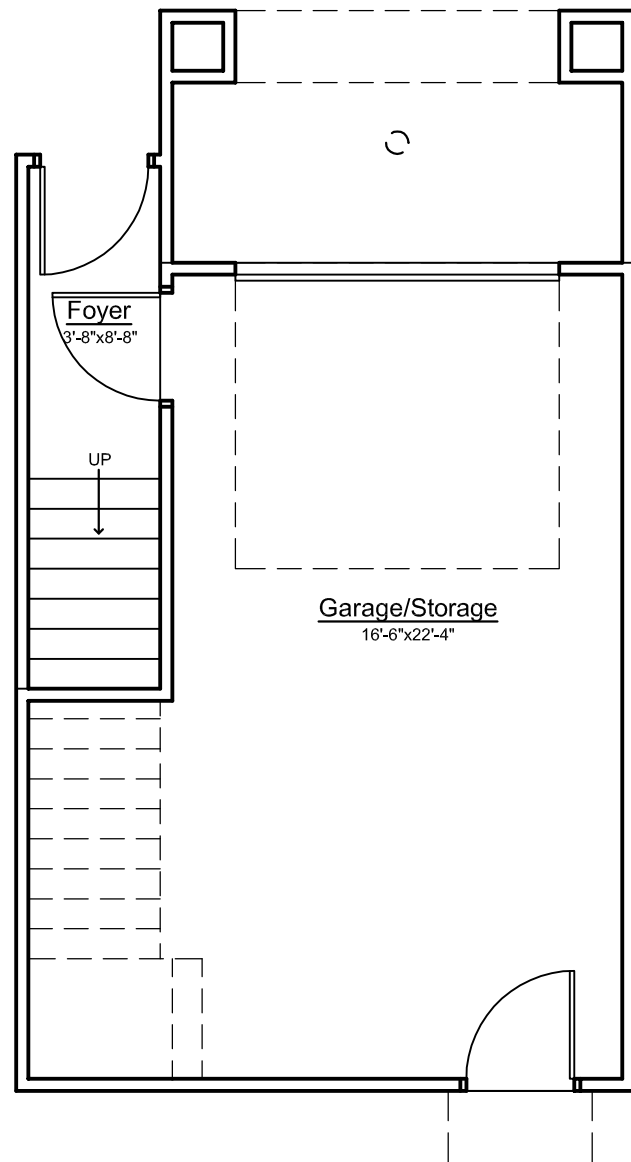
UNIT N-C - 3 BED / 2 BATH W/ BALCONY

SCALE: 3/16" = 1'-0"

LIVING = 1,304 S.F.
BALCONY = 108 S.F.
TOTAL = 1,412 S.F.



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PROJECT #6068



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.

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PROJECT #6068

FUGLEBERG KOCH

EPOCH

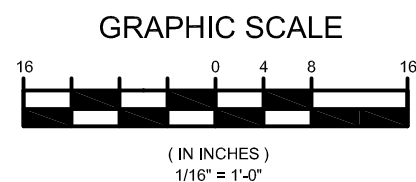
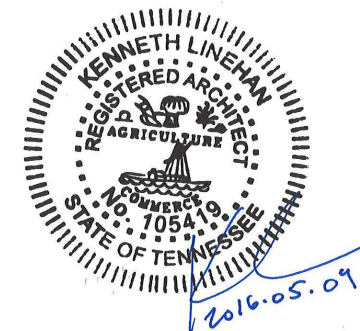
RESIDENTIAL™

NORTH PARCEL UNIT PLANS

THE EPOCH DEVELOPMENT

2016-05-09

FRANKLIN, TENNESSEE



ELEVATION

NORTH PARCEL

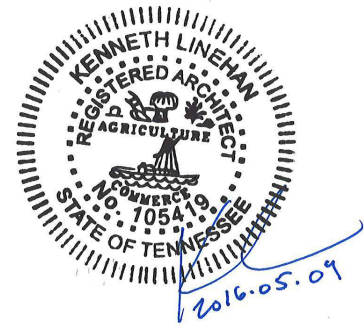
PAGE 29
PROJECT #6068



EPOCH RESIDENTIAL™

BUILDING ELEVATIONS
2016-05-09

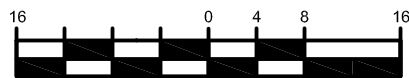
THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE



SIDE ELEVATION

NORTH PARCEL

GRAPHIC SCALE



(IN INCHES)
1/16" = 1'-0"



FUGLEBERG KOCH

EPOCH RESIDENTIAL™

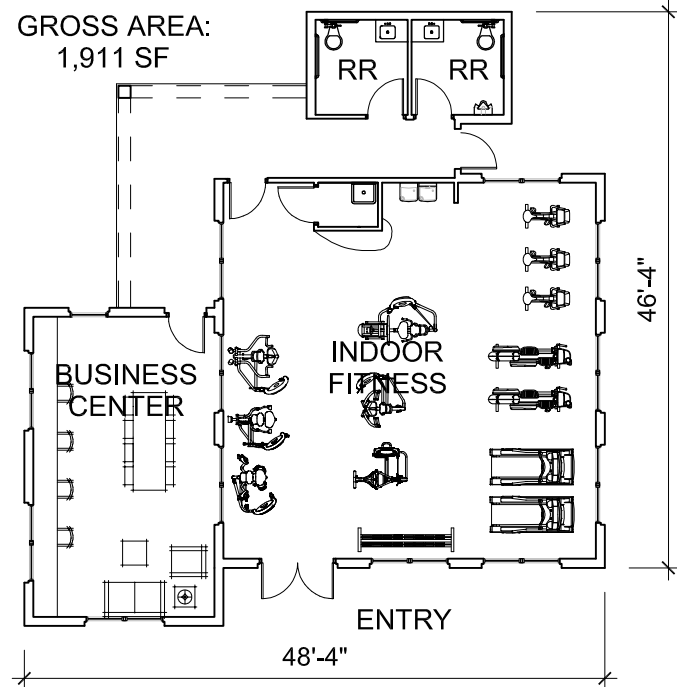
BUILDING ELEVATIONS

2016-05-09

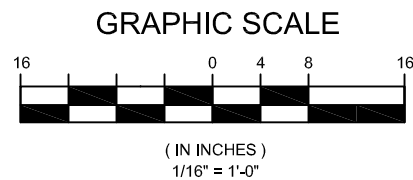
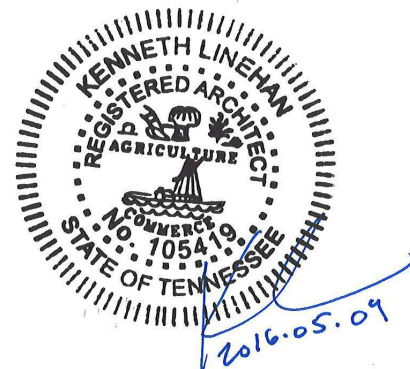
THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

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PROJECT #6068

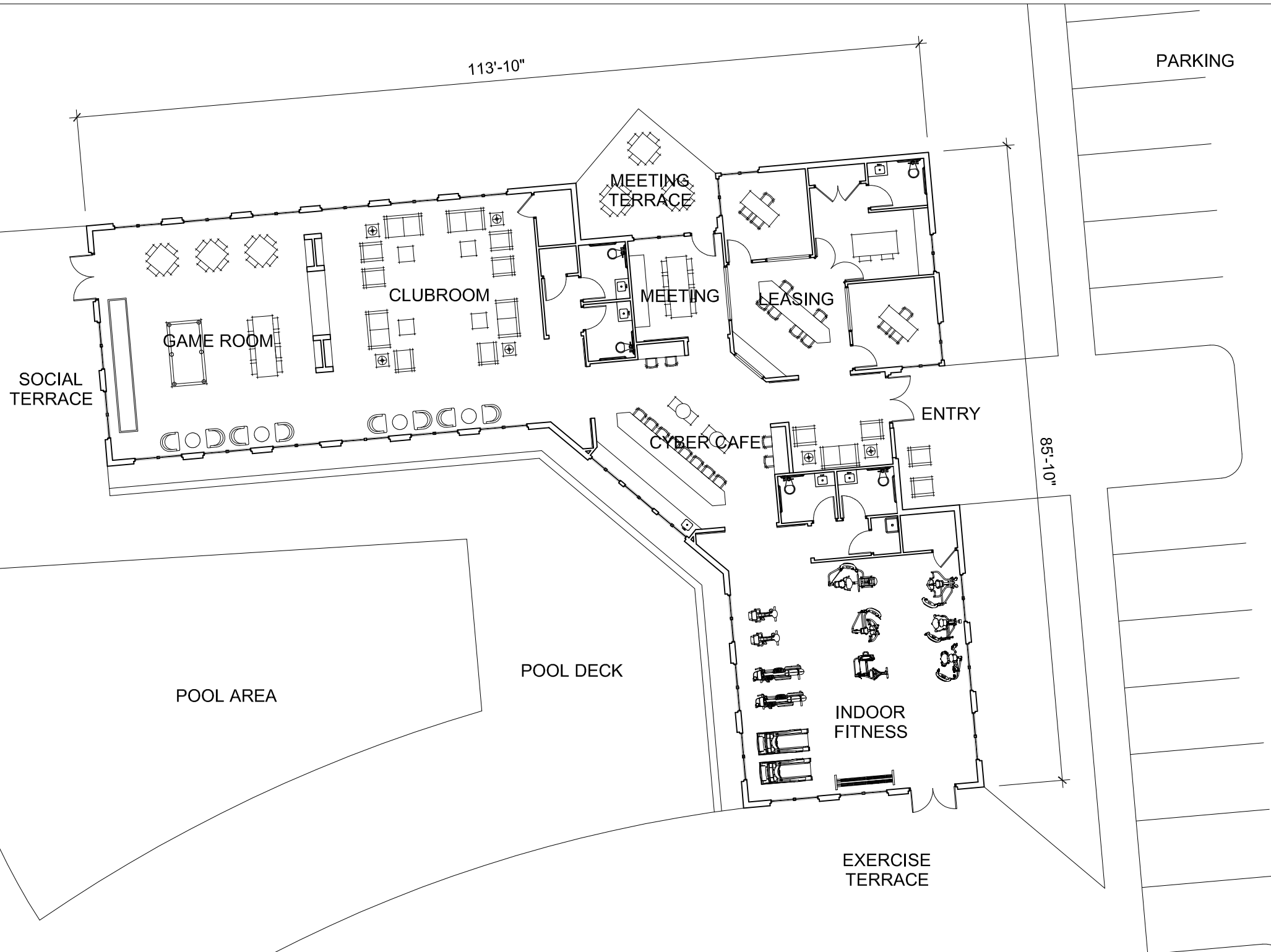


PAVILION PLAN
NORTH PARCEL



FUGLEBERG KOCH

EPOCH RESIDENTIAL™



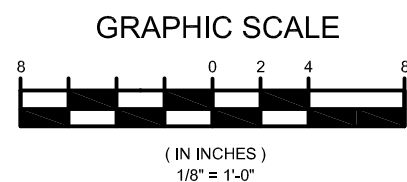
GROSS AREA - 5,370 SF

SOUTH PARCEL

CLUBHOUSE PLAN
2016-05-09

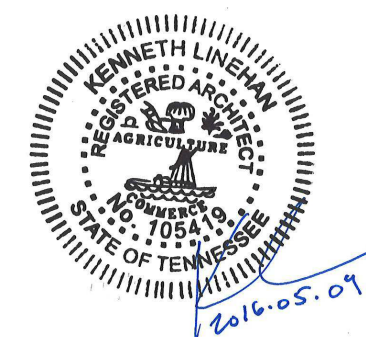
THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

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PROJECT #6068



AMENITY / CLUBHOUSE CENTER
ELEVATION

SOUTH PARCEL



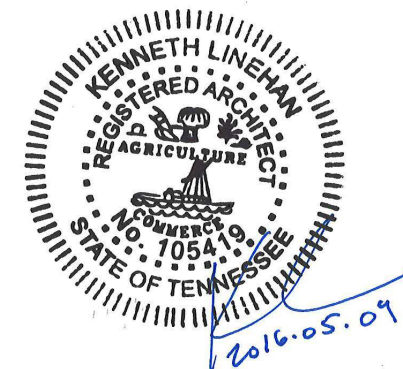
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PROJECT #6068


FUGLEBERG KOCH

EPOCH RESIDENTIAL™

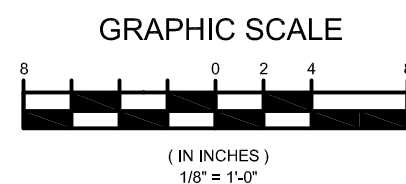
BUILDING ELEVATIONS
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FRANKLIN, TENNESSEE



POOL PAVILION ELEVATION

NORTH PARCEL

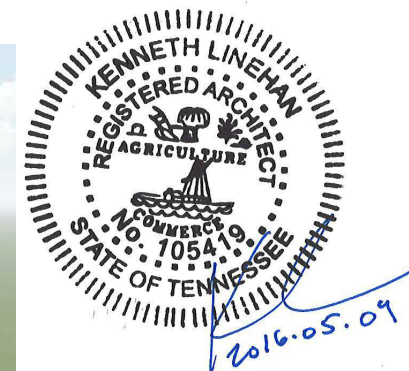


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BUILDING ELEVATIONS
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VIEW LOOKING WEST

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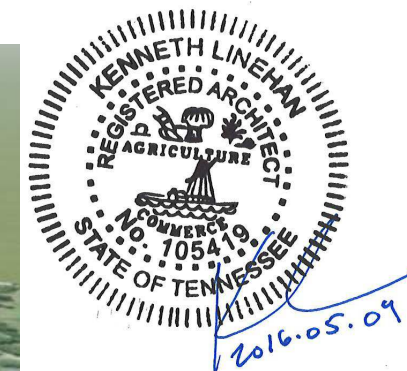
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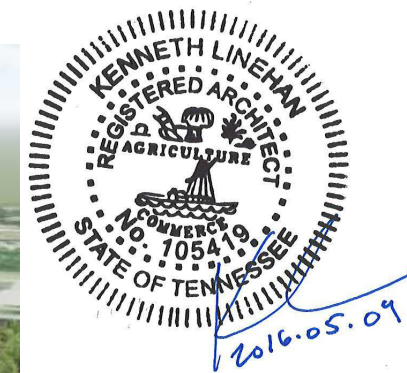
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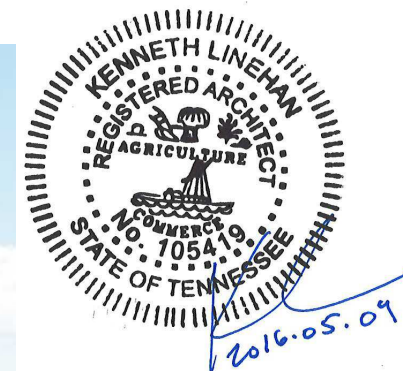
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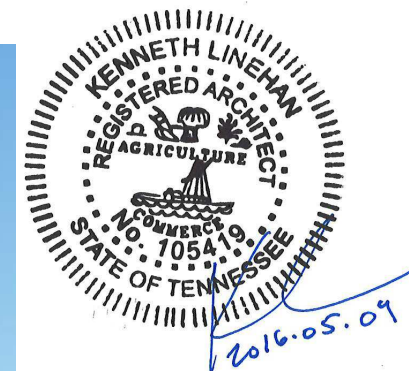
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VIEW LOOKING EAST ON OAK MEADOW DR.

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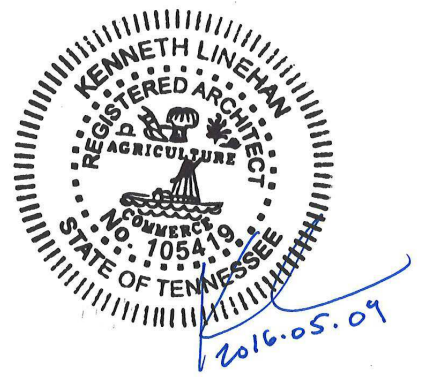
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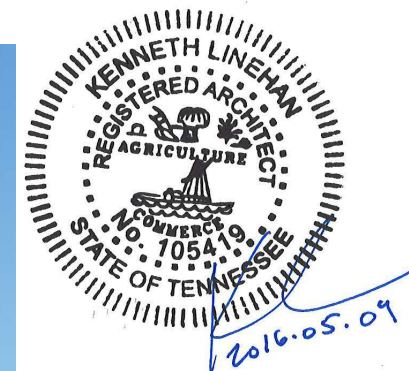
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VIEW LOOKING SOUTHEAST ON OAK MEADOW DR.

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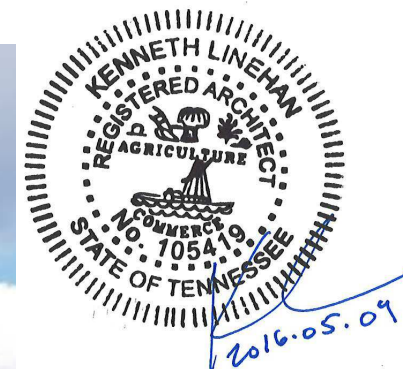
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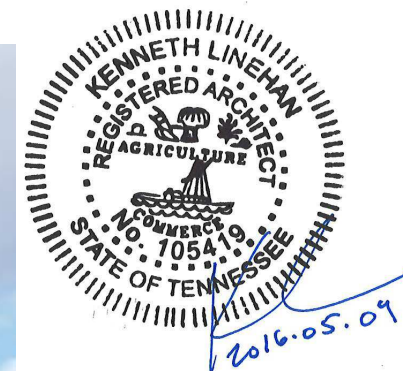
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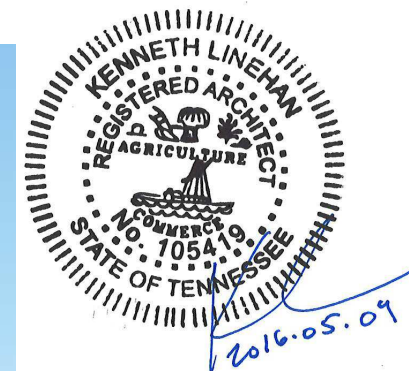
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VIEW LOOKING NORTHWEST ON OAK MEADOW DR.

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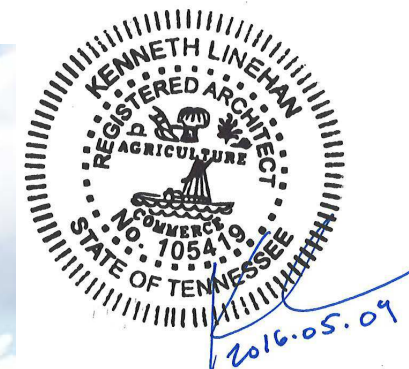
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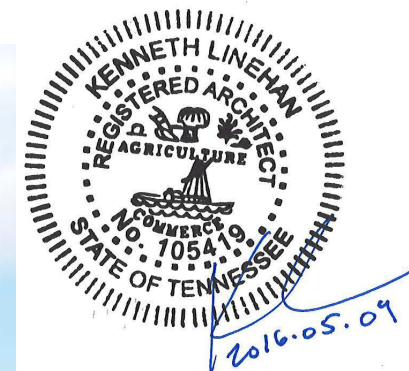
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FRANKLIN, TENNESSEE

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

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Traffic Impact Study

Epoch Apartments Oak Meadow Drive

Franklin, Tennessee

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

PREPARED FOR:

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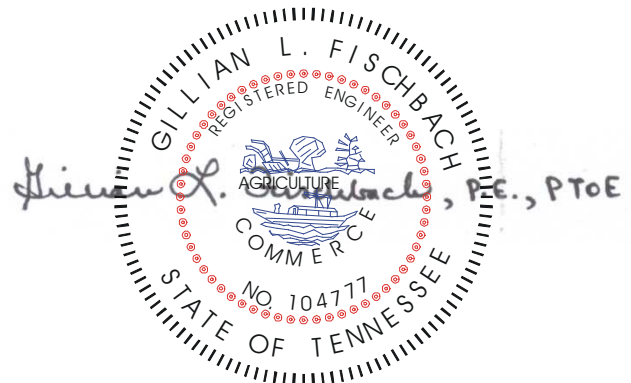


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1. INTRODUCTION

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.

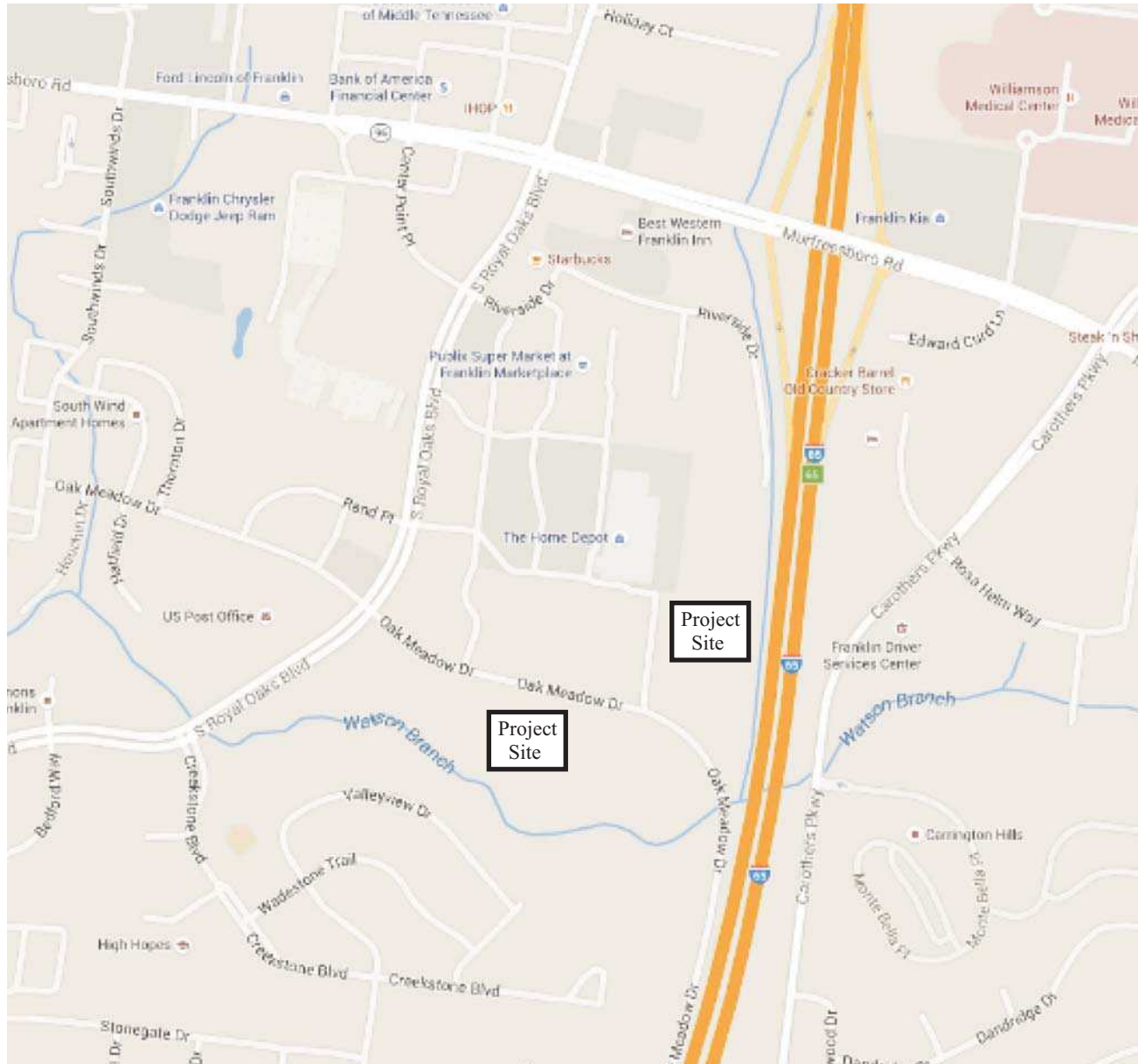
Access for the southern portion of the site will be provided at two locations on Oak Meadow Drive, and access for the northern portion of the site will be provided at one location on the eastern access for the Home Depot shopping center on the north side of Oak Meadow Drive. Also, secondary access for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

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Traffic Engineering and Planning



No Scale

Figure 1.
Location of the Project Site

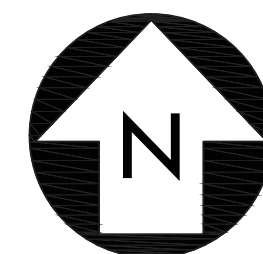
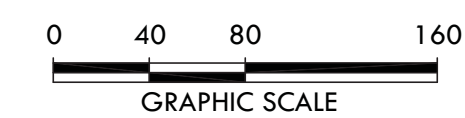


LINE TABLE		
LINE	BEARING	DISTANCE
L1	N83°48'10"W	161.22'
L2	S61°46'08"W	106.65'
L3	S86°48'30"W	198.12'
L4	N65°28'52"W	120.02'
L5	N24°43'04"W	244.21'
L6	N84°36'00"W	115.35'
L7	N52°04'01"W	87.70'
L8	N57°18'12"W	163.19'
L9	N29°52'55"W	101.80'
L10	N74°02'09"W	41.15'
L11	N48°56'27"W	137.25'
L12	S88°57'25"W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



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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	DATE	
	No.	

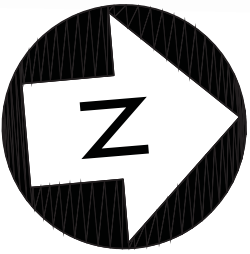
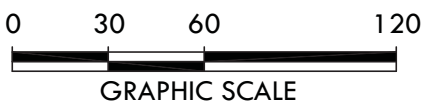
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C2.2
SOUTH SITE
DEVELOPMENT
PLAN

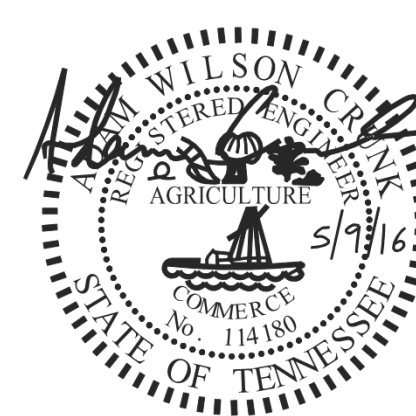


TOTAL OF 204 UNITS ON NORTH PARCEL

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



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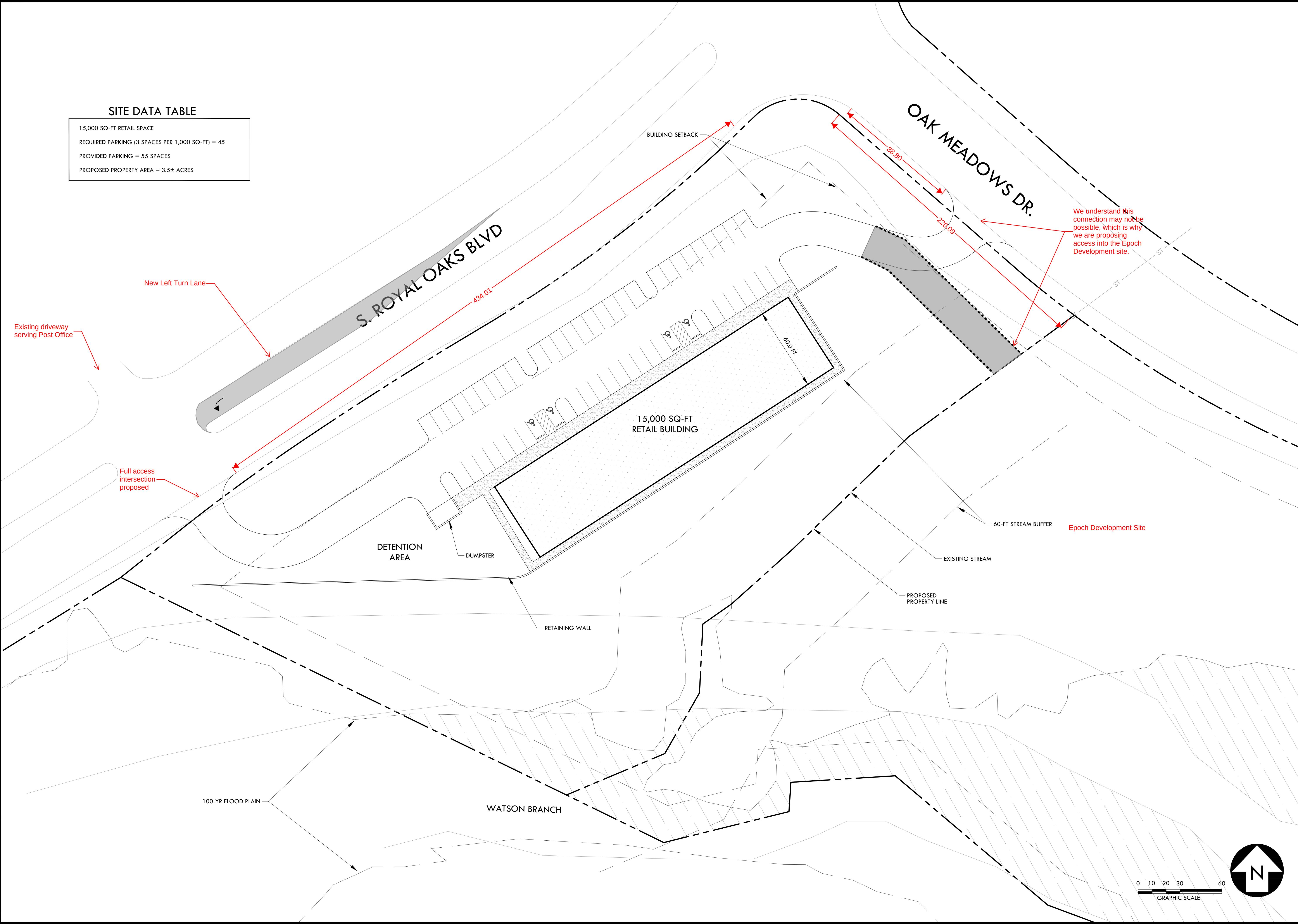


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PUD SUBDIVISION, DEVELOPMENT PLAN
COF #6086 FRANKLIN, TN

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	

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1894 GENERAL GEORGE PATTON DR.
SUITE 600
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**PROPOSED RETAIL SITE
AT
ROYAL OAKS & OAK MEADOWS DRIVE
FRANKLIN, TN**

REVISIONS	DATE
No.	

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:

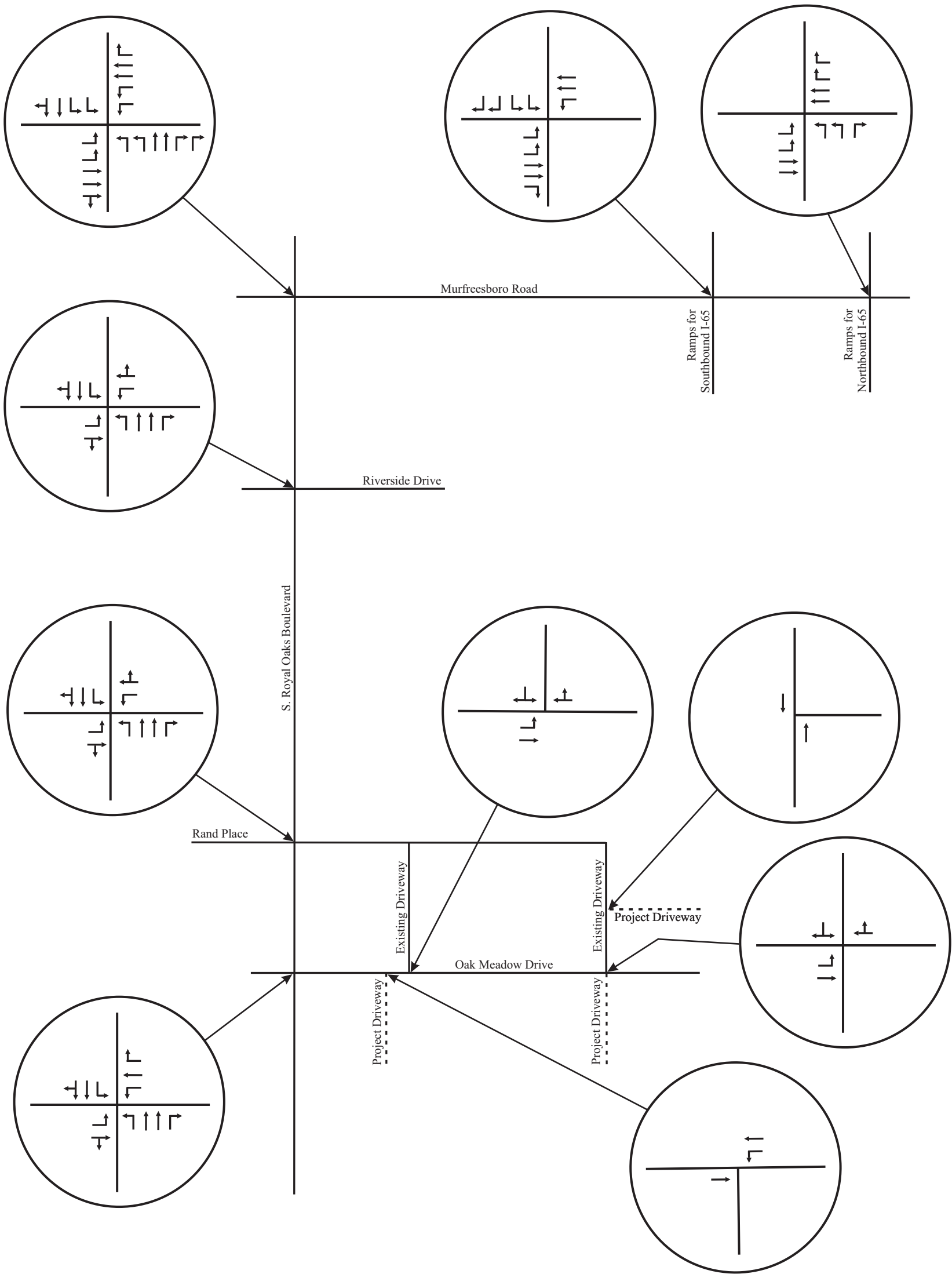
5. Murfreesboro Road and Royal Oaks Boulevard
6. Murfreesboro Road and the Ramps for Southbound I-65
7. Murfreesboro Road and the Ramps for Northbound I-65

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.

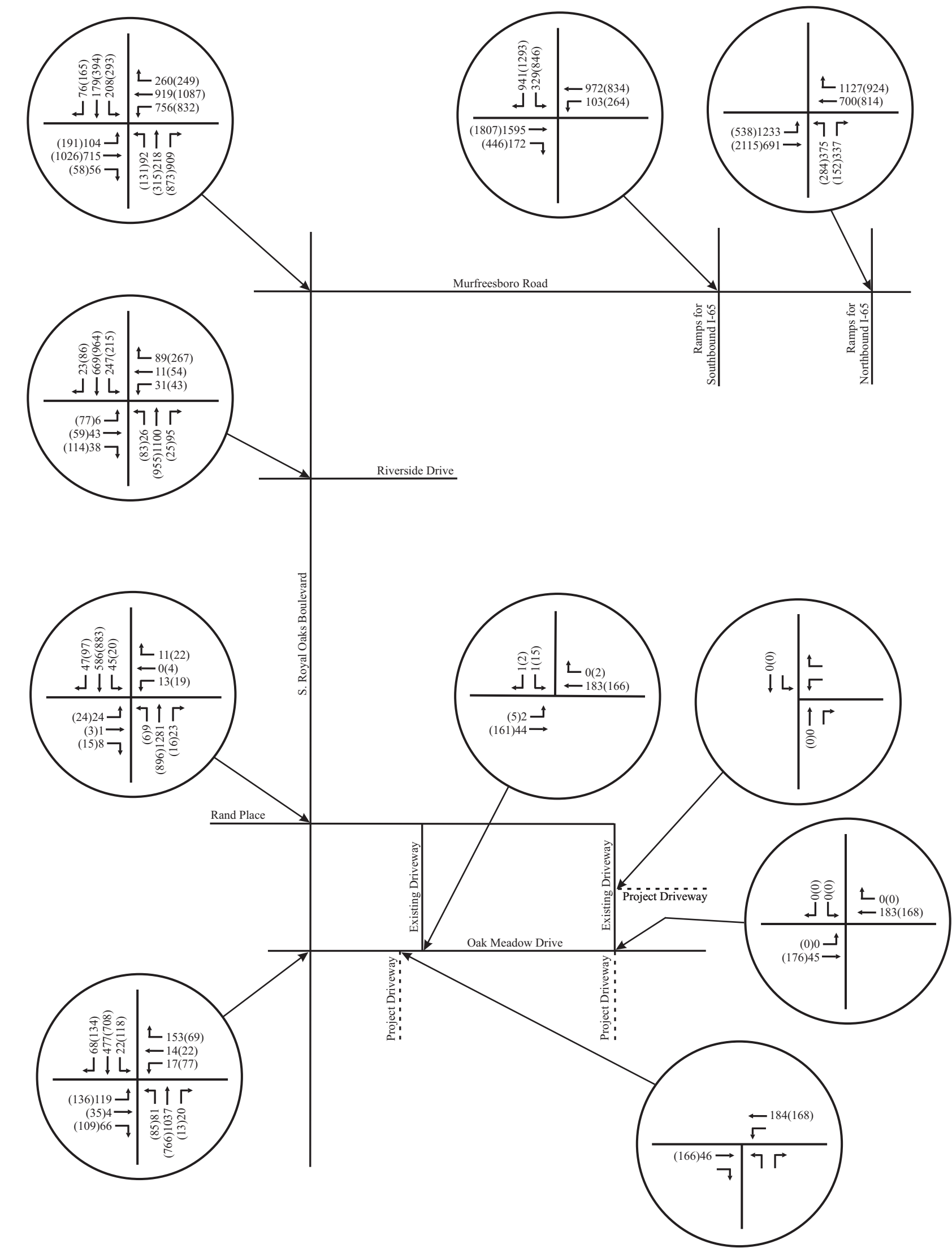
It is important to note that the City of Franklin Engineering Department provided the Synchro software files that were used to identify existing operations at the signalized intersections within the study area. Specifically, the files were updated to include the February 2016 traffic volumes. Also, the 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.



No Scale

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



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	95 TH %-ILE QUEUE	LEVEL OF SERVICE	95 TH %-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%	
2015	22,638	2.35%	
			Overall Growth
			2.65%

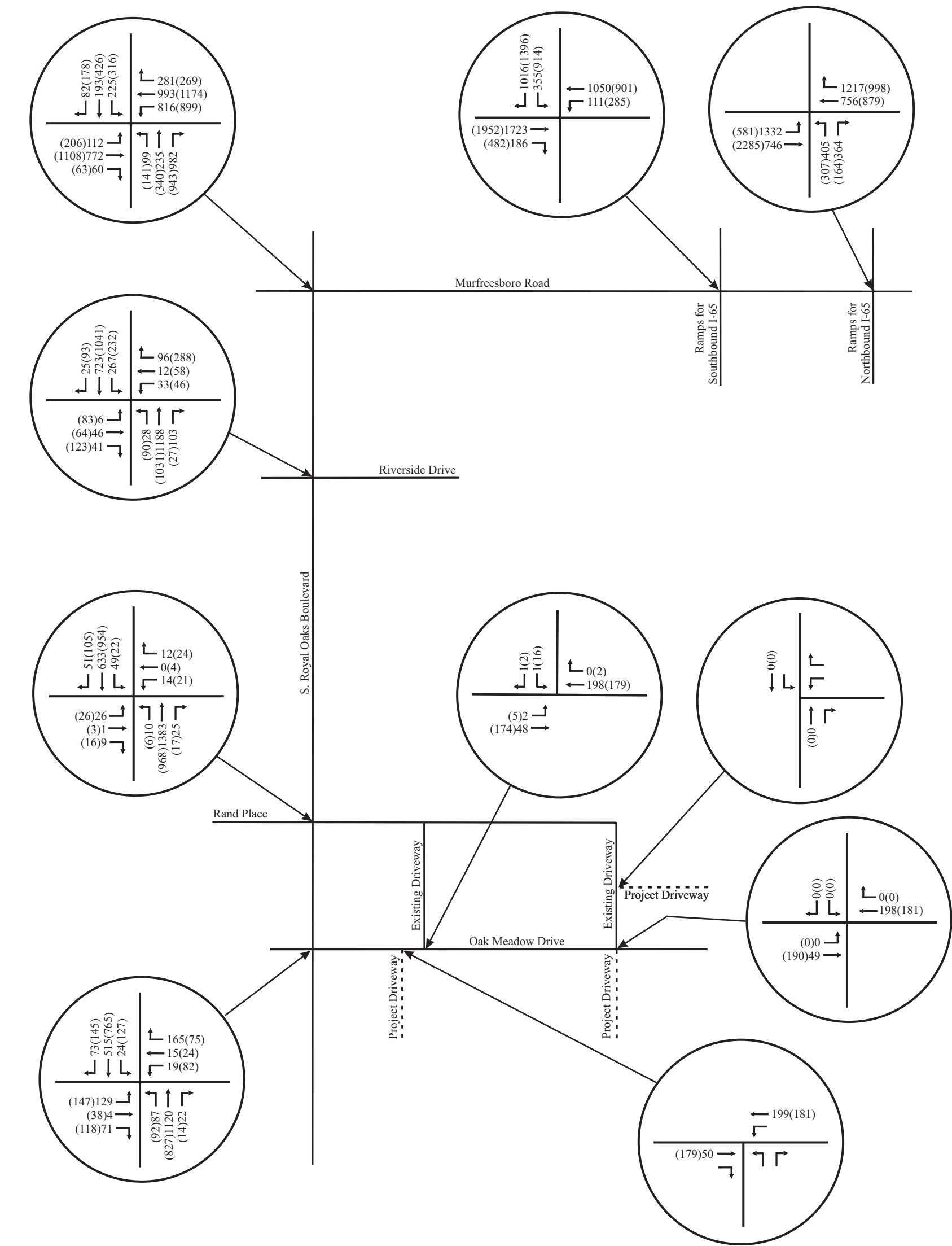


Figure 5A.
Initial Background Peak Hour Traffic Volumes within the Study Area

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.

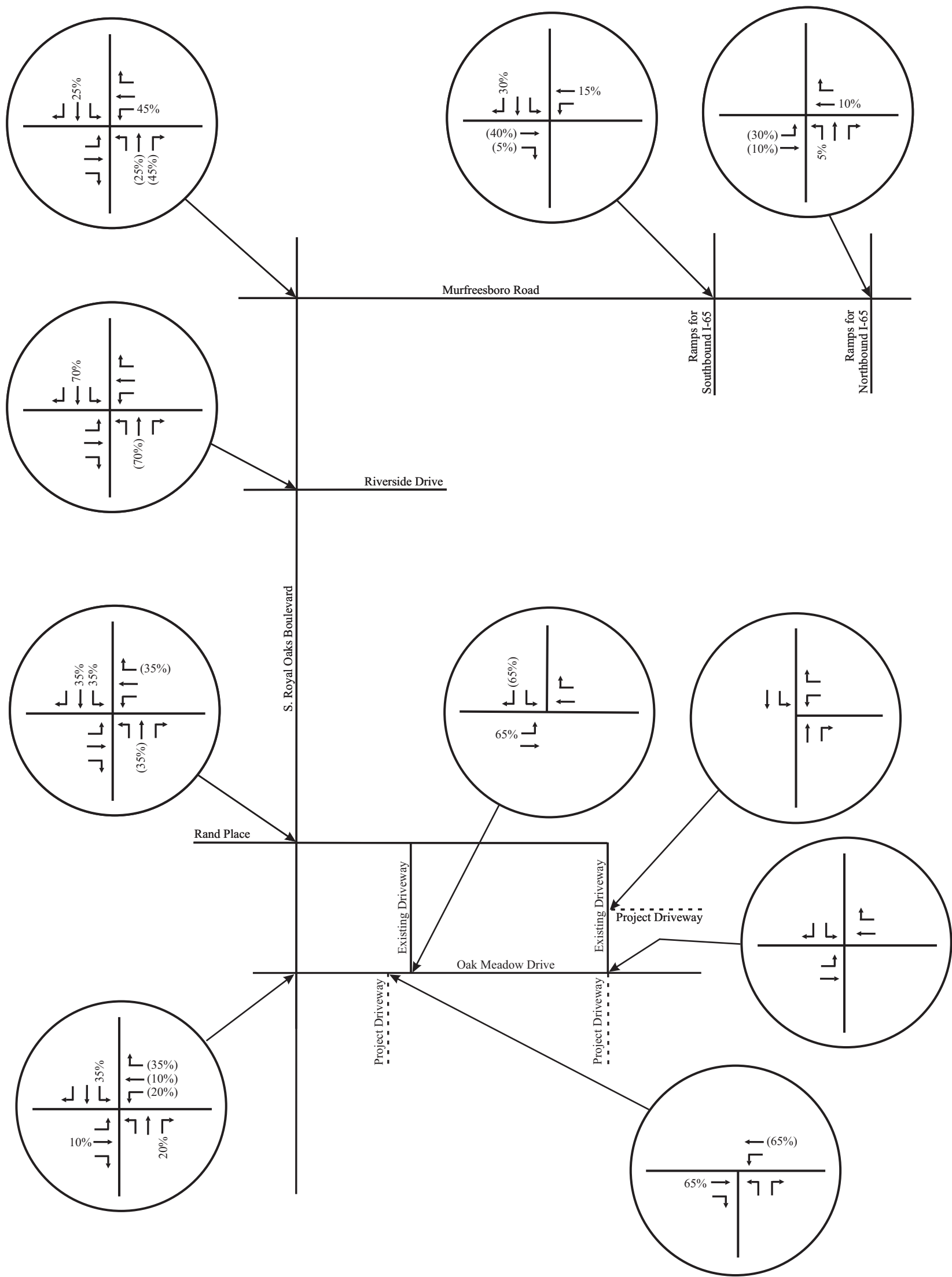
Also, it is important to note that an assisted living facility with 208 beds is under construction on the north side of Oak Meadow Drive, opposite the southern project site for the proposed project. For the purposes of this study, trip generation calculations were conducted in order to identify how much 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.

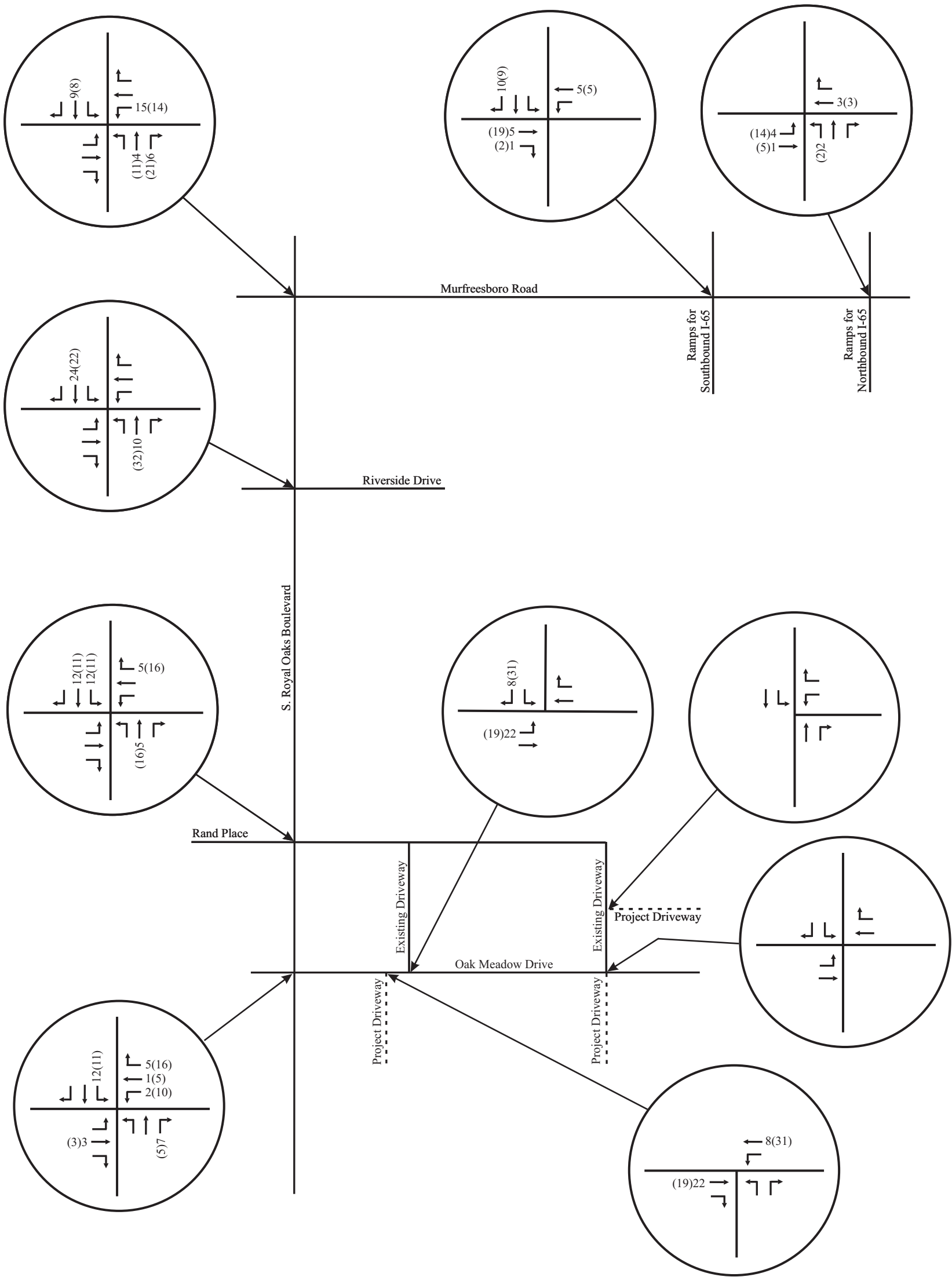
The peak hour traffic volumes shown in [Figures 5B and 5C](#) were added to the traffic volumes shown in [Figure 5A](#) in order to establish the final background traffic volumes shown in [Figure 5D](#). Using the background peak hour traffic volumes, capacity analyses were conducted for the intersections 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.



No Scale

XX - Entering Volumes
(XX) - Exiting Volumes

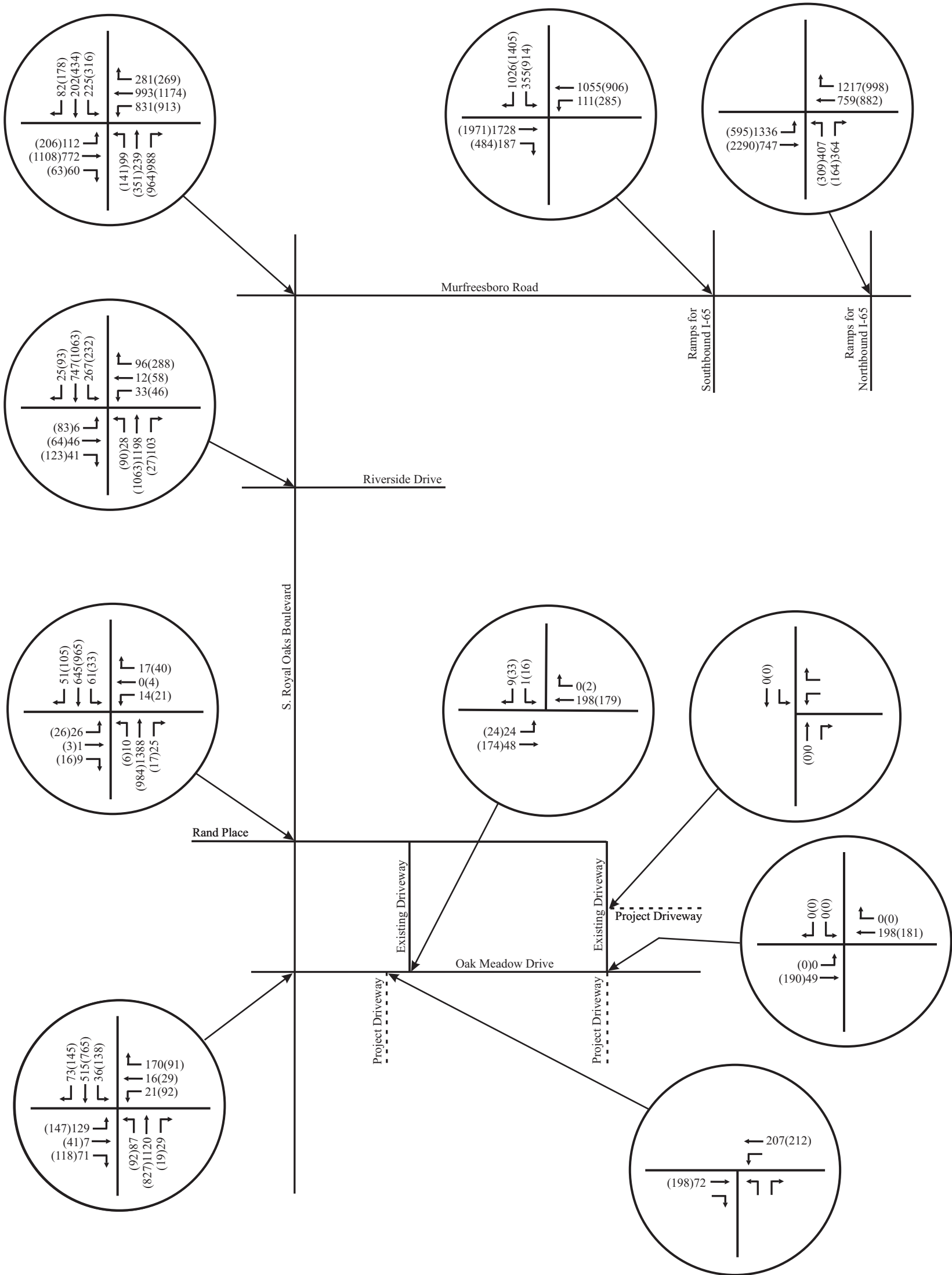
Figure 5B.
Directional Distribution of Peak Hour Traffic Generated by
the Somerby Assisted Living Facility



No Scale

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

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



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	95 TH %-ILE QUEUE	LEVEL OF SERVICE	95 TH %-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

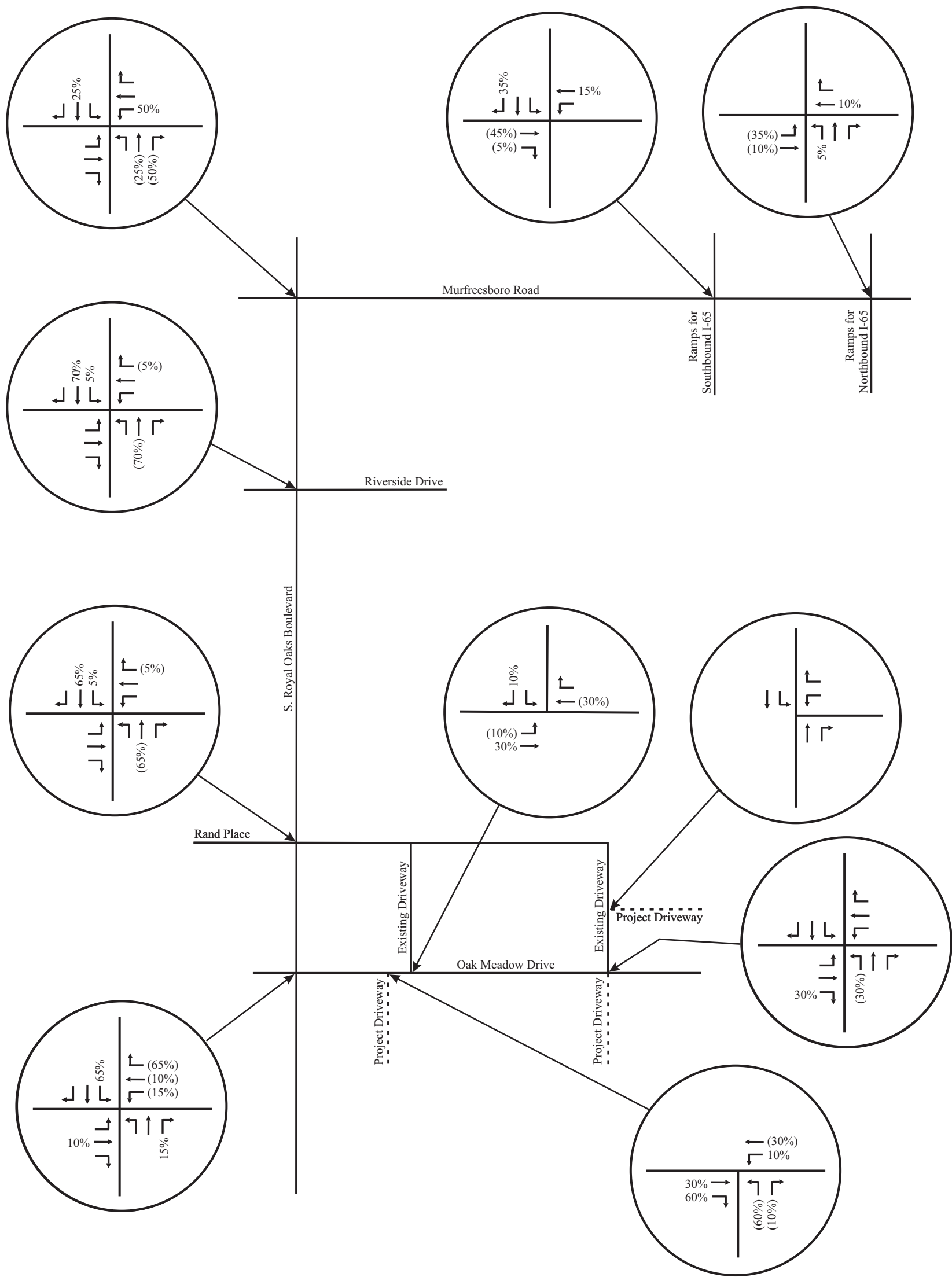
LAND USE	SIZE	DAILY TRAFFIC	GENERATED TRAFFIC			
			AM PEAK HOUR		PM PEAK HOUR	
			ENTER	EXIT	ENTER	EXIT
Office (LUC 710)	140,000 sq.ft.	1,696	220	30	40	195
Retail (LUC 820)	90,000 sq.ft.	6,342	91	56	268	290

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.

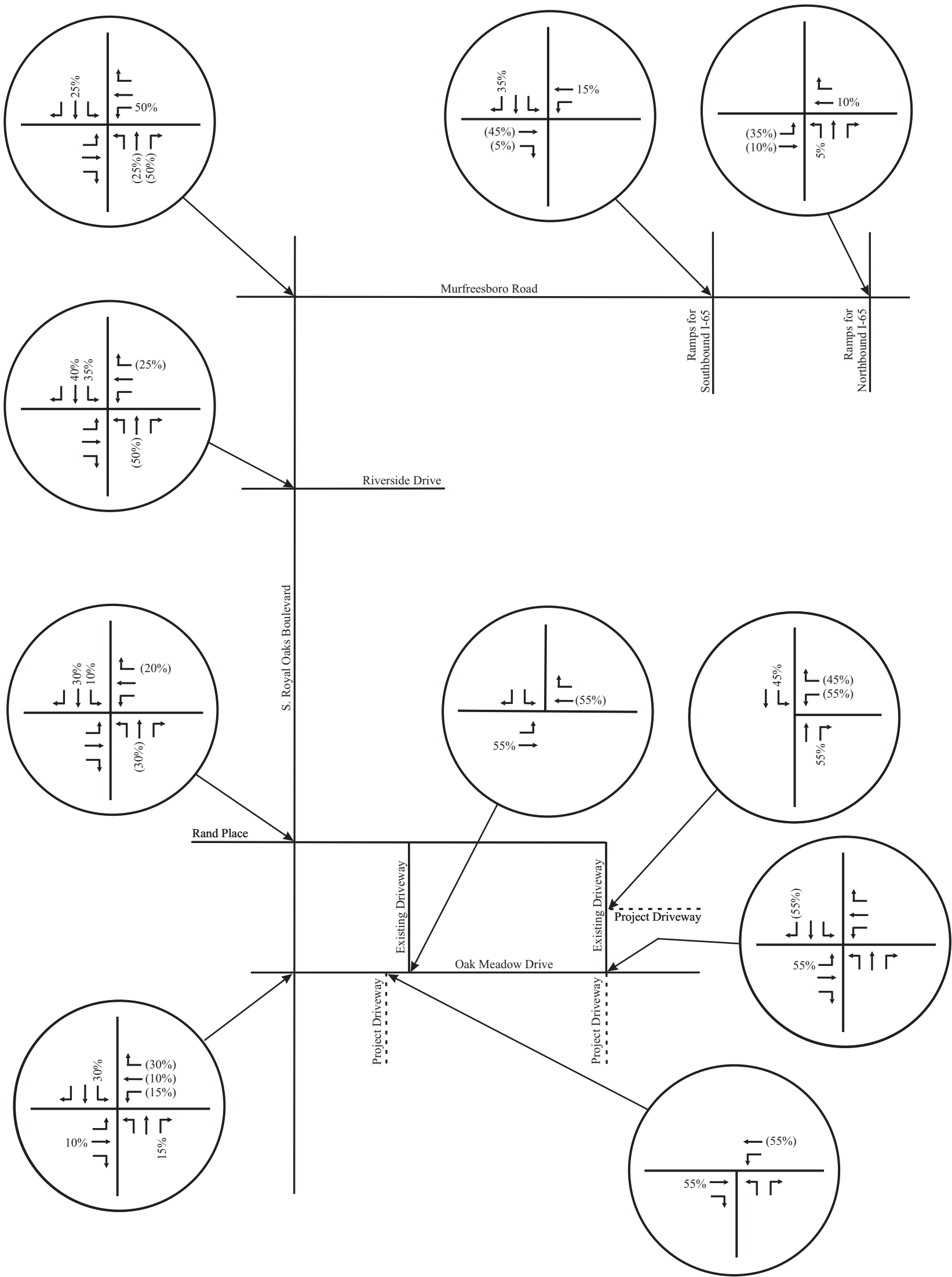
The peak hour trip generations and directional distributions were used to add the site-generated trips to the roadway system. [Figures 7A, 7B, 7C, and 7D](#) include the peak hour traffic volumes that are expected to be generated by the proposed project and the future commercial development.



No Scale

XX - Entering Volumes
(XX) - Exiting Volumes

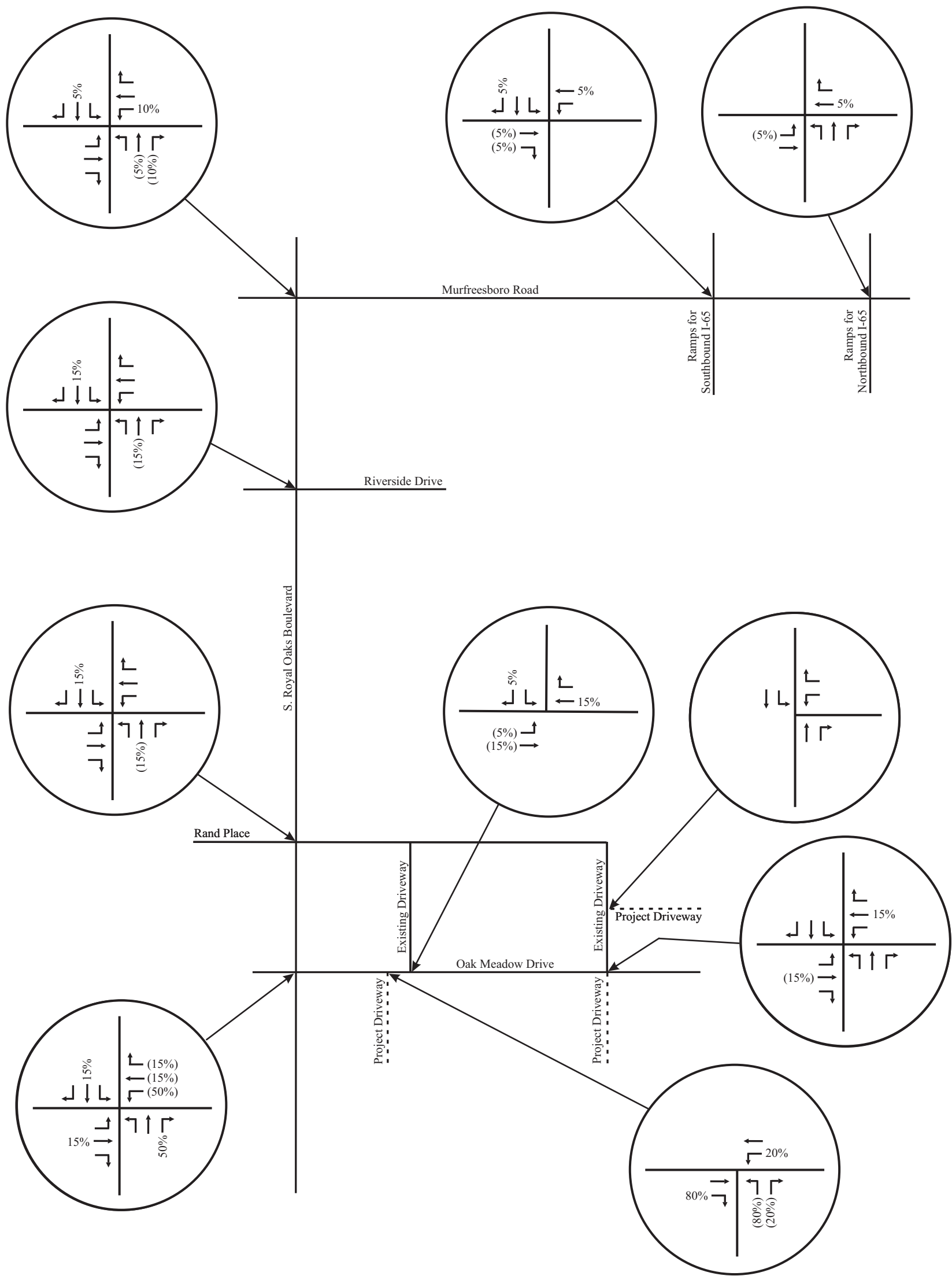
Figure 6A.
Directional Distribution of Peak Hour Traffic Volumes
Generated by the Proposed Apartments (Southern Site)



No Scale

XX - Entering Volumes
(XX) - Exiting Volumes

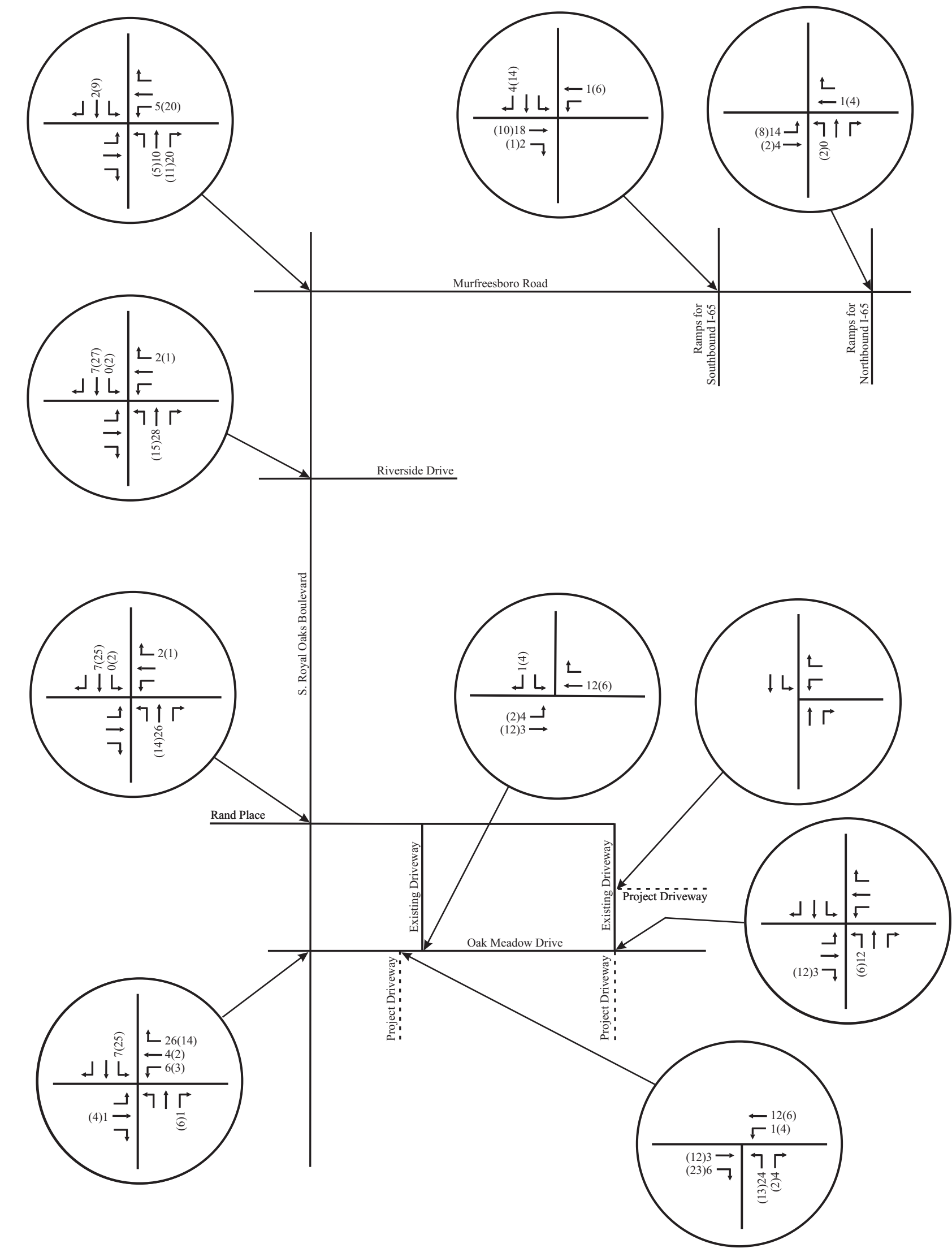
Figure 6B.
Directional Distribution of Peak Hour Traffic Volumes
Generated by the Proposed Apartments (Northern Site)



No Scale

XX - Entering Volumes
(XX) - Exiting Volumes

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

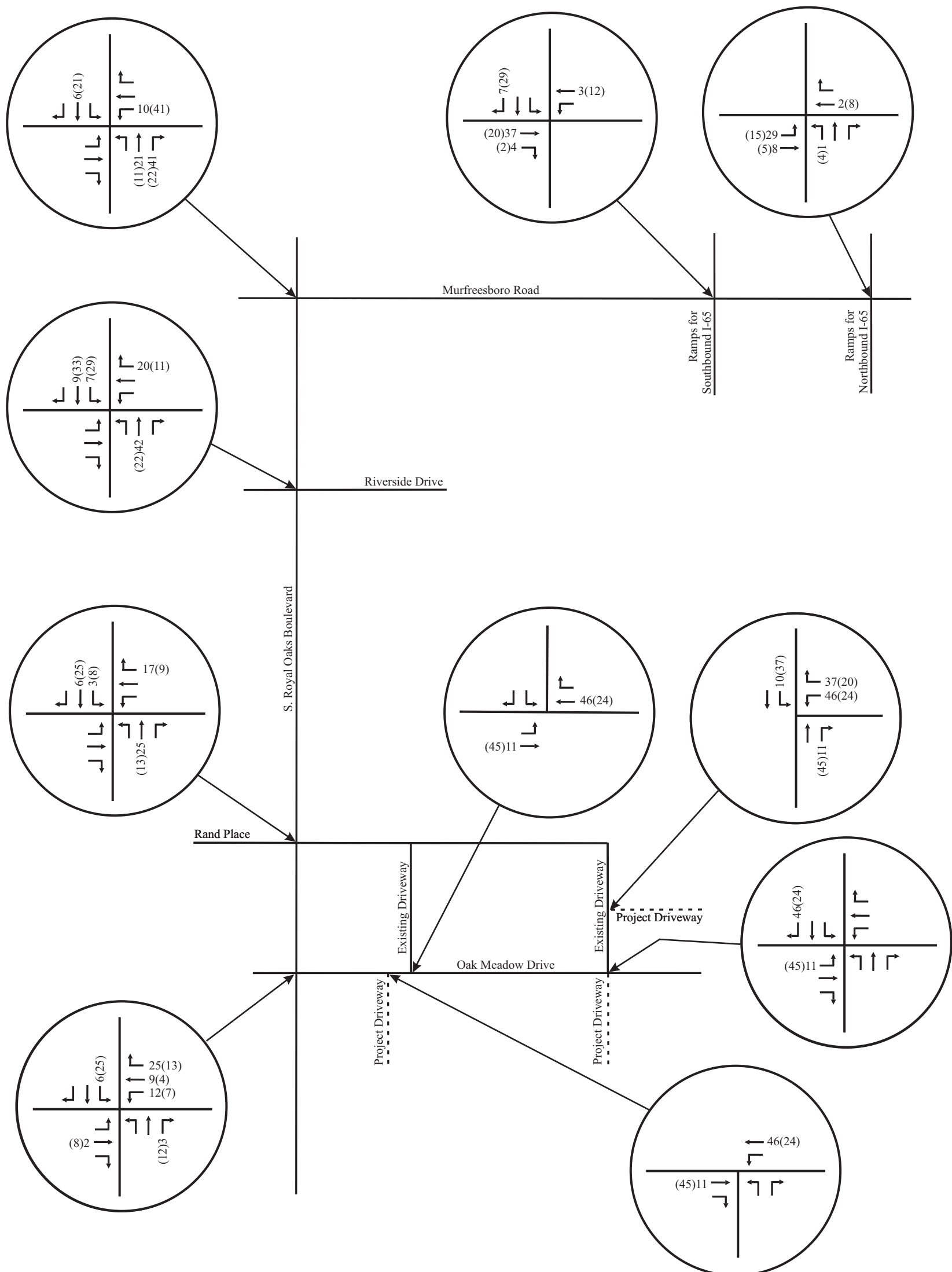


No Scale

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

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

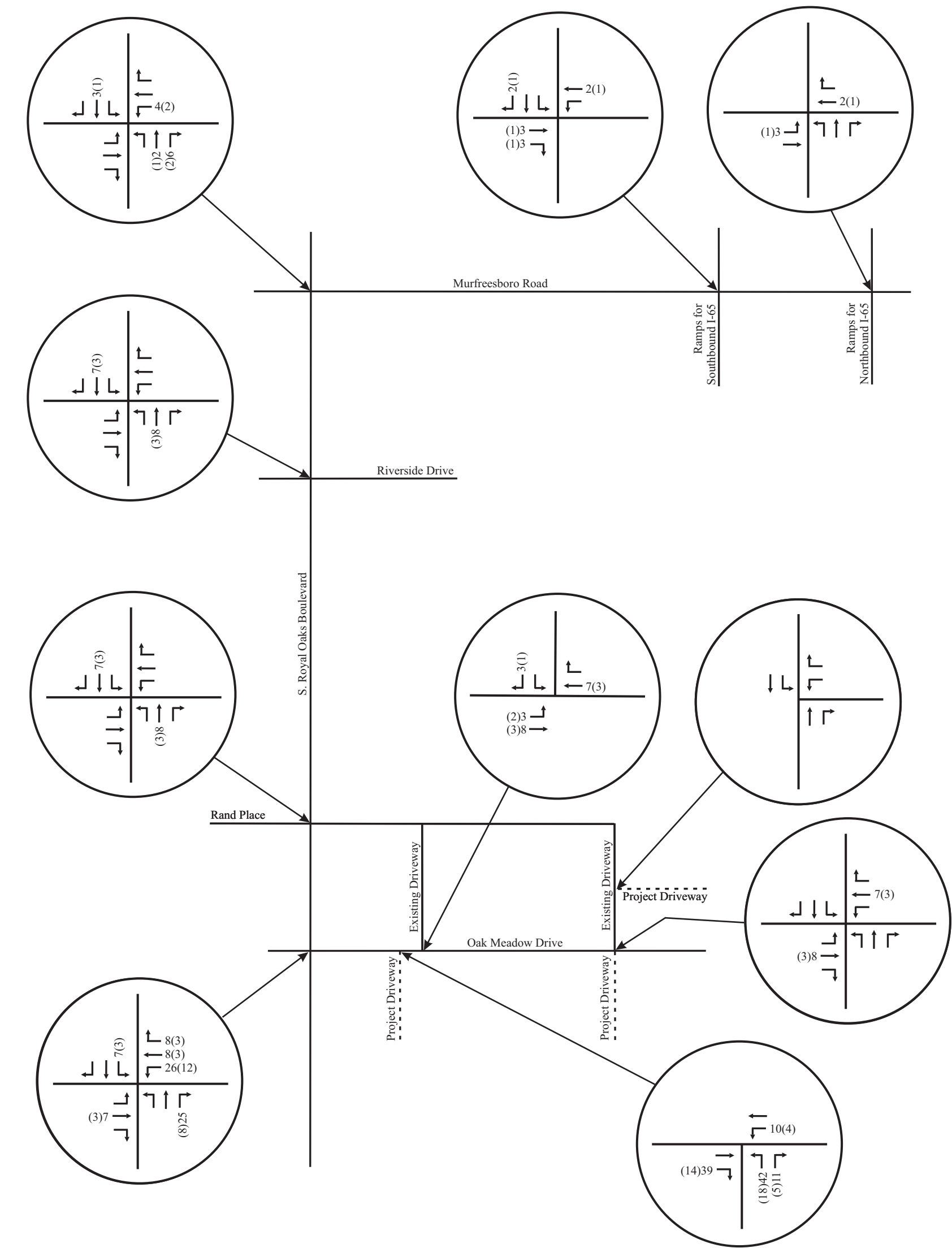
F i s c h b a c h
Transportation Group, LLC
Traffic Engineering and Planning



No Scale

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

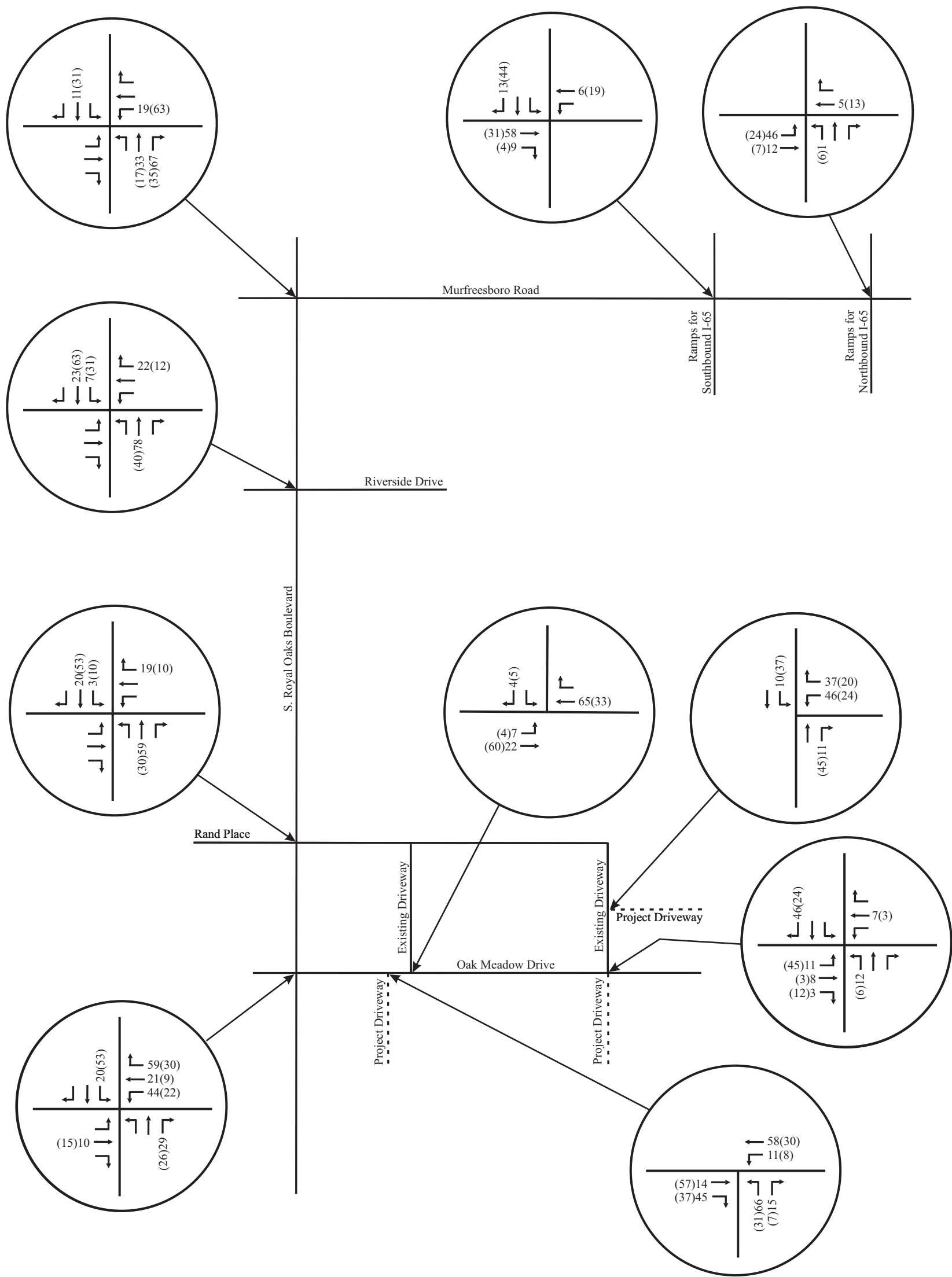
Figure 7B.
Peak Hour Traffic Volumes Generated by the
Proposed Apartments (Northern Site)



No Scale

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

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



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

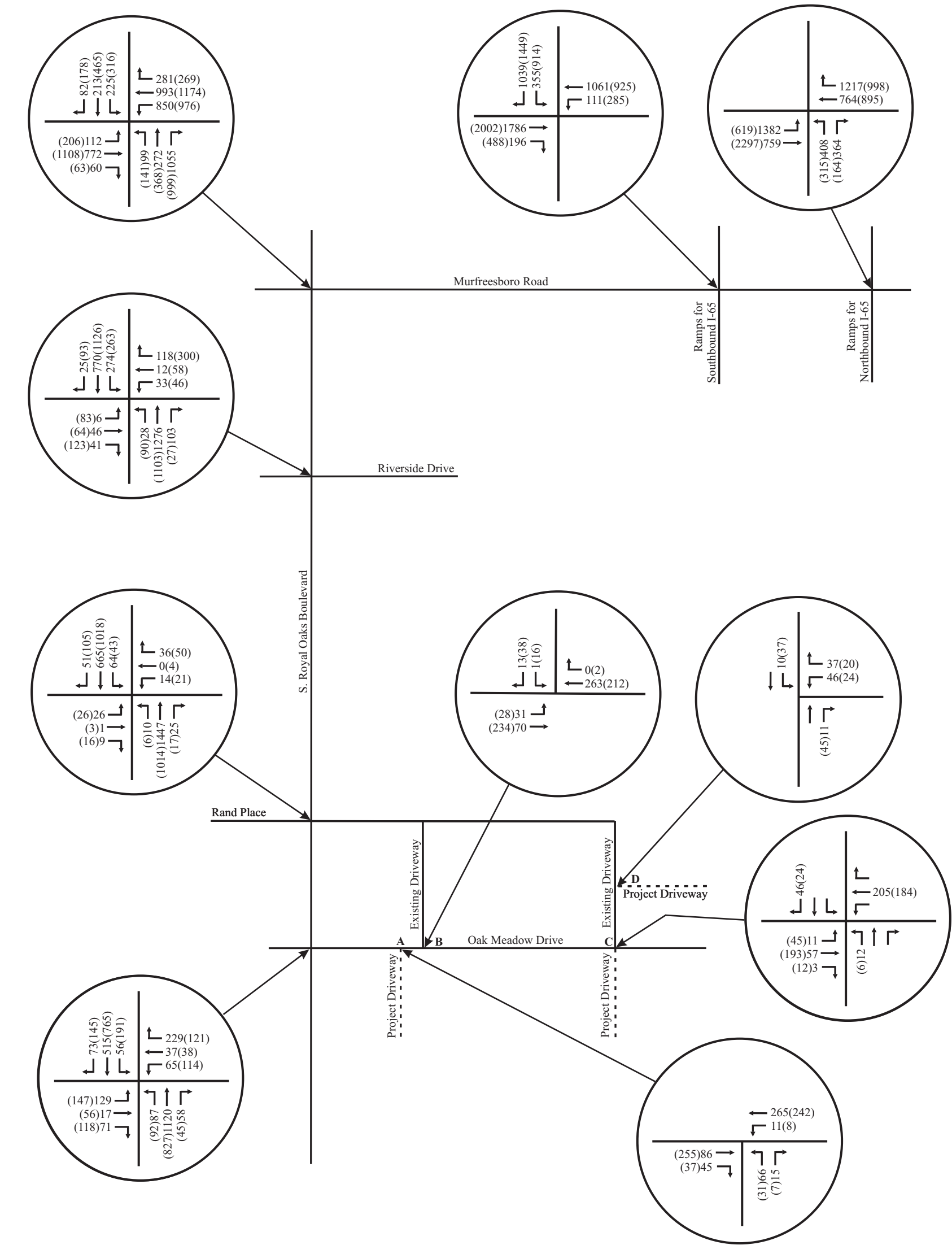
In order to identify the projected peak hour traffic volumes at the completion of the proposed project, the trips generated by the project were added to the background peak hour traffic volumes. The resulting peak hour volumes are shown in [Figure 8](#).

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.



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 and Future Retail

TABLE 7. PROJECTED PEAK HOUR LEVELS OF SERVICE

INTERSECTION	TURNING MOVEMENT	AM PEAK HOUR		PM PEAK HOUR	
		LEVEL OF SERVICE	95 TH %-ILE QUEUE	LEVEL OF SERVICE	95 TH %-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.**

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

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

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

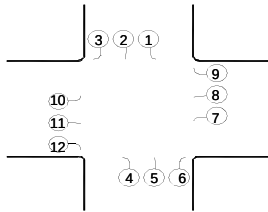
Property Owner Title: _____

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	
6:45-7:00								54			13	
7:00-7:15								50			13	
7:15-7:30								36			12	
7:30-7:45								43			7	
7:45-8:00								41			7	
8:00-8:15								33			10	
8:15-8:30								29			9	
4:30-4:45								46			33	
4:45-5:00								33			49	
5:00-5:15								41			48	
5:15-5:30								48			46	
5:30-5:45								33			38	
5:45-6:00								34			58	
6:00-6:15								25			47	
6:15-6:30								32			42	
TOTAL								602			439	
AM PK HR								183			45	
PM PK HR								168			176	

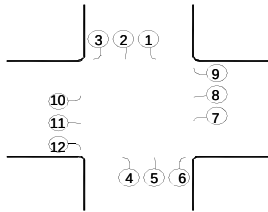
209 31
228 67
209 63
189 48
179 50
48
43
38
344 79
336 82
346 89
329 94
309 71
92
72
74

6:45-7:45
4:30-5:30

AM PK PHF								0.85			0.87	
PM PK PHF								0.88			0.90	

0.85
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	
6:45-7:00								54			13	
7:00-7:15								50		1	13	
7:15-7:30			1					36		1	12	
7:30-7:45	1							43			6	
7:45-8:00								41		1	7	
8:00-8:15	1							33			9	
8:15-8:30								29			9	
4:30-4:45	3							46		1	30	
4:45-5:00	4							33		1	45	
5:00-5:15	3		1					40	1	2	45	
5:15-5:30	5		1					47	1	1	41	
5:30-5:45	3							33		1	35	
5:45-6:00	6							34		2	52	
6:00-6:15	7							25		1	40	
6:15-6:30	5							32		1	37	
TOTAL	38		4					600	2	13	401	
AM PK HR	1		1					183		2	44	
PM PK HR	15		2					166	2	5	161	

213 32

231 67

213 64

192 50

180 50

49

43

38

351 80

343 83

354 92

335 96

314 72

94

73

75

6:45-7:45

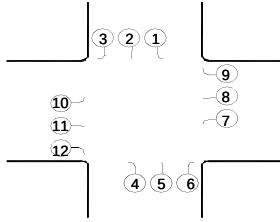
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AM PK PHF	0.25		0.25					0.85		0.50	0.85	
PM PK PHF	0.75		0.50					0.88	0.50	0.63	0.89	

0.86

0.91

INTERSECTION TRAFFIC VOLUME COUNTS

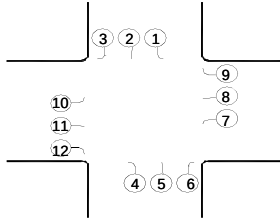


LOCATION: S. Royal Oaks Blvd and Oak Meadow Dr
DATE: 4-Feb-16 Thu
RECORDER: Burns
NOTES: signalized

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
6:45-7:00	4	88	17	17	270	7	1	4	49	31	2	12
7:00-7:15	6	115	15	14	300	6	5	2	43	26	2	16
7:15-7:30	9	117	15	23	242	4	4		33	34		17
7:30-7:45	3	157	21	27	225	3	7	8	28	28		21
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
4:45-5:00	29	179	29	18	200	6	17	2	14	25	11	31
5:00-5:15	32	170	33	28	222	5	19	5	17	35	10	29
5:15-5:30	32	172	32	22	175	2	21	6	21	32	8	23
5:30-5:45	27	150	29	16	188	4	14	3	16	33	5	28
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
PM PK HR	118	708	134	85	766	13	77	22	69	136	35	109

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	
6:45-7:00	10	132	8	2	358	6	2		1	5		1
7:00-7:15	15	119	12		364	5	1		1	8	1	1
7:15-7:30	9	153	9	4	264	5	2		7	4		4
7:30-7:45	11	182	18	3	295	7	8		2	7		2
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
4:45-5:00	5	211	27	1	209	3	3		8	6	1	6
5:00-5:15	5	228	26	2	235	4	4	3	3	5		2
5:15-5:30	5	237	25	2	234	4	1	1	5	5	1	3
5:30-5:45	2	262	17	4	156	1	5	1	3	12		4
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
PM PK HR	20	883	97	6	896	16	19	4	22	24	3	15

1,934

2,048

2,029

1,968

1,986

2,005

1,987

1,967

1,888

1,720

6:45-7:45

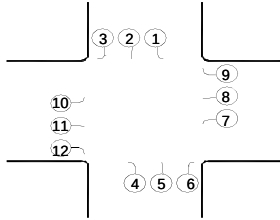
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AM PK PHF	0.75	0.80	0.65	0.56	0.88	0.82	0.41		0.39	0.75	0.25	0.50
PM PK PHF	1.00	0.93	0.90	0.75	0.95	0.80	0.43	0.33	0.69	0.75	0.75	0.63

0.97

0.96

INTERSECTION TRAFFIC VOLUME COUNTS

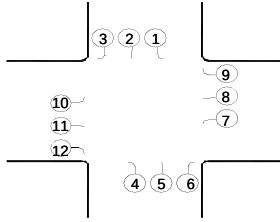


LOCATION: S. Royal Oaks Blvd and Center Point Pl and Riverside Dr
DATE: 4-Feb-16 Thu
RECORDER: Burns
NOTES: signalized

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

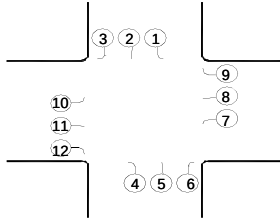


LOCATION: Murfreesboro Road and Royal Oaks Blvd
DATE: 11-Feb-16 Thu
RECORDER: Burns
NOTES: signalized

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
6:45-7:00	69		181				31				406	47
7:00-7:15	66		139				30				471	49
7:15-7:30	73		196				37				452	57
7:30-7:45	61		237				32				432	46
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
4:45-5:00	222		322				48				388	95
5:00-5:15	197		298				76				470	119
5:15-5:30	222		374				69				469	118
5:30-5:45	175		319				56				385	102
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
PM PK HR	846		1,293				264				1,807	446

2,929

3,112

3,159

3,168

3,140

4,656

4,524

4,499

4,376

4,089

7:15-8:15

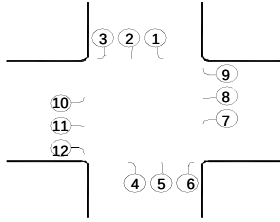
4:30-5:30

AM PK PHF	0.85		0.92				0.91				0.96	1.03
PM PK PHF	0.95		0.86				0.87				0.94	0.94

0.97

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

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

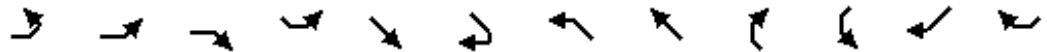
5/17/2016

												
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	

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/17/2016



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 Effect 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

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/17/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
14 s	50 s	12 s	27 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	50 s	12 s	27 s

Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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 Effect 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	

Lanes, Volumes, Timings

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

5/17/2016

												
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

 Ø1	 Ø2 (R)	 Ø4
17 s	73 s	50 s
 Ø5	 Ø6 (R)	 Ø8
17 s	73 s	50 s

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/17/2016

												
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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/17/2016

												
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 Effect 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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/17/2016

												
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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
21 s	66 s	21 s	32 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
45 s	42 s	21 s	32 s

Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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					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 Effect 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

Lanes, Volumes, Timings

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

5/17/2016

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

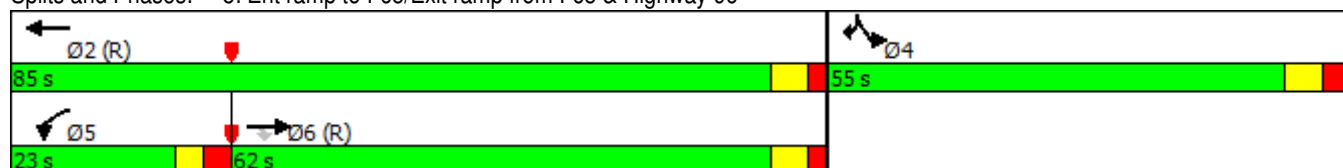
Analysis Period (min) 15

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



Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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

Lanes, Volumes, Timings

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

5/17/2016

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

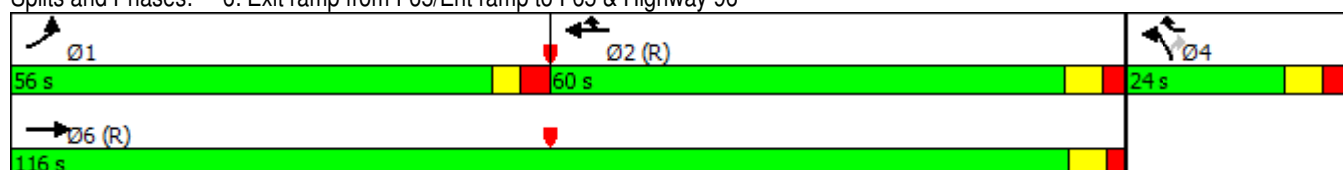
~ Volume exceeds capacity, queue is theoretically infinite.

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



Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/17/2016

												
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	

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/17/2016

												
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 Effect 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												

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/17/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
18 s	53 s	14 s	35 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	57 s	14 s	35 s

Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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 Effect 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	

Lanes, Volumes, Timings

3: S Royal Oaks & Riverside Dr/Center Point PI

5/17/2016

												
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 PI



Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/17/2016

												
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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/17/2016

												
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 Effect 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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/17/2016

												
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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
25 s	69 s	22 s	34 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
42 s	52 s	22 s	34 s

Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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)		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 Effect 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

Lanes, Volumes, Timings

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

5/17/2016

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



Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

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

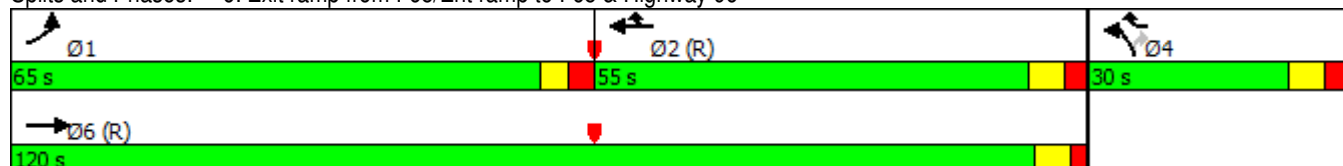
Intersection Capacity Utilization 79.1%

ICU Level of Service D

Analysis Period (min) 15

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

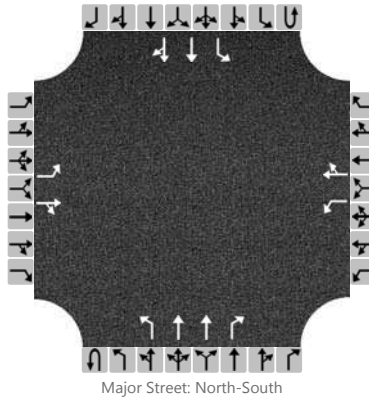
Splits and Phases: 6: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	S. Royal Oaks and Rand
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	Mar 2016	East/West Street	Rand Pl / Home Depot
Analysis Year	2016	North/South Street	S. Royal Oaks Blvd
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.97
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Existing)		

Lanes



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															

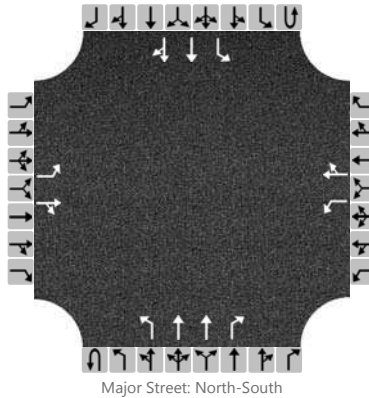
Delay, Queue Length, and Level of Service

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			

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	S. Royal Oaks and Rand
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	Mar 2016	East/West Street	Rand Pl / Home Depot
Analysis Year	2016	North/South Street	S. Royal Oaks Blvd
Time Analyzed	PM Peak Hour	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Existing)		

Lanes



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															

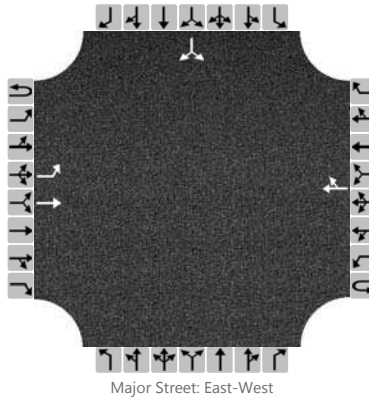
Delay, Queue Length, and Level of Service

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			

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	AM Peak Hour	Peak Hour Factor	0.80
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	10728 (Existing)		

Lanes



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															

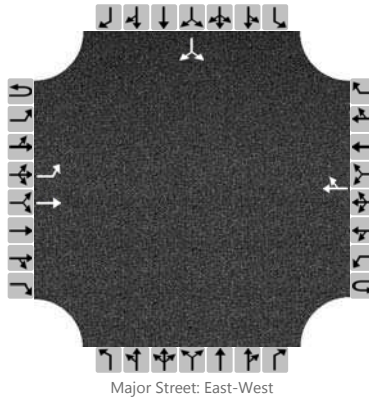
Delay, Queue Length, and Level of Service

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			

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 (Existing)		

Lanes



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			

BACKGROUND CONDITIONS

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

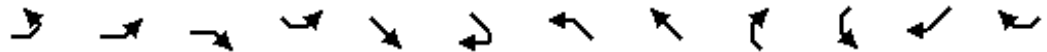
5/17/2016

												
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	

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/17/2016



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 Effect 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

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/17/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
14 s	50 s	12 s	27 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	50 s	12 s	27 s

Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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 Effect 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	

Lanes, Volumes, Timings

3: S Royal Oaks & Riverside Dr/Center Point PI

5/17/2016

												
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 PI



Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/17/2016

												
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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/17/2016

												
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 Effect 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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/17/2016

												
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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
21 s	66 s	21 s	32 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
45 s	42 s	21 s	32 s

Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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					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 Effect 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

Lanes, Volumes, Timings

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

5/17/2016

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.

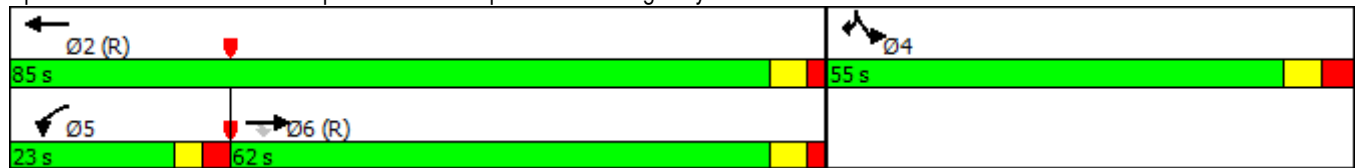
Queue shown is maximum after two cycles.

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



Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

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

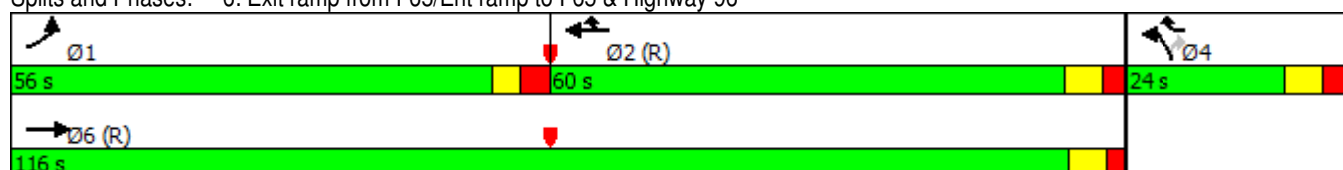
~ Volume exceeds capacity, queue is theoretically infinite.

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



Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/17/2016

												
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	

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/17/2016

												
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 Effect 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												

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/17/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
18 s	53 s	14 s	35 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	57 s	14 s	35 s

Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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 Effect 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	

Lanes, Volumes, Timings

3: S Royal Oaks & Riverside Dr/Center Point PI

5/17/2016

												
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.

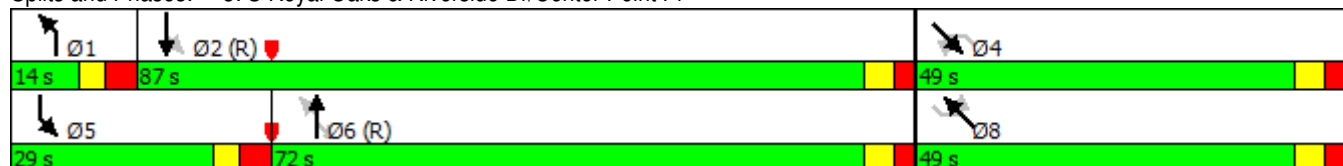
Queue shown is maximum after two cycles.

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 PI



Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

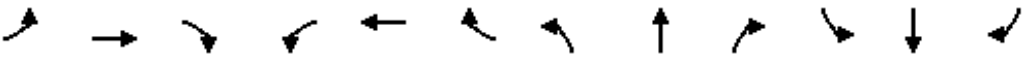
5/17/2016

												
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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/17/2016

												
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 Effect 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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/17/2016

												
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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
25 s	69 s	22 s	34 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
42 s	52 s	22 s	34 s

Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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)		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 Effect 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

Lanes, Volumes, Timings

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

5/17/2016

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



Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

												
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												

Lanes, Volumes, Timings

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

5/17/2016

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

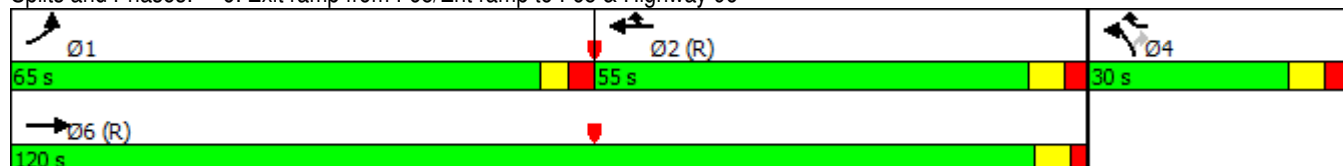
Intersection Capacity Utilization 84.7%

ICU Level of Service E

Analysis Period (min) 15

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

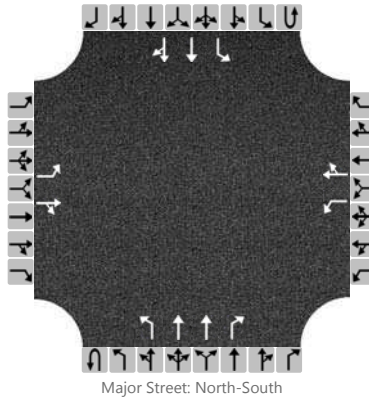
Splits and Phases: 6: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	S. Royal Oaks and Rand
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	Mar 2016	East/West Street	Rand Pl / Home Depot
Analysis Year	2016	North/South Street	S. Royal Oaks Blvd
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.97
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Background)		

Lanes



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															

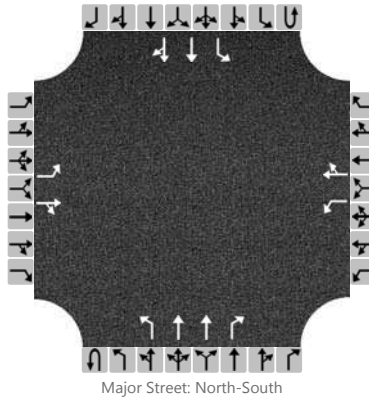
Delay, Queue Length, and Level of Service

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			

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	S. Royal Oaks and Rand
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	Mar 2016	East/West Street	Rand Pl / Home Depot
Analysis Year	2016	North/South Street	S. Royal Oaks Blvd
Time Analyzed	PM Peak Hour	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Background)		

Lanes



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															

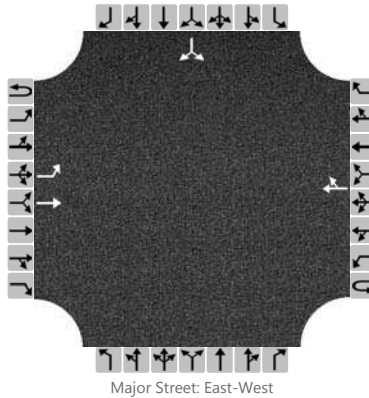
Delay, Queue Length, and Level of Service

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			

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	AM Peak Hour	Peak Hour Factor	0.80
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	10728 (Background)		

Lanes



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															

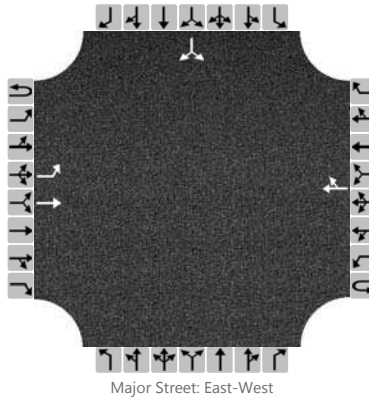
Delay, Queue Length, and Level of Service

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			

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



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			

TOTAL PROJECTED CONDITIONS

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

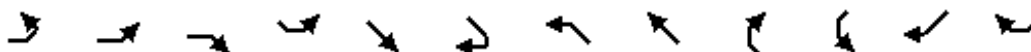
5/25/2016

												
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	

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/25/2016



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 Effect 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

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/25/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
14 s	50 s	12 s	27 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	50 s	12 s	27 s

Lanes, Volumes, Timings

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

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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 Effect 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	

Lanes, Volumes, Timings

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

5/25/2016

												
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



Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

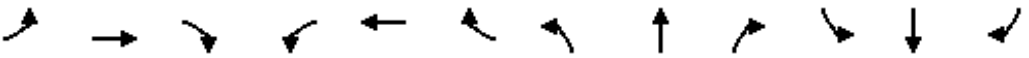
5/25/2016

												
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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

												
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 Effect 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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

												
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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
21 s	66 s	21 s	32 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
45 s	42 s	21 s	32 s

Lanes, Volumes, Timings

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

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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					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 Effect 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

Lanes, Volumes, Timings

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

5/25/2016

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.

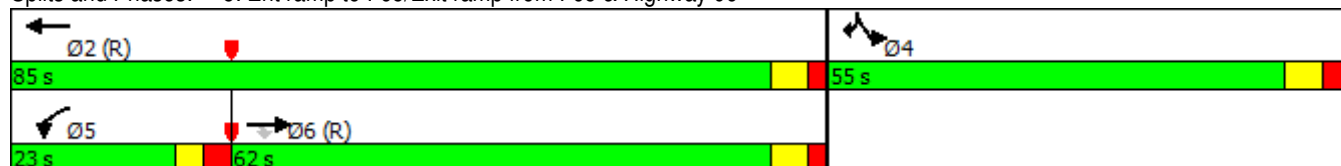
Queue shown is maximum after two cycles.

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



Lanes, Volumes, Timings

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

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

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

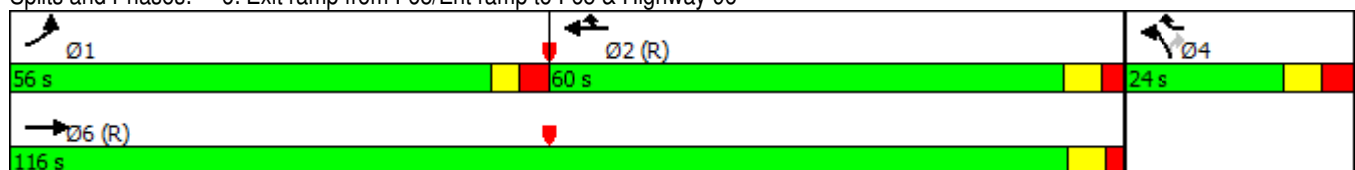
~ Volume exceeds capacity, queue is theoretically infinite.

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



Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/25/2016

												
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	

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/25/2016

												
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 Effect 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												

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/25/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
18 s	53 s	14 s	35 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	57 s	14 s	35 s

Lanes, Volumes, Timings

3: S Royal Oaks & Riverside Dr/Center Point PI

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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 Effect 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	

Lanes, Volumes, Timings

3: S Royal Oaks & Riverside Dr/Center Point PI

5/25/2016

												
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.

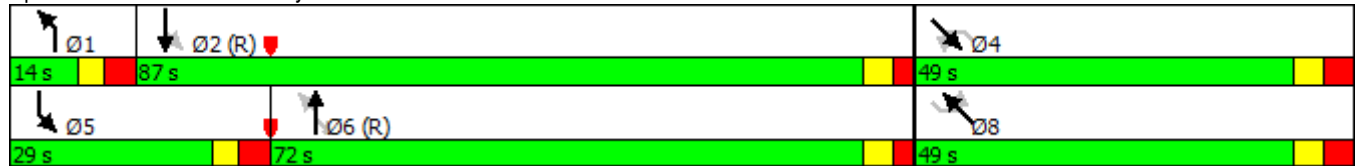
Queue shown is maximum after two cycles.

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 PI



Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

												
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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

												
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 Effect 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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

												
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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
25 s	69 s	22 s	34 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
42 s	52 s	22 s	34 s

Lanes, Volumes, Timings

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

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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)		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 Effect 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

Lanes, Volumes, Timings

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

5/25/2016

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.

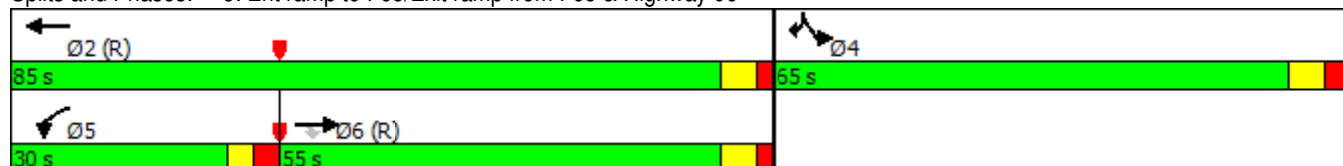
Queue shown is maximum after two cycles.

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



Lanes, Volumes, Timings

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

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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

Lanes, Volumes, Timings

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

5/25/2016

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

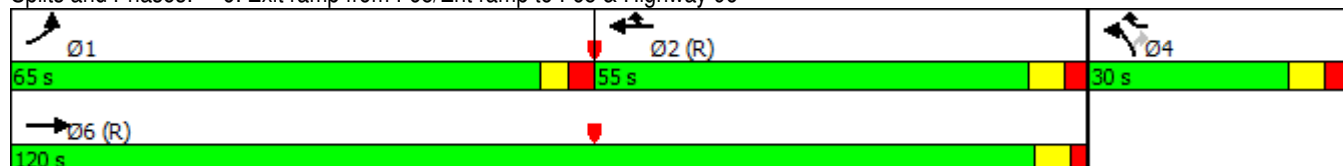
Intersection Capacity Utilization 84.9%

ICU Level of Service E

Analysis Period (min) 15

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

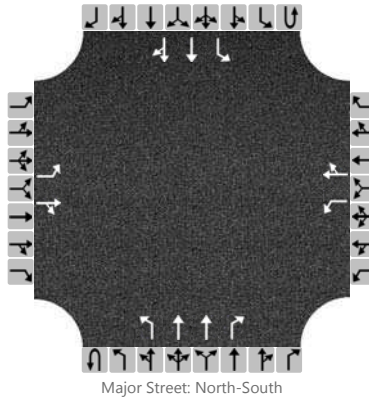
Splits and Phases: 6: Exit ramp from I-65/Ent ramp to I-65 & Highway 96



HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	S. Royal Oaks and Rand
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	May 2016	East/West Street	Rand Pl / Home Depot
Analysis Year	2016	North/South Street	S. Royal Oaks Blvd
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.97
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Total)		

Lanes



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															

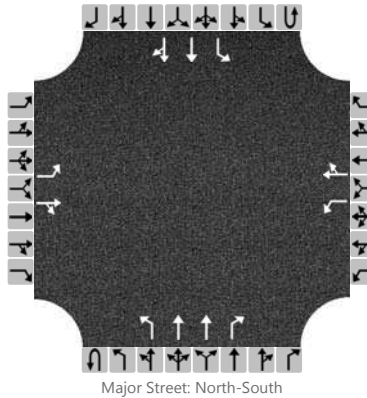
Delay, Queue Length, and Level of Service

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			

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	S. Royal Oaks and Rand
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	May 2016	East/West Street	Rand Pl / Home Depot
Analysis Year	2016	North/South Street	S. Royal Oaks Blvd
Time Analyzed	PM Peak Hour	Peak Hour Factor	0.96
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Total)		

Lanes



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															

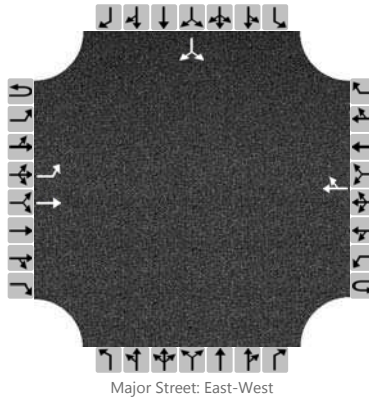
Delay, Queue Length, and Level of Service

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			

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	May 2016	East/West Street	Oak Meadow Drive
Analysis Year	2016	North/South Street	Western Home Depot dwy
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.80
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	10728 (Total)		

Lanes



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															

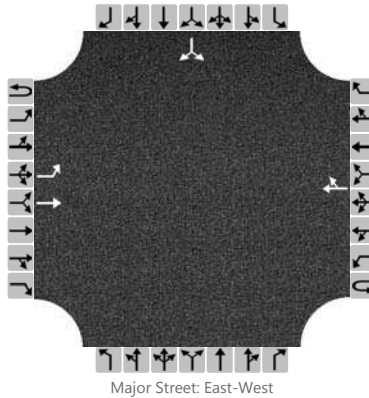
Delay, Queue Length, and Level of Service

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			

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	May 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 (Total)		

Lanes



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															

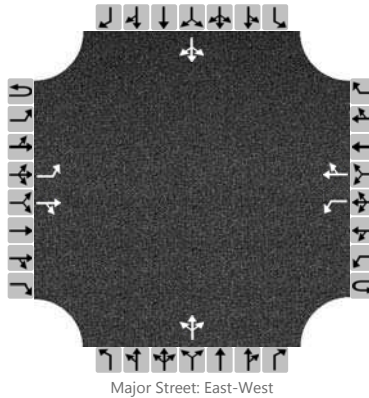
Delay, Queue Length, and Level of Service

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			

HCS 2010 Two-Way Stop Control Summary Report

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

Lanes



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															

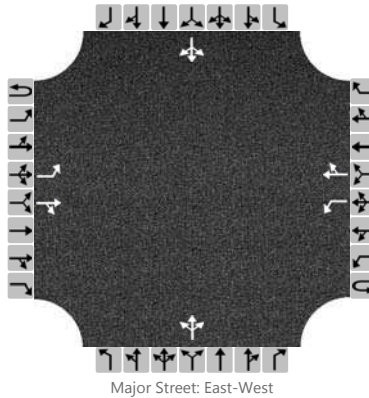
Delay, Queue Length, and Level of Service

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			

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	Oak Meadow Dr and east dw
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	May 2016	East/West Street	Oak Meadow Drive
Analysis Year	2016	North/South Street	Eastern 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 (Total)		

Lanes



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															

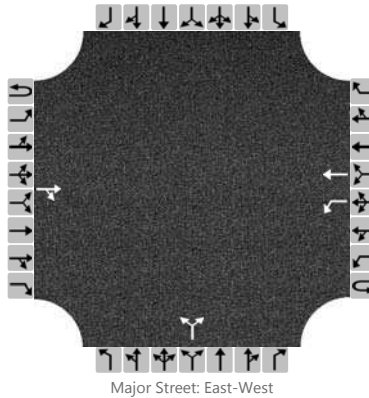
Delay, Queue Length, and Level of Service

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			

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	Oak Meadow Dr and west dw
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	May 2016	East/West Street	Oak Meadow Drive
Analysis Year	2016	North/South Street	Western project dwy
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.80
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	10728 (Total)		

Lanes



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															

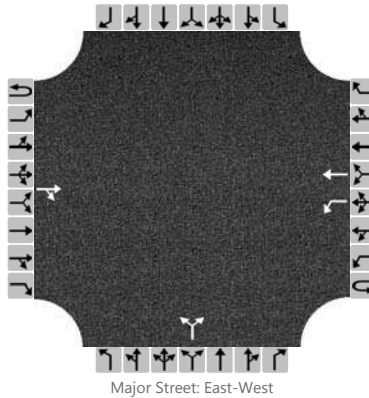
Delay, Queue Length, and Level of Service

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							

HCS 2010 Two-Way Stop Control Summary Report

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

Lanes



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															

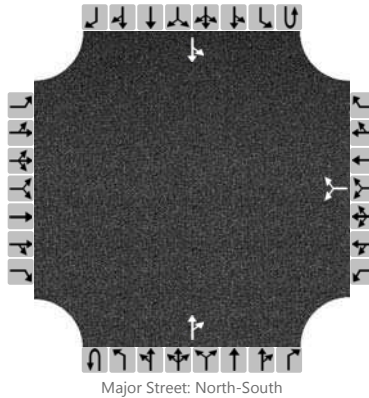
Delay, Queue Length, and Level of Service

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							

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	Home Depot and Apt Dwy
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	May 2016	East/West Street	Project Driveway
Analysis Year	2016	North/South Street	Home Depot Access
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.80
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Total)		

Lanes



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																

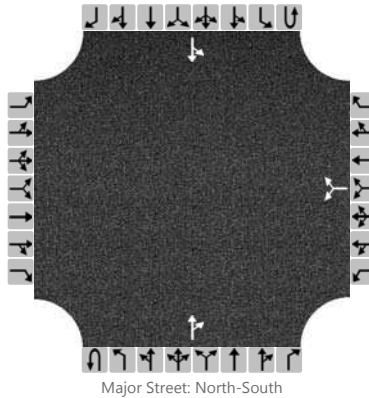
Delay, Queue Length, and Level of Service

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			

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	FTG	Intersection	Home Depot and Apt Dwy
Agency/Co.	FTG	Jurisdiction	Franklin, TN
Date Performed	May 2016	East/West Street	Project Driveway
Analysis Year	2016	North/South Street	Home Depot Access
Time Analyzed	PM Peak Hour	Peak Hour Factor	0.80
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	10728 (Total)		

Lanes



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			

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

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/25/2016

												
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	

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/25/2016

												
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 Effect 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												

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/25/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
14 s	50 s	12 s	27 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	50 s	12 s	27 s

Lanes, Volumes, Timings

3: S Royal Oaks & Riverside Dr/Center Point PI

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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 Effect 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	

Lanes, Volumes, Timings

3: S Royal Oaks & Riverside Dr/Center Point PI

5/25/2016

												
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 PI

 Ø1	 Ø2 (R)	 Ø3	 Ø4
17 s	73 s	10 s	50 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
17 s	73 s	10 s	50 s

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

												
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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

												
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 Effect 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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

												
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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
21 s	66 s	21 s	32 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
45 s	42 s	21 s	32 s

Lanes, Volumes, Timings

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

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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					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 Effect 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

Lanes, Volumes, Timings

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

5/25/2016

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.

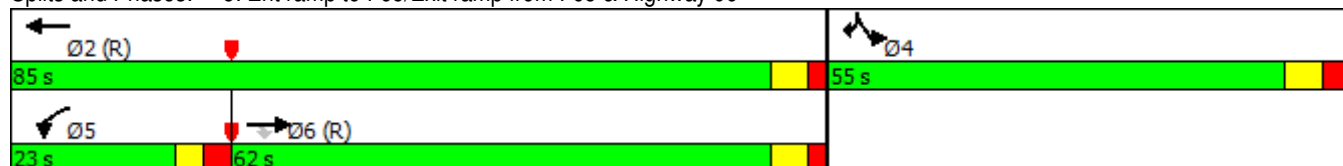
Queue shown is maximum after two cycles.

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



Lanes, Volumes, Timings

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

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

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

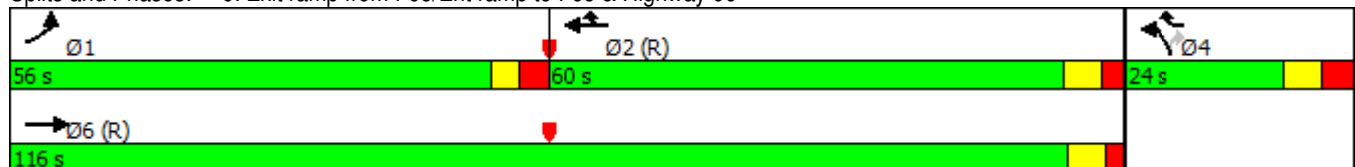
~ Volume exceeds capacity, queue is theoretically infinite.

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



Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/25/2016

												
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	

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/25/2016

												
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 Effect 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												

Lanes, Volumes, Timings

1: Oak Meadow Dr. & S Royal Oaks

5/25/2016

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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
18 s	53 s	14 s	35 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	57 s	14 s	35 s

Lanes, Volumes, Timings

3: S Royal Oaks & Riverside Dr/Center Point PI

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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 Effect 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	

Lanes, Volumes, Timings

3: S Royal Oaks & Riverside Dr/Center Point PI

5/25/2016

												
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 PI

 Ø1	 Ø2 (R)	 Ø3	 Ø4
14 s	87 s	10 s	49 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
29 s	72 s	10 s	49 s

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

												
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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

												
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 Effect 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	

Lanes, Volumes, Timings

4: S Royal Oaks/N Royal Oaks & Highway 96

5/25/2016

												
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

 Ø1	 Ø2 (R)	 Ø3	 Ø4
25 s	69 s	22 s	34 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
42 s	52 s	22 s	34 s

Lanes, Volumes, Timings

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

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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)		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 Effect 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

Lanes, Volumes, Timings

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

5/25/2016

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.

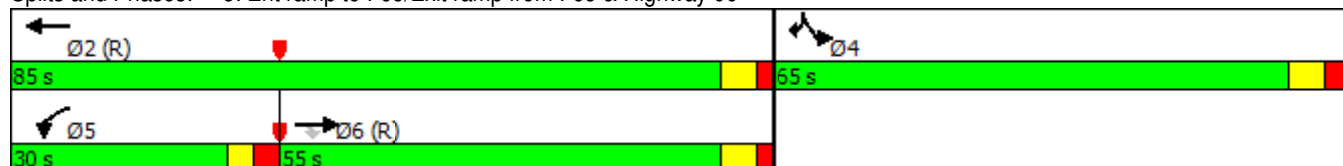
Queue shown is maximum after two cycles.

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



Lanes, Volumes, Timings

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

5/25/2016

												
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												

Lanes, Volumes, Timings

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

5/25/2016

												
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

Lanes, Volumes, Timings

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

5/25/2016

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

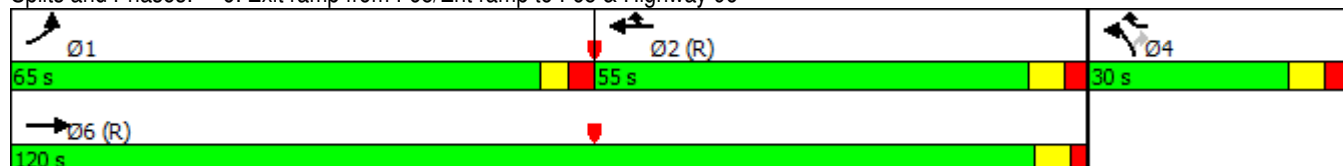
Intersection Capacity Utilization 84.9%

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

$$T = 2.74 (X)$$

$$T = 2.74 (208)$$

$$T = 570 \text{ vehicles}$$

$$\text{Enter} = 0.50 (570) = 285 \text{ vehicles}$$

$$\text{Exit} = 0.50 (570) = 285 \text{ vehicles}$$

AM traffic during peak hour of adjacent street

$$T = 0.23 (X)$$

$$T = 0.23 (208)$$

$$T = 47 \text{ vehicles}$$

$$\text{Enter} = 0.72 (47) = 34 \text{ vehicles}$$

$$\text{Exit} = 0.28 (47) = 13 \text{ vehicles}$$

PM traffic during peak hour of adjacent street

$$T = 0.37 (X)$$

$$T = 0.37 (208)$$

$$T = 77 \text{ vehicles}$$

$$\text{Enter} = 0.39 (77) = 30 \text{ vehicles}$$

$$\text{Exit} = 0.61 (77) = 47 \text{ vehicles}$$

TRIP GENERATION CALCULATIONS – Multi-Family (South)

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

Average Daily Traffic

$$T = 6.65 (X)$$

$$T = 6.65 (98)$$

$$T = 652 \text{ vehicle-trips}$$

$$\text{Enter} = 0.50 (652) = 326 \text{ vehicles}$$

$$\text{Exit} = 0.50 (652) = 326 \text{ vehicles}$$

A.M. traffic during peak hour of adjacent street

$$T = 0.51 (X)$$

$$T = 0.51 (98)$$

$$T = 50 \text{ vehicle-trips}$$

$$\text{Enter} = 0.20 (50) = 10 \text{ vehicles}$$

$$\text{Exit} = 0.80 (50) = 40 \text{ vehicles}$$

P.M. traffic during peak hour of adjacent street

$$T = 0.62 (X)$$

$$T = 0.62 (98)$$

$$T = 60 \text{ vehicle-trips}$$

$$\text{Enter} = 0.65 (60) = 39 \text{ vehicles}$$

$$\text{Exit} = 0.35 (60) = 21 \text{ vehicles}$$

TRIP GENERATION CALCULATIONS – Multi-Family (North)

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

Average Daily Traffic

$$T = 6.65 (X)$$

$$T = 6.65 (204)$$

$$T = 1,356 \text{ vehicle-trips}$$

$$\text{Enter} = 0.50 (1,356) = 678 \text{ vehicles}$$

$$\text{Exit} = 0.50 (1,356) = 678 \text{ vehicles}$$

A.M. traffic during peak hour of adjacent street

$$T = 0.51 (X)$$

$$T = 0.51 (204)$$

$$T = 104 \text{ vehicle-trips}$$

$$\text{Enter} = 0.20 (104) = 21 \text{ vehicles}$$

$$\text{Exit} = 0.80 (104) = 83 \text{ vehicles}$$

P.M. traffic during peak hour of adjacent street

$$T = 0.62 (X)$$

$$T = 0.62 (204)$$

$$T = 126 \text{ vehicle-trips}$$

$$\text{Enter} = 0.65 (126) = 82 \text{ vehicles}$$

$$\text{Exit} = 0.35 (126) = 44 \text{ vehicles}$$

TRIP GENERATION CALCULATIONS – Specialty Retail

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

Average Daily Traffic

$$T = 44.32 (X)$$

$$T = 44.32 (15.000)$$

$$T = 664 \text{ vehicle-trips}$$

$$\text{Enter} = 0.50 (664) = 332 \text{ vehicles}$$

$$\text{Exit} = 0.50 (664) = 332 \text{ vehicles}$$

A.M. traffic during peak hour of adjacent street

$$T = 6.84 (X)$$

$$T = 6.84 (15.000)$$

$$T = 102 \text{ vehicle-trips}$$

$$\text{Enter} = 0.48 (102) = 49 \text{ vehicles}$$

$$\text{Exit} = 0.52 (102) = 53 \text{ vehicles}$$

P.M. traffic during peak hour of adjacent street

$$T = 2.71 (X)$$

$$T = 2.71 (15.000)$$

$$T = 41 \text{ vehicle-trips}$$

$$\text{Enter} = 0.44 (41) = 18 \text{ vehicles}$$

$$\text{Exit} = 0.56 (41) = 23 \text{ vehicles}$$

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.

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 are 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

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

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It was compiled from the most authentic information available.
The City is not responsible for any errors or omissions contained hereon.
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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,

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 PROCEEDING 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. SUBDIVISION, 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.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 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, REVISION 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 PROCEEDING 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, REVISION 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 Approved: _____ Denied: _____	Request to reduce the parking requirement to 1.75 spaces per unit. <i>Staff recommended disapproval.</i>
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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
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_____

PLANNING COMMISSION RECOMMENDED APPROVAL: _____

PUBLIC HEARING AND BOMA APPROVAL: _____

SITE DATA

PROJECT NAME: OAK MEADOWS EPOCH DEVELOPMENT
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
FRANKLIN, TN 37067
PHONE NO.: 615.873.1795
E-MAIL ADDRESS: adam@crunkeng.com
CONTACT NAME: MR. ADAM CRUNK, P.E.

DENSITY: 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: 6 STORIES MAXIMUM
ALLOWABLE: NORTH PARCEL - 4 STORIES
PROPOSED: 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: 0 EXISTING
REQUIRED (1.5/1BR + 2.5/2BR + 3/3BR)
NORTH SITE: 18R - 104 UNITS * 1.5 = 156 SPACES
28R - 112 UNITS * 2.5 = 280 SPACES
38R - 24 UNITS * 3.0 = 72 SPACES
TOTAL REQUIRED = 508 SPACES
INCLUDING 9 ADA SPACES
SOUTH SITE: 18R - 45 UNITS * 1.5 = 68 SPACES
28R - 50 UNITS * 2.5 = 125 SPACES
38R - 20 UNITS * 3.0 = 60 SPACES
TOTAL REQUIRED = 253 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: 329 REGULAR SPACES
COMPACT SPACES (22 % OF TOTAL) 84
ADA SPACES 16
TOTAL PROVIDED 429
SOUTH SITE (APTS. ONLY): 198 REGULAR SPACES
COMPACT SPACES (8 % OF TOTAL) 19
ADA SPACES 8
TOTAL PROVIDED 225
SOUTH SITE (AMENITY CTR.): 24 REGULAR SPACES
COMPACT SPACES (0% OF TOTAL) 0
ADA SPACES 2
TOTAL PROVIDED 26

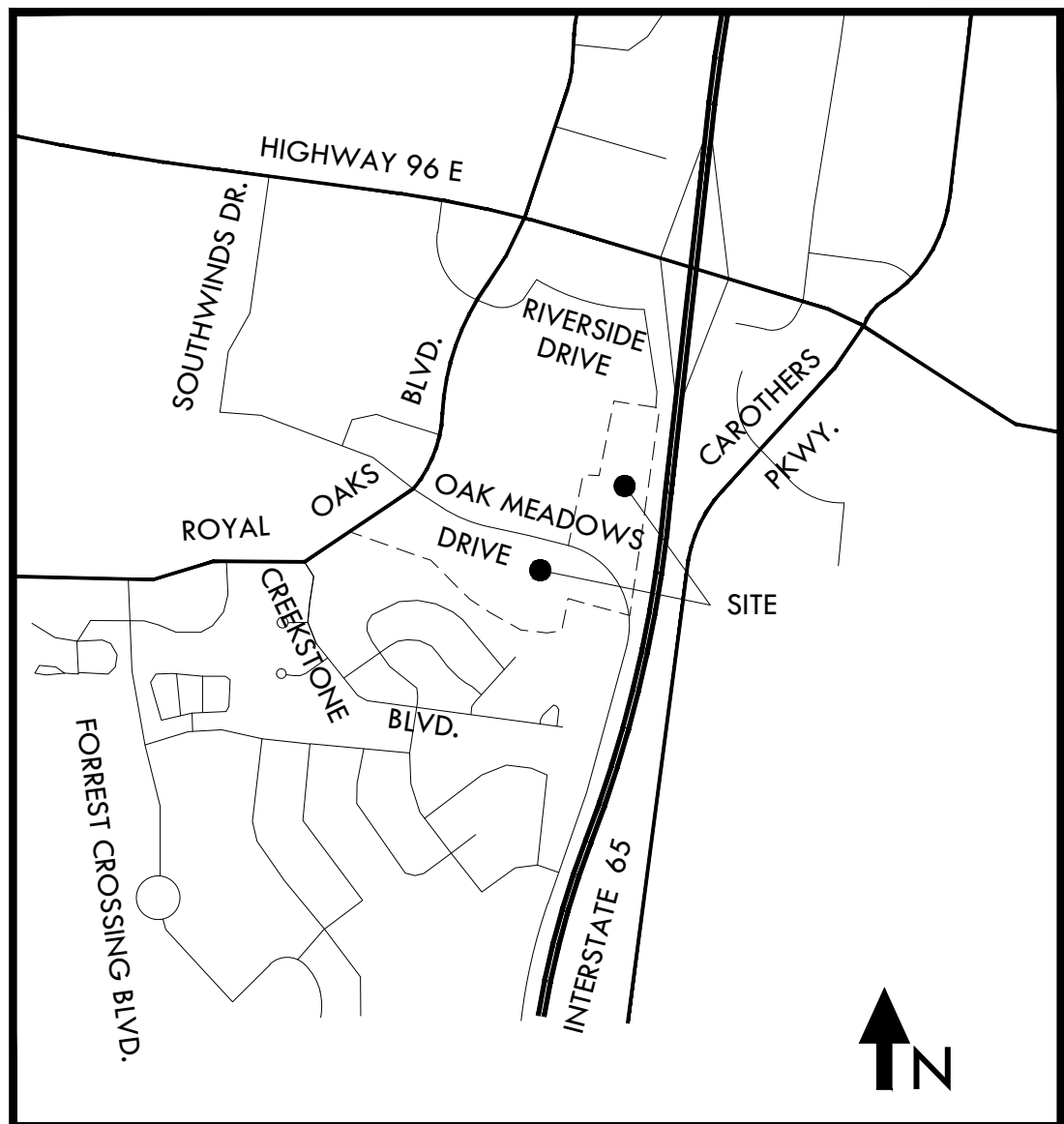
TREE CANOPY: EXISTING CANOPY COVERAGE: NORTH SITE - 9%; SOUTH SITE - 62%
REQUIRED PERCENTAGE TO REMAIN: NORTH SITE - 54%; SOUTH SITE - 54%
PROPOSED PERCENTAGE TO REMAIN: NORTH SITE - 54%; SOUTH SITE - 42%

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) 1.65 AC. PROVIDED
INFORMAL OPEN SPACE REQUIRED (67% OF OPEN SPACE REQUIRED) 3.04 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 UNGLAZED 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



ARCHITECT OF RECORD:
KENNETH LINEHAN, AIA, LEED AP
FUGLEBURG KOCH ARCHITECTS
2555 TENNIE 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

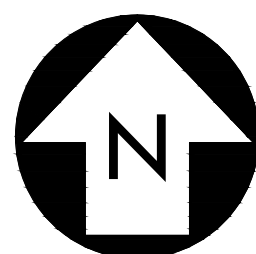


THE EPOCH DEVELOPMENT
PUD SUBDIVISION, DEVELOPMENT PLAN
COF #6086
FRANKLIN, TN

REVISIONS	DATE	
No.		

04/07/16 15001

C0.0
COVER SHEET



C1.0

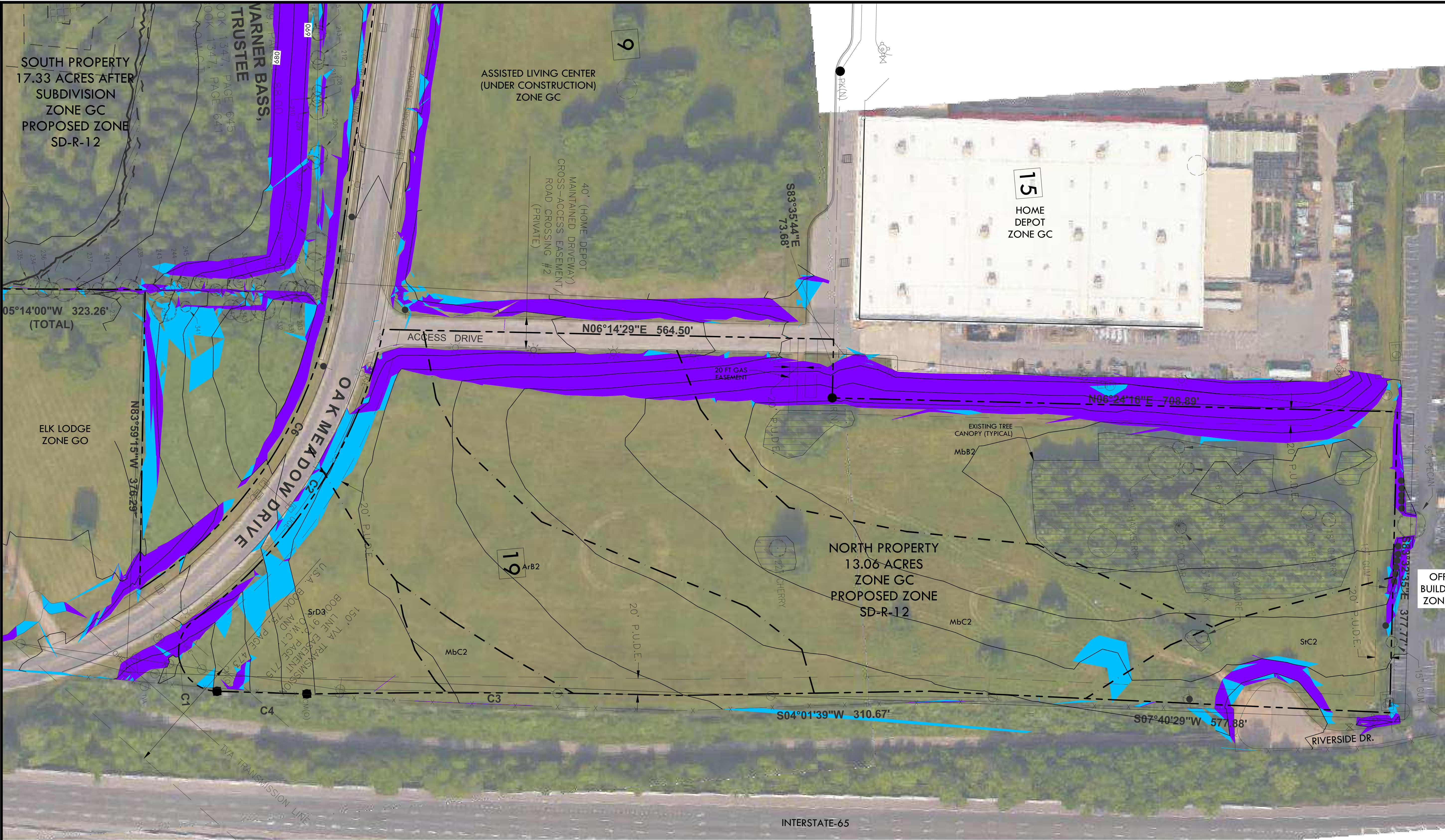
OVERALL EXISTING
CONDITIONS PLAN

COF #6086



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SLOPE LEGEND

- GREATER THAN 1.4% AND LESS THAN 20% SLOPE
- GREATER THAN 20% SLOPE

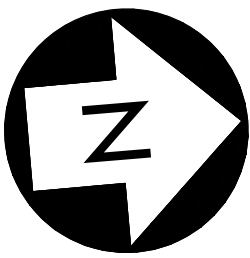
SOIL TYPES

- ArB2 Armour silt loam, 2% to 5 % slopes, eroded
- CaC2 Capling 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
- SrC2 Stiversville silt loam, 5% to 12% slopes, eroded

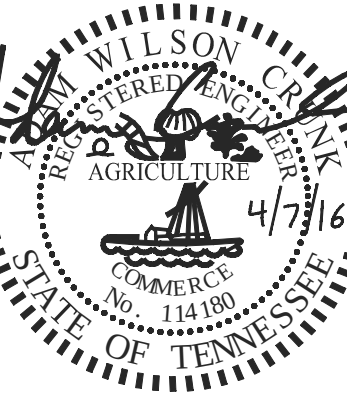
CURVE TABLE

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



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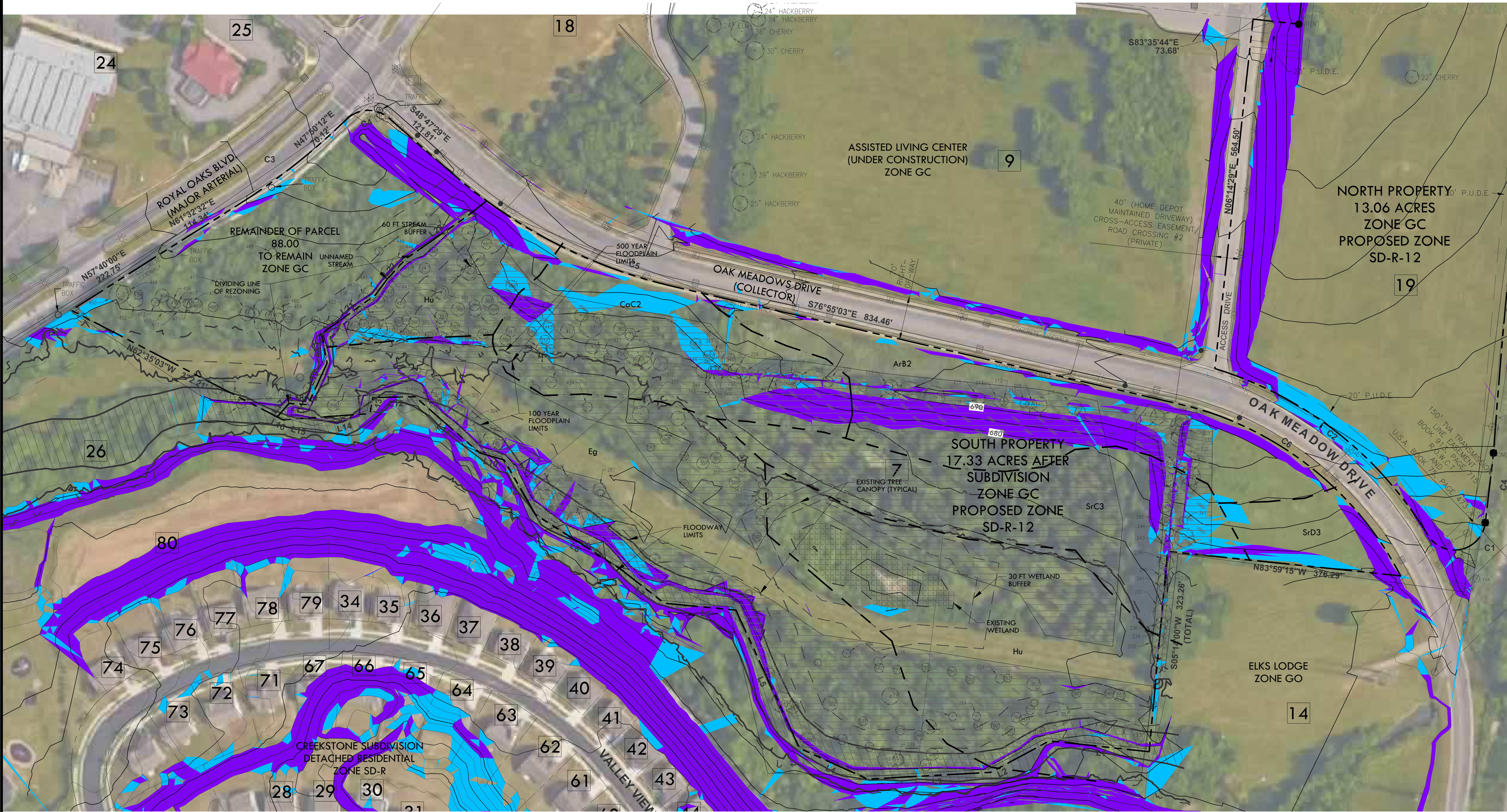
THE EPOCH DEVELOPMENT
PUD SUBDIVISION, DEVELOPMENT PLAN
COF #6086 FRANKLIN, TN

REVISIONS	DATE
No.	

04/07/16 15001

C1.1

NORTH SITE
EXISTING
CONDITIONS PLAN

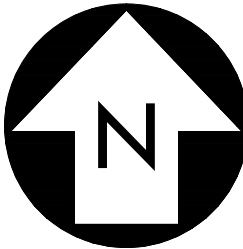
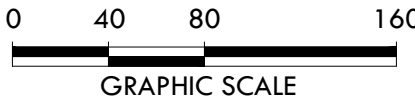


SLOPE LEGEND

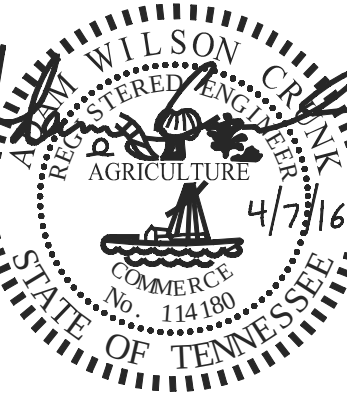
- GREATER THAN 1.4% AND LESS THAN 20% SLOPE
- GREATER THAN 20% SLOPE

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 Silversville clay loam, 5% to 12% slopes, eroded
- SrD3 Silversville clay loam, 12% to 20% slopes, severely eroded
- SrC2 Silversville silt loam, 5% to 12% slopes, eroded



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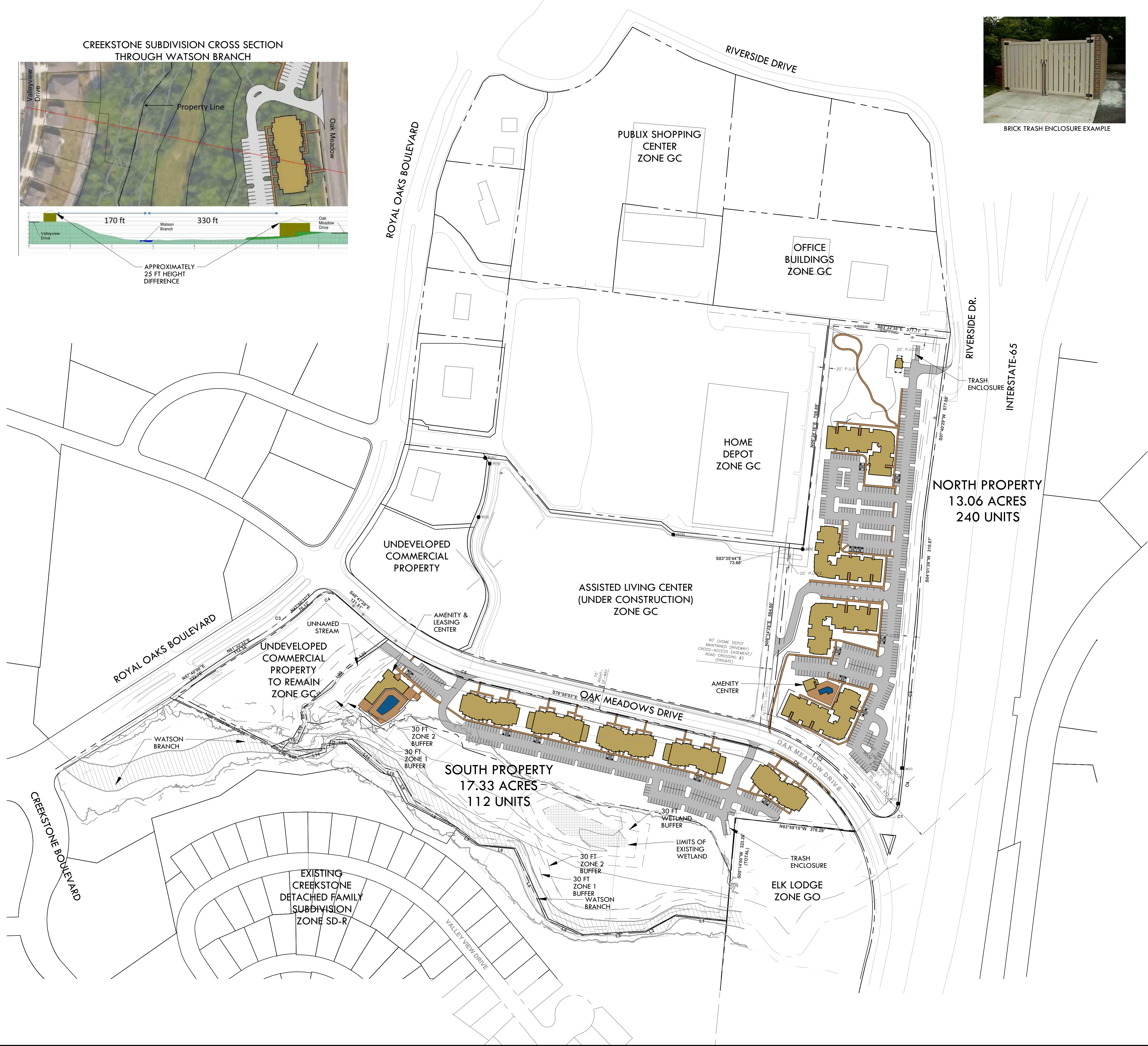
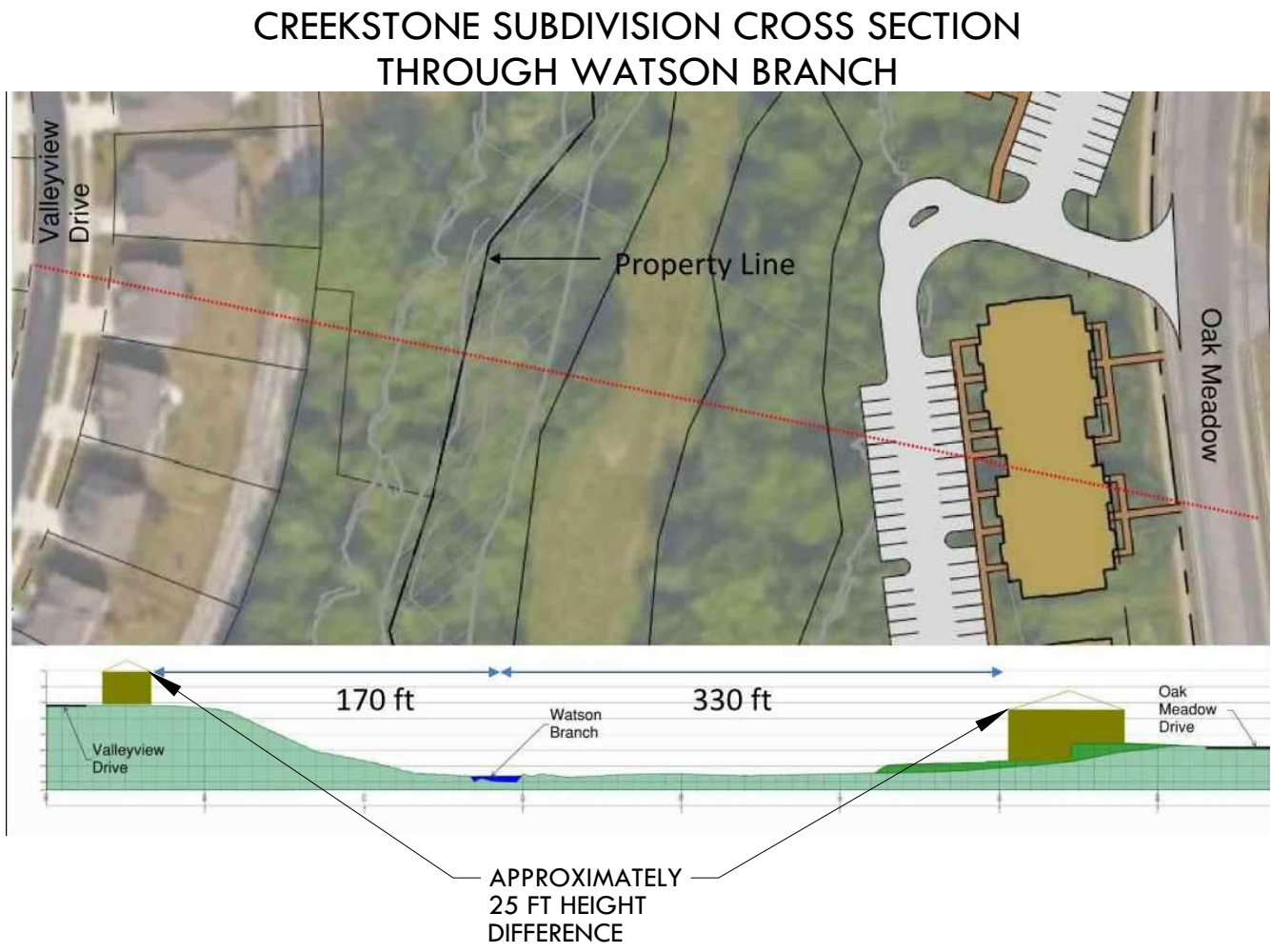


THE EPOCH DEVELOPMENT
PUD SUBDIVISION, DEVELOPMENT PLAN
COF #6086 FRANKLIN, TN

No.	REVISIONS			
	DATE			

04/07/16 15001

C1.2
SOUTH SITE
EXISTING
CONDITIONS PLAN



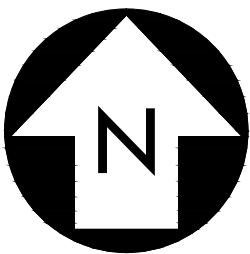
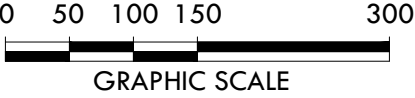
SITE DATA

PROJECT NAME	OAK MEADOWS EPOCH DEVELOPMENT 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@basberry.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 FRANKLIN, TN 37067
PHONE NO.:	615.873.1795
E-MAIL ADDRESS:	adam@crunkeng.com
CONTACT NAME:	MR. ADAM CRUNK, P.E.
DENSITY:	355 UNITS
ATTACHED DWELLING UNITS:	30.39 ACRES
LAND AREA:	8.32 ACRES
LAND AREA WITHIN FLOODPLAIN OVERLAY:	11.7 UNITS/ACRE
OVERALL DENSITY:	16.1 UNITS/ACRE
NET DENSITY (MINUS OVERLAY CONSTRAINT):	
BUILDING HEIGHT:	6 STORIES MAXIMUM
ALLOWABLE:	NORTH PARCEL - 4 STORIES
PROPOSED:	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:	
18R - 104 UNITS * 1.5 = 156 SPACES	
28R - 112 UNITS * 2.5 = 280 SPACES	
38R - 24 UNITS * 3.0 = 72 SPACES	
TOTAL REQUIRED = 508 SPACES	
INCLUDING 9 ADA SPACES	
SOUTH SITE:	
18R - 45 UNITS * 1.5 = 68 SPACES	
28R - 50 UNITS * 2.5 = 125 SPACES	
38R - 20 UNITS * 3.0 = 60 SPACES	
TOTAL REQUIRED = 253 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:	
REGULAR SPACES	329
COMPACT SPACES (22 % OF TOTAL)	84
ADA SPACES	16
TOTAL PROVIDED	429
SOUTH SITE (APTS. ONLY):	
REGULAR SPACES	198
COMPACT SPACES (8 % OF TOTAL)	19
ADA SPACES	8
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.
INFORMAL OPEN SPACE REQUIRED (67% OF OPEN SPACE REQUIRED)	1.65 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:

- 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.
 - 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.
 - 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.



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THE EPOCH DEVELOPMENT
PUD SUBDIVISION, DEVELOPMENT PLAN
COF #6086
FRANKLIN, TN

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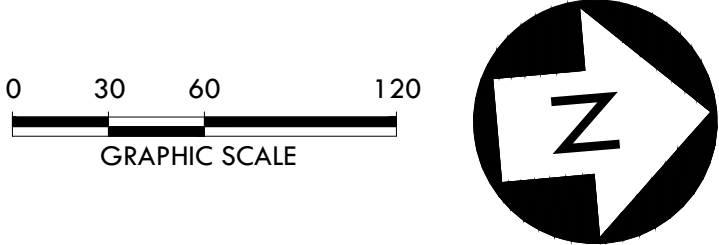
C2.0
OVERALL
DEVELOPMENT
PLAN



INTERSTATE-65

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



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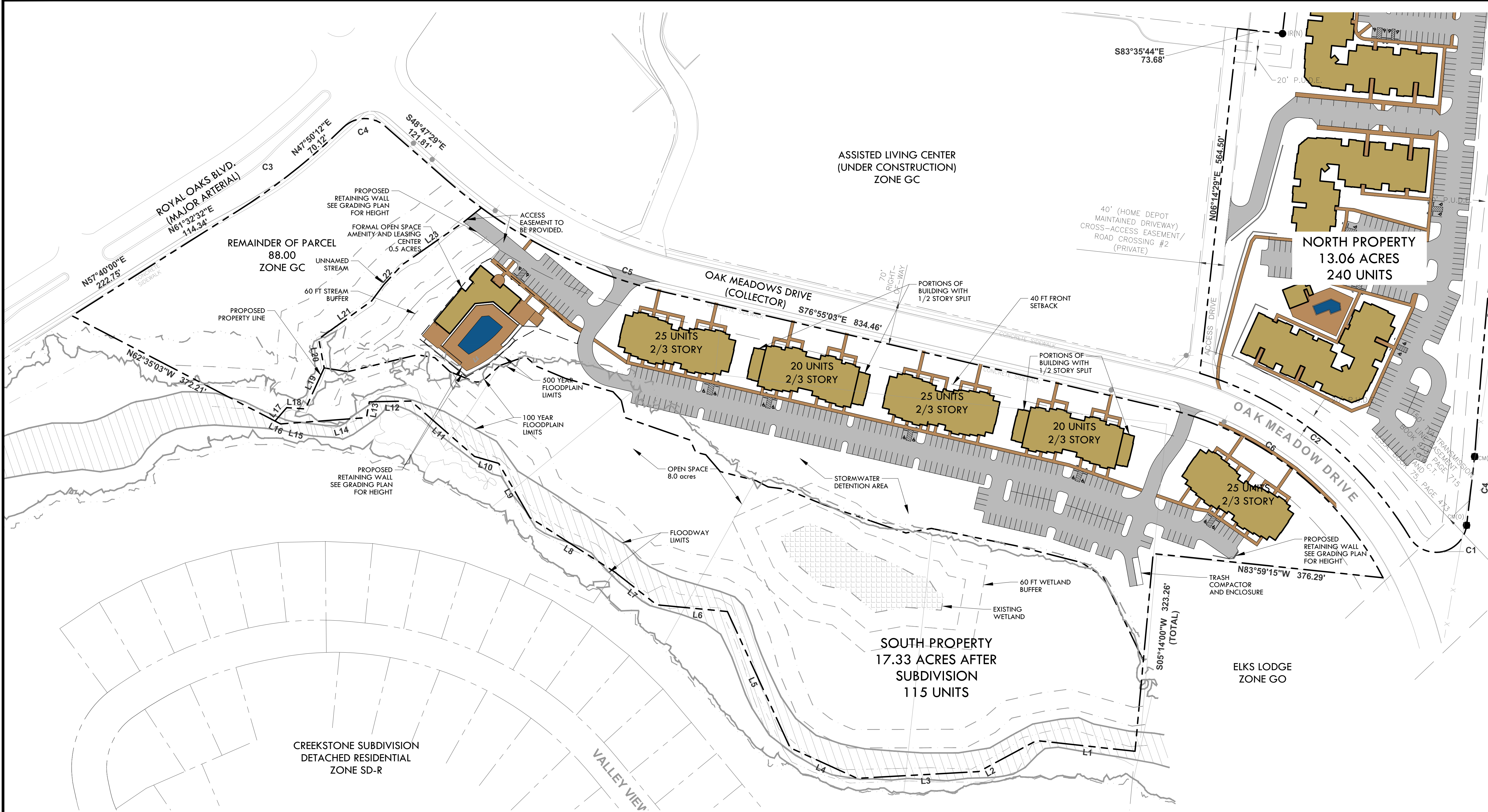
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C2.1
NORTH SITE
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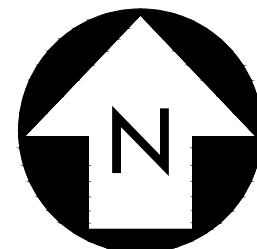
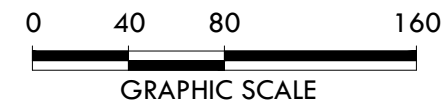


LINE TABLE		
LINE	BEARING	DISTANCE
L1	N83°48'10"W	161.22'
L2	S61°46'08"W	106.65'
L3	S86°48'30"W	198.12'
L4	N65°28'52"W	120.02'
L5	N24°43'04"W	244.21'
L6	N84°36'00"W	115.35'
L7	N52°04'01"W	87.70'
L8	N57°18'12"W	163.19'
L9	N29°52'55"W	101.80'
L10	N74°02'09"W	41.15'
L11	N48°56'27"W	137.25'
L12	S88°57'25"W	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 BRG
C5	820.00'	330.94'	23°07'24"	167.75	S65°21'21"E
C6	537.96'	464.57'	49°28'46"	247.89	S52°10'40"E

TOTAL OF 115 UNITS ON SOUTH PARCEL



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C2.2
SOUTH SITE
DEVELOPMENT
PLAN



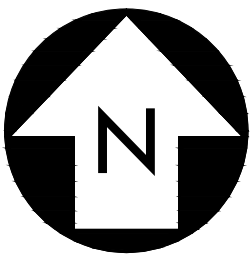
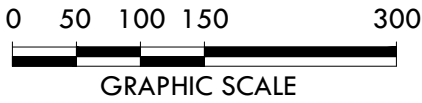
SITE LIGHTING DATA

NOTE:
STREET LIGHT LOCATIONS AND QUANTITIES ARE APPROXIMATE. FINAL POSITIONING AND QUANTITIES SHALL BE AT THE DISCRETION OF THE ENGINEER.

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.



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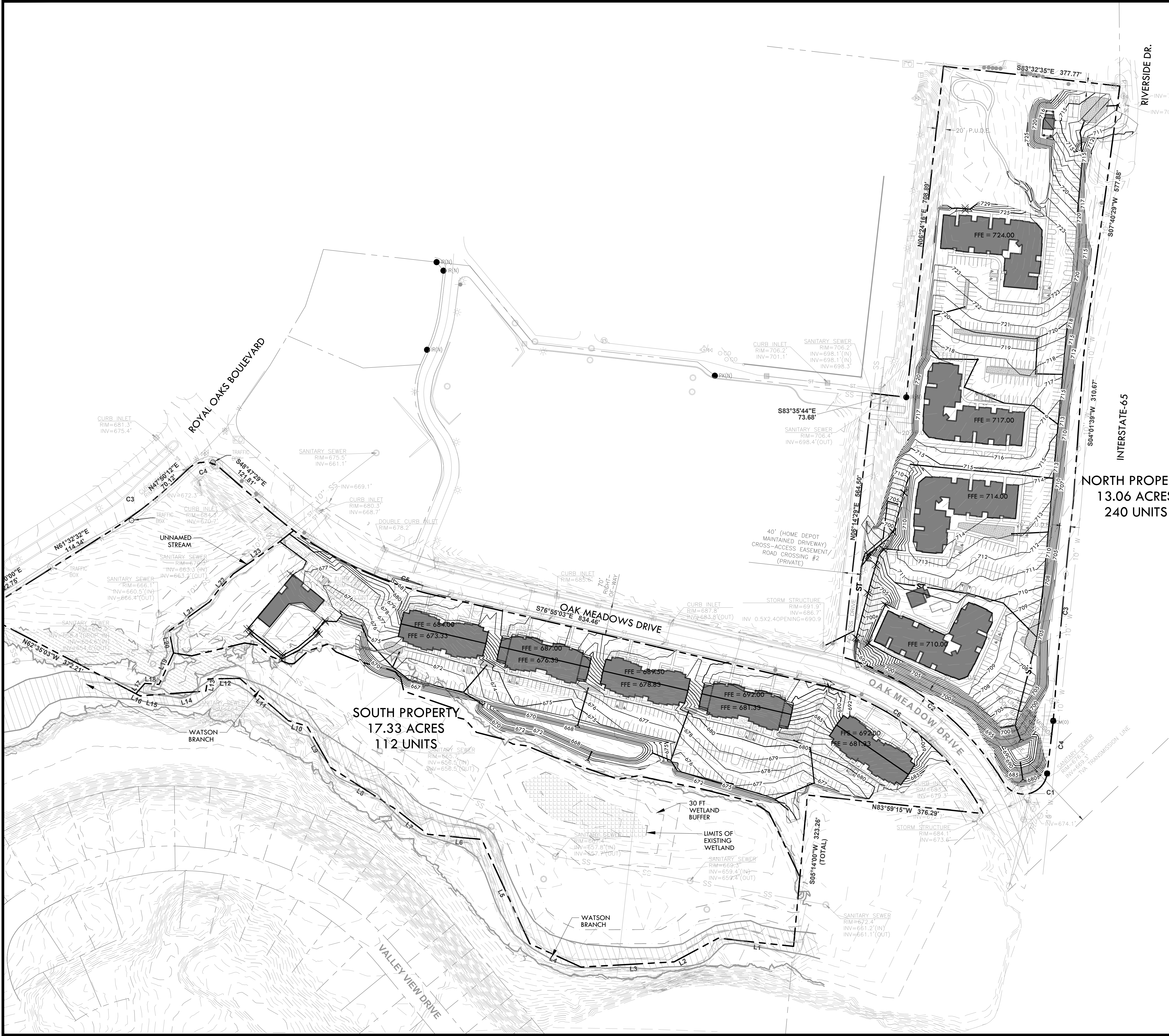


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C2.3
GENERAL LIGHTING PLAN



- 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.

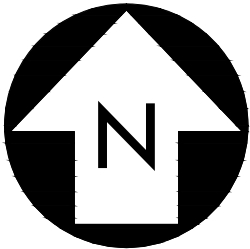
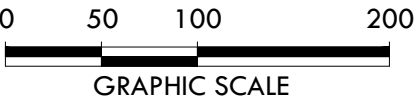
GRADING & DRAINAGE DATA CHART

- 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

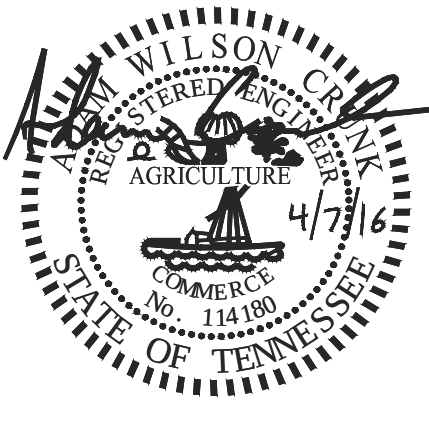
*PROPOSED DEVELOPMENT WILL COMPLY WITH CITY OF FRANKLIN STORMWATER REQUIREMENTS TO PROVIDE A TREATED Rv VALUE OF LESS THAN OR EQUAL TO 0.200. THE PROPOSED DEVELOPMENT WILL DETAIN THE PEAK FLOWS FOR THE 2 YEAR THROUGH 100 YEAR STROM EVENTS.

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.



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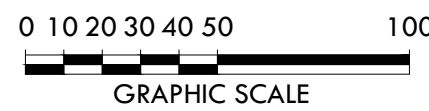
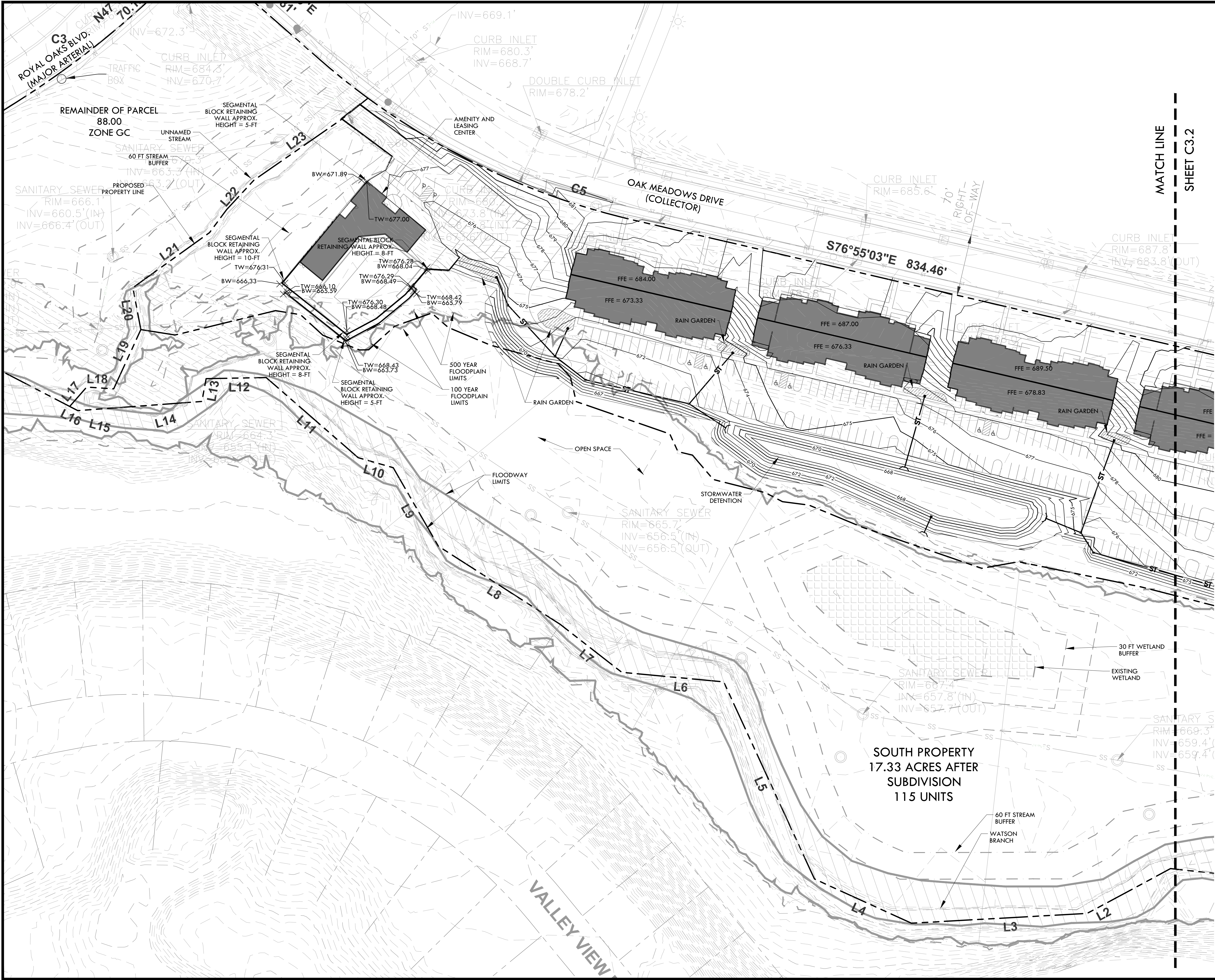
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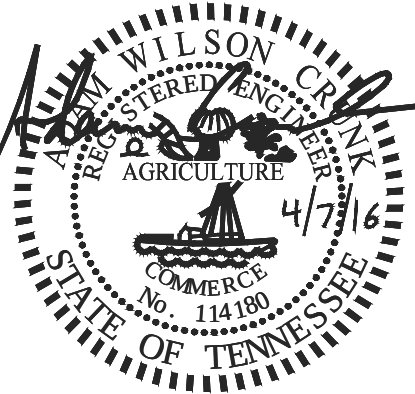
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C3.0
OVERALL
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MATCH LINE
SHEET C3.2

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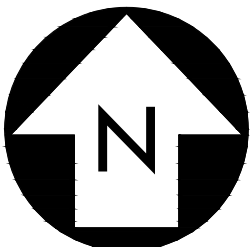
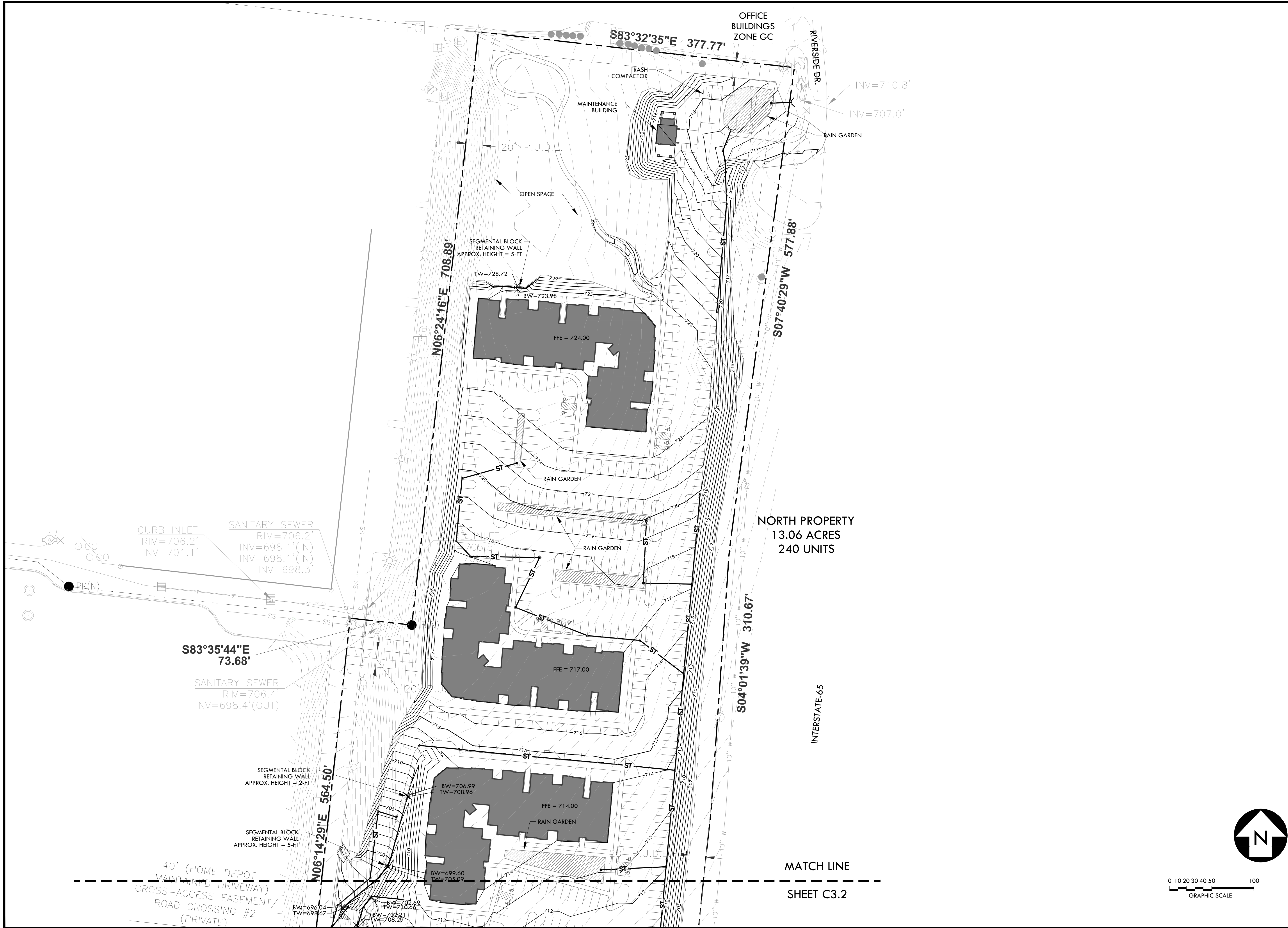


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C3.1
SOUTH SITE
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C3.3
NORTH SITE
GRADING
PLAN



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 northerly direction toward Cool Springs.

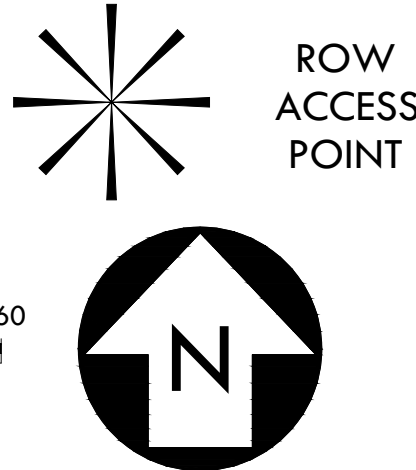
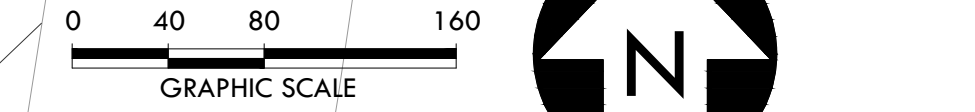
- R.O.W. & Access General Notes
1. Prior to beginning any construction, the Developer and/or Contractor, shall obtain all necessary permits as required by law. Such permits may include, but are not limited to, those required by State of Tennessee, Williamson County and other City of Franklin agencies.
 2. All off-site work within the public right-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.
 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 = 4.4117'
Body Length = 50.0417'
Width = 8.333'
Rear Overhang = 22.1424'
Body Style = Fire Truck
Turning Radius Wall to Wall = 42'



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THE EPOCH DEVELOPMENT

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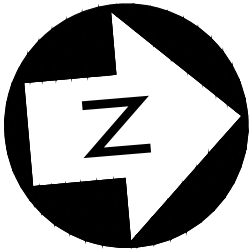
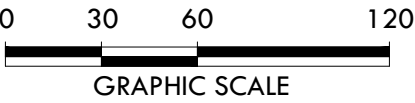
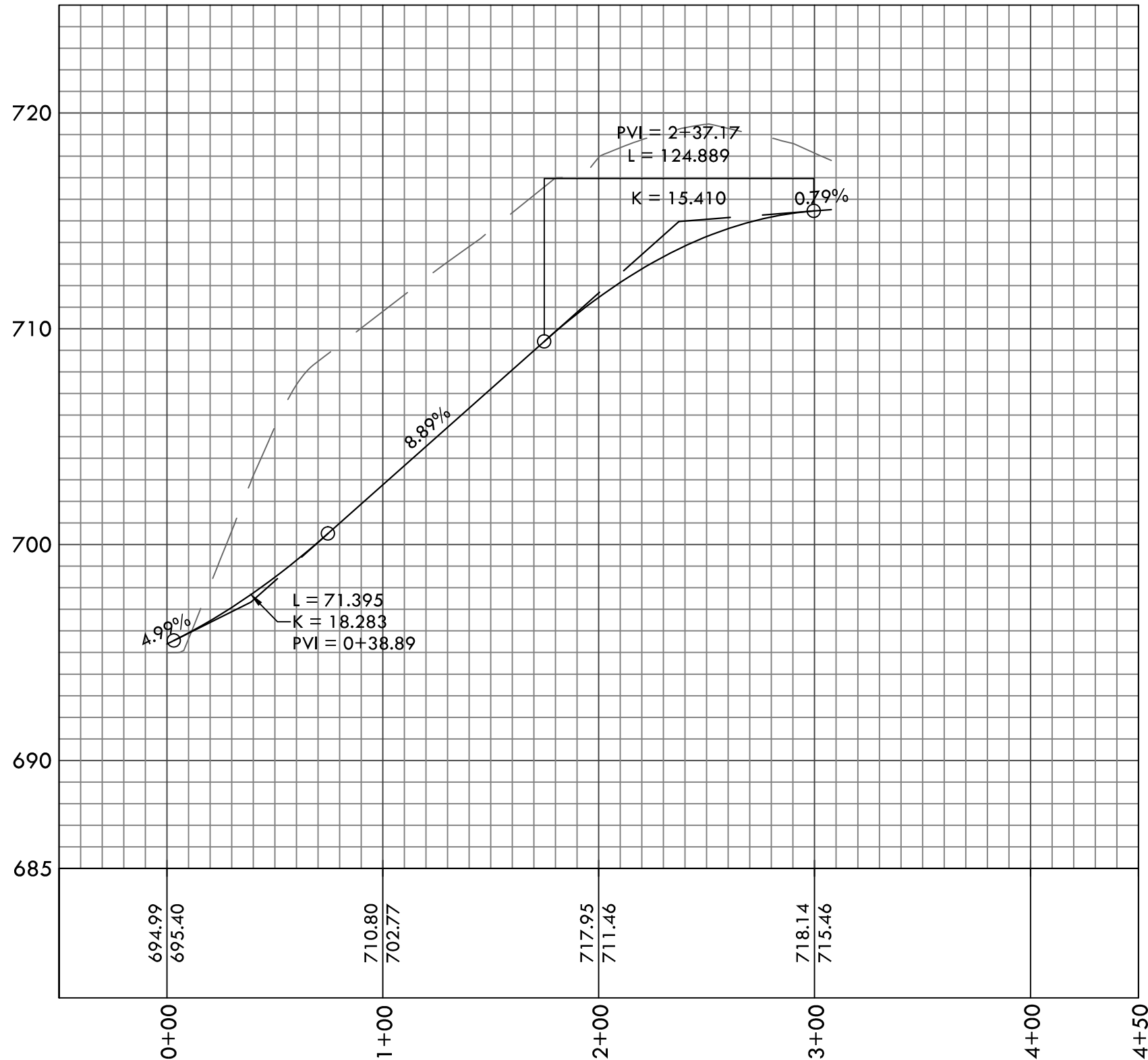
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C4.0

OVERALL ACCESS PLAN



WESTERN DRIVE PROFILE



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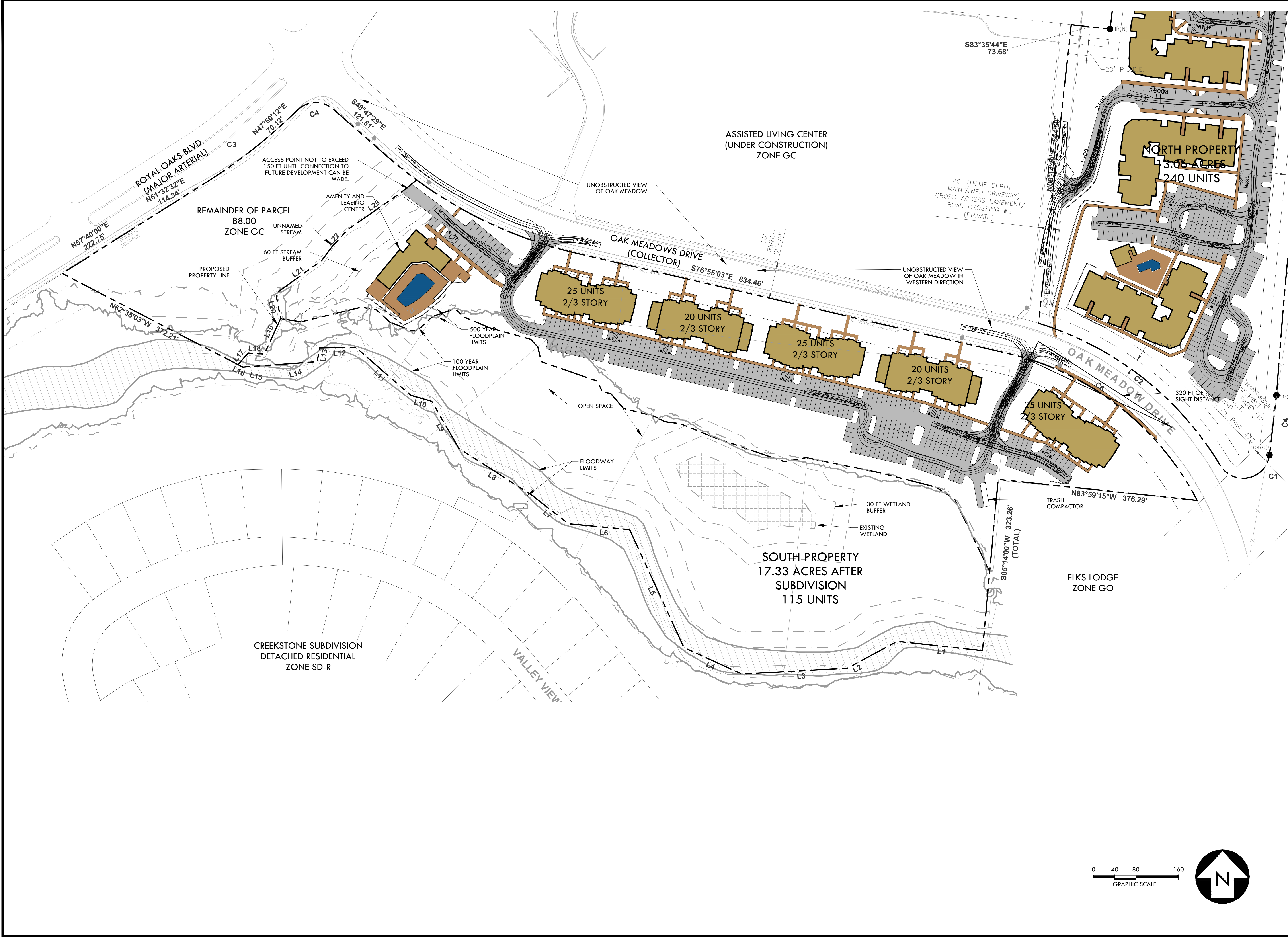


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C4.1
NORTH SITE
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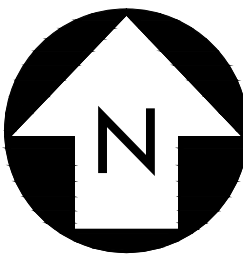
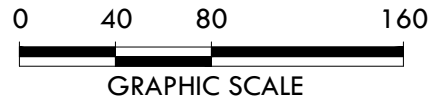


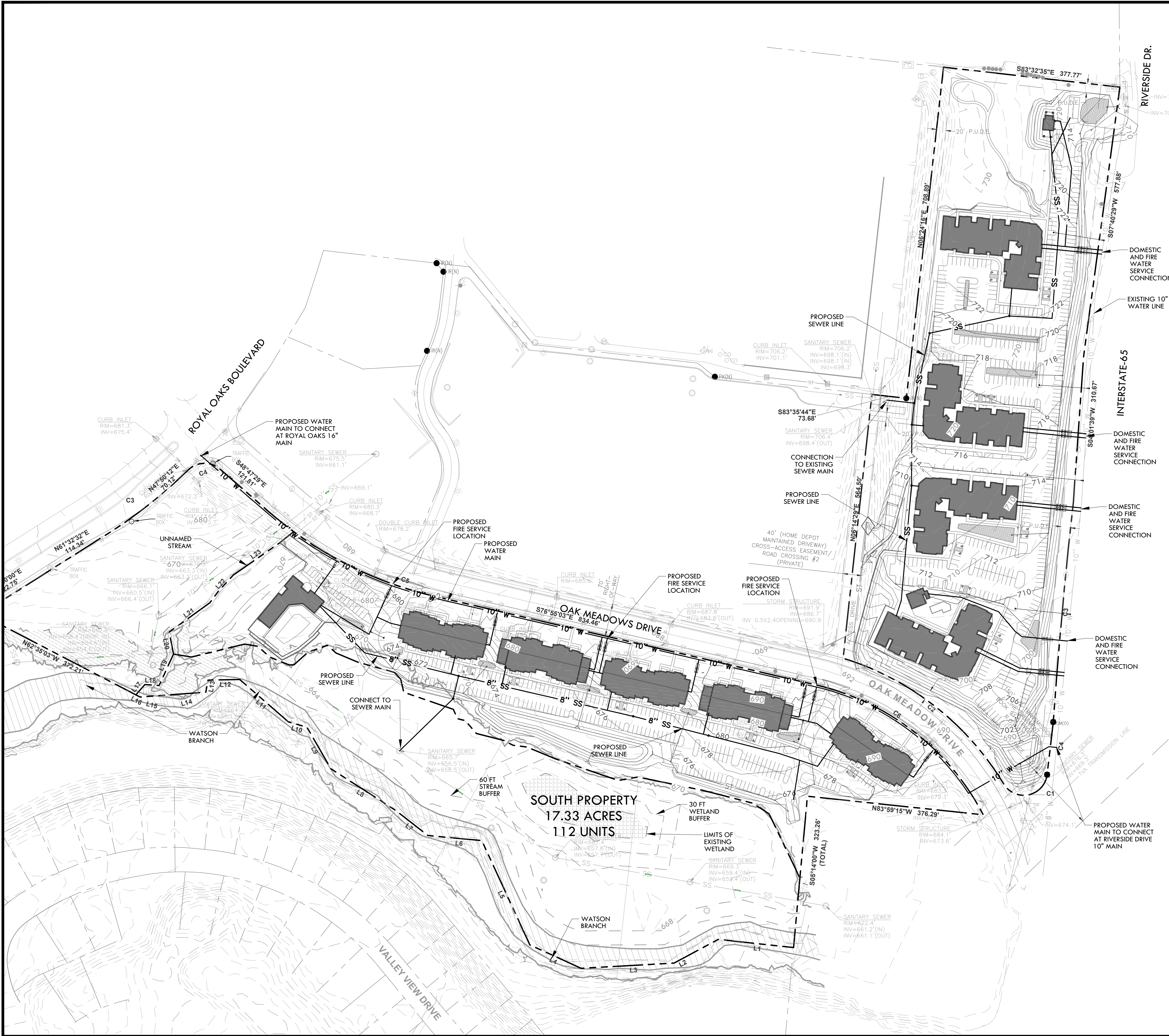
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SOUTH SITE
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PLAN





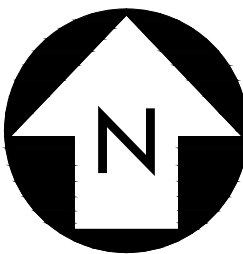
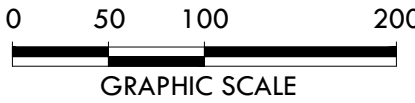
STATEMENT OF IMPACTS
The proposed project is the construction of 355 new attached dwelling units with a mixture of one, two, and three bedroom units. The project will result in a projected flow of 101,250 GPD. The Northern site will be served by water off of the existing 10" main in the old Riverside 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

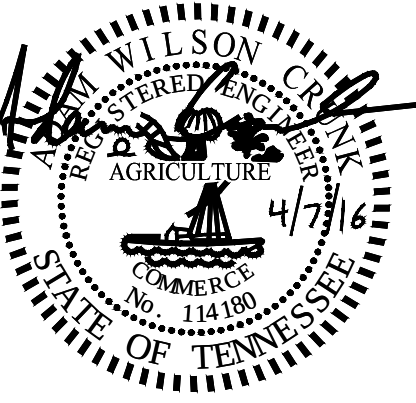
- All persons who undertake the construction of water, sewer and/or reclaimed water lines located in, or affecting services provided by the City of Franklin shall comply with the requirements and regulations set forth in the "General Requirements & Technical Specifications, Water Management Department, 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.
- 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.
- Contractor shall obtain and keep all of the following items on the jobsite at all times during construction:
 - Approved, Stamped and Signed Water and/or Sewer Plans
 - Water & Sewer Infrastructure Installation Permit, with all steps completed and signed by appropriate City employees.
 - Copy of approved availability request response letter.
 - A copy of all approved Cut Sheets.
- 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.
- 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.
- 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.
- 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.
- 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



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

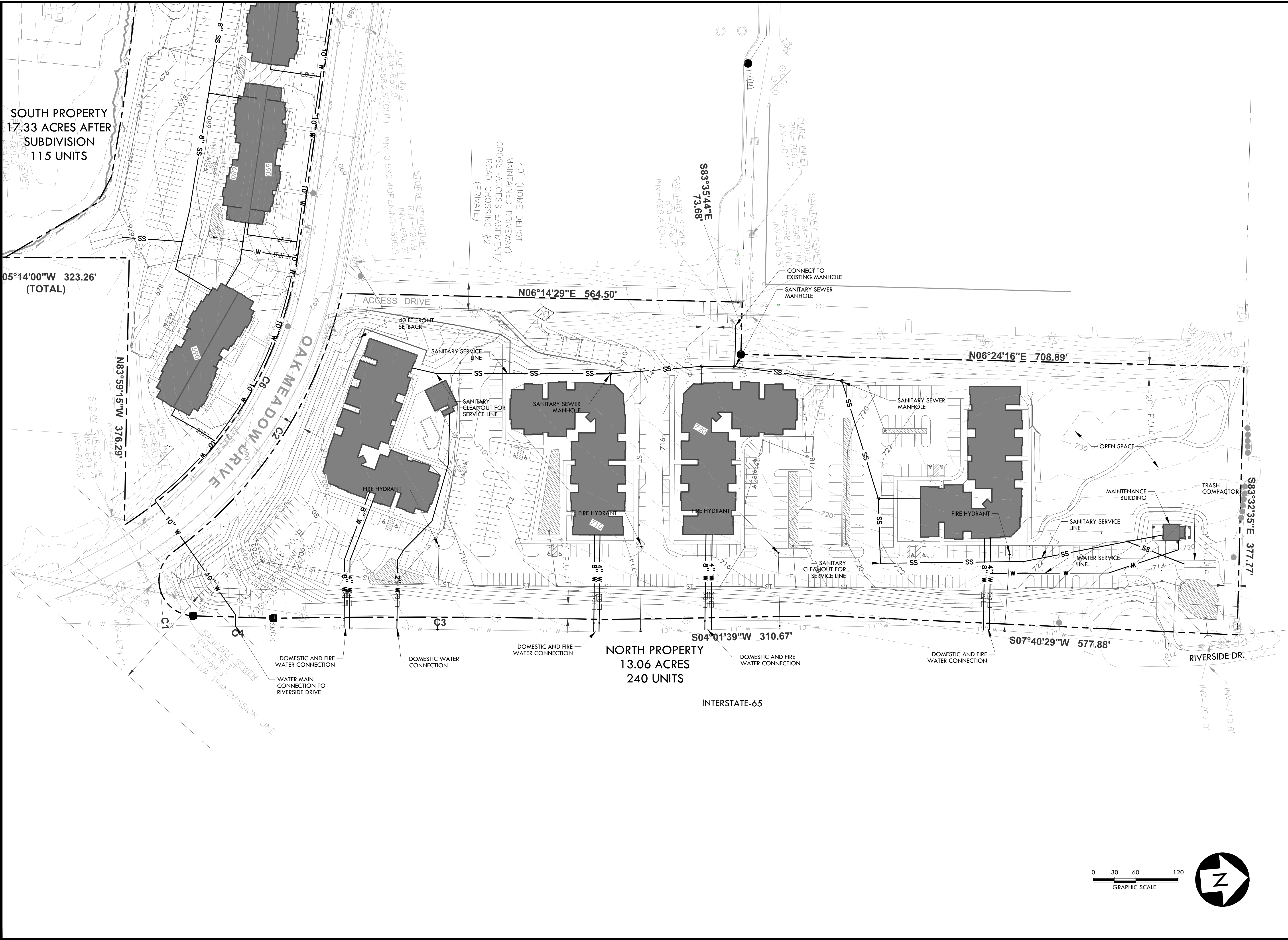


THE EPOCH DEVELOPMENT
PUD SUBDIVISION, DEVELOPMENT PLAN
COF #6086 FRANKLIN, TN

REVISIONS		DATE	
No.			

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

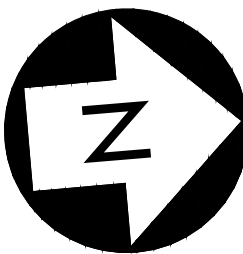
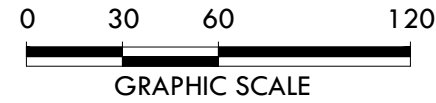


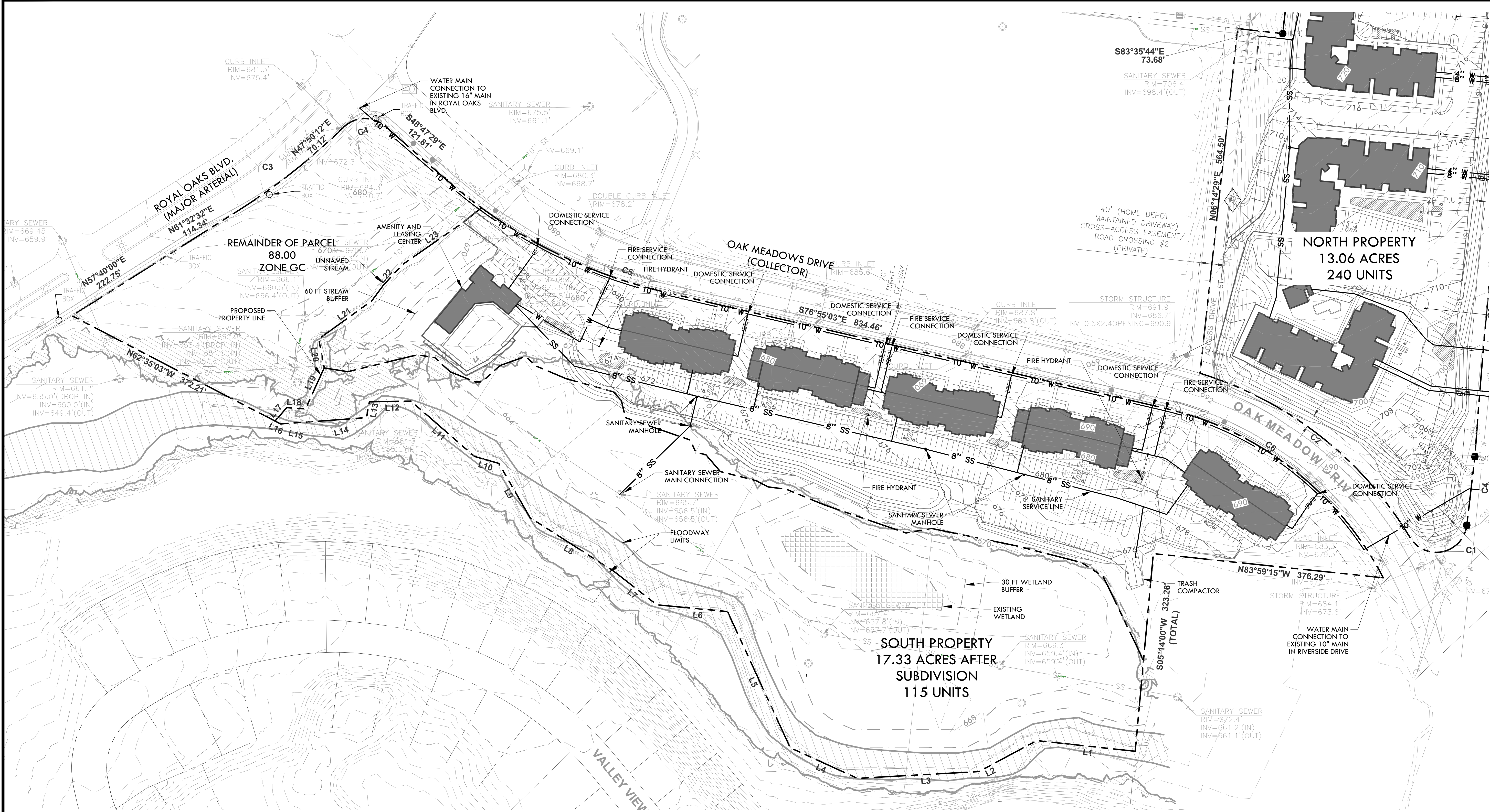
THE EPOCH DEVELOPMENT
PUD SUBDIVISION, DEVELOPMENT PLAN
COF #6086 FRANKLIN, TN

REVISIONS	DATE	
	No.	

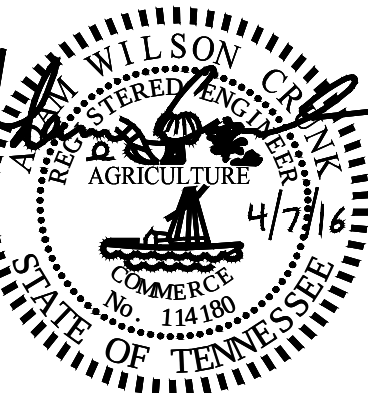
04/07/16 15001

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



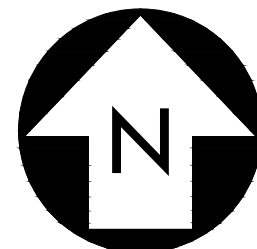
THE EPOCH DEVELOPMENT
PUD SUBDIVISION, DEVELOPMENT PLAN
COF #6086 FRANKLIN, TN

REVISIONS	DATE	
	No.	

04/07/16 15001

C5.2
SOUTH SITE
UTILITY
PLAN

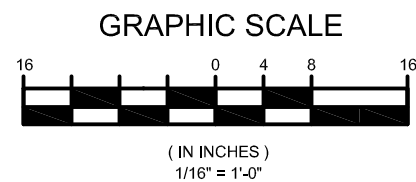
0 40 80 160
GRAPHIC SCALE





ELEVATION

NORTH PARCEL



FUGLEBERG KOCH

EPOCH

RESIDENTIAL™

BUILDING ELEVATIONS

2016-04-07

THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

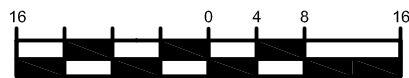
PROJECT #6068



SIDE ELEVATION

NORTH PARCEL

GRAPHIC SCALE



(IN INCHES)
1/16" = 1'-0"



FUGLEBERG KOCH

EPOCH

RESIDENTIAL™

BUILDING ELEVATIONS

2016-04-07

THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE

PROJECT #6068

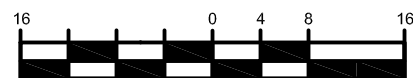


UNIT ENTRY DOOR

UNIT ENTRY DOOR

NORTH ELEVATION
(OAK MEADOW DRIVE)
SOUTH PARCEL

GRAPHIC SCALE



(IN INCHES)
1/16" = 1'-0"



FUGLEBERG KOCH

EPOCH RESIDENTIAL™

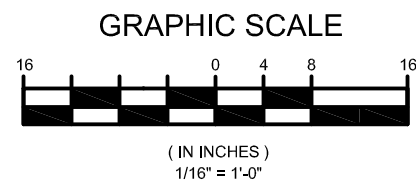
BUILDING ELEVATIONS
2016-04-07

THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

PROJECT #6068



SOUTH ELEVATION



SOUTH PARCEL

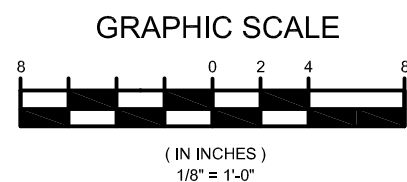
PROJECT #6068


FUGLEBERG KOCH

EPOCH RESIDENTIAL™

BUILDING ELEVATIONS
2016-04-07

THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE



FUGLEBERG KOCH

EPOCH

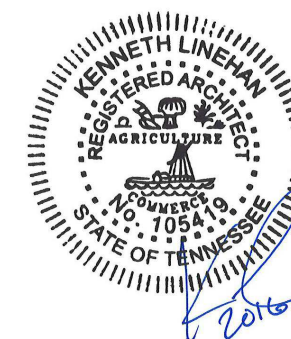
RESIDENTIAL™

AMENITY / CLUBHOUSE CENTER
ELEVATION

SOUTH PARCEL

BUILDING ELEVATIONS

2016-04-07

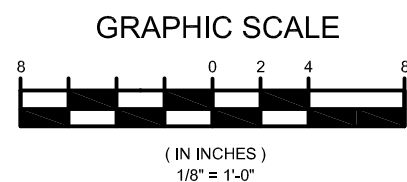


A5.0

PROJECT #6068

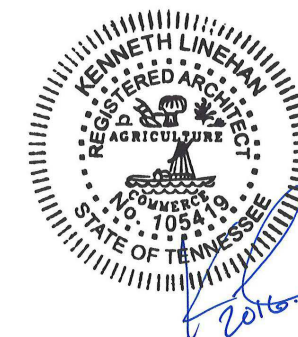
THE EPOCH DEVELOPMENT

FRANKLIN, TENNESSEE



POOL PAVILION ELEVATION

NORTH PARCEL



A6.0

PROJECT #6068


FUGLEBERG KOCH

EPOCH RESIDENTIAL™

BUILDING ELEVATIONS
2016-04-07

THE EPOCH DEVELOPMENT
FRANKLIN, TENNESSEE

Formal Open Space locations: not integrated into the site, but rather “left-over” spaces after building and parking lot locations were set



Detention locations





August 4, 2016

YOUR *Dream* STARTS HERE

Mr. Josh King
Planning and Sustainability Department
City of Franklin
109 Third Avenue South
Franklin, TN 37064
August 4, 2016

RE:COF Rizer Point PUD Subdivision,Rezoning and development plan
COF no: 6144

Dear Josh:

We respectfully request that the above referenced application be withdrawn.

Very truly yours,

Jack Ludington, P.E.
Vice President of Development



RIZER POINT PUD SUBDIVISION, REZONING,
(ORDINANCE 2016-21)
FRANKLIN MUNICIPAL PLANNING COMMISSION
06/23/2016

<UND><BOL>Project Information</BOL></UND>
Existing Zoning: Agricultural (AG)
Proposed Zoning: SD-R 0.56
Existing Land Use: Vacant
Proposed Land Use: Detached Residential
Character Area: WHCO 2 & 3
Development Standard: Conventional
Other Overlays: N/A
Site Acreage: 35.74 acres

- | | |
|---|---|
|  Harpeth River (Polygon) |  SD-R Specific Development-Residential |
|  Rizer Point PUD Subdivision |  SD-X Specific Development-Variety |
|  AG Agricultural District |  OR Office Residential District |
|  ER Estate Residential |  GO General Office District |
|  R-1 Residential District |  CC Central Commercial District |
|  R-2 Residential District |  NC Neighborhood Commercial District |
|  R-3 Residential District |  GC General Commercial District |
|  R-6 Residential District |  LI Light Industrial District |
|  RM-10 Attached 10 Residential District |  HI Heavy Industrial District |
|  RM-15 Attached 15 Residential District |  CI Civic and Institutional District |
|  RM-20 Attached 20 Residential District | |



0 250 500 1,000
Feet

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It was compiled from the most authentic information available.
The City is not responsible for any errors or omissions contained hereon.
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RIZER POINT PUD SUBDIVISION REZONING REQUEST

REVISION 2

ADDITION OF PROPERTY IDENTIFIED AS MAP 63, PARCEL 3.01 TO THE RIZER POINT PUD
FRANKLIN, TENNESSEE

OWNER/APPLICANT:
GOODALL INC, BUILDERS
393 MAPLE STREET, SUITE 100
GALLATIN, TN 37066
JACK LUDINGTON
615.451.5029

PLANNER/LANDSCAPE ARCHITECT
GAMBLE DESIGN COLLABORATIVE
GREG GAMBLE
greggamble209@gmail.com
615.975.5765
144 SOUTHEAST PARKWAY
SUITE 200
FRANKLIN TN 37064

CIVIL ENGINEER:
DEWEY ENGINEERING
MICHEAL DEWEY
2925 BERRY HILL DRIVE
NASHVILLE, TENNESSEE 37204
615.401-9956
mdewey@dewey-engineering.com

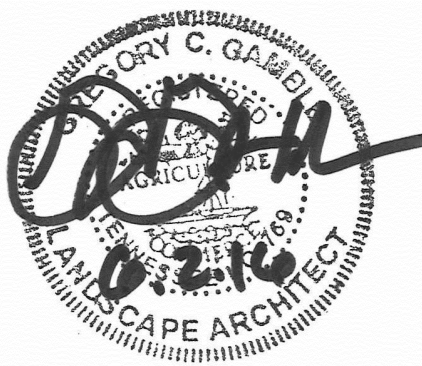


REVISION 2 SUMMARY:

This Rezoning Request is to accompany the Development Plan Revision 3, and is to include a new Section, Section 5 to the overall PUD. Section 5 is an additional parcel (+/-35.14 AC) and 20 new single family detached homes. The other four sections of the original Rizer Point PUD have approved Site Plans and are either in construction or complete. No change is proposed to Sections 1 - 4.

INDEX OF SHEETS

SHEET	DESCRIPTION
C	COVER SHEET AND LOCATION MAP
C 1.0	OVERALL EXISTING CONDITIONS
C 1.1	EXISTING CONDITIONS



COF # 6144
MAY 9, 2016
REVISED: JUNE 2, 2016

LEGAL DESCRIPTIONS:
LEGAL DESCRIPTION OF NEW PROPERTY, TO BE REZONED
The following legal description is for property in Williamson County, City of Franklin, TN, located on the lands of F-L Farms, LLC, of record in Deed Book 4530, Page 178, R.O.W.C., TN. Property is also described as Parcel 3.01 on Map 63.

Commencing at the point of beginning, point being the Northeastern property line of the land conveyed to Ryan and Krystin Lemmon, of record in Deed Book 6534, Page 854, R.O.W.C., TN, Point also being along the westerly margin of the Viola Lane Right of Way;

Thence, N 75° 28' 11" W for a distance of 228.99 feet to a point on a line.

Thence, N 75° 28' 09" W for a distance of 32.25 feet to a point on a line.

Thence, N 00° 30' 49" E for a distance of 505.70 feet to a point on a line.

Thence, N 03° 37' 49" E for a distance of 362.80 feet to a point on a line.

Thence, N 29° 37' 49" E for a distance of 519.50 feet to a point on a line.

Thence, N 42° 12' 49" E for a distance of 318.00 feet to a point on a line.

Thence, N 40° 20' 49" E for a distance of 300.00 feet to a point on a line.

Thence, N 50° 04' 49" E for a distance of 300.00 feet to a point on a line.

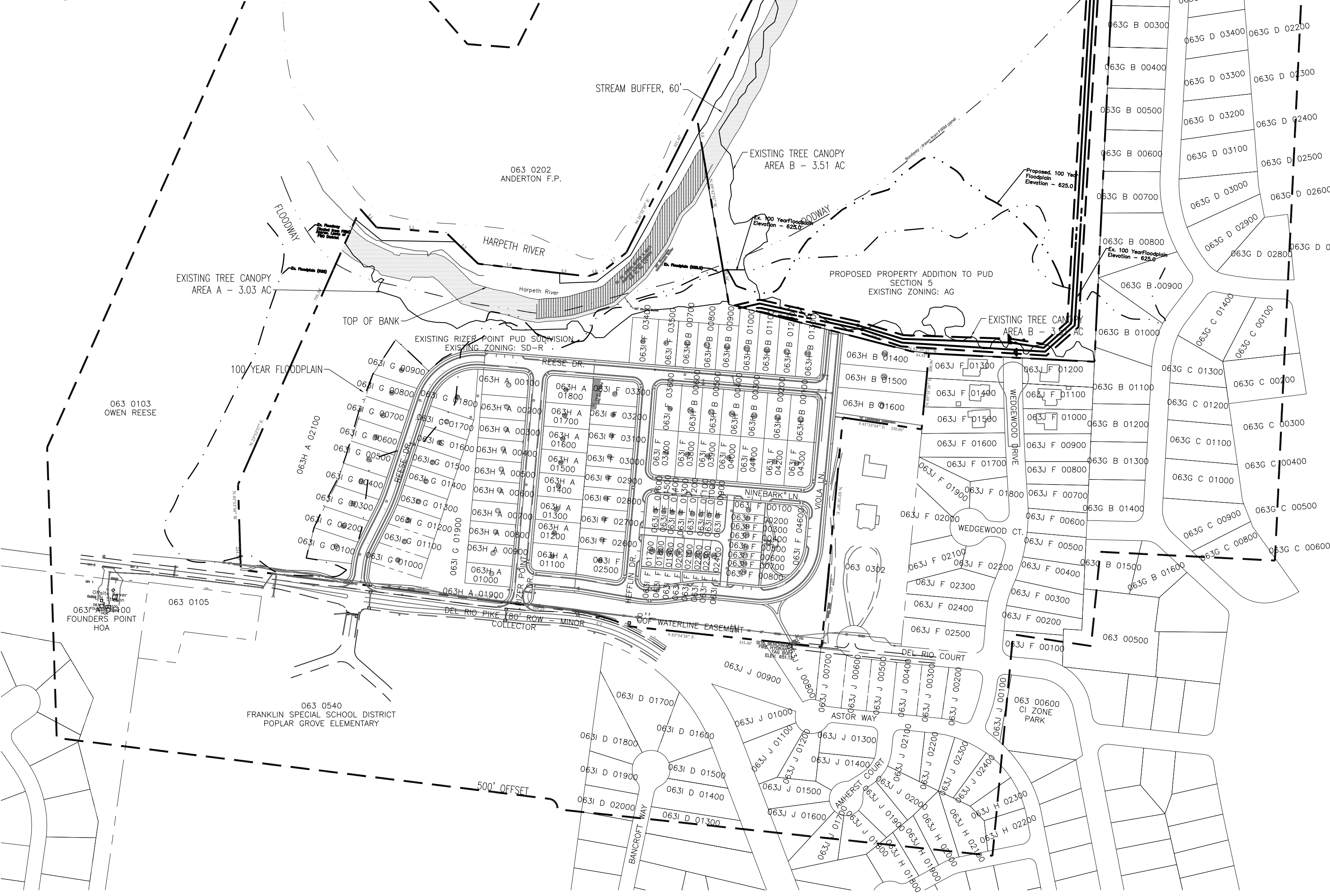
Thence, S 26° 33' 27" E for a distance of 172.40 feet to a point on a line.

Thence, S 03° 59' 27" E for a distance of 169.00 feet to a point on a line.

Thence, S 02° 50' 33" W for a distance of 1829.84 feet to a point on a line.

Thence, N 83° 36' 11" W for a distance of 439.04 feet to a point on a line.

Thence N 75° 28' 11" W a distance of 238.86 feet to the point of beginning and containing 35.74 acres more or less.



OVERALL EXISTING CONDITIONS



ADJACENT PROPERTY OWNERS WITHIN 500'

MAP PARCEL	PROPR. STREET	OWNER1	OWNER2
063-0103	2010 Del Rio Pk	Gordon Owen Reese	
063-0104	DEL RIO PK	Founders Point HOA	
063-0105	DEL RIO PK	Zaring Homes Inc	
063-0002	1100 Del Rio Ck	Tennessee Valley Authority	
063-0540	750 New HWY 98 W	Franklin Special School Dist	
063-01700	547 Bancroft Way	James Robert Brown	
063-01800	545 Bancroft Way	Robert E Bright	
063-02000	541 Bancroft Way	Joel Lee Bennett	
063-02100	541 Bancroft Way	Villard M Swenness	
063-02200	540 Bancroft Way	Timothy A Parker	
063-02300	538 Bancroft Way	Nancy Samuel	
063-02400	536 Bancroft Way	Xingy Guo	
063-02500	534 Bancroft Way	Shirley Vicki	
063-02600	536 Astor Way	Charles V Garrett	
063-02700	559 Astor Way	Kristal Dale	
063-02800	555 Astor Way	Rolling Hollow Prop LLC	
063-02900	551 Astor Way	Victoria L Marcoe	
063-03000	704 Amhurst Ct	Venus Adams	
063-03100	706 Amhurst Ct	Shawneer Amhurst	
063-03200	709 Amhurst Ct	James L Hough	
063-03300	707 Amhurst Ct	David A Cole	
063-03400	705 Amhurst Ct	Angela Marie Powell	
063-03500	700 Amhurst Ct	Judith Hill	
063-03600	702 Amhurst Ct	Tapes Pritchett	
063-03700	354 Astor Way	ARP 2014 - B Borrower LLC	
063-03800	352 Astor Way	Keith Everett Smith	
063-03900	350 Astor Way	Budger Clark R Row Trust	
063-04000	348 Astor Way	Ronald Jay Hill	
063-04100	344 Astor Way	Kenny M Coleman	
063-04200	342 Astor Way	Christopher Harris	
063-04300	Astor Way	City of Franklin	
063-04400	701 Amhurst Ct	Miss S Bengali	
063-04500	359 Astor Way	Victor M Menard	
063-04600	355 Astor Way	Benjamin L Davis	
063-04700	331 Astor Way	McCarte T S & Family Trust	
063-04800	327 Astor Way	Camille T Ford	
063-04900	323 Astor Way	Paul V Skovelski	
063-05000	608 Doubrooke Ct	James D Carter	
063-05100	606 Doubrooke Ct	Kris Hubbard	
063-05200	604 Doubrooke Ct	James E Siegel IV	
063-05300	602 Doubrooke Ct	Henry J Seneal	
063-05400	1105 Wedgewood Dr	Timothy J Forbes	
063-05500	1100 Wedgewood Dr	Trent Collier	
063-05600	1113 Wedgewood Dr	Patricia Patterson	
063-05700	585 Wedgewood Ct	Robert M Chiles	
063-05800	1115 Wedgewood Dr	Hansel Jonathan Eason	
063-05900	1113 Wedgewood Dr	Kean Patterson	
063-06000	1108 Wedgewood Dr	Pearso Trust Company Custodian	
063-06100	1104 Wedgewood Dr	Glenn H Moore	
063-06200	1109 Del Rio Ct	Gerardo Ruiz	
063-06300	605 Edwards Dr	Daryl W Sanders	
063-06400	603 Edwards Dr	Jennifer Hart	
063-06500	789 Edwards Dr	James E Bough	
063-06600	615 Rabel Ct	Stanley A Christiansen	
063-06700	Hillsboro Rd	Anderson Family Partnership	
063-06800	1100 Del Rio Ct	Anderson Family Partnership	
063-06900	HILLSBORO RD	ANDERSON FAMILY PARTNERSHIP	
063-07000	DEL RIO PK	F.F. FARMER LLC	
063-07100	2660 DEL RIO PK	REITLER RYAN	
063-07200	1108 HILLSBORO RD	GLENWALTER M TR	
063-07300	512 ALLEN AVE	HORTON ALDEN II	
063-07400	514 ALLEN AVE	ANDERSON ADAM L	
063-07500	516 ALLEN AVE	HARRIS ROBERT CLYDE JR	
063-07600	518 ALLEN AVE	PARRISH EDWARD J	
063-07700	517 CRAFTON AVE	SAMS TIMOTHY A	
063-07800	515 CRAFTON AVE	CATHER ROBERT DALE JR	
063-07900	513 CRAFTON AVE	MURDO NICOLE	
063-08000	513 VICTORIA DR	MURDO CALLEN BROWN	
063-08100	512 CRAFTON AVE	SCHALK FRANKIE J	
063-08200	514 CRAFTON AVE	SMITHSON OVERALL S TR	
063-08300	512 REBEL CIR	SMITHSON ROBBIE A	
063-08400	514 REBEL CIR	CANN FRANK A II	
063-08500	502 REBEL CIR	STATE OF TENNESSEE	
063-08600	519 VICTORIA DR	STATE OF TENNESSEE	
063-08700	517 VICTORIA DR	SHEPHERD WILLIAM GENE	
063-08800	502 REBEL CIR	STATE OF TENNESSEE	
063-08900	502 REBEL CIR	STATE OF TENNESSEE	
063-09000	502 REBEL CIR	STATE OF TENNESSEE	
063-09100	519 REBEL CIR	STATE OF TENNESSEE	
063-09200	517 REBEL CIR	STATE OF TENNESSEE	
063-09300	515 REBEL CIR	CHRISTENSEN BRADLEY A	
063-09400	513 REBEL CIR	ROBEY TIMOTHY J	
063-09500	511 REBEL CIR	COBBINS NORMAN WADE	
063-09600	509 REBEL CIR	ARSLAN MEMET	
063-09700	507 REBEL CIR	TERRY BULLE E	
063-09800	505 REBEL CIR	JOHNS JAMES E	
063-09900	503 REBEL CIR	LONG VINCENT LEO JR	
063-10000	501 REBEL CIR	BATTERFIELD LESLIE J	
063-10100	500 REBEL CIR	CHOWNE DONALD R	
063-10200	500 REBEL CIR	LETT PAUL J	
063-10300	500 REBEL CIR	HICKSON ROBERT D JR	
063-10400	500 REBEL CIR	HICKSON STEPHANIE	
063-10500	500 REBEL CIR	FELDS WILLIAM H	
063-10600	500 REBEL CIR	LICHARLES	
063-10700	500 REBEL CIR	RAY BILLY D	
063-10800	513 RONALD DR	PREST EARL D	
063-10900	511 RONALD DR	WILSON KENNETH W	
063-11000	509 RONALD DR	HERNANDEZ AMARCO	
063-11100	507 RONALD DR	HARRIS TERRY MORGAN	
063-11200	505 RONALD DR	WHITLEY JAMIE LEDON	
063-11300	78 EDWARDS DR	HARRETH HOMES LLC	
063-11400	78 EDWARDS DR	MARTIN JUSTIN E	
063-11500	81 EDWARDS DR	PATTON MINNIE J	
063-11600	81 EDWARDS DR	NUNEZ FRANCISCO S	
063-11700	80 EDWARDS DR	CAUILL DENNIS ROSS	
063-11800	80 EDWARDS DR	RENFRO JERN L	
063-11900	802 RONALD DR	SMITH MARK S	
063-12000	804 RONALD DR	EMMONS JAS NATHAN	
063-12100	806 RONALD DR	WHERRY WM EVERETT	
063-12200	808 RONALD DR	SAVAGE PHIL	
063-12300	810 RONALD DR	SZABO JAMES	
063-12400	812 RONALD DR	LINN JOHNNY R	
063-12500	832 CHRISMAN DR	GINN JOHN ROBERT	
063-12600	831 CHRISMAN DR	ROLEY FRANK E	
063-12700	829 CHRISMAN DR	FRASER JONATHAN	
063-12800	827 CHRISMAN DR	KITSMILLER PATRICIA L	
063-12900	825 CHRISMAN DR	UNION JEFFREY Z	
063-13000	823 CHRISMAN DR	RASSAND MALINDA	
063-13100	821 CHRISMAN DR	HATCHER NORMAN GENE TR	
063-13200	819 CHRISMAN DR	ELLIOTT DANIEL	
063-13300	817 CHRISMAN DR	DEPATA SARAH M	
063-13400	814 REBEL CIR	HAGAN MICHAEL C	
063-13500	816 REBEL CIR	ADD LISA MAE	
063-13600	820 REBEL CIR	EHRNSBERGER MARGARET A	
063-13700	822 REBEL CIR	CLOVERBY ANDREW V	
063-13800	824 REBEL CIR	BEILD CHRISTY F	
063-13900	826 REBEL CIR	GENTRY JOE W	
063-14000	828 REBEL CIR	PERNAN ABRI DENISE	
063-14100	830 REBEL CIR	LAYTON FORREST	
063-14200	832 REBEL CIR	MCCALL CHARLES C TR	
063-14300	5014 RIZER POINT DR	HOCKASSIAN SHEYOND	
063-14400	5016 RIZER POINT DR	BERRY BRIAN RAY	
063-14500	5018 RIZER POINT DR	GOODALL NC BUILDERS	
063-14600	1219 REESE DR	GOODALL NC BUILDERS	
063-14700	1214 REESE DR	THOMAS EBY KATTAPURATHU	
063-14800	1212 REESE DR	SMITH GARY S	
063-14900	1210 REESE DR	GOODALL NC BUILDERS	
063-15000	1208 REESE DR	GOODALL NC BUILDERS	
063-15100	1206 REESE DR	GOODALL NC BUILDERS	
063-15200	1204 REESE DR	GOODALL NC BUILDERS	
063-15300	1202 REESE DR	GOODALL NC BUILDERS	
063-15400	1200 REESE DR	GOODALL NC BUILDERS	
063-15500	1211 REESE DR	CONNELLY FRANCH X II	
063-15600	1213 REESE DR	GOODALL NC BUILDERS	
063-15700	1215 REESE DR	WHITE DANIEL C	
063-15800	1217 REESE DR	LEMON RYAN M	
063-15900	5004 VOLA DR	GOODALL NC BUILDERS	
063-16000	5002 VOLA DR	BRODSKY JEFFREY	
063-16100	5000 VOLA DR	JOHNSON ANDREW G	
063-16200	5001 VOLA LN	GOODALL NC BUILDERS	
063-16300	2011 HEFLIN LN	GOODALL NC BUILDERS	
063-16400	2013 HEFLIN LN	FRIDENSTINE GEORGE W	
063-16500	2015 HEFLIN LN	FRIDENSTINE GEORGE W	
063-16600	2017 HEFLIN LN	FRIDENSTINE GEORGE W	
063-16700	1201 REESE DR	MATHEWS PAUL J JR	
063-16800	1203 REESE DR	STICKLEY MELINDA J	
063-16900	1204 REESE DR	CLEVELAND LISA A	
063-17000	3001 NINE BARK LN	BROWN ANSLY T	
063-17100	3003 NINE BARK LN	NGUYEN JUSTIN T	
063-17200	3005 NINE BARK LN	KARTCHNER JEANNETTE E	
063-17300	3007 NINE BARK LN	WRIGHT JAMES C JR	
063-17400	3009 NINE BARK LN	EBLE DAVID M	
063-17500	3011 NINE BARK LN	GRIFIN MICHAEL S	
063-17600	3013 NINE BARK LN	FRIDENSTINE STEVEN	
063-17700	VOLA LN	GOODALL NC BUILDERS	
063-17800	1120 WEDGEWOOD DR	VAN SOREN ERIC	
063-17900	1124 WEDGEWOOD DR	FEISTER ANGEL A	
063-18000	1126 WEDGEWOOD DR	SMITHSON DEBORAH L	
063-18100	1128 WEDGEWOOD DR	MCDONALD ANDREW J	
063-18200	1130 WEDGEWOOD DR	LOGAN BRENDA G	
063-18300	1132 WEDGEWOOD DR	LOCKWOOD PROP LLC	
063-18400	1134 WEDGEWOOD DR	MUCCI BARBARA A	
063-18500	1136 WEDGEWOOD DR	MAGNOLIA INV LLC	
063-18600	1138 WEDGEWOOD DR	MATHEWS JAMES A	
063-18700	1140 WEDGEWOOD DR	LOCKWOOD PROP LLC	
063-18800	1142 WEDGEWOOD DR	WHITFIELD JAMES F	
063-18900	1136 WEDGEWOOD DR	DUNN KEVAN G	
063-19000	1134 WEDGEWOOD DR	DUNN JENNIFER M	
063-19100	309 WEDGEWOOD CT	K-TEAM REALTORS	
063-19200	312 WEDGEWOOD CT	VAN SOREN DALE G	
063-19300	314 WEDGEWOOD CT	FAHLER CHEYENNE	
063-19400	309 WEDGEWOOD CT	WINTER SCOTT D	
063-19500	305 WEDGEWOOD CT	GARNER CATHERINE C	

SITE DATA:

PROJECT NAME: RIZER POINT PUD SUBDIVISION
REZONING REQUEST, REV. 2
6144
SUBDIVISION: RIZER POINT
LOT NUMBER: DEL RIO PIKE
ADDRESS: FRANKLIN, TN
CITY: WILLIAMSON
STATE: TENNESSEE
CIVIL DISTRICT: 14TH CIVIL DISTRICT
MAP, GROUP, PARCEL NUMBERS: MAP 63, PARCEL 3.01 (NEW PARCEL)
EXISTING ZONING: S-R & AG
PROPOSED ZONING NEW PARCEL: S-DR (0.57)
CHARACTER AREA OVERLAY: WHCO 2 & 3
OTHER APPLICABLE OVERLAYS: FFO, FWO
APPLICABLE DEVELOPMENT STANDARD: CONVENTIONAL
TOTAL AREA: ORIGINAL RIZER POINT AREA: 35.94 AC
63-00031 (NEW PARCEL) AREA: 35.14 AC AC
TOTAL AREA: 71.08 AC
1.62 UNITS/AC TOTAL SITE
2.64 UNITS/AC ORIGINAL PUD AREA
0.57 UNITS/AC NEW PROPERTY
1.88 UNITS/AC

OVERALL DENSITY: NET DENSITY (MINUS 5.92 AC ROW):
NET DENSITY (MINUS ROW AND 24 AC FWO OVERLAY):
NUMBER OF RESIDENTIAL UNITS BY USE TYPE:
24 TOWN HOME (CURRENT RIZER POINT PUD)
71 SINGLE FAMILY HOME (CURRENT RIZER POINT PUD)
20 SINGLE FAMILY HOME (NEW PROPERTY)

NONRESIDENTIAL SQUARE FOOTAGE: N/A
TOTAL ACREAGE BY USE, ENTIRE SITE: 16.68 AC LOT IN RESERVE
26.88 AC OPEN SPACE
5.92 AC ROW
21.52 AC RESIDENTIAL LOTS

SECTION	RESIDENTIAL LOTS	OPEN SPACE	TOTAL
1	3,08 AC	14.82 AC	17.90 AC
2	4.35 AC	0.81 AC	5.16 AC
3	3.30 AC	- AC	3.30 AC
4	3.11 AC	0.93 AC	4.04 AC
5	3.69 AC	14.16 AC	17.85 AC

MINIMUM REQUIRED SETBACK LINES: SEE LOT DIAGRAMS

OWNER (RIZER POINT MASTER DEVELOPER): GOODALL INC BUILDERS
CONTACT: JACK LUDINGTON
ADDRESS: 393 MAPLE STREET, SUITE 100
GALLATIN, TN 37066
PHONE: 615-451-5029
EMAIL: ludington@goodallhomes.com

OWNER (PARCEL 3.01) ADDRESS: F-L FARMS
4720 HARPERH PLYTONSVILLE RD
THOMPSON STATION, TN 37179

APPLICANT: GOODALL HOMES
ADDRESS: 393 MAPLE STREET, SUITE 100
GALLATIN, TN 37066
OFFICE PHONE: 615-451-5029
CONTACT: JACK LUDINGTON
EMAIL ADDRESS: ludington@goodallhomes.com

BUILDING SQUARE FOOTAGE: 1,700 SF - 4,200 SF
BUILDING HEIGHT: 2 STORIES
LANDSCAPE SURFACE RATIO: .49
MINIMUM LANDSCAPE SURFACE RATIO: .20
MINIMUM PARKING REQUIREMENT: 2 PER SINGLE FAMILY HOME
MAXIMUM PARKING LIMIT: N/A
PARKING PROVIDED: 2 PER SINGLE FAMILY HOME
RESIDENTIAL DENSITY: 1.62 DUA (TOTAL SITE)
TREE CANOPY: 6.54 AC (9.2%) EXISTING
DEDICATION OF GREENWAY TRAIL AREA
(35x100 SF) + (60x600 SF) = 90,000 SF
ADDITIONALLY, LOT LINES FOR THE PROPOSED ADDITION HAVE BEEN PROPOSED TO BE SIMILAR TO THEIR EXISTING ADJACENT LOTS.

OPEN SPACE: 27.04 AC (49.7% PUD SITE)
OPEN SPACE ACREAGE REQUIRED: 15% (10.66 AC)
FORMAL OPEN SPACE REQUIRED: 33% (15.2 AC)
FORMAL OPEN SPACE REQUIRED: 66% (7.04 AC)

LAND USE PLAN COMPLIANCE: WHCO 2 & 3
CHARACTER AREA OVERLAY: WHCO 2 & 3
APPLICABLE DEVELOPMENT STANDARD: CONVENTIONAL

RIZER POINT PUD WAS APPROVED IN AUGUST 2007. THE PROPERTY HAS BOTH SPECIAL AREA 2 AND 3 ON THE PROPERTY. THIS DEVELOPMENT PLAN MAKES NO CHANGE TO THE ORIGINALLY APPROVED RIZER POINT PUD; IT ADDS AN ADDITIONAL PROPERTY TO THE NORTH WITH 20 NEW SINGLE FAMILY LOTS AND OPEN SPACE.

1. THE PROPOSED DEVELOPMENT PLAN IS DESIGNED WITH LOT SIZES CONSISTENT WITH THE APPROVED RIZER POINT PUD AND ADJACENT NEIGHBORHOOD EAST AND SOUTH OF THE PROPOSED NEW PARCEL.

2. NO RETAIL IS PLANNED FOR THIS PROPERTY.

DESIGN CONCEPT
THE ADDITION OF THE NEW PROPERTY TO THE RIZER POINT PUD ALLOWS FOR VIOLA LANE TO EXTEND AND CREATE A VEHICULAR AND PEDESTRIAN CONNECTION TO WEDGEWOOD DRIVE. ADDITIONALLY, LOT LINES FOR THE PROPOSED ADDITION HAVE BEEN PROPOSED TO BE SIMILAR TO THEIR EXISTING ADJACENT LOTS.

LOCAL COMPATIBILITY
NO CHANGE IS PROPOSED FOR THE EXISTING PUD AREA. THIS REVISION IS TO INCLUDE ADDITIONAL PROPERTY TO THE NORTH EAST. THIS PROPERTY ADDITION IS DESIGNED WITH LOTS CONSISTENT WITH NEIGHBORHOODS ALONG THE DEL RIO PIKE CORRIDOR.

STATEMENT OF IMPACTS

WATER
WATER SERVICE WILL BE PROVIDED BY THE CITY OF FRANKLIN WATER SERVICES. WATER MAIN IS LOCATED ON DEL RIO PIKE.
115 SFU / 350 GPD = 40,250 GPD

SEWER
SEWER SERVICE WILL BE PROVIDED BY THE CITY OF FRANKLIN. SEWER MAIN WILL CONNECT INTO PUMP STATION LOCATED ON DEL RIO PIKE.

REPURIFIED (REUSE) WATER FACILITIES
REUSE WATER IS AVAILABLE, AND WILL BE UTILIZED FOR COMMON AREAS OWNED AND MAINTAINED BY THE RIZER POINT HOMEOWNERS ASSOCIATION.

STREET NETWORK
THE MAJOR THROUGHFARE PLAN INDICATES THE FUTURE DEVELOPMENT MACK HATCHER PARKWAY NORTH OF RIZER POINT. PROJECTED TRIPS FOR THIS ADDITION IS 214 TRIPS PER DAY (20 SINGLE FAMILY RESIDENTIAL UNITS @ 10.7 TRIPS PER DAY).

DRAINAGE FACILITIES
THE PROPERTY DRAINS NORTH INTO THE HARPERH RIVER AND WEST INTO THE RETENTION AREA CREATED WITH THE ORIGINAL RIZER POINT PUD.

POLICE AND FIRE
FIRE STATION, HWY 96 - 3.6 MILES DRIVING DISTANCE
COLUMBIA AVE, POLICE STATION - 2.06 MILES DRIVING DISTANCE

RECREATION FACILITIES
WILLIAMSON COUNTY RECREATION FACILITY - 1.8 MILES FROM THE PROPERTY

PROJECTED STUDENT POPULATION
THE STUDENT POPULATION IS PROJECTED AT A RATE OF ONE STUDENT PER .64 HOMES.
115 X .64 = 73.6 STUDENTS

REFUSE COLLECTION
REFUSE COLLECTION SERVICE WILL BE PROVIDED BY THE CITY OF FRANKLIN SOLID WASTE

RESTRICTIVE COVENANTS
THE RIZER POINT HOME OWNER'S ASSOCIATION WILL BE ESTABLISHED PRIOR TO THE FIRST OCCUPANCY OF RESIDENTS. THE HOME OWNER'S ASSOCIATION WILL REGULATE ARCHITECTURAL STANDARDS AND MAINTENANCE OF THE COMMUNITY. THE HOA WILL MAINTAIN ALL COMMON OPEN SPACE, RECREATION AREAS, AND TOWN HOME YARDS.

NOTES
1. A



OVERALL EXISTING CONDITIONS



EXISTING TREE CANOPY:
TOTAL EXISTING CANOPY: 6.54 AC (9.2%)
REQUIRED PRESERVATION: 54% 3.53 AC
TREE CANOPY AREA A: 3.03 AC (ORIGINAL RIZER POINT PROPERTY)
TREE CANOPY AREA B: 3.51 AC (NEW PROPERTY)

SOIL TYPES		
A/B	ARMOUR SILT LOAM	2-5% SLOPES
ArC2	ARMOUR SILT LOAM (ERODED)	5-12% SLOPES
BrC2	BRAXTON CHERTY SILT LOAM (ERODED)	5-12% SLOPES
BsD3	BRAXTON CHERTY SILT LOAM (ERODED)	12-20% SLOPES
Hu	HUNTINGTON SILT LOAM (PHOSPHATIC)	N/A
MbB2	MAURY SILT LOAM (ERODED)	2-5%
MbC2	MAURY SILT LOAM (ERODED)	5-12%

SITE DATA:

PROJECT NAME:

PROJECT NUMBER:

SUBDIVISION:

LOT NUMBER:

ADDRESS:

CITY:

COUNTY:

STATE:

CIVIL DISTRICT:

MAP GROUP, PARCEL NUMBERS:

EXISTING ZONING:

PROPOSED ZONING NEW PARCEL:

CHARACTER AREA OVERLAY:

OTHER APPLICABLE OVERLAYS:

APPLICABLE DEVELOPMENT STANDARD:

TOTAL AREA:

OVERALL DENSITY:

RIZER POINT PUD SUBDIVISION

REZONING REQUEST, REV. 2

6144

RIZER POINT

N/A

DEL RIO PIKE

FRANKLIN, TN

WILLIAMSON

TENNESSEE

14TH CIVIL DISTRICT

MAP 63, PARCEL 3.01 (NEW PARCEL)

S-DR & AG

S-DR (0.57)

WHCO 2 & 3

FFO, FWO

CONVENTIONAL

ORIGINAL RIZER POINT AREA: 35.94 AC

63-000301 (NEW PARCEL) AREA: 35.14 AC

TOTAL AREA: 71.08 AC

1.62 UNITS/AC TOTAL SITE

2.64 UNITS/AC ORIGINAL PUD AREA

0.57 UNITS/AC NEW PROPERTY

1.88 UNITS/AC

2.79 UNITS/AC

24 TOWN HOME (CURRENT RIZER POINT PUD)

71 SINGLE FAMILY HOME (CURRENT RIZER POINT PUD)

20 SINGLE FAMILY HOME (NEW PROPERTY)

N/A

16.68 AC LOT IN RESERVE

26.88 AC OPEN SPACE

5.92 AC ROW

21.52 AC RESIDENTIAL LOTS

TOTAL ACREAGE BY USE, PER SECTION:

SECTION	RESIDENTIAL LOTS	OPEN SPACE	TOTAL
1	3.08 AC	10.57 AC	14.82 AC
2	4.35 AC	0.81 AC	9.24 AC
3	3.30 AC	- AC	4.10 AC
4	3.11 AC	0.93 AC	4.89 AC
5	3.69 AC	14.18 AC	17.87 AC

MINIMUM REQUIRED SETBACK LINES:	SEE LOT DIAGRAMS
OWNER (RIZER POINT MASTER DEVELOPER):	GOODALL INC BUILDERS JACK LUDINGTON 393 MAPLE STREET, SUITE 100 GALLATIN, TN 37066 615-451-5029 jludington@goodallhomes.com
OWNER (PARCEL 3.01):	F-L FARMS 4720 HARPETH PEYTONSVILLE RD THOMPSON STATION, TN 37179
APPLICANT:	GOODALL HOMES 393 MAPLE STREET, SUITE 100 GALLATIN, TN 37066 615-451-5029 JACK LUDINGTON jludington@goodallhomes.com
BUILDING SQUARE FOOTAGE:	1,700 SF - 4,200 SF
BUILDING HEIGHT:	2 STORIES
LANDSCAPE SURFACE RATIO:	.49
MINIMUM LANDSCAPE SURFACE RATIO:	.20
MINIMUM PARKING REQUIREMENT:	2 PER SINGLE FAMILY HOME
MAXIMUM PARKING LIMIT:	N/A
PARKING PROVIDED:	2 PER SINGLE FAMILY HOME
RESIDENTIAL DENSITY:	1.62 DUA (TOTAL SITE)
TREE CANOPY:	6.54 AC (9.2%) EXISTING
PARKLAND (IF APPLICABLE):	DEDICATION OF GREENWAY TRAIL AREA (354,1200 SF) * (80x600 SF) = 90,000 SF 78,000 SF ORIGINAL PUD 12,000 SF REVISION 3 27.04, (49.7% PUD SITE)
OPEN SPACE:	OPEN SPACE ACREAGE REQUIRED: 15% (10.66 AC) FORMAL OPEN SPACE REQUIRED: 33% (3.52 AC) FORMAL OPEN SPACE REQUIRED: 66% (7.04 AC)
LAND USE PLAN COMPLIANCE:	WHCO 2 & 3 APPLICABLE DEVELOPMENT STANDARD: CONVENTIONAL

THE PROPERTY ADDITION IS DESIGNED WITH LOTS CONSISTENT WITH NEIGHBORHOODS ALONG THE DEL RIO PIKE CORRIDOR.

- THE PROPOSED DEVELOPMENT PLAN IS DESIGNED WITH LOT SIZES CONSISTENT WITH THE APPROVED RIZER POINT PUD AND ADJACENT NEIGHBORHOOD EAST AND SOUTH OF THE PROPOSED NEW PARCEL.
- NO RETAIL IS PLANNED FOR THIS PROPERTY.

DESIGN CONCEPT
THE ADDITION OF THE NEW PROPERTY TO THE RIZER POINT PUD ALLOWS FOR VIOLA LANE TO EXTEND AND CREATE A VEHICULAR AND PEDESTRIAN CONNECTION TO WEDGEWOOD DRIVE. ADDITIONALLY, LOT LINES FOR THE PROPOSED ADDITION HAVE BEEN PROPOSED TO BE SIMILAR TO THEIR EXISTING, ADJACENT LOTS.

LOCAL COMPATIBILITY
NO CHANGE IS PROPOSED FOR THE EXISTING PUD AREA. THIS REVISION IS TO INCLUDE ADDITIONAL PROPERTY TO THE NORTH EAST. THE PROPERTY ADDITION IS DESIGNED WITH LOTS CONSISTENT WITH NEIGHBORHOODS ALONG THE DEL RIO PIKE CORRIDOR.

STATEMENT OF IMPACTS
WATER
WATER SERVICE WILL BE PROVIDED BY THE CITY OF FRANKLIN WATER SERVICES. WATER MAIN IS LOCATED ON DEL RIO PIKE.
11" SFI * 350 GPD * 40,250 GPD
SEWER
SEWER SERVICE WILL BE PROVIDED BY THE CITY OF FRANKLIN. SEWER MAIN WILL CONNECT INTO PUMP STATION LOCATED ON DEL RIO PIKE.

REPURIFIED (REUSE) WATER FACILITIES
REUSE WATER IS AVAILABLE, AND WILL BE UTILIZED FOR COMMON AREAS OWNED AND MAINTAINED BY THE RIZER POINT HOMEOWNERS ASSOCIATION.

STREET NETWORK
THE MAJOR THROUGHFARE PLAN INDICATES THE FUTURE DEVELOPMENT MACK HATCHER PARKWAY NORTH OF RIZER POINT. PROJECTED TRIPS FOR THIS ADDITION IS 214 TRIPS PER DAY (20 SINGLE FAMILY RESIDENTIAL UNITS @ 10.7 TRIPS PER DAY).

DRAINAGE FACILITIES
THE PROPERTY DRAINS NORTH INTO THE HARPETH RIVER AND WEST INTO THE RETENTION AREA CREATED WITH THE ORIGINAL RIZER POINT PUD.

POLICE AND FIRE
FIRE STATION, HWY 96- 3.6 MILES DRIVING DISTANCE
COLUMBIA AVE, POLICE STATION - 2.06 MILES DRIVING DISTANCE

RECREATION FACILITIES
WILLIAMSON COUNTY RECREATION FACILITY -1.8 MILES FROM THE PROPERTY

PROJECTED STUDENT POPULATION
THE STUDENT POPULATION IS PROJECTED AT A RATE OF ONE STUDENT PER .64 HOMES.
115 X .64 = 73.6 STUDENTS

REFUSE COLLECTION
REFUSE COLLECTION SERVICE WILL BE PROVIDED BY THE CITY OF FRANKLIN SOLID WASTE

RESTRICTIVE COVENANTS
THE RIZER POINT HOME OWNER'S ASSOCIATION WILL BE ESTABLISHED PRIOR TO THE FIRST OCCUPANCY OF RESIDENTS. THE HOME OWNERS ASSOCIATION WILL REGULATE ARCHITECTURAL STANDARDS AND MAINTENANCE OF THE COMMUNITY. THE HOA WILL MAINTAIN ALL COMMON OPEN SPACE, RECREATION AREAS, AND TOWN HOME YARDS.

- NOTES
- A PORTION OF THIS PROPERTY FALLS WITHIN A FLOOD HAZARD AREA, ZONE AE, AS DEPICTED ON THE CURRENT FLOOD INSURANCE RATE MAP (FIRM) NUMBERS: 47187C0184F & 47187C0192F, DATED SEPT 2006. ELEVATION VARIES 625.0-625.5.
 - NO MINERAL RIGHTS ARE HELD BY PARTIES OUTSIDE OF THE OWNER.

RIZER POINT PUD SUBDIVISION
REZONING REQUEST, REVISION 2
FRANKLIN, WILLIAMSON COUNTY, TENNESSEE 37064
COF PROJECT NO. xxxx



rev. date
June 2, 2016

△
△
△
△

MAY 9, 2016

SHEET

C1.1
EXISTING
CONDITIONS

ORDINANCE 2016-21

TO BE ENTITLED, “AN ORDINANCE TO REZONE 35.74 ACRES FROM AGRICULTURAL – AG DISTRICT TO SPECIFIC DEVELOPMENT RESIDENTIAL – SD-R (0.56) DISTRICT FOR THE PROPERTY LOCATED NORTH OF DEL RIO PIKE AND EAST OF DEL RIO COURT.”

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

WHEREAS, the Specific Development Residential – SR-R (0.57) 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 2016-30, approving a Revised 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 Agriculture – AG District to Specific Development Residential – SD-R (0.57) District:

PREMISES CONSIDERED

Map-Parcel	Acres
63 3.01	35.74
Total	35.74

The following legal description is for property in Williamson County, City of Franklin, TN, located on the lands of F-L Farms, LLC, of record in Deed Book 4530, Page 178, R.O.W.C., TN. Property is also described as Parcel 3.01 on Map 63.

Commencing at the point of beginning, point being the Northeastern property line of the land conveyed to Ryan and Krystin Lemmon, of record in Deed Book 6534, Page 854, R.O.W.C., TN, Point also being along the westerly margin of the Viola Lane Right of Way;

Thence, N 75° 28' 11" W for a distance of 228.99 feet to a point on a line.

Thence, N 75° 28' 09" W for a distance of 32.25 feet to a point on a line.

Thence, N 00° 30' 49" E for a distance of 505.70 feet to a point on a line.

Thence, N 03° 37' 49" E for a distance of 362.80 feet to a point on a line.

Thence, N 29° 37' 49" E for a distance of 519.50 feet to a point on a line.

Thence, N 42° 12' 49" E for a distance of 318.00 feet to a point on a line.

Thence, N 40° 20' 49" E for a distance of 300.00 feet to a point on a line.

Thence, N 50° 04' 49" E for a distance of 300.00 feet to a point on a line.

Thence, S 26° 33' 27" E for a distance of 172.40 feet to a point on a line.
Thence, S 03° 59' 27" E for a distance of 169.00 feet to a point on a line.
Thence, S 02° 50' 33" W for a distance of 1829.84 feet to a point on a line.
Thence, N 83° 36' 11" W for a distance of 439.04 feet to a point on a line.
Thence N 75° 28' 11" W a distance of 238.86 feet to the point of beginning
and containing 35.74 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:

CITY OF FRANKLIN, TENNESSEE:

By: _____
Eric Stuckey
City Administrator/Recorder

By: _____
Dr. Ken Moore
Mayor

Approved as to form by:

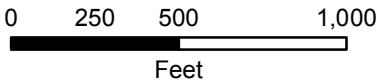
Shauna R. Billingsley
City Attorney

PLANNING COMMISSION RECOMMENDED:	_____
PASSED FIRST READING:	_____
PUBLIC HEARING HELD:	_____
PASSED SECOND READING:	_____
PASSED THIRD READING:	_____

RIZER POINT PUD SUBDIVISION, REZONING,
(ORDINANCE 2016-21)
FRANKLIN MUNICIPAL PLANNING COMMISSION
06/23/2016

<UND><BOL>Project Information</BOL></UND>
Existing Zoning: Agricultural (AG)
Proposed Zoning: SD-R 0.57
Existing Land Use: Vacant
Proposed Land Use: Detached Residential
Character Area: WHCO 2 & 3
Development Standard: Conventional
Other Overlays: N/A
Site Acreage: 35.14 acres

- | | |
|---|---|
|  Harpeth River (Polygon) |  SD-R Specific Development-Residential |
|  Rizer Point PUD Subdivision |  SD-X Specific Development-Variety |
|  AG Agricultural District |  OR Office Residential District |
|  ER Estate Residential |  GO General Office District |
|  R-1 Residential District |  CC Central Commercial District |
|  R-2 Residential District |  NC Neighborhood Commercial District |
|  R-3 Residential District |  GC General Commercial District |
|  R-6 Residential District |  LI Light Industrial District |
|  RM-10 Attached 10 Residential District |  HI Heavy Industrial District |
|  RM-15 Attached 15 Residential District |  CI Civic and Institutional District |
|  RM-20 Attached 20 Residential District | |



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.
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RIZER POINT PUD SUBDIVISION REZONING REQUEST

REVISION 2

ADDITION OF PROPERTY IDENTIFIED AS MAP 63, PARCEL 3.01 TO THE RIZER POINT PUD
FRANKLIN, TENNESSEE

OWNER/APPLICANT:
GOODALL INC, BUILDERS
393 MAPLE STREET, SUITE 100
GALLATIN, TN 37066
JACK LUDINGTON
615.451.5029

PLANNER/LANDSCAPE ARCHITECT
GAMBLE DESIGN COLLABORATIVE
GREG GAMBLE
greggamble209@gmail.com
615.975.5765
144 SOUTHEAST PARKWAY
SUITE 200
FRANKLIN TN 37064

CIVIL ENGINEER:
DEWEY ENGINEERING
MICHEAL DEWEY
2925 BERRY HILL DRIVE
NASHVILLE, TENNESSEE 37204
615.401-9956
mdewey@dewey-engineering.com

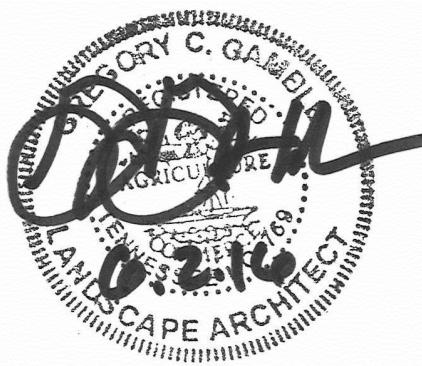


REVISION 2 SUMMARY:

This Rezoning Request is to accompany the Development Plan Revision 3, and is to include a new Section, Section 5 to the overall PUD. Section 5 is an additional parcel (+/-35.14 AC) and 20 new single family detached homes. The other four sections of the original Rizer Point PUD have approved Site Plans and are either in construction or complete. No change is proposed to Sections 1 - 4.

INDEX OF SHEETS

SHEET	DESCRIPTION
C	COVER SHEET AND LOCATION MAP
C 1.0	OVERALL EXISTING CONDITIONS
C 1.1	EXISTING CONDITIONS



COF # 6144
MAY 9, 2016
REVISED: JUNE 2, 2016

LEGAL DESCRIPTIONS:
LEGAL DESCRIPTION OF NEW PROPERTY, TO BE REZONED
The following legal description is for property in Williamson County, City of Franklin, TN, located on the lands of F-L Farms, LLC, of record in Deed Book 4530, Page 178, R.O.W.C., TN. Property is also described as Parcel 3.01 on Map 63.

Commencing at the point of beginning, point being the Northeastern property line of the land conveyed to Ryan and Krystin Lemmon, of record in Deed Book 6534, Page 854, R.O.W.C., TN, Point also being along the westerly margin of the Viola Lane Right of Way;

Thence, N 75° 28' 11" W for a distance of 228.99 feet to a point on a line.

Thence, N 75° 28' 09" W for a distance of 32.25 feet to a point on a line.

Thence, N 00° 30' 49" E for a distance of 505.70 feet to a point on a line.

Thence, N 03° 37' 49" E for a distance of 362.80 feet to a point on a line.

Thence, N 29° 37' 49" E for a distance of 519.50 feet to a point on a line.

Thence, N 42° 12' 49" E for a distance of 318.00 feet to a point on a line.

Thence, N 40° 20' 49" E for a distance of 300.00 feet to a point on a line.

Thence, N 50° 04' 49" E for a distance of 300.00 feet to a point on a line.

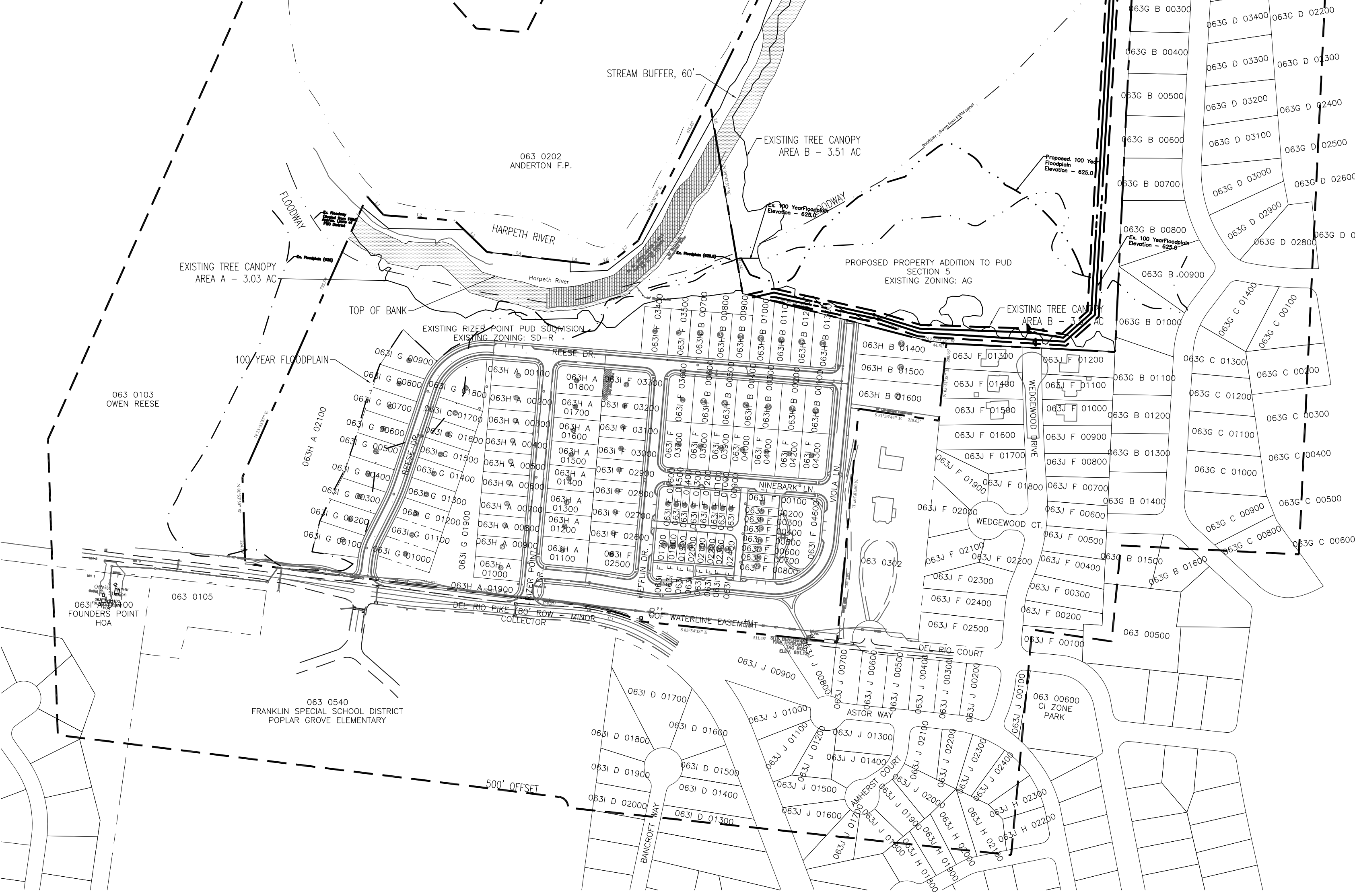
Thence, S 26° 33' 27" E for a distance of 172.40 feet to a point on a line.

Thence, S 03° 59' 27" E for a distance of 169.00 feet to a point on a line.

Thence, S 02° 50' 33" W for a distance of 1829.84 feet to a point on a line.

Thence, N 83° 36' 11" W for a distance of 439.04 feet to a point on a line.

Thence N 75° 28' 11" W a distance of 238.86 feet to the point of beginning and containing 35.74 acres more or less.



OVERALL EXISTING CONDITIONS



ADJACENT PROPERTY OWNERS WITHIN 500'

MAP PARCEL	PROPR. STREET	OWNER1	OWNER2
063-0103	2010 Del Rio Pk	Condon Owen Reese	
063-0104	2010 Del Rio Pk	Founders Point HOA	
063-0105	2010 Del Rio Pk	Zaring Homes Inc	
063-0002	1100 Del Rio Pk	Tennessee Valley Authority	
063-0540	750 New HWY 96 W	Franklin Special School Dist	
063-01700	547 Bancroft Way	James Robert Brown	
063-01800	545 Bancroft Way	Robert E Bright	
063-02000	541 Bancroft Way	Joel Lee Bennett	
063-02100	541 Bancroft Way	William M Swenness	
063-02200	540 Bancroft Way	Timothy A Parker	
063-02300	538 Bancroft Way	Nancy Samuel	
063-02400	536 Bancroft Way	Xingy Guo	
063-02500	534 Bancroft Way	Shirley Vicki	
063-02600	532 Astor Way	Charles V Garrett	
063-02700	530 Astor Way	Kristal Dale	
063-02800	528 Astor Way	Rolling Hollow Prop LLC	
063-02900	526 Astor Way	Victoria L Marlowe	
063-03000	524 Astor Way	Venus Adams	
063-03100	522 Astor Way	Shawneer Amundak	
063-03200	520 Astor Way	James L Hough	
063-03300	518 Astor Way	David A Cole	
063-03400	516 Astor Way	Angela Marie Powell	
063-03500	514 Astor Way	Judith Hill	
063-03600	512 Astor Way	James P. Pappell	
063-03700	510 Astor Way	ARP 2014 - B Borrower LLC	
063-03800	508 Astor Way	Keith Everett Smith	
063-03900	506 Astor Way	Budger Clark R. Rex Trust	
063-04000	504 Astor Way	Ronald Jay Hill	
063-04100	502 Astor Way	Kenny M Coleman	
063-04200	500 Astor Way	Christopher Harris	
063-04300	498 Astor Way	City of Franklin	
063-04400	496 Astor Way	Miss S Bengali	
063-04500	494 Astor Way	Victor M Menzies	
063-04600	492 Astor Way	Benjamin L. Davis	
063-04700	490 Astor Way	McCarte T & S Family Trust	
063-04800	488 Astor Way	Camille T Ford	
063-04900	486 Astor Way	Paul V. Skovicki	
063-05000	484 Astor Way	James D. Carter	
063-05100	482 Astor Way	Kris Hubbard	
063-05200	480 Astor Way	James E. Seigel IV	
063-05300	478 Astor Way	Henry J. Seneal	
063-05400	476 Astor Way	Timothy J. Forbes	
063-05500	474 Astor Way	Trent Collier	
063-05600	472 Astor Way	Patricia Patterson	
063-05700	470 Astor Way	Robert M. Chiles	
063-05800	468 Astor Way	Magdalena Ann Eason	
063-05900	466 Astor Way	Tamara Patterson	
063-06000	464 Astor Way	James E. Seigel IV	
063-06100	462 Astor Way	Henry J. Seneal	
063-06200	460 Astor Way	Timothy J. Forbes	
063-06300	458 Astor Way	Trent Collier	
063-06400	456 Astor Way	Patricia Patterson	
063-06500	454 Astor Way	Robert M. Chiles	
063-06600	452 Astor Way	Magdalena Ann Eason	
063-06700	450 Astor Way	Tamara Patterson	
063-06800	448 Astor Way	James E. Seigel IV	
063-06900	446 Astor Way	Henry J. Seneal	
063-07000	444 Astor Way	Timothy J. Forbes	
063-07100	442 Astor Way	Trent Collier	
063-07200	440 Astor Way	Patricia Patterson	
063-07300	438 Astor Way	Robert M. Chiles	
063-07400	436 Astor Way	Magdalena Ann Eason	
063-07500	434 Astor Way	Tamara Patterson	
063-07600	432 Astor Way	James E. Seigel IV	
063-07700	430 Astor Way	Henry J. Seneal	
063-07800	428 Astor Way	Timothy J. Forbes	
063-07900	426 Astor Way	Trent Collier	
063-08000	424 Astor Way	Patricia Patterson	
063-08100	422 Astor Way	Robert M. Chiles	
063-08200	420 Astor Way	Magdalena Ann Eason	
063-08300	418 Astor Way	Tamara Patterson	
063-08400	416 Astor Way	James E. Seigel IV	
063-08500	414 Astor Way	Henry J. Seneal	
063-08600	412 Astor Way	Timothy J. Forbes	
063-08700	410 Astor Way	Trent Collier	
063-08800	408 Astor Way	Patricia Patterson	
063-08900	406 Astor Way	Robert M. Chiles	
063-09000	404 Astor Way	Magdalena Ann Eason	
063-09100	402 Astor Way	Tamara Patterson	
063-09200	400 Astor Way	James E. Seigel IV	
063-09300	398 Astor Way	Henry J. Seneal	
063-09400	396 Astor Way	Timothy J. Forbes	
063-09500	394 Astor Way	Trent Collier	
063-09600	392 Astor Way	Patricia Patterson	
063-09700	390 Astor Way	Robert M. Chiles	
063-09800	388 Astor Way	Magdalena Ann Eason	
063-09900	386 Astor Way	Tamara Patterson	
063-10000	384 Astor Way	James E. Seigel IV	
063-10100	382 Astor Way	Henry J. Seneal	
063-10200	380 Astor Way	Timothy J. Forbes	
063-10300	378 Astor Way	Trent Collier	
063-10400	376 Astor Way	Patricia Patterson	
063-10500	374 Astor Way	Robert M. Chiles	
063-10600	372 Astor Way	Magdalena Ann Eason	
063-10700	370 Astor Way	Tamara Patterson	
063-10800	368 Astor Way	James E. Seigel IV	
063-10900	366 Astor Way	Henry J. Seneal	
063-11000	364 Astor Way	Timothy J. Forbes	
063-11100	362 Astor Way	Trent Collier	
063-11200	360 Astor Way	Patricia Patterson	
063-11300	358 Astor Way	Robert M. Chiles	
063-11400	356 Astor Way	Magdalena Ann Eason	
063-11500	354 Astor Way	Tamara Patterson	
063-11600	352 Astor Way	James E. Seigel IV	
063-11700	350 Astor Way	Henry J. Seneal	
063-11800	348 Astor Way	Timothy J. Forbes	
063-11900	346 Astor Way	Trent Collier	
063-12000	344 Astor Way	Patricia Patterson	
063-12100	342 Astor Way	Robert M. Chiles	
063-12200	340 Astor Way	Magdalena Ann Eason	
063-12300	338 Astor Way	Tamara Patterson	
063-12400	336 Astor Way	James E. Seigel IV	
063-12500	334 Astor Way	Henry J. Seneal	
063-12600	332 Astor Way	Timothy J. Forbes	
063-12700	330 Astor Way	Trent Collier	
063-12800	328 Astor Way	Patricia Patterson	
063-12900	326 Astor Way	Robert M. Chiles	
063-13000	324 Astor Way	Magdalena Ann Eason	
063-13100	322 Astor Way	Tamara Patterson	
063-13200	320 Astor Way	James E. Seigel IV	
063-13300	318 Astor Way	Henry J. Seneal	
063-13400	316 Astor Way	Timothy J. Forbes	
063-13500	314 Astor Way	Trent Collier	
063-13600	312 Astor Way	Patricia Patterson	
063-13700	310 Astor Way	Robert M. Chiles	
063-13800	308 Astor Way	Magdalena Ann Eason	
063-13900	306 Astor Way	Tamara Patterson	
063-14000	304 Astor Way	James E. Seigel IV	
063-14100	302 Astor Way	Henry J. Seneal	
063-14200	300 Astor Way	Timothy J. Forbes	
063-14300	298 Astor Way	Trent Collier	
063-14400	296 Astor Way	Patricia Patterson	
063-14500	294 Astor Way	Robert M. Chiles	
063-14600	292 Astor Way	Magdalena Ann Eason	
063-14700	290 Astor Way	Tamara Patterson	
063-14800	288 Astor Way	James E. Seigel IV	
063-14900	286 Astor Way	Henry J. Seneal	
063-15000	284 Astor Way	Timothy J. Forbes	
063-15100	282 Astor Way	Trent Collier	
063-15200	280 Astor Way	Patricia Patterson	
063-15300	278 Astor Way	Robert M. Chiles	
063-15400	276 Astor Way	Magdalena Ann Eason	
063-15500	274 Astor Way	Tamara Patterson	
063-15600	272 Astor Way	James E. Seigel IV	
063-15700	270 Astor Way	Henry J. Seneal	
063-15800	268 Astor Way	Timothy J. Forbes	
063-15900	266 Astor Way	Trent Collier	
063-16000	264 Astor Way	Patricia Patterson	
063-16100	262 Astor Way	Robert M. Chiles	
063-16200	260 Astor Way	Magdalena Ann Eason	
063-16300	258 Astor Way	Tamara Patterson	
063-16400	256 Astor Way	James E. Seigel IV	
063-16500	254 Astor Way	Henry J. Seneal	
063-16600	252 Astor Way	Timothy J. Forbes	
063-16700	250 Astor Way	Trent Collier	
063-16800	248 Astor Way	Patricia Patterson	
063-16900	246 Astor Way	Robert M. Chiles	
063-17000	244 Astor Way	Magdalena Ann Eason	
063-17100	242 Astor Way	Tamara Patterson	
063-17200	240 Astor Way	James E. Seigel IV	
063-17300	238 Astor Way	Henry J. Seneal	
063-17400	236 Astor Way	Timothy J. Forbes	
063-17500	234 Astor Way	Trent Collier	
063-17600	232 Astor Way	Patricia Patterson	
063-17700	230 Astor Way	Robert M. Chiles	
063-17800	228 Astor Way	Magdalena Ann Eason	
063-17900	226 Astor Way	Tamara Patterson	
063-18000	224 Astor Way	James E. Seigel IV	
063-18100	222 Astor Way	Henry J. Seneal	
063-18200	220 Astor Way	Timothy J. Forbes	
063-18300	218 Astor Way	Trent Collier	
063-18400	216 Astor Way	Patricia Patterson	
063-18500	214 Astor Way	Robert M. Chiles	
063-18600	212 Astor Way	Magdalena Ann Eason	
063-18700	210 Astor Way	Tamara Patterson	
063-18800	208 Astor Way	James E. Seigel IV	
063-18900	206 Astor Way	Henry J. Seneal	
063-19000	204 Astor Way	Timothy J. Forbes	
063-19100	202 Astor Way	Trent Collier	
063-19200	200 Astor Way	Patricia Patterson	
063-19300	198 Astor Way	Robert M. Chiles	
063-19400	196 Astor Way	Magdalena Ann Eason	
063-19500	194 Astor Way	Tamara Patterson	
063-19600	192 Astor Way	James E. Seigel IV	
063-19700	190 Astor Way	Henry J. Seneal	
063-19800	188 Astor Way	Timothy J. Forbes	
063-19900	186 Astor Way	Trent Collier	
063-20000	184 Astor Way	Patricia Patterson	
063-20100	182 Astor Way	Robert M. Chiles	
063-20200	180 Astor Way	Magdalena Ann Eason	
063-20300	178 Astor Way	Tamara Patterson	
063-20400	176 Astor Way	James E. Seigel IV	
063-20500	174 Astor Way	Henry J. Seneal	
063-20600	172 Astor Way	Timothy J. Forbes	
063-20700	170 Astor Way	Trent Collier	
063-20800	168 Astor Way	Patricia Patterson	
063-20900	166 Astor Way	Robert M. Chiles	
063-21000	164 Astor Way	Magdalena Ann Eason	
063-21100	162 Astor Way	Tamara Patterson	
063-21200	160 Astor Way	James E. Seigel IV	
063-21300	158 Astor Way	Henry J. Seneal	
063-21400	156 Astor Way	Timothy J. Forbes	
063-21500	154 Astor Way	Trent Collier	
063-21600	152 Astor Way	Patricia Patterson	
063-21700	150 Astor Way	Robert M. Chiles	
063-21800	148 Astor Way	Magdalena Ann Eason	
063-21900	146 Astor Way	Tamara Patterson	
063-22000	144 Astor Way	James E. Seigel IV	
063-22100	142 Astor Way	Henry J. Seneal	
063-22200	140 Astor Way	Timothy J. Forbes	
063-22300	138 Astor Way	Trent Collier	
063-22400	136 Astor Way	Patricia Patterson	
063-22500	134 Astor Way	Robert M. Chiles	
063-22600	132 Astor Way	Magdalena Ann Eason	
063-22700	130 Astor Way	Tamara Patterson	
063-22800	128 Astor Way	James E. Seigel IV	
063-22900	126 Astor Way	Henry J. Seneal	
063-23000	124 Astor Way	Timothy J. Forbes	
063-23100	122 Astor Way	Trent Collier	
063-23200	120 Astor Way	Patricia Patterson	
063-23300	118 Astor Way	Robert M. Chiles	
063-23400	116 Astor Way	Magdalena Ann Eason	
063-23500	114 Astor Way	Tamara Patterson	
063-23600	112 Astor Way	James E. Seigel IV	
063-23700	110 Astor Way	Henry J. Seneal	
063-23800	108 Astor Way	Timothy J. Forbes	
063-23900	106 Astor Way	Trent Collier	
063-24000	104 Astor Way	Patricia Patterson	
063-24100	102 Astor Way	Robert M. Chiles	
063-24200	100 Astor Way	Magdalena Ann Eason	
063-24300	98 Astor Way	Tamara Patterson	
063-24400	96 Astor Way	James E. Seigel IV	
063-24500	94 Astor Way	Henry J. Seneal	
063-24600	92 Astor Way	Timothy J. Forbes	
063-24700	90 Astor Way	Trent Collier	
063-24800	88 Astor Way	Patricia Patterson	
063-24900	86 Astor Way	Robert M. Chiles	
063-25000	84 Astor Way	Magdalena Ann Eason	
063-25100	82 Astor Way	Tamara Patterson	
063-25200	80 Astor Way	James E. Seigel IV	
063-25300	78 Astor Way	Henry J. Seneal	
063-25400	76 Astor Way	Timothy J. Forbes	
063-25500	74 Astor Way	Trent Collier	
063-25600	72 Astor Way	Patricia Patterson	
063-25700	70 Astor Way	Robert M. Chiles	
063-25800	68 Astor Way	Magdalena Ann Eason	
063-25900	66 Astor Way	Tamara Patterson	
063-26000	64 Astor Way	James E. Seigel IV	
063-26100	62 Astor Way	Henry J. Seneal	
063-26200	60 Astor Way	Timothy J. Forbes	
063-26300	58 Astor Way	Trent Collier	
063-26400	56 Astor Way	Patricia Patterson	
063-26500	54 Astor Way	Robert M. Chiles	
063-26600	52 Astor Way	Magdalena Ann Eason	
063-26700	50 Astor Way	Tamara Patterson	
063-26800	48 Astor Way	James E. Seigel IV	
063-26900	46 Astor Way	Henry J. Seneal	
063-27000	44 Astor Way	Timothy J. Forbes	
063-27100	42 Astor Way	Trent Collier	
063-27200	40 Astor Way	Patricia Patterson	



OVERALL EXISTING CONDITIONS



EXISTING TREE CANOPY:
TOTAL EXISTING CANOPY: 6.54 AC (9.2%)
REQUIRED PRESERVATION: 54% 3.53 AC
TREE CANOPY AREA A: 3.03 AC (ORIGINAL RIZER POINT PROPERTY)
TREE CANOPY AREA B: 3.51 AC (NEW PROPERTY)

SOIL TYPES		
A/B	ARMOUR SILT LOAM	2-5% SLOPES
ArC2	ARMOUR SILT LOAM (ERODED)	5-12% SLOPES
BrC2	BRAXTON CHERTY SILT LOAM (ERODED)	5-12% SLOPES
BsD3	BRAXTON CHERTY SILT LOAM (ERODED)	12-20% SLOPES
Hu	HUNTINGTON SILT LOAM (PHOSPHATIC)	N/A
MbB2	MAURY SILT LOAM (ERODED)	2-5%
MbC2	MAURY SILT LOAM (ERODED)	5-12%

SITE DATA:

PROJECT NAME:

RIZER POINT PUD SUBDIVISION
REZONING REQUEST, REV. 2

PROJECT NUMBER:

6144

SUBDIVISION:

RIZER POINT

LOT NUMBER:

N/A

ADDRESS:

DEL RIO PIKE

CITY:

FRANKLIN, TN

COUNTY:

WILLIAMSON

STATE:

TENNESSEE

CIVIL DISTRICT:

14TH CIVIL DISTRICT

MAP, GROUP, PARCEL NUMBERS:

MAP 63, PARCEL 3.01 (NEW PARCEL)

EXISTING ZONING:

S-DR & AG

PROPOSED ZONING NEW PARCEL:

S-DR (0.57)

CHARACTER AREA OVERLAY:

WHCO 2 & 3

OTHER APPLICABLE OVERLAYS:

FFO, FWO

APPLICABLE DEVELOPMENT STANDARD:

CONVENTIONAL

TOTAL AREA:

ORIGINAL RIZER POINT AREA: 35.94 AC
63-000301 (NEW PARCEL) AREA: 35.14 AC
TOTAL AREA: 71.08 AC

OVERALL DENSITY:

1.62 UNITS/AC TOTAL SITE
2.64 UNITS/AC ORIGINAL PUD AREA
0.57 UNITS/AC NEW PROPERTY
1.88 UNITS/AC

NET DENSITY (MINUS 5.92 AC ROW):

NET DENSITY (MINUS ROW AND 24 AC FWO OVERLAY):

2.79 UNITS/AC

NUMBER OF RESIDENTIAL UNITS BY USE TYPE:

24 TOWN HOME (CURRENT RIZER POINT PUD)
71 SINGLE FAMILY HOME (CURRENT RIZER POINT PUD)
20 SINGLE FAMILY HOME (NEW PROPERTY)

NONRESIDENTIAL SQUARE FOOTAGE:

N/A

TOTAL ACREAGE BY USE, ENTIRE SITE:

16.68 AC LOT IN RESERVE
26.88 AC OPEN SPACE
5.92 AC ROW
21.52 AC RESIDENTIAL LOTS

TOTAL ACREAGE BY USE, PER SECTION:

SECTION	RESIDENTIAL LOTS	OPEN SPACE	TOTAL
1	3.08 AC	10.57 AC	14.82 AC
2	4.35 AC	0.81 AC	9.24 AC
3	3.30 AC	- AC	4.10 AC
4	3.11 AC	0.93 AC	4.89 AC
5	3.69 AC	14.18 AC	17.87 AC

MINIMUM REQUIRED SETBACK LINES:	SEE LOT DIAGRAMS
OWNER (RIZER POINT MASTER DEVELOPER):	GOODALL, INC BUILDERS JACK LUDINGTON 393 MAPLE STREET, SUITE 100 GALLATIN, TN 37066 615-451-5029 jludington@goodallhomes.com
OWNER (PARCEL 3.01):	F-L FARMS 4720 HARPETH PEYTONSVILLE RD THOMPSON STATION, TN 37179
APPLICANT:	GOODALL HOMES 393 MAPLE STREET, SUITE 100 GALLATIN, TN 37066 615-451-5029 JACK LUDINGTON jludington@goodallhomes.com
BUILDING SQUARE FOOTAGE:	1,700 SF - 4,200 SF
BUILDING HEIGHT:	2 STORIES
LANDSCAPE SURFACE RATIO:	.49
MINIMUM LANDSCAPE SURFACE RATIO:	.20
MINIMUM PARKING REQUIREMENT:	2 PER SINGLE FAMILY HOME
MAXIMUM PARKING LIMIT:	N/A
PARKING PROVIDED:	2 PER SINGLE FAMILY HOME
RESIDENTIAL DENSITY:	1.62 DUA (TOTAL SITE)
TREE CANOPY:	6.54 AC (9.2%) EXISTING
PARKLAND (IF APPLICABLE):	DEDICATION OF GREENWAY TRAIL AREA (35x1200 SF) + (80x600 SF) = 90,000 SF 78,000 SF ORIGINAL PUD 12,000 SF REVISION 3 27.04, (49.7% PUD SITE)
OPEN SPACE:	
OPEN SPACE ACREAGE REQUIRED: 15% (10.66 AC)	
FORMAL OPEN SPACE REQUIRED: 33% (3.52 AC)	
FORMAL OPEN SPACE REQUIRED: 66% (7.04 AC)	

LAND USE PLAN COMPLIANCE:
CHARACTER AREA OVERLAY: WHCO 2 & 3
APPLICABLE DEVELOPMENT STANDARD: CONVENTIONAL

RIZER POINT PUD WAS APPROVED IN AUGUST 2007. THE PROPERTY HAS BOTH SPECIAL AREA 2 AND 3 ON THE PROPERTY. THIS DEVELOPMENT PLAN MAKES NO CHANGE TO THE ORIGINALLY APPROVED RIZER POINT PUD: IT ADDS AN ADDITIONAL PROPERTY TO THE NORTH WITH 20 NEW SINGLE FAMILY LOTS AND OPEN SPACE.

1. THE PROPOSED DEVELOPMENT PLAN IS DESIGNED WITH LOT SIZES CONSISTENT WITH THE APPROVED RIZER POINT PUD AND ADJACENT NEIGHBORHOOD EAST AND SOUTH OF THE PROPOSED NEW PARCEL.
2. NO RETAIL IS PLANNED FOR THIS PROPERTY.

DESIGN CONCEPT
THE ADDITION OF THE NEW PROPERTY TO THE RIZER POINT PUD ALLOWS FOR VIOLA LANE TO EXTEND AND CREATE A VEHICULAR AND PEDESTRIAN CONNECTION TO WEDGEWOOD DRIVE. ADDITIONALLY, LOT LINES FOR THE PROPOSED ADDITION HAVE BEEN PROPOSED TO BE SIMILAR TO THEIR EXISTING, ADJACENT LOTS.

LOCAL COMPATIBILITY
NO CHANGE IS PROPOSED FOR THE EXISTING PUD AREA. THIS REVISION IS TO INCLUDE ADDITIONAL PROPERTY TO THE NORTH EAST. THE PROPERTY ADDITION IS DESIGNED WITH LOTS CONSISTENT WITH NEIGHBORHOODS ALONG THE DEL RIO PIKE CORRIDOR.

STATEMENT OF IMPACTS
WATER
WATER SERVICE WILL BE PROVIDED BY THE CITY OF FRANKLIN WATER SERVICES. WATER MAIN IS LOCATED ON DEL RIO PIKE.
11" SFI * 350 GPD * 40,250 GPD
SEWER
SEWER SERVICE WILL BE PROVIDED BY THE CITY OF FRANKLIN. SEWER MAIN WILL CONNECT INTO PUMP STATION LOCATED ON DEL RIO PIKE.

REPURIFIED (REUSE) WATER FACILITIES
REUSE WATER IS AVAILABLE, AND WILL BE UTILIZED FOR COMMON AREAS OWNED AND MAINTAINED BY THE RIZER POINT HOMEOWNERS ASSOCIATION.

STREET NETWORK
THE MAJOR THROUGHFARE PLAN INDICATES THE FUTURE DEVELOPMENT MACK HATCHER PARKWAY NORTH OF RIZER POINT. PROJECTED TRIPS FOR THIS ADDITION IS 214 TRIPS PER DAY (20 SINGLE FAMILY RESIDENTIAL UNITS @ 10.7 TRIPS PER DAY).

DRAINAGE FACILITIES
THE PROPERTY DRAINS NORTH INTO THE HARPETH RIVER AND WEST INTO THE RETENTION AREA CREATED WITH THE ORIGINAL RIZER POINT PUD.

POLICE AND FIRE
FIRE STATION, HWY 96- 3.6 MILES DRIVING DISTANCE
COLUMBIA AVE, POLICE STATION - 2.06 MILES DRIVING DISTANCE

RECREATION FACILITIES
WILLIAMSON COUNTY RECREATION FACILITY -1.8 MILES FROM THE PROPERTY

PROJECTED STUDENT POPULATION
THE STUDENT POPULATION IS PROJECTED AT A RATE OF ONE STUDENT PER .64 HOMES.
115 X .64 = 73.6 STUDENTS

REFUSE COLLECTION
REFUSE COLLECTION SERVICE WILL BE PROVIDED BY THE CITY OF FRANKLIN SOLID WASTE

RESTRICTIVE COVENANTS
THE RIZER POINT HOME OWNER'S ASSOCIATION WILL BE ESTABLISHED PRIOR TO THE FIRST OCCUPANCY OF RESIDENTS. THE HOME OWNERS ASSOCIATION WILL REGULATE ARCHITECTURAL STANDARDS AND MAINTENANCE OF THE COMMUNITY. THE HOA WILL MAINTAIN ALL COMMON OPEN SPACE, RECREATION AREAS, AND TOWN HOME YARDS.

- NOTES
1. A PORTION OF THIS PROPERTY FALLS WITHIN A FLOOD HAZARD AREA, ZONE AE, AS DEPICTED ON THE CURRENT FLOOD INSURANCE RATE MAP (FIRM) NUMBERS: 47187C0184F & 47187C0192F, DATED SEPT 2006. ELEVATION VARIES 625.0-625.5.
 2. NO MINERAL RIGHTS ARE HELD BY PARTIES OUTSIDE OF THE OWNER.

RIZER POINT PUD SUBDIVISION
REZONING REQUEST, REVISION 2
FRANKLIN, WILLIAMSON COUNTY, TENNESSEE 37064
COF PROJECT NO. xxxx



rev. date
June 2, 2016

△
△
△
△

MAY 9, 2016

SHEET

C1.1
EXISTING
CONDITIONS

COF no: 6144

CONDITIONS OF APPROVAL:

Planning

[Rizer Point Rezoning_6.2.2016.pdf](#)

1. Zoning

- Applicant shall correct zoning to:

SD-R 0.56

Based on 20 DWU on 35.74 Acres

2. Acreage

- Applicant shall correct site acreage to 35.74 acres per the surveyors description

Comment to June 23 FMPC meeting

Thank you for the opportunity to address the commission on agenda item 16-0513, consideration of ordinance 2016-21, and agenda item 16-0530, consideration of ordinance 2016-30 on the issue of Rizer Point Development Plan Revision and Rezoning, and Development requests.

My name is Eric Pan, and I reside at 1213 Reese Drive, one of five Goodall Rizer Point homes that borders the new property in question.

On May 15th, I was shocked to discover that there is a rezoning request for my neighborhood. My shock was only compounded when I learned the next day that it's going to be right behind my house, and I had already missed the first hearing! The first Goodall representative I spoke with said, "I was surprised I didn't see you there. I thought for sure this would be something you'd be all over on." Even Goodall knew and agreed that this issue would affect me deeply, that I would be actively involved, and that I would have a major stake in the outcome. If I had known, I would have taken every opportunity to be present and address the Commission on April 28th. I had planned on being here tonight in person, and would have been but for my father, a cancer survivor with failing health, who is flying in tonight to see us before he gets too sick to travel.

The next day, May 18th, I spoke with my alderman, Mr. McLendon, and the planning office to see why I wasn't notified about the April meeting. The planning office confirmed that my home, 1213 Reese Drive, was supposed to be notified for the April 28th meeting. However, the addressee list city provided to Goodall accidentally listed my home as still being owned by Goodall. I immediately requested the city to update the records and inform Goodall to correct their records, so I am notified for tonight's meeting and all future meetings.

I want to point out that section 2.3.8.4 of the Franklin Zoning Ordinance placed the entire responsibility of written notification on the applicant. Even though the city mistakenly listed Goodall as the owner of my home, it does not lessen Goodall's obligation to notify me when it has direct knowledge of the truth — Goodall knows that Goodall doesn't own my home, and Goodall knows that it sold me the home at the end of last year. I have also checked with the other 4 homes at Rizer Point that border the new property, and only 3 of 5 had received notice for the prior meeting. Tonight's rezoning request still erroneously identify no less than 8 private homes, including mine, as Goodall properties.

Comment to June 23 FMPC meeting

Since May 19th, I have been trying to meet with Goodall to learn more about their plans and discuss my concerns. We've finally met on the evening of June 20th, and many issues were raised but not resolved. It has taken more than a month just to have a first meeting, and I need more time to understand Goodall's proposal and its implications.

Since I am not at this meeting in person, I want to be explicit to avoid misunderstanding. I want to be clear that I am not accusing Goodall of malice or conspiracy. Nonetheless, the fact remains that someone at Goodall knowingly accepted mistaken information from the city, conveniently overlooked the fact that Goodall no longer owns my home, avoided mailing the public notice to my home, and denied me the right to be notified about this important issue that affects my daily living and my property value.

The public notification process exist to protect and give private property owners time and opportunity to voice their concerns. There was inadequate public notice in this case, and the applicant's responsibility should not be lessened just because of a paperwork error on the city's part when the applicant has direct knowledge of the truth, and when a simple letter of notice to the property address would have fulfilled the applicant's obligation.

As such, I am asking the Commission to restart the hearing process on this rezoning request due to inadequate public notification, so that my neighbors and I have time to understand the plan and impacts to our community, give this matter our full consideration, and discuss our concerns with Goodall, so that other neighbors and stakeholders who are not here tonight won't have their rights and their voices taken away like mine was.

Thank you,

Eric Pan

From: [Mario](#)
To: [Amy Diaz-Barriga](#)
Subject: Items #22, #23; Hillsboro Rd Improvements; Sidewalk Request
Date: Wednesday, June 22, 2016 9:29:53 AM

Date: June 21, 2016

Ms. Amy Diaz-Barriga:

As a resident of the Magnolia Place Subdivision since 1999, I would like to express my opinion regarding the Rizer Point Subdivision's request for expansion of 20 single family homes and the Hillsboro Road improvements now underway.

Let me begin by stating that I am not opposed to the Rizer Point proposal for additional housing. I am delighted that the success of Goodall Inc. Builders has generated additional interest in further expansion of their existing subdivision. Who wouldn't want to live in this wonderful city we call home. Franklin is a coveted area and growth is inevitable.

Equally, I am elated with the Hillsboro Road improvements now underway. They were and are greatly needed and long overdue.

My reason for writing is simply this: Due to the increase in traffic in the subdivisions affected by these endeavors, I would like to propose Safety features be provided for residents.

Sidewalks, for example would be greatly appreciated. There are two elementary schools, one middle school, one high school, and a private school all within a half mile radius of these proposals. Children are forced to walk these narrow and dangerous streets or stand on the corners waiting for the school bus. With the increase of traffic flow the risk to children is multiplied. Please provide sidewalks for our children. My daughter walks to school everyday during the school year and the traffic projected in the fall causes me great concern.

Additionally, along with sidewalks, the improvement for rain water drains would be a welcoming upgrade to our neighborhoods. The drainage improvements made on Del Rio Pike a few years ago have been appreciated, the only disappointment was that the development fell short of including Del Rio Court.

Thank you for your attention to my concerns.

Mrs. Lupe Veloz
1009 Del Rio Court
Franklin, TN 37064
Phone 615-879-8260
Email: veloz6@msn.com

Comment to June 23, 2016 FMPC Meeting

Thank you for the opportunity to address the commission on the following agenda items. . .

- 1) Item #22 (File 16-0513), consideration of ordinance 2016-21, on the issue of Rizer Point Development Plan Revision and Rezoning request.
- 2) Item #23 (File 16-0630), consideration of resolution 2016-30, on the proposal from Goodall Homes for a Phase 5 development plan on property discussed on item #22

My name is Jeff Brodoski, and I reside at 5002 Viola Lane, one of the Goodall Rizer Point homes that will be greatly impacted by the new Phase 5 development proposal. We are a family of 5 with 3 kids under the age of 10 and a pet dog.

First, let me state my family's position on the above items #22 and #23. We strongly oppose both proposal, especially the resolution 2016-30 proposal from Goodall Homes to develop a phase 5 expansion of Rizer Point. This proposed expansion of the neighborhood dramatically alters the environment that we bought into on July 2015.

We moved to Franklin in September 2008, spending almost 7 years in Villages of Clovercroft. In 2015 we wanted to find a home that was closer to school, had less traffic, was quieter, was safer, and was more private. Rizer Point provided us with a very nice and new neighborhood that was closer to school and was a smaller subdivision. What sold us on the home was that we were able to get a lot in the back corner Rizer Point, which gave us the **privacy, quietness, very low traffic, and safety** that we coveted in a new home.

Below is a picture of where our lot is within Rizer Point . . .



This proposal to expand our neighborhood into the wooded area does the following to why we bought our home . . .

- Reduces Safety by adding traffic in front of our house. As you can see, right now we only have 1 neighbor (not developed yet in this picture, but sits between us and tree line) that needs to drive past our house to get home.
- Quietness – adding 20 homes will obviously create more noise than we have now. The biggest noisemakers now are the birds and other animals that live in the wooded area. IN ADDITION, Goodall's proposal to have a playground right next to our neighbors yard will add even more noise.
- The view – right now we have a very nice view looking out the North side of our home into the wooded area. While the proposal does keep the tree line, the view would still be somewhat impacted in a negative way, especially with the playground there.
- Privacy – it goes without saying that by adding 20 additional homes in our corner of Rizer Point will definitely reduce our level of privacy.
- Home value – I have bought and sold 4 homes over the past 13 years, one thing I know for sure is that our home value will take a hit during the 2+ years it will take Goodall to prep land, develop the streets, sell and build the homes. While our home value will likely recover, the recovery will be delayed and it will be slower than if this proposal did not occur. The selling points that go away due to this proposal will greatly impact the home value recovery.
 - o In fact, the impact on our home value in the next 5 years would conservatively be \$15,000-\$20,000. That assumes losing a modest 1.0-1.5% increase each year.
- Construction – while not permanent, our home will be dealing with construction traffic for at least 2 years, and every single vehicle will have to pass our driveway to get to the Phase 5 expansion. This will greatly reduce the ability for our young kids, and 8 other young kids next to us, to play outdoors together the way they do now.

So it is easy to see why my family does not support this expansion, and you will see by the comments made during the meeting and written that other neighbors oppose this plan as well.

Please also keep in mind that not only did we buy our home for the reasons above, we also paid the highest lot premium (\$15,000) in Rizer Point to attain all of these reasons to purchase. While the long term impact on our home environment is the most important thing, I do not take it lightly when someone tries to take away what we paid for.

Which brings me to the bigger picture question I have for the City of Franklin and Goodall Homes . . .

The incentive from Goodall Homes is understood, they are a business and they stand to profit a few million from this expansion. BUT, I must mention that myself and all the other neighbors around me were told last year that Goodall has no plans to expand into the land (land subject in Item #22), and that Goodall could not build there if they wanted to because of the flood zones. This is one of the major reasons that neighbors are upset about this plan.

As for the City of Franklin, if you were to accept this proposal, the only incentive I can think of is more tax revenue. And by my estimates the city would gain about \$75-85,000 in tax revenue each year from these 20 homes. This proposal would do nothing to enhance your city, it would make several of your current residents unhappy, and it would destroy quiet land that really poses no strategic advantage for a potential builder. If you look at the land in question on item #22, it lies between Harpeth river, Rizer Point, and another established neighborhood that has been in existence since the 70's and early 80's.

I ask the City of Franklin, is it really worth the extra tax revenue to accept a plan that does not enhance your city and only upsets existing residents?

My family and I are hopeful that you will say no to this question and reject the proposed items #22 and #23.

Thank you for allowing us the opportunity to voice our concerns,

A handwritten signature in black ink, appearing to read "Jeff Brodoski". The signature is fluid and cursive, with the first name "Jeff" being more prominent.

Jeff Brodoski

5002 Viola Lane, Franklin, TN 37069

Agenda # 22

Re: Rizer Point Rezoning

City of Franklin Planning Commission,

I write to you today as a 30-year resident of Franklin, Tennessee who currently resides on Wedgewood Drive. I have multiple concerns about the proposed plans to rezone and develop the property north of Del Rio Pike and East of Del Rio Court.

My first concern is that this land should not be rezoned from agricultural to residential due to the implications for surrounding homes and the Harpeth River. As an avid kayaker, I am very familiar with the stretch of river that runs adjacent to this property as well as other portions of the river downstream. I understand that Goodall Homes plans to “dig out” an area equal to 125% of the flood plain that they are developing, however this does not compensate for the effects created by changing this landscape. First, when this land is converted from a pasture to development, the rain will no longer soak into the ground and then gradually percolate to the nearby river. Instead, it will immediately rush into the storm drains and the river at high speeds, washing away banks and vegetation. This flow of water will continue downstream at a rapid pace, putting stress and unnecessary wear and tear on bridges that are already aging, specifically the bridge at Cotton Lane. The long term implications of changing the landscapes will only lead to more cost for the city and the tax payers when these bridges are in need of repair and Goodall homes has already moved on to their next project.

The implications of changing this flood plain on surrounding homes should also be obvious to anyone who lived in Franklin during the 2010 flood, when this property and the adjacent neighborhood of Rebel Meadows were underwater. Many homes were completely destroyed and some have yet to be fully repaired due to the financial implications for these families. Leaving this property as an agricultural zone allows more absorption of water, slower runoff, and less impact on existing homeowners if the river were to rise to similar flood levels again. The addition of pavement and houses for Rizer Point would certainly divert more water into Rebel Meadows due to it's lower lying geography, so the increased risk you are placing on the existing home owners should not be ignored. Additionally, you must take responsibility that your decision also impacts neighborhoods downstream likely causing increased flooding in Fieldstone Farms, CottonWood, and the wastewater treatment plant behind Cottonwood.

I will conclude by reassuring you that I am not against developments in Franklin. We moved to Cottonwood when I was 5 years old and I watched as Fieldstone Farms, Mach Hatcher, and every other development create the town that I still call home. I appreciate the way our city scrutinizes developments and holds residential and commercial builders to high standards. However, I believe your role as the planning commission involves weighing the pros and cons of each application. In this scenario, I do not think the revenue generated by 20 additional homes in a flood plain will outweigh the environmental impact and threat of loss that will be placed on existing residents of your county.

Thank you for your consideration and please contact me directly for further discussion of this or related topics.

Jennifer Dunn, LCSW
(615) 218-8826

jennmdunn@gmail.com

1135 Wedgewood Drive Franklin, TN 37069



YOUR *Dream* STARTS HERE

July 21, 2016

Franklin Planning Department
Franklin City Hall
109 3rd Ave. South, Suite 120
Franklin, TN 37064

Dear Planning Commissioners,

This letter is in reference to the steps that have been taken, on behalf of Goodall Homes, as we go through the process of entitlement for a proposed section of 20 lots at the Rizer Point community, in Franklin. As we start a possible development we understand the feedback from the existing and surrounding community is vital in establishing a good plan. As you well know while it is challenging to address the concerns and request of everyone, it is important to have a thoughtful process and implement those suggestions that are both reasonable and improve the plan. We have had multiple meetings with homeowners of Rizer Point, both as a group and individually. In each of these meetings we have listened to concerns and suggestions. While this process has taken a considerable amount of time, it has ultimately provided us with information that we believe improves the overall plan for Rizer Point. Listed below is a list of items that Goodall Homes has agreed to provide within the plan, based on the community feedback.

1. Goodall Homes will add a significant landscape buffer between existing homeowners and the new section to provide separation and privacy between the two sections.
2. Within the new section, Goodall Homes will be shifting the original lot layout further away from the existing community to provide more distance between the two sections.
3. Goodall Homes will add a playground within the new section that will serve the entire Rizer Point Community.
4. Goodall Homes will add a walking trail to connect the playground to the existing community. In addition, walking trails will be added along the river. The walking trail system will serve the entire community.
5. Goodall Homes recommends adding traffic calming features entering into the new 20 lot section to minimize the effects of traffic.
6. Finally, we identified nine homeowners that we felt were directly impacted by the new section (Those home owners that back directly to the development) and partially impacted by the new section (Those home owners that are along the traffic route of the new section) and met with each individually. In those meetings we offered to refund the full lot premium for those directly impacted and refund ½ of the lot premium for those impacted partially. While we feel like each of these lots still warrants a premium for its location, we felt that since the homeowners bought prior to the proposed section being discussed that this was the right step to take.

As I mentioned before, while it difficult at times to meet the request of every homeowner, I believe that Goodall Homes as taken the steps to listen intently to the community and offer multiple enhancements for the community. I want to personally thank each of you for your time and consideration in this matter.

Sincerely,

Chris O'Neal
Chief Sales Officer
Goodall Homes
615.681.4335
coneal@goodallhomes.com





August 4, 2016

YOUR *Dream* STARTS HERE

Mr. Josh King
Planning and Sustainability Department
City of Franklin
109 Third Avenue South
Franklin, TN 37064
August 4, 2016

RE:COF Rizer Point PUD Subdivision,Rezoning and development plan
COF no: 6144

Dear Josh:

We respectfully request that the above referenced application be withdrawn.

Very truly yours,

Jack Ludington, P.E.
Vice President of Development



RIZER POINT PUD SUBDIVISION, DEVELOPMENT PLAN, REVISION 3
 RESOLUTION 2016-30
 FRANKLIN MUNICIPAL PLANNING COMMISSION
 6/23/2016

Site

<UND><BOL>Project Information</BOL></UND>

Existing Zoning: Agricultural (AG)
 Proposed Zoning: SD-R 0.56
 Existing Land Use: Vacant
 Proposed Land Use: Detached Residential
 Character Area: WHCO-2 & WHCO - 3
 Development Standard: Conventional
 Other Overlays: FFO, FWO
 Site Acreage: 35.14 acres
 Proposed Number of Dwelling Units: 20
 Proposed Building Height: 2 stories

- | | |
|--|---------------------------------------|
| Harpeth River (Polygon) | SD-R Specific Development-Residential |
| Rizer Point PUD Subdivision | SD-X Specific Development-Variety |
| AG Agricultural District | OR Office Residential District |
| ER Estate Residential | GO General Office District |
| R-1 Residential District | CC Central Commercial District |
| R-2 Residential District | NC Neighborhood Commercial District |
| R-3 Residential District | GC General Commercial District |
| R-6 Residential District | LI Light Industrial District |
| RM-10 Attached 10 Residential District | HI Heavy Industrial District |
| RM-15 Attached 15 Residential District | CI Civic and Institutional District |
| RM-20 Attached 20 Residential District | |



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.



rev.	date
1	JUNE 2, 2016

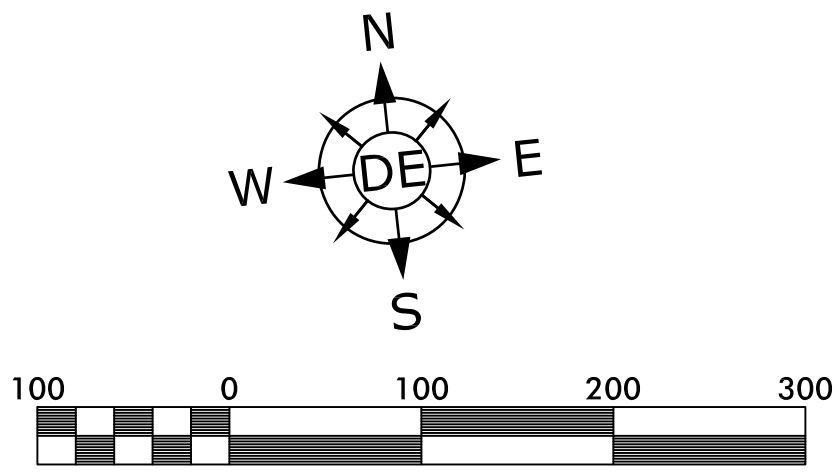
MAY 9, 2016

- TYPICAL ARCHITECTURE NOTES:
1. SINGLE FAMILY DETACHED HOMES DESIGNED FOR LOTS WITH GARAGE ACCESSED FROM THE FRONT-FACING STREET WITH GARAGE ATTACHED.
 2. ONE TO TWO STORIES IN HEIGHT.
 3. MATERIALS INCLUDE BRICK, SIMULATED STONE, CEMENTATIOUS SIDING, AND ARCHITECTURAL SHINGLES.
 4. GARAGE IS SETBACK 10 FEET FROM THE FRONT FASCADE.
 5. DRIVEWAY IS A MINIMUM OF 22' FROM THE SIDEWALK TO THE GARAGE DOORS.
 6. ALL TWO CAR GARAGES SHALL HAVE TWO GARAGE DOORS WITH A MAXIMUM WIDTH OF 9' WIDE WITH A 2 FOOT MINIMUM SEPERATION BETWEEN.

S H E E T

C2.1

TYPICAL
ARCHITECTURE



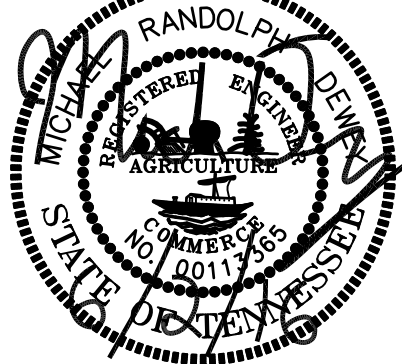
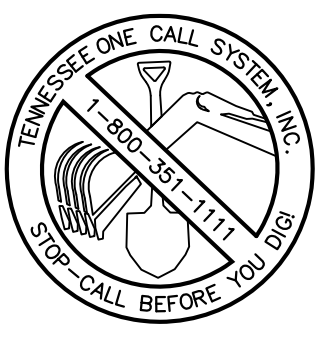
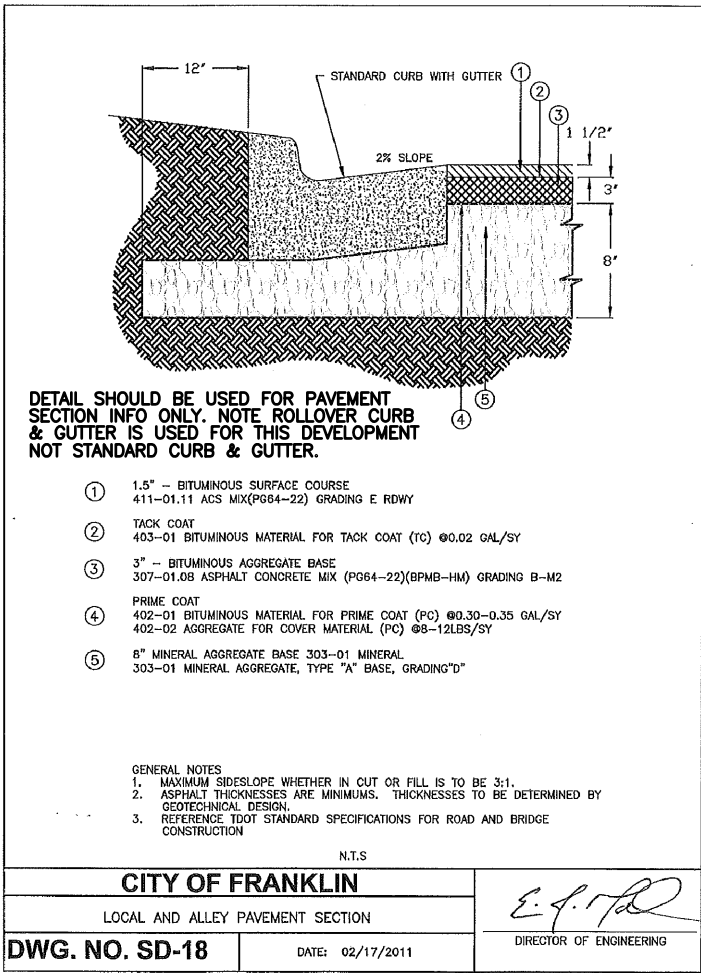
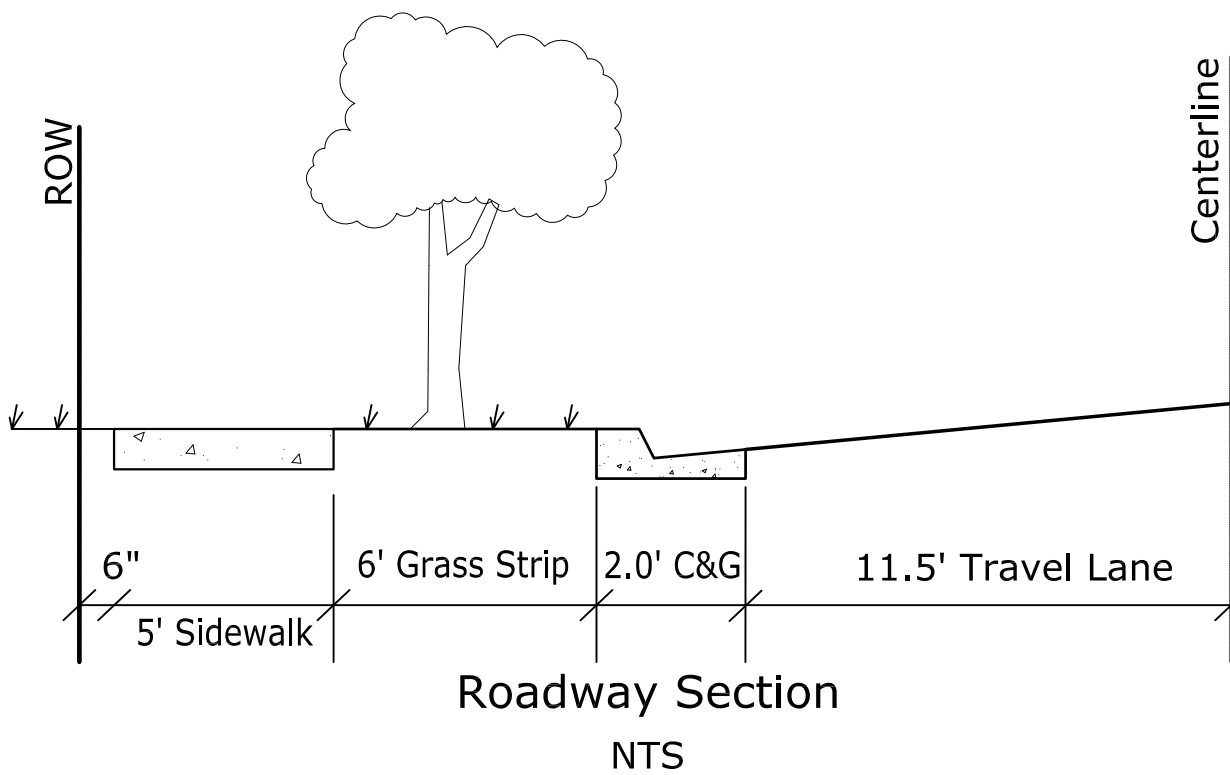
Scale 1" = 100'
Total Site Area = 68.5 ac
Section 5 Area = 35.5 ac

Engineer
Dewey Engineering
Contact: Michael Dewey, PE
2925 Berry Hill Drive
Nashville, TN 37204
Phone: (615) 401-9956
E-mail: mdewey@dewey-engineering.com

Developer
Goodall Inc. Builders
Contact: Jack Ludington
393 Maple Street #100
Gallatin, TN 37066
Phone: (615) 451-5029
Fax: (615) 451-4029

Flood Note
A Portion of this Property is Located Within a Flood Hazard Area, Zone AE, As Shown on Map Panel Number 47187C0184F & 47187C0192F.
Dated Sept. 29, 2006.
Elev. Varies: 625.3-625.6
*Note: Preliminary FIRM
Dated: August 29, 2014
100 Year Floodplain Elevation 625.0

Site Benchmark
Tag Bolt of Existing Fire Hydrant Located Near the Southeast Corner of the Subject Property, Approximately 100 feet West of the Terminus of Del Rio Court. NGVD Elevation 651.12.



Revisions:

Drawing Notes:
COF Project # 6145

Date: June 2, 2016

Rizer Point PUD

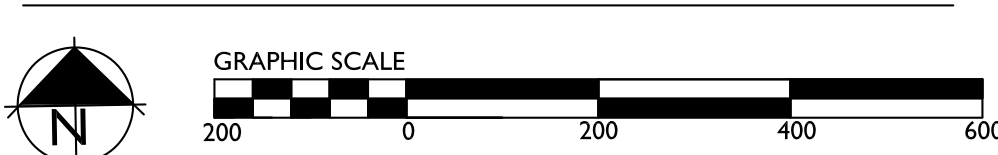
Section 5 Development Plan

Being Parcel 1.09 on Tax Map 63
Franklin, Williamson County, Tennessee

DEWEY
ENGINEERING

Overall ROW & Access Plan

C4.0

[illegible]

OPEN SPACE:
 (35x1200 SF) + (60x600 SF) = 90,000 SF
 79,000 SF ORIGINAL PUD
 12,000 SF REVISION 3
 27.04, (49.7% PUD SITE)
 OPEN SPACE ACREAGE REQUIRED: 15% (10.85 AC)
 FORMAL OPEN SPACE REQUIRED: 33% (3.52 AC)
 FORMAL OPEN SPACE REQUIRED: 66% (7.04 AC)

Commencing at the point of beginning, point being the Northeastern property line of the land conveyed to Ryan and Krystin Lemmon, of record in Deed Book 6534, Page 854, R.O.W.C., TN, Point also being along the westerly margin of the Viola Lane Right of Way;

Thence, N 75° 28' 11" W for a distance of 228.99 feet to a point on a line.

Thence, N 75° 28' 09" W for a distance of 32.25 feet to a point on a line.

Thence, N 00° 30' 49" E for a distance of 505.70 feet to a point on a line.

Thence, N 03° 37' 49" E for a distance of 362.80 feet to a point on a line.

Thence, N 29° 37' 49" E for a distance of 519.50 feet to a point on a line.

Thence, N 42° 12' 49" E for a distance of 318.00 feet to a point on a line.

Thence, N 40° 20' 49" E for a distance of 300.00 feet to a point on a line.

Thence, N 50° 04' 49" E for a distance of 300.00 feet to a point on a line.

Thence, S 26° 33' 27" E for a distance of 172.40 feet to a point on a line.

Thence, S 03° 59' 27" E for a distance of 169.00 feet to a point on a line.

Thence, S 02° 50' 33" W for a distance of 1829.84 feet to a point on a line.

Thence, N 83° 36' 11" W for a distance of 439.04 feet to a point on a line.

Thence N 75° 28' 11" W a distance of 238.86 feet to the point of beginning and containing 35.74 acres more or less.

NOTES

1. A PORTION OF THIS PROPERTY FALLS WITHIN A FLOOD HAZARD AREA, ZONE AE, AS DEPICTED ON THE CURRENT FLOOD INSURANCE RATE MAP (FIRM) NUMBERS 47187C0184F & 47187C0192F, DATED SEPT 2006. ELEVATION VARIES 625.0-625.5.

2. NO MINERAL RIGHTS ARE HELD BY PARTIES OUTSIDE OF THE OWNER.

S H E E T

C1.0

OVERALL EXISTING
CONDITIONS



OVERALL EXISTING CONDITIONS



SITE DATA:

PROJECT NAME:	ORIZER POINT PUD SUBDIVISION DEVELOPMENT PLAN, REV. 3
PROJECT NUMBER:	6145
SUBDIVISION:	ORIZER POINT
LOT NUMBER:	N/A
ADDRESS:	DEL RIO PIKE
CITY:	FRANKLIN, TN
COUNTY:	WILLIAMSON
STATE:	TENNESSEE
CIVIL DISTRICT:	14TH CIVIL DISTRICT
MAP, GROUP, PARCEL NUMBERS:	MAP 63, PARCEL 3.01 (NEW PARCEL)
EXISTING ZONING:	S-DR & AG
PROPOSED ZONING NEW PARCEL:	S-DR (0.57)
CHARACTER AREA OVERLAY:	VHCO 2 & 3
OTHER APPLICABLE OVERLAYS:	FFO, FWO
APPLICABLE DEVELOPMENT STANDARD:	CONVENTIONAL
TOTAL AREA:	ORIGINAL RIZER POINT AREA: 35.94 AC 63-000301 (NEW PARCEL) AREA: 35.14 AC TOTAL AREA: 71.08 AC
OVERALL DENSITY:	1.62 UNITS/AC TOTAL SITE 2.64 UNITS/AC ORIGINAL PUD AREA 0.57 UNITS/AC NEW PROPERTY

MINIMUM REQUIRED SETBACK LINES:
SEE LOT DIAGRAMS

OWNER (ORIZER POINT MASTER DEVELOPER)	GOODALL INC BUILDERS
CONTACT ADDRESS	JACK LUDINGTON 393 MAPLE STREET, SUITE 100 GALLATIN, TN 37066 615-451-5029 judington@goodallhomes.com
OWNER (PARCEL 3.01)	F-L FARMS
ADDRESS	4720 HARPEH PEYTONSVILLE RD THOMPSON STATION, TN 37179
APPLICANT:	GOODALL HOMES
ADDRESS	393 MAPLE STREET, SUITE 100 GALLATIN, TN 37066 615-451-5029
OFFICE PHONE	JACK LUDINGTON
CONTACT	judington@goodallhomes.com
EMAIL ADDRESS	

BUILDING SQUARE FOOTAGE:	1,700 SF - 4,200 SF
BUILDING HEIGHT:	2 STORIES
LANDSCAPE SURFACE RATIO:	.49
MINIMUM LANDSCAPE SURFACE RATIO:	.20
MINIMUM PARKING REQUIREMENT:	2 PER SINGLE FAMILY HOME
MAXIMUM PARKING LIMIT:	N/A
PARKING PROVIDED:	2 PER SINGLE FAMILY HOME
RESIDENTIAL DENSITY:	1.62 DUA (TOTAL SITE)
TREE CANOPY:	6.54 AC (9.2%) EXISTING
PARKLAND (IF APPLICABLE):	DEDICATION OF GREENWAY TRAIL AREA (58x1200 SF) + (60x600 SF) = 90,000 SF 78,000 SF ORIGINAL PUD 12,000 SF REVISION 3 27.04, (49.7% PUD SITE)
OPEN SPACE:	
OPEN SPACE ACREAGE REQUIRED:	15% (10.66 AC)
FORMAL OPEN SPACE REQUIRED:	33% (3.52 AC)
FORMAL OPEN SPACE REQUIRED:	66% (7.04 AC)

EXISTING TREE CANOPY:

TOTAL EXISTING CANOPY:	6.54 AC (9.2%)
REQUIRED PRESERVATION:	54%, 3.53 AC
TREE CANOPY AREA A:	3.03 AC (ORIGINAL RIZER POINT PROPERTY)
TREE CANOPY AREA B:	3.51 AC (NEW PROPERTY)

SOIL TYPES

ArB	ARMOUR SILT LOAM	2-5% SLOPES
ArC2	ARMOUR SILT LOAM (ERODED)	5-12% SLOPES
BcC2	BRAXTON CHERTY SILT LOAM (ERODED)	12-20% SLOPES
BsD3	BRAXTON CHERTY SILT LOAM (ERODED)	12-20% SLOPES
Hu	HUNTINGTON SILT LOAM (PHOSPHATIC)	N/A
MbB2	MAURY SILT LOAM (ERODED)	2-5%
MbC2	MAURY SILT LOAM (ERODED)	5-12%

LEGAL DESCRIPTIONS:

LEGAL DESCRIPTION OF NEW PROPERTY, TO BE REZONED

The following legal description is for property in Williamson County, City of Franklin, TN, located on the lands of F-L Farms, LLC, of record in Deed Book 4530, Page 178, R.O.W.C., TN. Property is also described as Parcel 3.01 on Map 63.

Commencing at the point of beginning, point being the Northeastern property line of the land conveyed to Ryan and Krystin Lemmon, of record in Deed Book 6534, Page 854, R.O.W.C., TN, Point also being along the westerly margin of the Viola Lane Right of Way;

Thence, N 75° 28' 11" W for a distance of 228.99 feet to a point on a line.

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NOTES

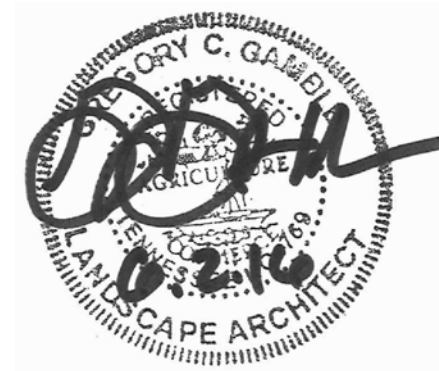
1. A PORTION OF THIS PROPERTY FALLS WITHIN A FLOOD HAZARD AREA, ZONE AE, AS DEPICTED ON THE CURRENT FLOOD INSURANCE RATE MAP (FIRM) NUMBERS 47187C0184F & 47187C0192F, DATED SEPT 2006, ELEVATION VARIES 625.0-625.5.
2. NO MINERAL RIGHTS ARE HELD BY PARTIES OUTSIDE OF THE OWNER.

GDC

GAMBLE
DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND
LANDSCAPE ARCHITECTURE

ORIZER POINT PUD SUBDIVISION
DEVELOPMENT PLAN, REVISION 3
FRANKLIN, WILLIAMSON COUNTY, TENNESSEE 37064

COF PROJECT NO. xxxx



rev. date

1 June 2, 2016

△

△

△

MAY 9, 2016

S H E E T

C1.1

EXISTING
CONDITIONS

Figure 10.10 consists of two cross-section diagrams of a two-lane highway. Both diagrams show a total width of 120'-0". The left diagram shows a 72'-0" lane width and a 62'-0" shoulder width. The right diagram shows a 52'-0" lane width and a 62'-0" shoulder width. Both diagrams show a 25'-0" base layer. The diagrams illustrate the difference in lane width and shoulder width between the two configurations.

15' FRONT YARD
15' CORNER YARD
5' SIDE YARD
10' REAR YARD

15' FRONT YARD
15' CORNER YARD
5' SIDE YARD
10' REAR YARD

10' FRONT YARD
10' CORNER YARD
5' SIDE YARD
5' REAR YARD

● LINKS 16
* NODES 9
 $16 / 9 = 1.78$ INDEX

REDUCED INDEX IS DUE TO ENVIRONMENTAL CONSTRAINTS
OF THE PROPERTY TO THE NORTH AND WEST.

MINIMUM OPEN SPACE REQUIREMENT: 15%
SITE ACREAGE: 71.08 AC
OPEN SPACE ACREAGE REQUIRED: 15% (10.66 AC)
FORMAL OPEN SPACE REQUIRED: 33% (3.52 AC)
INFORMAL OPEN SPACE REQUIRED: 66% (7.04 AC)

OPEN SPACE PROVIDED:		
KEY	CLASSIFICATION	TYPE AREA
98	FORMAL	PASSIVE PARK 0.12 AC ORIGINAL RIZER
98	FORMAL	PASSIVE PARK 1.48 AC ORIGINAL RIZER
99	FORMAL	POCKET PARK 0.17 AC ORIGINAL RIZER
100	FORMAL	POCKET PARK 0.49 AC ORIGINAL RIZER
98B	INFORMAL	20' LANDSCAPE BUFFER 0.06 AC ORIGINAL RIZER
98	INFORMAL	RIVERSIDE PARK 10.44 AC ORIGINAL RIZER
107	INFORMAL	OPEN SPACE 0.94 AC ORIGINAL RIZER
121	INFORMAL	RIVERSIDE PARK 12.92 AC NEW PROPERTY
122	FORMAL	PLAYGROUND/PARK 0.83 AC NEW PROPERTY
123	FORMAL	TRAIL HEAD PARK 0.43 AC NEW PROPERTY
TOTAL FORMAL: 3.52 AC		
TOTAL INFORMAL: 23.38 AC		
TOTAL OPEN SPACE: 26.88, (51.25% PUD SITE)		

60' GREENWAY TRAIL EASEMENT
DEDICATED TO THE CITY OF FRANKLIN
PARK'S DEPARTMENT FOR A FUTURE
TRAIL TO BE LOCATED WITHIN THE
STREAM BUFFER.

TRIP GENERATION CALCULATIONS - ORIGINAL APPROVED PUD			
-LAND USE: 24 CONDOS/TOWNHOMES		-LAND USE: 71 SINGLE FAMILY	
AVERAGE DAILY TRAFFIC: 192		AVERAGE DAILY TRAFFIC: 760	
DAILY ENTER: 96		DAILY ENTER: 380	
DAILY EXIT: 96		DAILY EXIT: 380	
AM PEAK HOUR TOTAL: 17	PM PEAK HOUR TOTAL: 17	AM PEAK HOUR TOTAL: 60	PM PEAK HOUR TOTAL: 60
AM PEAK HOUR ENTER: 3	PM PEAK HOUR ENTER: 3	AM PEAK HOUR ENTER: 15	PM PEAK HOUR ENTER: 15
AM PEAK HOUR EXIT: 14	PM PEAK HOUR EXIT: 14	AM PEAK HOUR EXIT: 45	PM PEAK HOUR EXIT: 45
AM PEAK HOUR TOTAL: 19	PM PEAK HOUR TOTAL: 19	AM PEAK HOUR TOTAL: 78	PM PEAK HOUR TOTAL: 78
PM PEAK HOUR ENTER: 13	PM PEAK HOUR ENTER: 13	PM PEAK HOUR ENTER: 49	PM PEAK HOUR ENTER: 49
PM PEAK HOUR EXIT: 6	PM PEAK HOUR EXIT: 6	PM PEAK HOUR EXIT: 29	PM PEAK HOUR EXIT: 29

PROJECT NAME:	RIZER POINT PUD SUBDIVISION DEVELOPMENT PLAN, REV. 3
PROJECT NUMBER:	6145
SUBDIVISION:	RIZER POINT
LOT NUMBER:	N/A
ADDRESS:	DEL RIO PIKE
CITY:	FRANKLIN, TN
COUNTY:	WILLIAMSON
STATE:	TENNESSEE
CIVIL DISTRICT:	14TH CIVIL DISTRICT
MAP, GROUP, PARCEL NUMBERS:	MAP 63, PARCEL 3.01 (NEW PARCEL)
EXISTING ZONING:	SD-R & AG
PROPOSED ZONING:	S-DR (2.11)
CHARACTER AREA OVERLAY:	WHCO 2 & 3
OTHER APPLICABLE OVERLAYS:	FFO, FVNO
APPLICABLE DEVELOPMENT STANDARD:	OPTIONAL
TOTAL AREA:	RIZER POINT ZONING AREA: 35.94 AC

2.64 UNITS/AC ORIGINAL PUD AREA
0.57 UNITS/AC NEW PROPERTY
1.88 UNITS/AC

NET DENSITY (MINUS 5.92 AC ROW):
NET DENSITY (MINUS ROW AND 24 AC FWO OVERLAY): 2.79 UNITS/AC

NUMBER OF RESIDENTIAL UNITS BY USE TYPE:

24 TOWN HOME (CURRENT RIZER POINT PUD)
71 SINGLE FAMILY HOME (CURRENT RIZER POINT PUD)
20 SINGLE FAMILY HOME (NEW PROPERTY)

NONRESIDENTIAL SQUARE FOOTAGE:	N/A
TOTAL ACREAGE BY USE, ENTIRE SITE:	16.68 AC LOT IN RESERVE
	26.88 AC OPEN SPACE
	5.92 AC ROW
	21.52 AC RESIDENTIAL LOT

SECTION	RESIDENTIAL LOTS	OPEN SPACE	TOTAL
1	3.08 AC	10.57 AC	14.82 AC
2	4.35 AC	0.81 AC	9.24 AC
3	3.30 AC	-- AC	4.10 AC
4	3.11 AC	0.93 AC	4.89 AC
5	3.69 AC	14.18 AC	17.87 AC

OWNER (RIZER POINT MASTER DEVELOPER)	GOODALL INC BUILDERS
CONTACT	JACK LUDINGTON
ADDRESS	393 MAPLE STREET, SUITE 100 GALLATIN, TN 37066
PHONE	615-451-5029
EMAIL	jludington@goodallhomes.com

OWNER (PARCEL 3.01) F-L FARMS
ADDRESS 4720 HARPETH PEYTONSVILLE RD

APPLICANT:	GOODALL HOMES
ADDRESS	393 MAPLE STREET, SUITE 100 GALLATIN, TN 37066
OFFICE PHONE	615.451.5029
CONTACT	JACK LUDINGTON
EMAIL ADDRESS	judlinton@goodallhomes.com

BUILDING SQUARE FOOTAGE:	1,700 SF + 4,200 SF
BUILDING HEIGHT:	2 STORIES
LANDSCAPE SURFACE RATIO:	.49
MINIMUM LANDSCAPE SURFACE RATIO:	.20
MINIMUM PARKING REQUIREMENT:	2 PER SINGLE FAMILY HOME
MAXIMUM PARKING LIMIT:	N/A
PARKING PROVIDED:	2 PER SINGLE FAMILY HOME
RESIDENTIAL DENSITY:	1.62 DUA (TOTAL SITE)
TREE CANOPY:	6.54 AC (9.2%) EXISTING
PARKLAND (IF APPLICABLE):	DEDICATION OF GREENWAY (35x1200 SF) + (80x600 SF) = 78,000 SF ORIGINAL PUD 12,000 SF REVISION B 27.04, (49.7% PUD SITE)
OPEN SPACE:	

CHARACTER AREA OVERLAY: WHC0 2 & 3
APPLICABLE DEVELOPMENT STANDARD: CONVENTIONAL

ORIZER POINT PUD WAS APPROVED IN AUGUST 2007. THE PROPERTY HAS BOTH SPECIAL AREA 2 AND 3 ON THE PROPERTY. THIS DEVELOPMENT PLAN MAKES NO CHANGE TO THE ORIGINALLY APPROVED RIZER POINT PUD; IT ADDS AN ADDITIONAL PROPERTY TO THE NORTH WITH 20 NEW SINGLE FAMILY LOTS AND OPEN SPACE.

1. THE PROPOSED DEVELOPMENT PLAN IS DESIGNED WITH LOT SIZES CONSISTENT WITH THE APPROVED RIZER POINT PUD AND ADJACENT NEIGHBORHOOD EAST AND SOUTH OF THE PROPOSED NEW PARCEL.

2. NO RETAIL IS PLANNED FOR THIS PROPERTY.

THE ADDITION OF THE NEW PROPERTY TO THE RIZER POINT PUD ALLOWS FOR VIOLA LANE TO EXTEND AND CREATE A VEHICULAR AND PEDESTRIAN CONNECTION TO WEDGEWOOD DRIVE. ADDITIONALLY, LOT LINES FOR THE PROPOSED ADDITION HAVE BEEN PROPOSED TO BE SIMILAR TO THEIR EXISTING, ADJACENT LOTS.

NO CHANGE IS PROPOSED FOR THE EXISTING PUD AREA. THIS REVISION IS TO INCLUDE ADDITIONAL PROPERTY TO THE NORTH EAST. THIS PROPERTY ADDITION IS DESIGNED WITH LOTS CONSISTENT WITH NEIGHBORHOODS ALONG THE DEL RIO PIKE COORIDOR.

WATER
WATER SERVICE WILL BE PROVIDED BY THE CITY OF FRANKLIN WATER SERVICES. WATER MAIN
IS LOCATED ON DEL RIO PIKE.
115 SFU * 350 GPD = 40,250 GPD

SEWER
SEWER SERVICE WILL BE PROVIDED BY THE CITY OF FRANKLIN. SEWER MAIN WILL CONNECT
INTO PUMP STATION LOCATED ON DEL RIO PIKE.

REPURIFIED (REUSE) WATER FACILITIES
REUSE WATER IS AVAILABLE, AND WILL BE UTILIZED FOR COMMON AREAS OWNED AND
MAINTAINED BY THE RIZER POINT HOMEOWNERS ASSOCIATION.

THE MAJOR THROUGHFARE PLAN INDICATES THE FUTURE DEVELOPMENT MACK HATCHER PARKWAY NORTH OF RIZER POINT.

DRAINAGE FACILITIES
THE PROPERTY DRAINS NORTH INTO THE HARPETH RIVER AND WEST INTO THE RETENTION
AREA CREATED WITH THE ORIGINAL RIZER POINT PUD.

POLICE AND FIRE
FIRE STATION, HWY 96- 3.6 MILES DRIVING DISTANCE
COLUMBIA AVE. POLICE STATION - 2.06 MILES DRIVING DISTANCE

RECREATION FACILITIES
WILLIAMSON COUNTY RECREATION FACILITY -1.8 MILES FROM THE PROPERTY

PROJECTED STUDENT POPULATION
THE STUDENT POPULATION IS PROJECTED AT A RATE OF ONE STUDENT PER .64 HOMES
 $115 \times .64 = 73.6$ STUDENTS

REFUSE COLLECTION
REFUSE COLLECTION SERVICE WILL BE PROVIDED BY THE CITY OF FRANKLIN SOLID WASTE

THE RIZER POINT HOME OWNER'S ASSOCIATION WILL BE ESTABLISHED PRIOR TO THE FIRST OCCUPANCY OF RESIDENTS. THE HOME OWNER'S ASSOCIATION WILL REGULATE ARCHITECTURAL STANDARDS AND MAINTENANCE OF THE COMMUNITY. THE HOA WILL MAINTAIN ALL COMMON OPEN SPACE, RECREATION AREAS, AND TOWN HOME YARDS.

GRAPHIC SCALE

A horizontal scale bar with alternating black and white segments. Below the bar, numerical markings are provided: 100, 0, 100, 200, and 300. The first 100-foot segment is divided into four equal black and white squares. The remaining segments are solid black.

EXTENT OF REARYARD FENCE
ALONG BOUNDARY LINE

GAMBLE
DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND
LANDSCAPE ARCHITECTURE

*ORIZER POINT PUD SUBDIVISION
DEVELOPMENT PLAN, REVISION 3
FRANKLIN, WILLIAMSON COUNTY, TENNESSEE 37064*

FRANKLIN, WILLIAMSON COUNTY, TENNESSEE 37064

COF PROJCT NO. xxxx



rev. date

1. JUNE 2, 2016

△ _____
△ _____
△ _____

MAY 9, 2016

S H E E T

C2.0

OVERALL DEVELOPMENT PLAN



rev.	date
1	JUNE 2, 2016

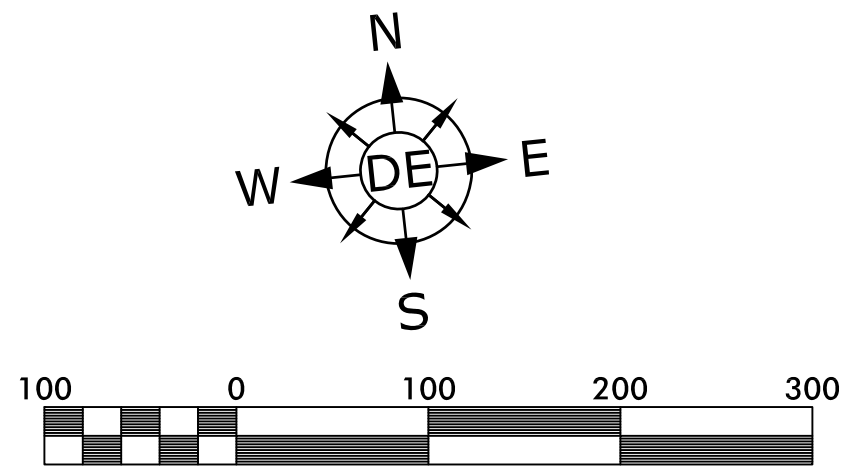
MAY 9, 2016

- TYPICAL ARCHITECTURE NOTES:
1. SINGLE FAMILY DETACHED HOMES DESIGNED FOR LOTS WITH GARAGE ACCESSED FROM THE FRONT-FACING STREET WITH GARAGE ATTACHED.
 2. ONE TO TWO STORIES IN HEIGHT.
 3. MATERIALS INCLUDE BRICK, SIMULATED STONE, CEMENTATIOUS SIDING, AND ARCHITECTURAL SHINGLES.
 4. GARAGE IS SETBACK 10 FEET FROM THE FRONT FASCAD.
 5. DRIVEWAY IS A MINIMUM OF 22' FROM THE SIDEWALK TO THE GARAGE DOORS.
 6. ALL TWO CAR GARAGES SHALL HAVE TWO GARAGE DOORS WITH A MAXIMUM WIDTH OF 9' WIDE WITH A 2 FOOT MINIMUM SEPERATION BETWEEN.

S H E E T

C2.1

TYPICAL
ARCHITECTURE



Scale 1" = 100'
Total Site Area = 68.5 ac
Section 5 Area = 35.5 ac

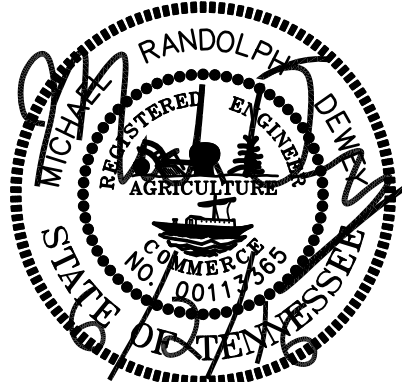
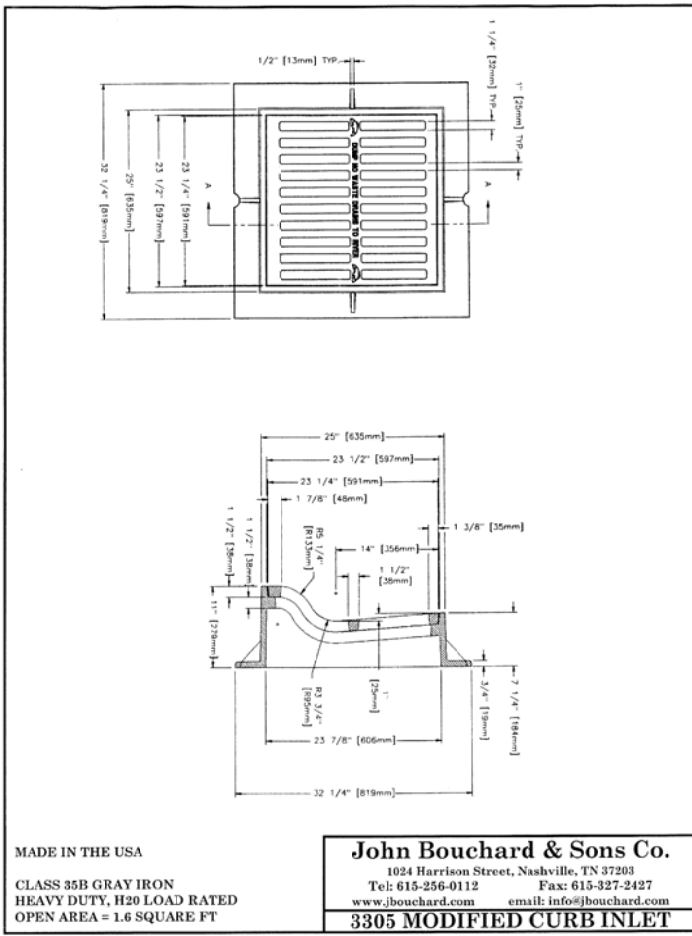
Engineer
Dewey Engineering
Contact: Michael Dewey, PE
2925 Berry Hill Drive
Nashville, TN 37204
Phone: (615) 401-9956
E-mail: mdewey@dewey-engineering.com

Developer
Goodall Inc. Builders
Contact: Jack Ludington
393 Maple Street #100
Gallatin, TN 37066
Phone: (615) 451-5029
Fax: (615) 451-4029

Flood Note
A Portion of this Property is Located Within a Flood Hazard Area, Zone AE, As Shown on Map Panel Number 47187C0184F & 47187C0192F.
Dated Sept. 29, 2006.
Elev. Varies: 625.3-625.6
*Note: Preliminary FIRM
Dated: August 29, 2014
100 Year Floodplain Elevation 625.0

Site Benchmark
Tag Bolt of Existing Fire Hydrant Located Near the Southeast Corner of the Subject Property, Approximately 100 feet West of the Terminus of Del Rio Court. NGVD Elevation 651.12.

- Notes:**
- 1) All lots as shown will be located 100% out of the floodplain. The floodplain shall be balanced at a minimum of a 1:1 ratio.
 - 2) Floodplain alteration will not decrease storage capacity. This section of the Harpeth River is not located in a damage reach.
 - 3) Alterations of the floodplain are to occur in a method that will provide improved water quality, recreational value, and a natural habitat. This alteration will be an improvement upon existing agricultural use and fallow conditions.
 - 4) The applicant shall obtain a floodplain development permit and complete floodplain alteration prior to the submittal of a site plan. Once a final letter of map revision has been issued from FEMA, the applicant shall go to the BZA to have the FFO Zoning boundary revised. After BZA has revised the FFO, the applicant may submit a site plan for any lots not within the newly delineated FFO.
 - 5) Drainage Easements shall be provided between lots to convey stormwater runoff where necessary. The easements shall be provided in the Site Plan and Final Plat.



Revisions:

Drawing Notes:
COF Project # 6145

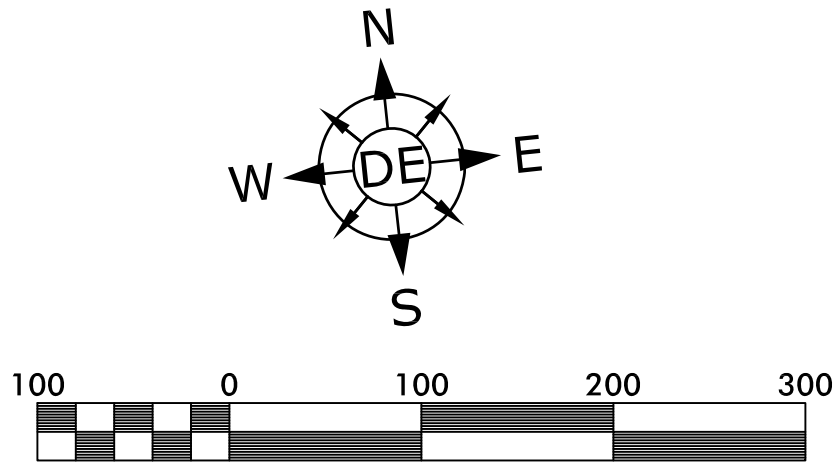
Date: June 2, 2016

Rizer Point PUD
Section 5 Development Plan
Being Parcel 1.09 on Tax Map 63
Franklin, Williamson County, Tennessee

DEWEY
ENGINEERING

Overall Grading
& Drainage Plan

C3.0



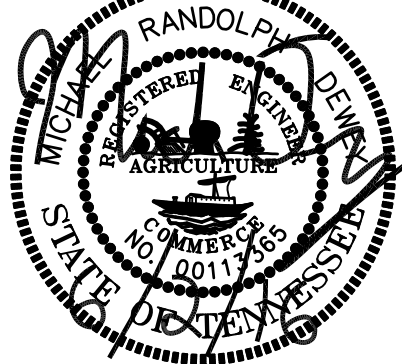
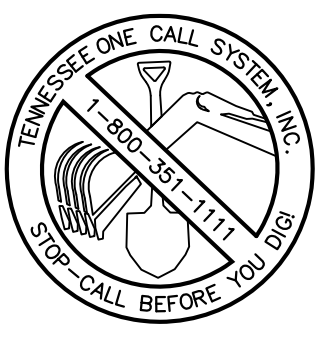
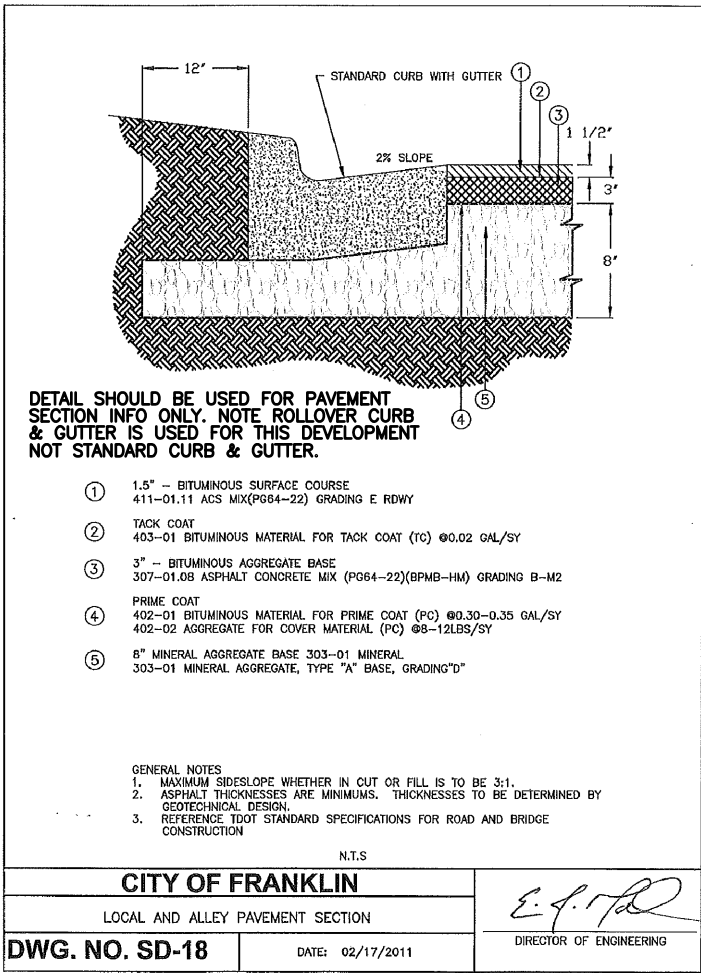
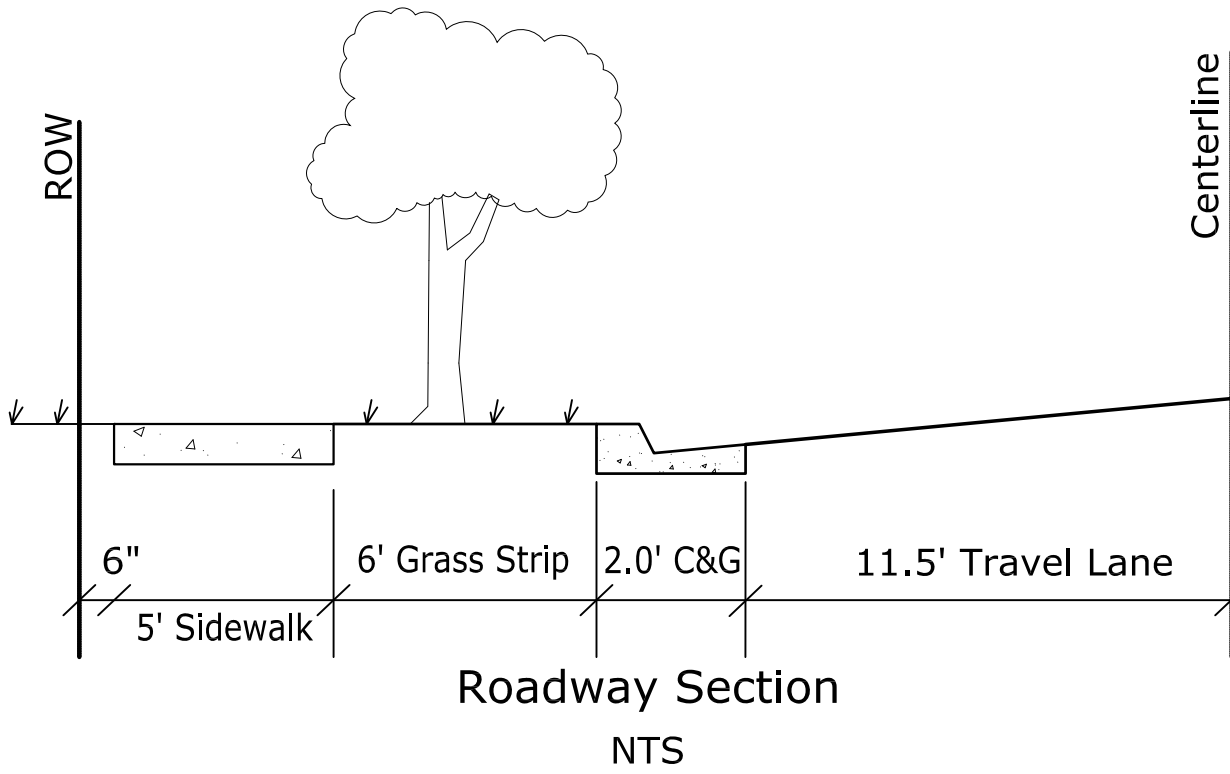
Scale 1" = 100'
Total Site Area = 68.5 ac
Section 5 Area = 35.5 ac

Engineer
Dewey Engineering
Contact: Michael Dewey, PE
2925 Berry Hill Drive
Nashville, TN 37204
Phone: (615) 401-9956
E-mail: mdewey@dewey-engineering.com

Developer
Goodall Inc. Builders
Contact: Jack Ludington
393 Maple Street #100
Gallatin, TN 37066
Phone: (615) 451-5029
Fax: (615) 451-4029

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Revisions:

Drawing Notes:
COF Project # 6145

Date: June 2, 2016

Rizer Point PUD

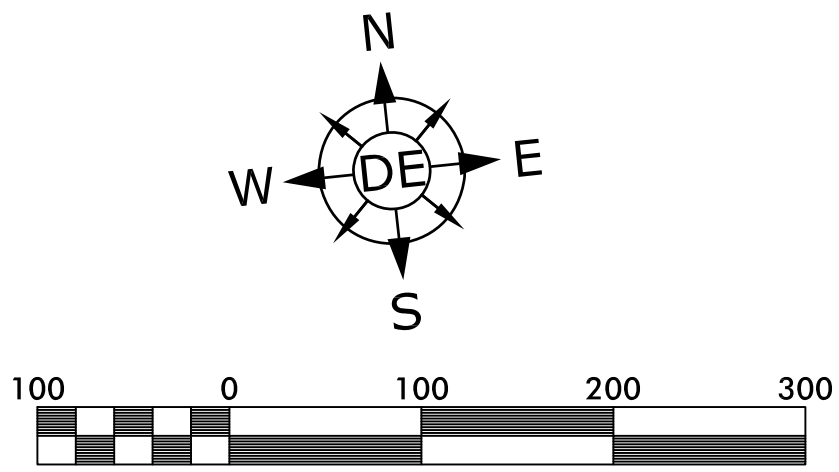
Section 5 Development Plan

Being Parcel 1.09 on Tax Map 63
Franklin, Williamson County, Tennessee

DEWEY
ENGINEERING

Overall ROW & Access Plan

C4.0



Scale 1" = 100'
Total Site Area = 68.5 ac
Section 5 Area = 35.5 ac

Engineer
Dewey Engineering
Contact: Michael Dewey, PE
2925 Berry Hill Drive
Nashville, TN 37204
Phone: (615) 401-9956
E-mail: mdewey@dewey-engineering.com

Developer
Goodall Inc. Builders
Contact: Jack Ludington
393 Maple Street #100
Gallatin, TN 37066
Phone: (615) 451-5029
Fax: (615) 451-4029

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Dated Sept. 29, 2006.
Elev. Varies: 625.3-625.6
*Note: Preliminary FIRM
Dated: August 29, 2014
100 Year Floodplain Elevation 625.0

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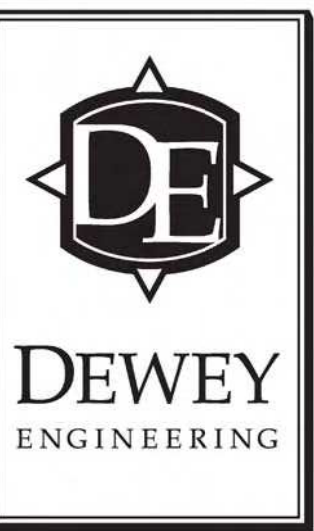
Revisions:

Drawing Notes:
COF Project # 6145

Date: June 2, 2016

Rizer Point PUD Section 5 Development Plan

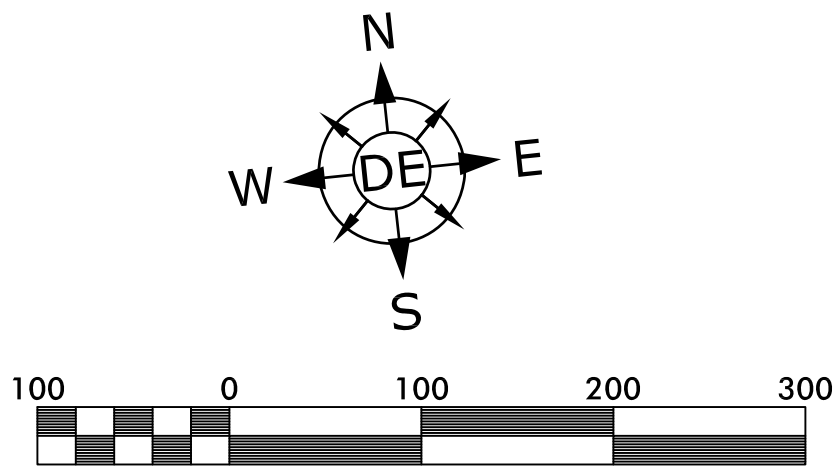
Being Parcel 1.09 on Tax Map 63
Franklin, Williamson County, Tennessee



AutoTurn
Exhibit

C4.1





Scale 1" = 100'
Total Site Area = 68.5 ac
Section 5 Area = 35.5 ac

Engineer
Dewey Engineering
Contact: Michael Dewey, PE
2925 Berry Hill Drive
Nashville, TN 37204
Phone: (615) 401-9956
E-mail: mdewey@dewey-engineering.com

Developer
Goodall Inc. Builders
Contact: Jack Ludington
393 Maple Street #100
Gallatin, TN 37066
Phone: (615) 451-5029
Fax: (615) 451-4029

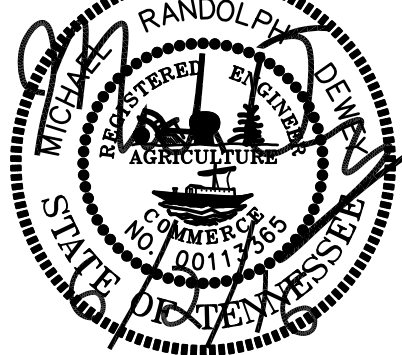
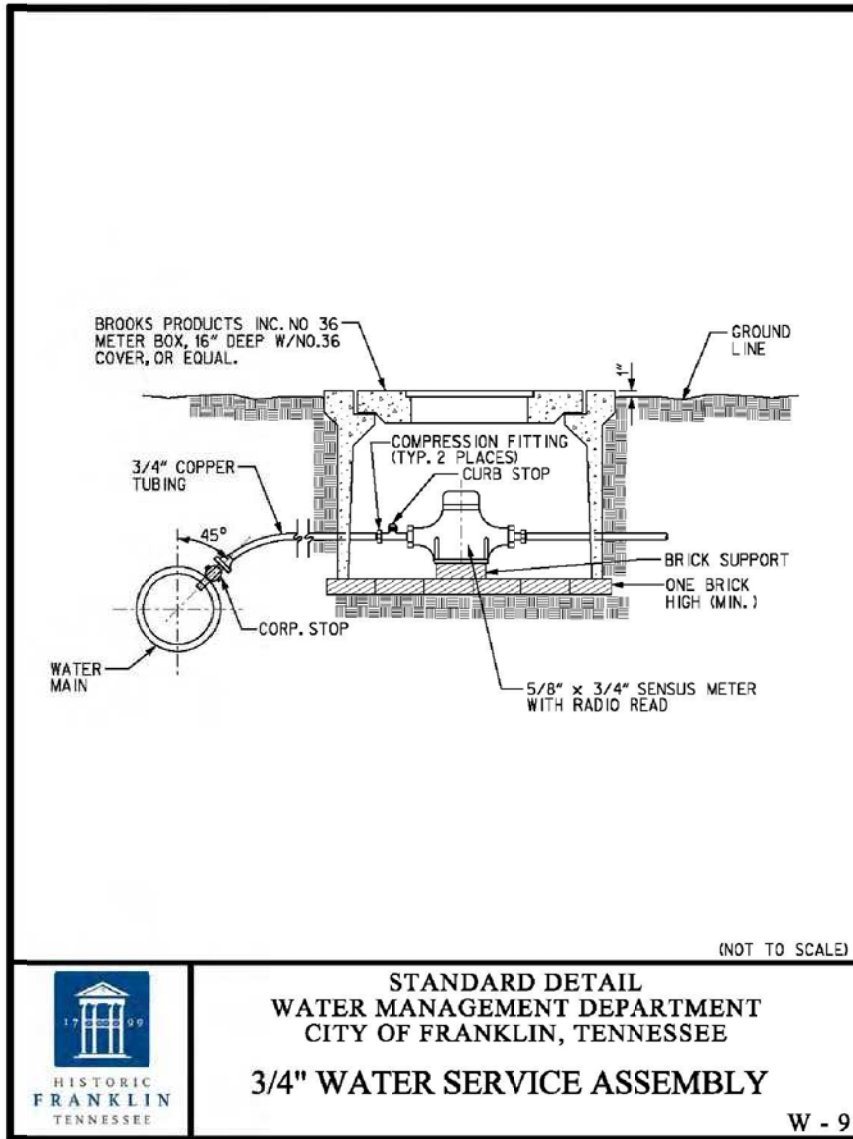
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Elev. Varies: 625.3-625.6
*Note: Preliminary FIRM
Dated: August 29, 2014
100 Year Floodplain Elevation 625.0

Site Benchmark
Tag Bolt of Existing Fire Hydrant Located Near the Southeast Corner of the Subject Property, Approximately 100 feet West of the Terminus of Del Rio Court. NGVD Elevation 651.12.

Utility Plan Legend

- PROP. STORM CULVERT
- PROP. 8" WATER MAIN
- PROP. 8" GRAVITY SEWER MAIN
- EX. 8" WATER MAIN (DEL RIO COURT)
- EX. 12" WATER MAIN (SOUTH PROP. LINE)
- EX. 16" RECLAIMED WATER MAIN
- EX. 14" DUCTILE IRON FORCEMAIN
- EX. OVERHEAD ELECTRIC (DOWNS BLVD)
- EX. UTILITY POLE
- PROP. HEADWALL
- PROP. DRAINAGE CATCH BASIN
- PROP. 6" SEWER LATERAL SERVICE
- EX. SEWER MANHOLE
- PROP. 3/4" RESIDENTIAL WATER METER
- PROP. FIRE HYDRANT & ASSEMBLY
- PROP. GATE VALVE & BOX

Note:
Within new developments and for off-site lines constructed as a result of, or to provide service to the new development, all utilities, such as cable television, electrical (excluding transformer), gas, sewer, telephone, and water lines shall be placed underground.



Revisions:

Drawing Notes:
COF Project # 6145

Date: June 2, 2016

Rizer Point PUD

Section 5 Development Plan

Being Parcel 1.09 on Tax Map 63
Franklin, Williamson County, Tennessee

DEWEY
ENGINEERING

Overall Utility
Plan

C5.0

CONDITIONS OF APPROVAL:

Engineering - PUD Plan Checklist

General Comments

1. F. Development Plan

- The previous comment "Applicant shall provide right-of-way for a future street connection or emergency access to the north of the proposed lots that will connect to Allen Avenue." was discussed in a meeting prior to this submittal but the following issues remain open. Provide grading and an auto turn exhibit for the access easement. Show the culvert required to cross over Reese Creek with the access drive. Place the emergency access drive outside of the utility easements.

2. F. Development Plan

- This is a new comment due to the chicanes being added at the subdivision entrance:

At Site Plan, "Fire Lane - No Parking" shall be marked on both sides of the curb and required accompanying signage posted between the proposed chicanes and extending 25 feet to the outside of the traffic calming area to prevent on-street parking within these spaces. The provided Autoturn exhibit indicates these areas pose a risk of potential conflict/collision should vehicles be parked in these areas.

This comment to remain open as a reminder to staff to be addressed at Site Plan, but should not hinder Development Plan approval.

Fire-Planning

General Comments

3. Fire Protection

- On 6/2/2016, the applicant responded a flow test had "been ordered and will be submitted prior to final approval or with the site plan submittal."

Please provide the results a full fire demand flow test (two hydrant).

The flow test must be performed within six (6) months of submittal date to be considered valid. Seasonal fluctuations should be discussed with the appropriate water utility based on the project's address/location.

Fire flow requirements in the International Fire Code shall be met as a minimum or fire sprinklers shall be provided if not otherwise required.

This comment remains open and unresolved.

Planning

General Comments

4. Zoning

- Applicant shall correct zoning to:
SD-R 0.56

Based on 20 DWU on 35.74 Acres

[Rizer Point PUD Dev Plan_6.2.2016.pdf](#)

5. Acreage

- Applicant shall correct site acreage to 35.74 acres per the surveyors description

Planning (Landscape)

General Comments

6. Formal Open Space

- Applicant shall supply on the site plan to be submitted a detail plan for the formal open spaces.

Water/Sewer

[Rizer Point PUD Dev Plan_6.2.2016.pdf](#)

7. General issues

- The location of the proposed access road is currently shown over the existing force main and reclaim water lines. At site plan if the proposed access road is to change the grade over the existing lines applicant shall meet with Water Management to ensure there is no effect to the utility lines. If the access road effects the utilities the access road shall be relocated.

Zoning

General Comments

8. FFO/FEMA

- Please remove the proposed floodplain line from sheets C1.0 and C1.1. These are existing condition sheets and should not contain proposed work.

9. FWO

- Please label the retaining wall as to the estimated height. Clearly show the wall so that it is apparent where it will begin and end.

RESOLUTION 2016-30

TO BE ENTITLED: "A RESOLUTION APPROVING A REVISED DEVELOPMENT PLAN FOR RIZER POINT PUD SUBDIVISION, FOR THE PROPERTY LOCATED NORTH OF DEL RIO PIKE AND EAST OF DEL RIO COURT."

WHEREAS, the Board of Mayor and Aldermen (BOMA) of the City of Franklin, Tennessee, has, or will, approve the zoning for the property as part of Ordinance 2016-21; 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 ALDERMEN OF THE CITY OF FRANKLIN, TENNESSEE, AS FOLLOWS:

SECTION I. That the legal description of the property being added to the Development Plan, as amended, is as follows:

PREMISES CONSIDERED	
Map-Parcel	Acres
63 3.01	35.74
Total	35.74

The following legal description is for property in Williamson County, City of Franklin, TN, located on the lands of F-L Farms, LLC, of record in Deed Book 4530, Page 178, R.O.W.C., TN. Property is also described as Parcel 3.01 on Map 63.

Commencing at the point of beginning, point being the Northeastern property line of the land conveyed to Ryan and Krystin Lemmon, of record in Deed Book 6534, Page 854, R.O.W.C., TN, Point also being along the westerly margin of the Viola Lane Right of Way;

Thence, N 75° 28' 11" W for a distance of 228.99 feet to a point on a line.

Thence, N 75° 28' 09" W for a distance of 32.25 feet to a point on a line.
 Thence, N 00° 30' 49" E for a distance of 505.70 feet to a point on a line.
 Thence, N 03° 37' 49" E for a distance of 362.80 feet to a point on a line.
 Thence, N 29° 37' 49" E for a distance of 519.50 feet to a point on a line.
 Thence, N 42° 12' 49" E for a distance of 318.00 feet to a point on a line.
 Thence, N 40° 20' 49" E for a distance of 300.00 feet to a point on a line.
 Thence, N 50° 04' 49" E for a distance of 300.00 feet to a point on a line.
 Thence, S 26° 33' 27" E for a distance of 172.40 feet to a point on a line.
 Thence, S 03° 59' 27" E for a distance of 169.00 feet to a point on a line.
 Thence, S 02° 50' 33" W for a distance of 1829.84 feet to a point on a line.
 Thence, N 83° 36' 11" W for a distance of 439.04 feet to a point on a line.
 Thence N 75° 28' 11" W a distance of 238.86 feet to the point of beginning and containing 35.74 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 Rizer Point PUD Subdivision, as amended, are as follows:

Entitlements	Rizer Point
Base Zone District	SD-R (0.56) and SD-R (2.64)
Character Area Overlay	WHCO-2 and WHCO-3
Other Zoning Overlays	FFO, FWO
Development Standard	Conventional
Number of Dwelling Units	91 Detached 24 Attached
Original Concept Plan Approval	Ordinance No. 2007-113 Date of Approval: 02/12/2008
Number of Phases in Development	5

SECTION IV. That the Development Plan, as amended, 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:	_____ 5/04/2016
BOMA/FMPC JOINT CONCEPTUAL WORKSHOP:	_____ 5/26/2016
NEIGHBORHOOD MEETING:	_____ 5/04/2016
PLANNING COMMISSION RECOMMENDED APPROVAL:	_____
PUBLIC HEARING AND BOMA APPROVAL:	_____

RIZER POINT PUD SUBDIVISION, DEVELOPMENT PLAN, REVISION 3
 RESOLUTION 2016-30
 FRANKLIN MUNICIPAL PLANNING COMMISSION
 6/23/2016

Site

<UND><BOL>Project Information</BOL></UND>

Existing Zoning: Agricultural (AG)
 Proposed Zoning: SD-R 0.56
 Existing Land Use: Vacant
 Proposed Land Use: Detached Residential
 Character Area: WHCO-2 & WHCO - 3
 Development Standard: Conventional
 Other Overlays: FFO, FWO
 Site Acreage: 35.14 acres
 Proposed Number of Dwelling Units: 20
 Proposed Building Height: 2 stories

- | | |
|--|---------------------------------------|
| Harpeth River (Polygon) | SD-R Specific Development-Residential |
| Rizer Point PUD Subdivision | SD-X Specific Development-Variety |
| AG Agricultural District | OR Office Residential District |
| ER Estate Residential | GO General Office District |
| R-1 Residential District | CC Central Commercial District |
| R-2 Residential District | NC Neighborhood Commercial District |
| R-3 Residential District | GC General Commercial District |
| R-6 Residential District | LI Light Industrial District |
| RM-10 Attached 10 Residential District | HI Heavy Industrial District |
| RM-15 Attached 15 Residential District | CI Civic and Institutional District |
| RM-20 Attached 20 Residential District | |



0 250 500 1,000
 Feet

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 It was compiled from the most authentic information available.
 The City is not responsible for any errors or omissions contained hereon.
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Comment to June 23 FMPC meeting

Thank you for the opportunity to address the commission on agenda item 16-0513, consideration of ordinance 2016-21, and agenda item 16-0530, consideration of ordinance 2016-30 on the issue of Rizer Point Development Plan Revision and Rezoning, and Development requests.

My name is Eric Pan, and I reside at 1213 Reese Drive, one of five Goodall Rizer Point homes that borders the new property in question.

On May 15th, I was shocked to discover that there is a rezoning request for my neighborhood. My shock was only compounded when I learned the next day that it's going to be right behind my house, and I had already missed the first hearing! The first Goodall representative I spoke with said, "I was surprised I didn't see you there. I thought for sure this would be something you'd be all over on." Even Goodall knew and agreed that this issue would affect me deeply, that I would be actively involved, and that I would have a major stake in the outcome. If I had known, I would have taken every opportunity to be present and address the Commission on April 28th. I had planned on being here tonight in person, and would have been but for my father, a cancer survivor with failing health, who is flying in tonight to see us before he gets too sick to travel.

The next day, May 18th, I spoke with my alderman, Mr. McLendon, and the planning office to see why I wasn't notified about the April meeting. The planning office confirmed that my home, 1213 Reese Drive, was supposed to be notified for the April 28th meeting. However, the addressee list city provided to Goodall accidentally listed my home as still being owned by Goodall. I immediately requested the city to update the records and inform Goodall to correct their records, so I am notified for tonight's meeting and all future meetings.

I want to point out that section 2.3.8.4 of the Franklin Zoning Ordinance placed the entire responsibility of written notification on the applicant. Even though the city mistakenly listed Goodall as the owner of my home, it does not lessen Goodall's obligation to notify me when it has direct knowledge of the truth — Goodall knows that Goodall doesn't own my home, and Goodall knows that it sold me the home at the end of last year. I have also checked with the other 4 homes at Rizer Point that border the new property, and only 3 of 5 had received notice for the prior meeting. Tonight's rezoning request still erroneously identify no less than 8 private homes, including mine, as Goodall properties.

Comment to June 23 FMPC meeting

Since May 19th, I have been trying to meet with Goodall to learn more about their plans and discuss my concerns. We've finally met on the evening of June 20th, and many issues were raised but not resolved. It has taken more than a month just to have a first meeting, and I need more time to understand Goodall's proposal and its implications.

Since I am not at this meeting in person, I want to be explicit to avoid misunderstanding. I want to be clear that I am not accusing Goodall of malice or conspiracy. Nonetheless, the fact remains that someone at Goodall knowingly accepted mistaken information from the city, conveniently overlooked the fact that Goodall no longer owns my home, avoided mailing the public notice to my home, and denied me the right to be notified about this important issue that affects my daily living and my property value.

The public notification process exist to protect and give private property owners time and opportunity to voice their concerns. There was inadequate public notice in this case, and the applicant's responsibility should not be lessened just because of a paperwork error on the city's part when the applicant has direct knowledge of the truth, and when a simple letter of notice to the property address would have fulfilled the applicant's obligation.

As such, I am asking the Commission to restart the hearing process on this rezoning request due to inadequate public notification, so that my neighbors and I have time to understand the plan and impacts to our community, give this matter our full consideration, and discuss our concerns with Goodall, so that other neighbors and stakeholders who are not here tonight won't have their rights and their voices taken away like mine was.

Thank you,

Eric Pan

From: [Mario](#)
To: [Amy Diaz-Barriga](#)
Subject: Items #22, #23; Hillsboro Rd Improvements; Sidewalk Request
Date: Wednesday, June 22, 2016 9:29:53 AM

Date: June 21, 2016

Ms. Amy Diaz-Barriga:

As a resident of the Magnolia Place Subdivision since 1999, I would like to express my opinion regarding the Rizer Point Subdivision's request for expansion of 20 single family homes and the Hillsboro Road improvements now underway.

Let me begin by stating that I am not opposed to the Rizer Point proposal for additional housing. I am delighted that the success of Goodall Inc. Builders has generated additional interest in further expansion of their existing subdivision. Who wouldn't want to live in this wonderful city we call home. Franklin is a coveted area and growth is inevitable.

Equally, I am elated with the Hillsboro Road improvements now underway. They were and are greatly needed and long overdue.

My reason for writing is simply this: Due to the increase in traffic in the subdivisions affected by these endeavors, I would like to propose Safety features be provided for residents.

Sidewalks, for example would be greatly appreciated. There are two elementary schools, one middle school, one high school, and a private school all within a half mile radius of these proposals. Children are forced to walk these narrow and dangerous streets or stand on the corners waiting for the school bus. With the increase of traffic flow the risk to children is multiplied. Please provide sidewalks for our children. My daughter walks to school everyday during the school year and the traffic projected in the fall causes me great concern.

Additionally, along with sidewalks, the improvement for rain water drains would be a welcoming upgrade to our neighborhoods. The drainage improvements made on Del Rio Pike a few years ago have been appreciated, the only disappointment was that the development fell short of including Del Rio Court.

Thank you for your attention to my concerns.

Mrs. Lupe Veloz
1009 Del Rio Court
Franklin, TN 37064
Phone 615-879-8260
Email: veloz6@msn.com

Comment to June 23, 2016 FMPC Meeting

Thank you for the opportunity to address the commission on the following agenda items. . .

- 1) Item #22 (File 16-0513), consideration of ordinance 2016-21, on the issue of Rizer Point Development Plan Revision and Rezoning request.
- 2) Item #23 (File 16-0630), consideration of resolution 2016-30, on the proposal from Goodall Homes for a Phase 5 development plan on property discussed on item #22

My name is Jeff Brodoski, and I reside at 5002 Viola Lane, one of the Goodall Rizer Point homes that will be greatly impacted by the new Phase 5 development proposal. We are a family of 5 with 3 kids under the age of 10 and a pet dog.

First, let me state my family's position on the above items #22 and #23. We strongly oppose both proposal, especially the resolution 2016-30 proposal from Goodall Homes to develop a phase 5 expansion of Rizer Point. This proposed expansion of the neighborhood dramatically alters the environment that we bought into on July 2015.

We moved to Franklin in September 2008, spending almost 7 years in Villages of Clovercroft. In 2015 we wanted to find a home that was closer to school, had less traffic, was quieter, was safer, and was more private. Rizer Point provided us with a very nice and new neighborhood that was closer to school and was a smaller subdivision. What sold us on the home was that we were able to get a lot in the back corner Rizer Point, which gave us the **privacy, quietness, very low traffic, and safety** that we coveted in a new home.

Below is a picture of where our lot is within Rizer Point . . .



This proposal to expand our neighborhood into the wooded area does the following to why we bought our home . . .

- Reduces Safety by adding traffic in front of our house. As you can see, right now we only have 1 neighbor (not developed yet in this picture, but sits between us and tree line) that needs to drive past our house to get home.
- Quietness – adding 20 homes will obviously create more noise than we have now. The biggest noisemakers now are the birds and other animals that live in the wooded area. IN ADDITION, Goodall's proposal to have a playground right next to our neighbors yard will add even more noise.
- The view – right now we have a very nice view looking out the North side of our home into the wooded area. While the proposal does keep the tree line, the view would still be somewhat impacted in a negative way, especially with the playground there.
- Privacy – it goes without saying that by adding 20 additional homes in our corner of Rizer Point will definitely reduce our level of privacy.
- Home value – I have bought and sold 4 homes over the past 13 years, one thing I know for sure is that our home value will take a hit during the 2+ years it will take Goodall to prep land, develop the streets, sell and build the homes. While our home value will likely recover, the recovery will be delayed and it will be slower than if this proposal did not occur. The selling points that go away due to this proposal will greatly impact the home value recovery.
 - o In fact, the impact on our home value in the next 5 years would conservatively be \$15,000-\$20,000. That assumes losing a modest 1.0-1.5% increase each year.
- Construction – while not permanent, our home will be dealing with construction traffic for at least 2 years, and every single vehicle will have to pass our driveway to get to the Phase 5 expansion. This will greatly reduce the ability for our young kids, and 8 other young kids next to us, to play outdoors together the way they do now.

So it is easy to see why my family does not support this expansion, and you will see by the comments made during the meeting and written that other neighbors oppose this plan as well.

Please also keep in mind that not only did we buy our home for the reasons above, we also paid the highest lot premium (\$15,000) in Rizer Point to attain all of these reasons to purchase. While the long term impact on our home environment is the most important thing, I do not take it lightly when someone tries to take away what we paid for.

Which brings me to the bigger picture question I have for the City of Franklin and Goodall Homes . . .

The incentive from Goodall Homes is understood, they are a business and they stand to profit a few million from this expansion. BUT, I must mention that myself and all the other neighbors around me were told last year that Goodall has no plans to expand into the land (land subject in Item #22), and that Goodall could not build there if they wanted to because of the flood zones. This is one of the major reasons that neighbors are upset about this plan.

As for the City of Franklin, if you were to accept this proposal, the only incentive I can think of is more tax revenue. And by my estimates the city would gain about \$75-85,000 in tax revenue each year from these 20 homes. This proposal would do nothing to enhance your city, it would make several of your current residents unhappy, and it would destroy quiet land that really poses no strategic advantage for a potential builder. If you look at the land in question on item #22, it lies between Harpeth river, Rizer Point, and another established neighborhood that has been in existence since the 70's and early 80's.

I ask the City of Franklin, is it really worth the extra tax revenue to accept a plan that does not enhance your city and only upsets existing residents?

My family and I are hopeful that you will say no to this question and reject the proposed items #22 and #23.

Thank you for allowing us the opportunity to voice our concerns,

A handwritten signature in black ink, appearing to read "Jeff Brodoski". The signature is fluid and cursive, with the first name "Jeff" being more prominent and the last name "Brodoski" written in a continuous script.

Jeff Brodoski

5002 Viola Lane, Franklin, TN 37069

Agenda Item #23
Re: Rizer Point Development Plan

City of Franklin Planning Commission,

I write to you as a 30-year resident of Franklin, Tennessee who currently resides on Wedgewood Drive. I have multiple concerns about the proposed plans to rezone and develop the property north of Del Rio Pike and East of Del Rio Court.

The proposed development will connect Wedgewood Drive to Viola Lane thereby increasing traffic flow and creating additional safety concerns for existing residents of Wedgewood Drive, Del Rio Court, and the entire Rebel Meadows subdivision. I do not think it is in the best interest of our community to connect the Rizer Point Subdivision to Wedgewood Drive for thru traffic, instead I would request that you consider a connection to Wedgewood drive for pedestrian and emergency access only.

The traffic implications of connecting Rizer Point to Del Rio Court and Rebel Meadows will be more significant than the 20 homes proposed to build. The connection will increase traffic from the entire Rizer Point subdivision as people try to access Hillsboro road by cutting through Rebel Meadows. Speeding has already been a documented problem in Rebel Meadows and Del Rio Court and adding more volume to these neighborhood streets adds to frustration for current residents as well as safety concerns.

To address safety concerns, I would specifically like you to consider the city park located at the corner of Wedgewood Drive and Del Rio Court. This park is close to the road and near a sharp curve in Del Rio Court that has compromised visibility. Adding traffic volume to this curve in the road poses safety risk for all persons who utilize this park. Additionally, Wedgewood Drive and Del Rio Court are both narrow roads with no sidewalks, making access to the park even more treacherous if there is a higher volume of vehicles.

I would also like to add that logistics of adding traffic volume to Wedgewood drive will be hazardous for all vehicles involved. Wedgewood Place is small subdivision with no HOA, there is little control over homeowners actions or maintenance of properties on our street. Literally 1/3 of the homes on our street (8 out of 25) are rental properties that are not always well maintained and frequently have 2-3 cars parked along the street in front of the home. Additionally, there are no designated parking places for the city park at the end of the street, encouraging more street parking on Del Rio Court and Wedgewood Drive. Due to the significant amount of street parking and the narrow design of these roads, it is already difficult for two cars to safely pass each other therefore adding construction traffic and ongoing volume will definitely lead to increased risk of traffic accidents or pedestrian injury.

Finally, I must add that as a resident of Wedgewood Drive for the past 11 years I have grown to enjoy our accessibility to walk from our home to the city park, bicentennial park, and downtown Franklin. I have a 3 year old daughter and another child coming soon and we deeply appreciate the value our city has placed on creating a walkable community for our family. However, by adding volume of vehicles without creating sidewalks, you take away accessibility or you ask us to forfeit our safety and the safety of our children. I conclude by reiterating that emergency access only to Wedgewood Drive would be sufficient to serve the needs of our community and all involved neighborhoods. Rizer Point already has 2 entry/exit points to the subdivision, therefore a 3rd access point for through traffic is redundant and only needed for emergencies.

Jennifer Dunn
jennmdunn@gmail.com
1135 Wedgewood Drive Franklin, TN 37069



YOUR *Dream* STARTS HERE

July 21, 2016

Franklin Planning Department
Franklin City Hall
109 3rd Ave. South, Suite 120
Franklin, TN 37064

Dear Planning Commissioners,

This letter is in reference to the steps that have been taken, on behalf of Goodall Homes, as we go through the process of entitlement for a proposed section of 20 lots at the Rizer Point community, in Franklin. As we start a possible development we understand the feedback from the existing and surrounding community is vital in establishing a good plan. As you well know while it is challenging to address the concerns and request of everyone, it is important to have a thoughtful process and implement those suggestions that are both reasonable and improve the plan. We have had multiple meetings with homeowners of Rizer Point, both as a group and individually. In each of these meetings we have listened to concerns and suggestions. While this process has taken a considerable amount of time, it has ultimately provided us with information that we believe improves the overall plan for Rizer Point. Listed below is a list of items that Goodall Homes has agreed to provide within the plan, based on the community feedback.

1. Goodall Homes will add a significant landscape buffer between existing homeowners and the new section to provide separation and privacy between the two sections.
2. Within the new section, Goodall Homes will be shifting the original lot layout further away from the existing community to provide more distance between the two sections.
3. Goodall Homes will add a playground within the new section that will serve the entire Rizer Point Community.
4. Goodall Homes will add a walking trail to connect the playground to the existing community. In addition, walking trails will be added along the river. The walking trail system will serve the entire community.
5. Goodall Homes recommends adding traffic calming features entering into the new 20 lot section to minimize the effects of traffic.
6. Finally, we identified nine homeowners that we felt were directly impacted by the new section (Those home owners that back directly to the development) and partially impacted by the new section (Those home owners that are along the traffic route of the new section) and met with each individually. In those meetings we offered to refund the full lot premium for those directly impacted and refund ½ of the lot premium for those impacted partially. While we feel like each of these lots still warrants a premium for its location, we felt that since the homeowners bought prior to the proposed section being discussed that this was the right step to take.

As I mentioned before, while it difficult at times to meet the request of every homeowner, I believe that Goodall Homes as taken the steps to listen intently to the community and offer multiple enhancements for the community. I want to personally thank each of you for your time and consideration in this matter.

Sincerely,

Chris O'Neal
Chief Sales Officer
Goodall Homes
615.681.4335
coneal@goodallhomes.com



393 Maple Street, Suite 100 • Gallatin, TN 37066 | 615.451.5029 | www.GoodallHomes.com

2014 Builder of the Year by Professional Builder Magazine. Options, room sizes and porch configurations may vary per plan and/or community and are subject to change.



New Hwy 96

ALRINGTON AT WEST MAIN PUD SUBDIVISION, REZONING,
SPECIFIC DEVELOPMENT RESIDENTIAL (10.0)
(ORDINANCE 2016-22)
FRANKLIN MUNICIPAL PLANNING COMMISSION
6/23/2016

Fair St

5th Ave N

9th Ave N

7th Ave N

9th Ave N

8th Ave

W Main St

7th Ave S

Site

Access

4th 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



0 125 250 500
Feet

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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.

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,

A handwritten signature in black ink, appearing to read "Matt K. Taylor".

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

8

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

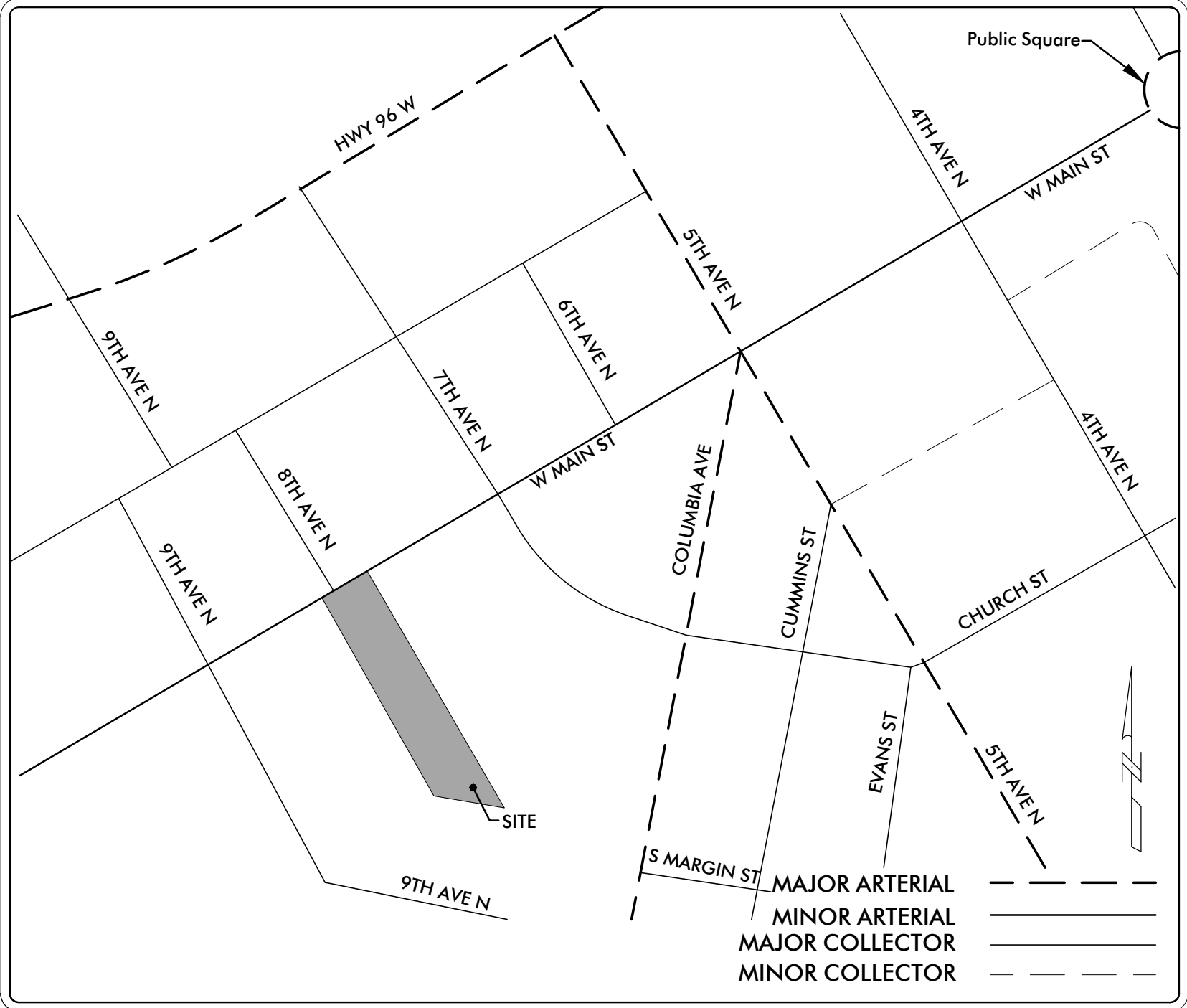
TOTAL AREA = 0.9 ACRES

Date: May 9, 2016

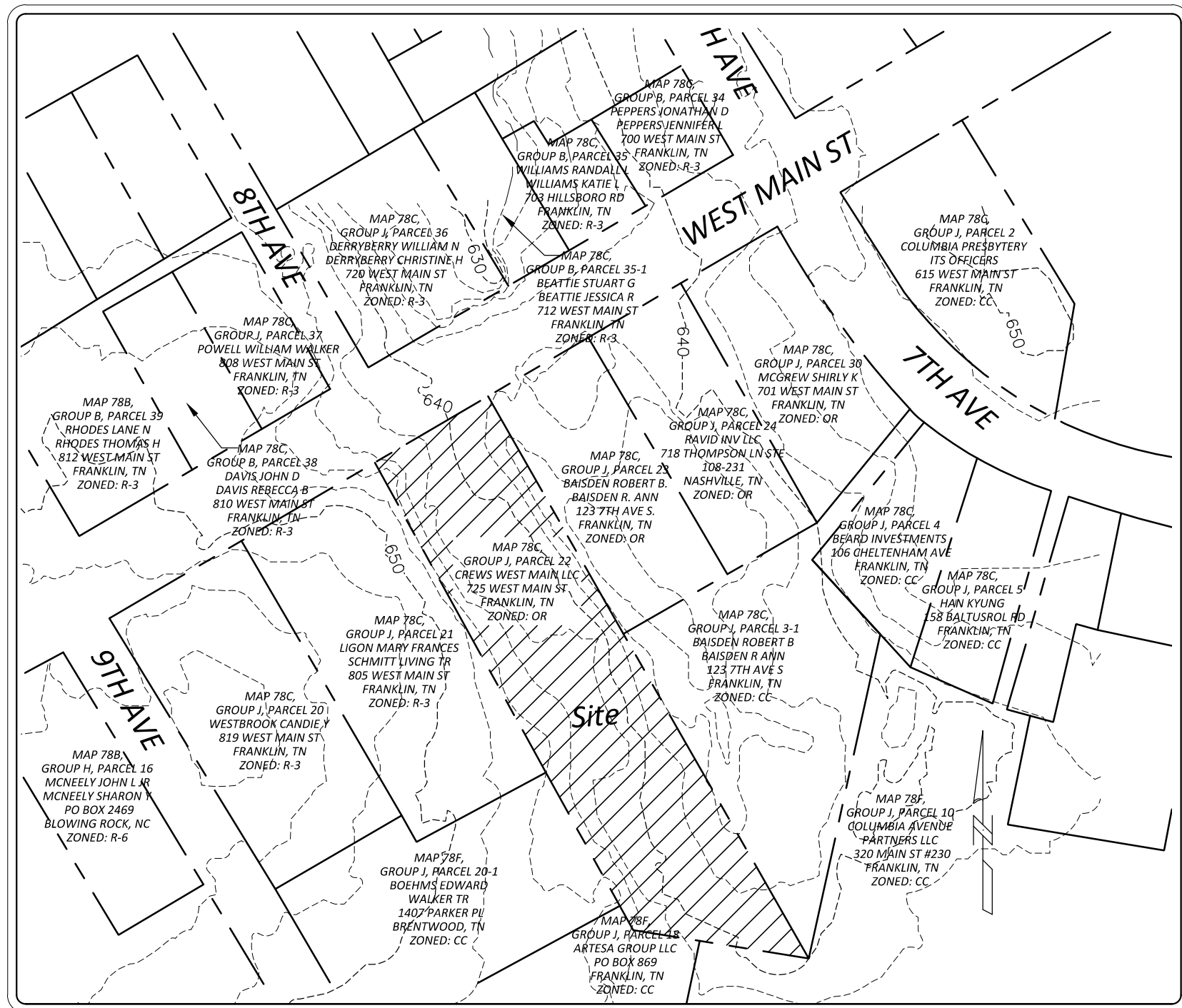
Sheet Schedule

C0.0 Notes & Project Standards

C1.0 Overall Existing Conditions Plan



LOCATION MAP
N.T.S.



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 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 DEVELOPMENT 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 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

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.

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



PERMITS:

Dale & Associates
Consulting Civil Engineering
Land Planning & Zoning
Landscape Architecture
516 Heather Place
Nashville, Tennessee 37204
(615) 297-5166

D&A Project #15153
The Arlington at
West Main

C0.0

Sheet 1 of 2

Notes & Project Standards

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

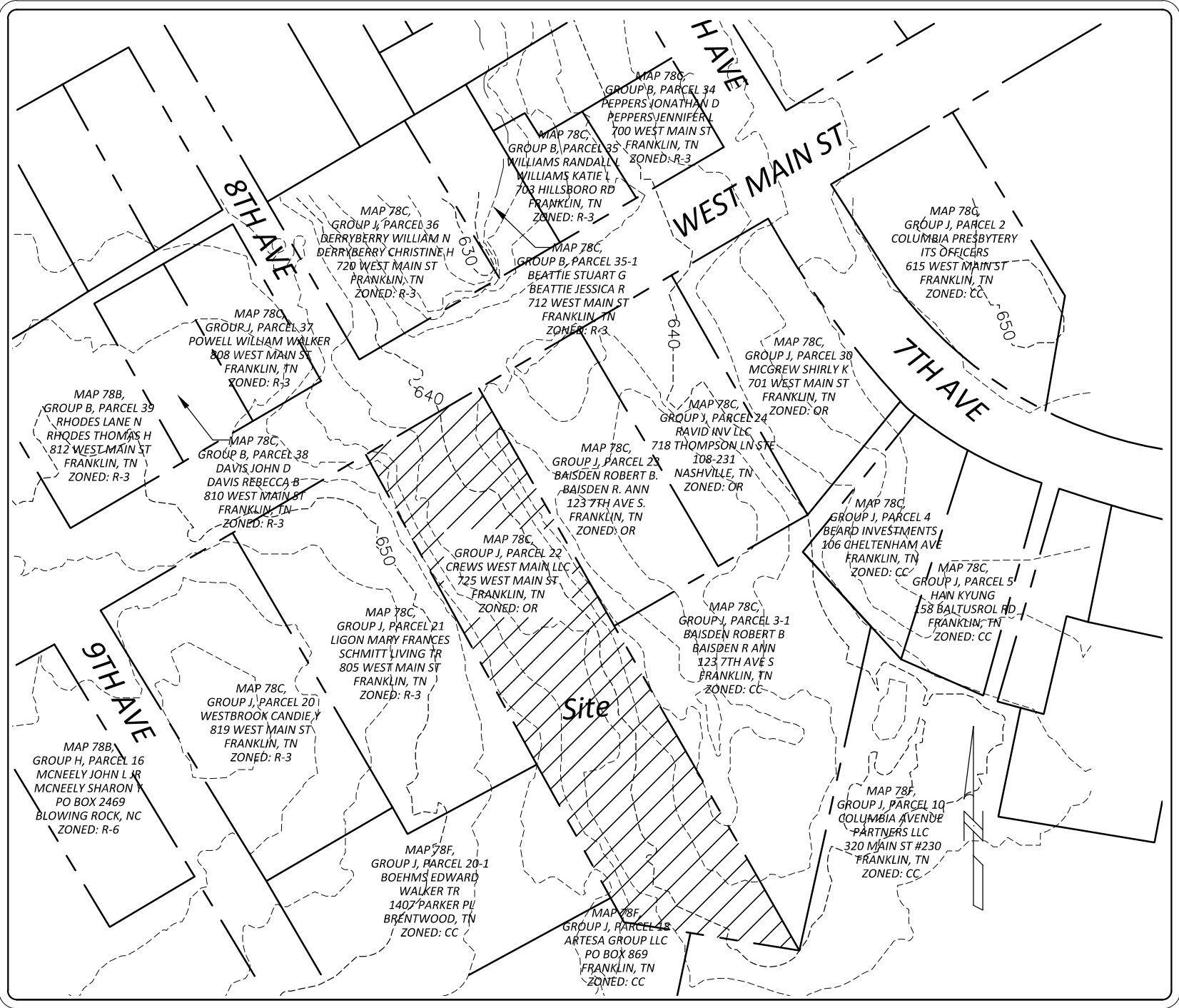
Owner
Crews West Main, LLC
131 Third Avenue North
Franklin, TN 37064

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
SCALE: 1" = 100'

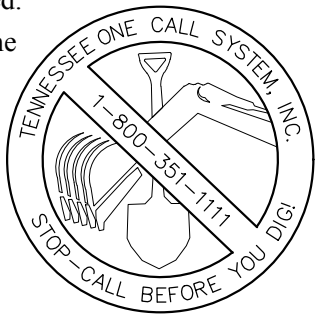
Legal Description

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.



Dale & Associates
Consulting Civil Engineering
Land Planning & Zoning
Surveying

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

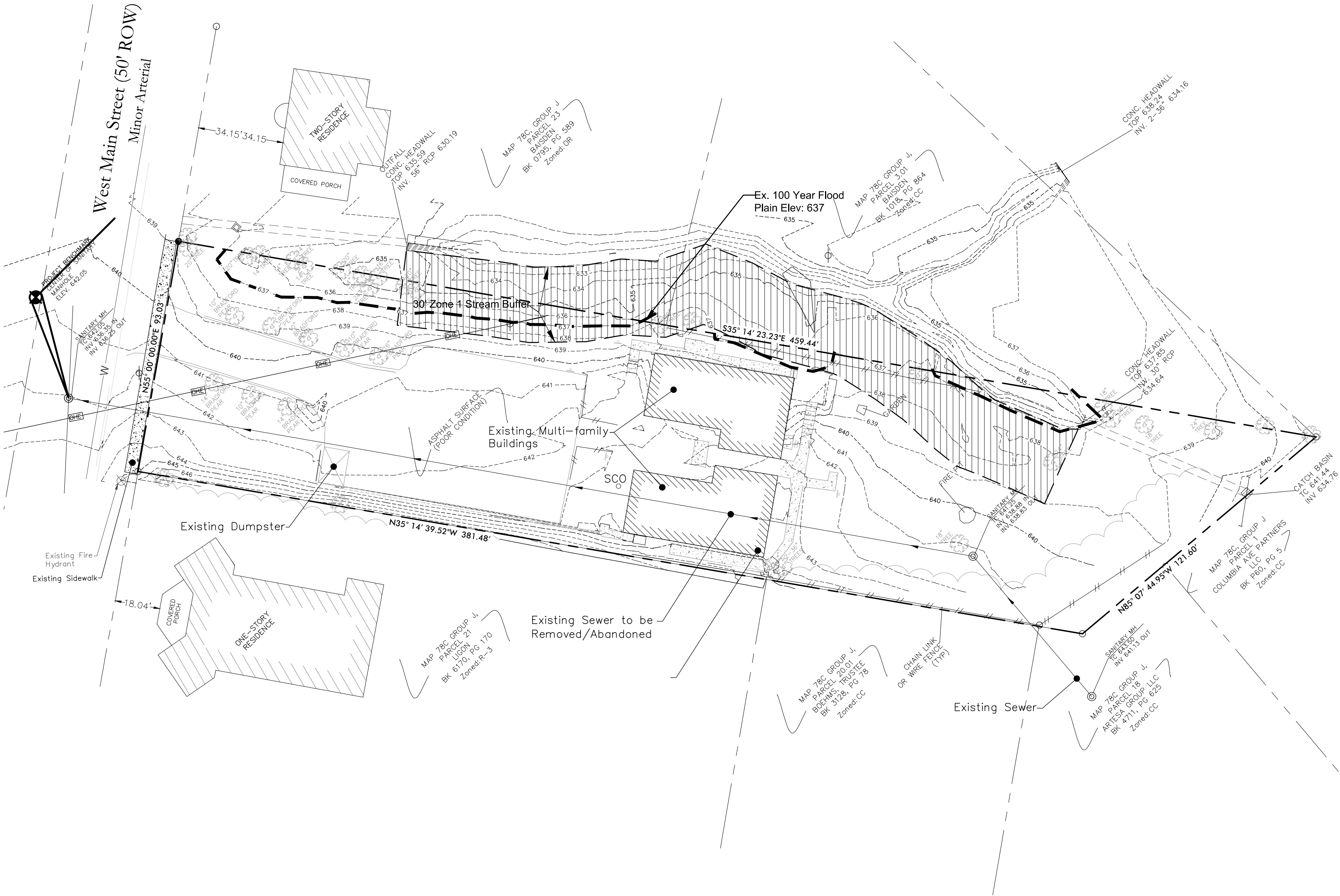


PERMITS:

D&A Project #15153
The Arlington at
West Main

C1.0
Sheet 2 of 2

Overall Existing Conditions Plan



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:

CITY OF FRANKLIN, TENNESSEE:

By: _____

Eric Stuckey

City Administrator/Recorder

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:

New Hwy 96

ALRINGTON AT WEST MAIN PUD SUBDIVISION, REZONING,
SPECIFIC DEVELOPMENT RESIDENTIAL (10.0)
(ORDINANCE 2016-22)
FRANKLIN MUNICIPAL PLANNING COMMISSION
6/23/2016

Fair St

5th Ave N

9th Ave N

7th Ave N

9th Ave N

8th Ave

W Main St

7th Ave S

Site

Access

4th 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



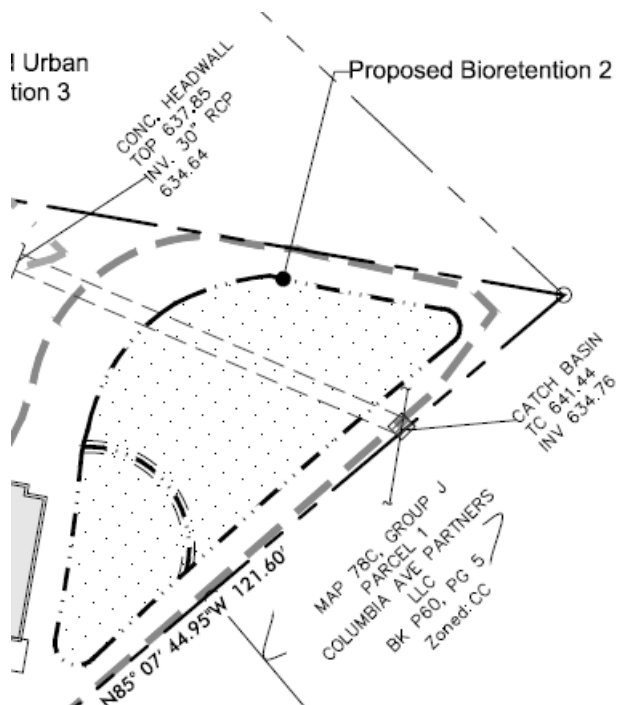
0 125 250 500
Feet

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.
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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

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		RM-10 Attached 10 Residential District		GC General Commercial District
	AG Agricultural District		RM-15 Attached 15 Residential District		LI Light Industrial District
	ER Estate Residential		RM-20 Attached 20 Residential District		HI Heavy Industrial District
	R-1 Residential District		SD-R Specific Development-Residential		CI Civic and Institutional District
	R-2 Residential District		SD-X Specific Development-Variety		
	R-3 Residential District		OR Office Residential District		
	R-6 Residential District		GO General Office District		
			CC Central Commercial District		
			NC Neighborhood Commercial District		



0 125 250 500
 Feet

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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

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

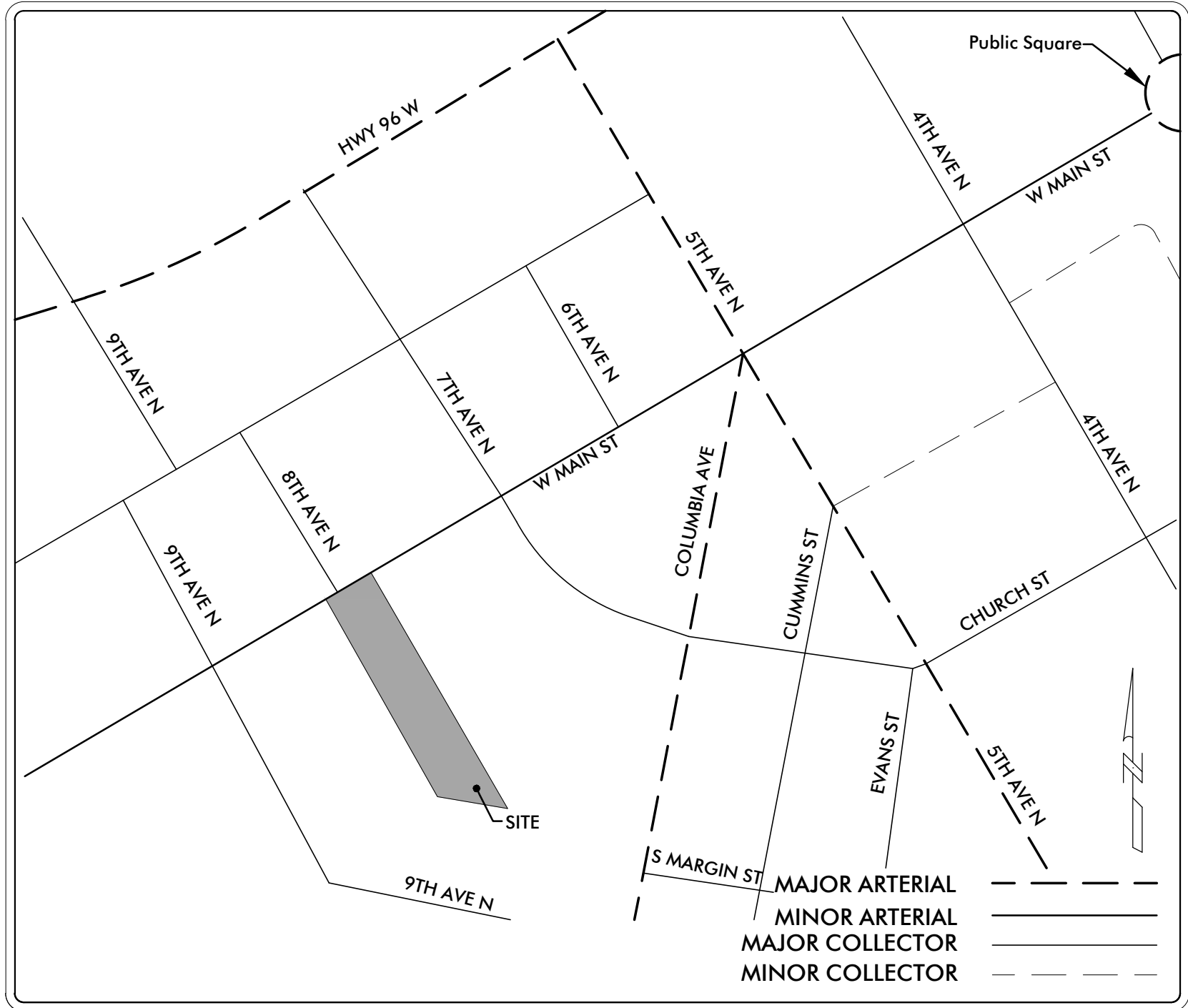
A1.0 Preliminary Building Floor Plans

A3.0 Conceptual Building Elevations and Renderings

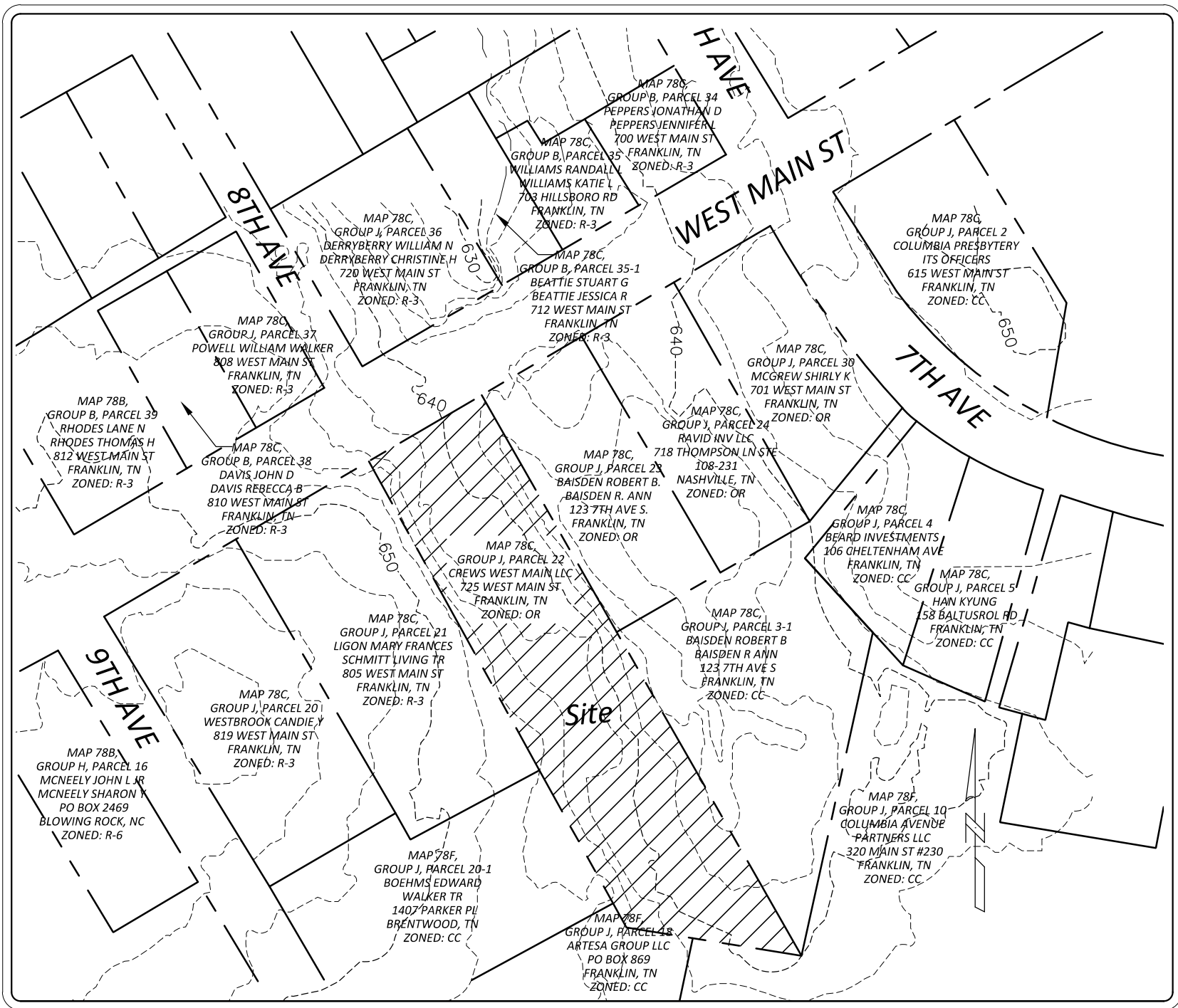
A3.1 Conceptual Building Elevations and Renderings

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 DEVELOPMENT 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 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



LOCATION MAP
N.T.S.



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.

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



PERMITS:

Dale & Associates
Consulting Civil Engineering
Land Planning & Zoning
Landscape Architecture
516 Heather Place
Nashville, Tennessee 37204
(615) 297-5166

D&A Project #15153
The Arlington at
West Main

C0.0

Sheet 1 of 5

Notes & Project Standards

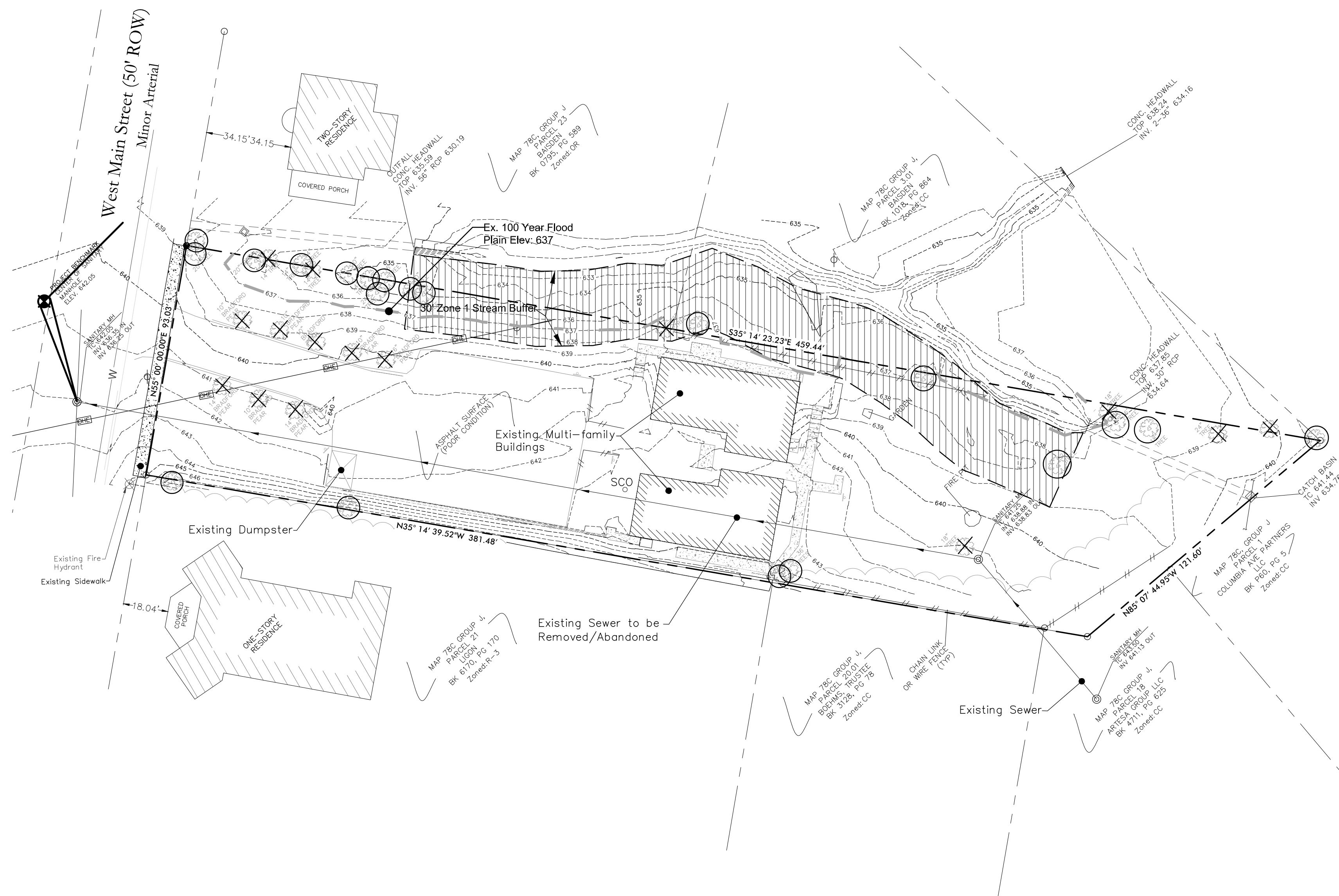
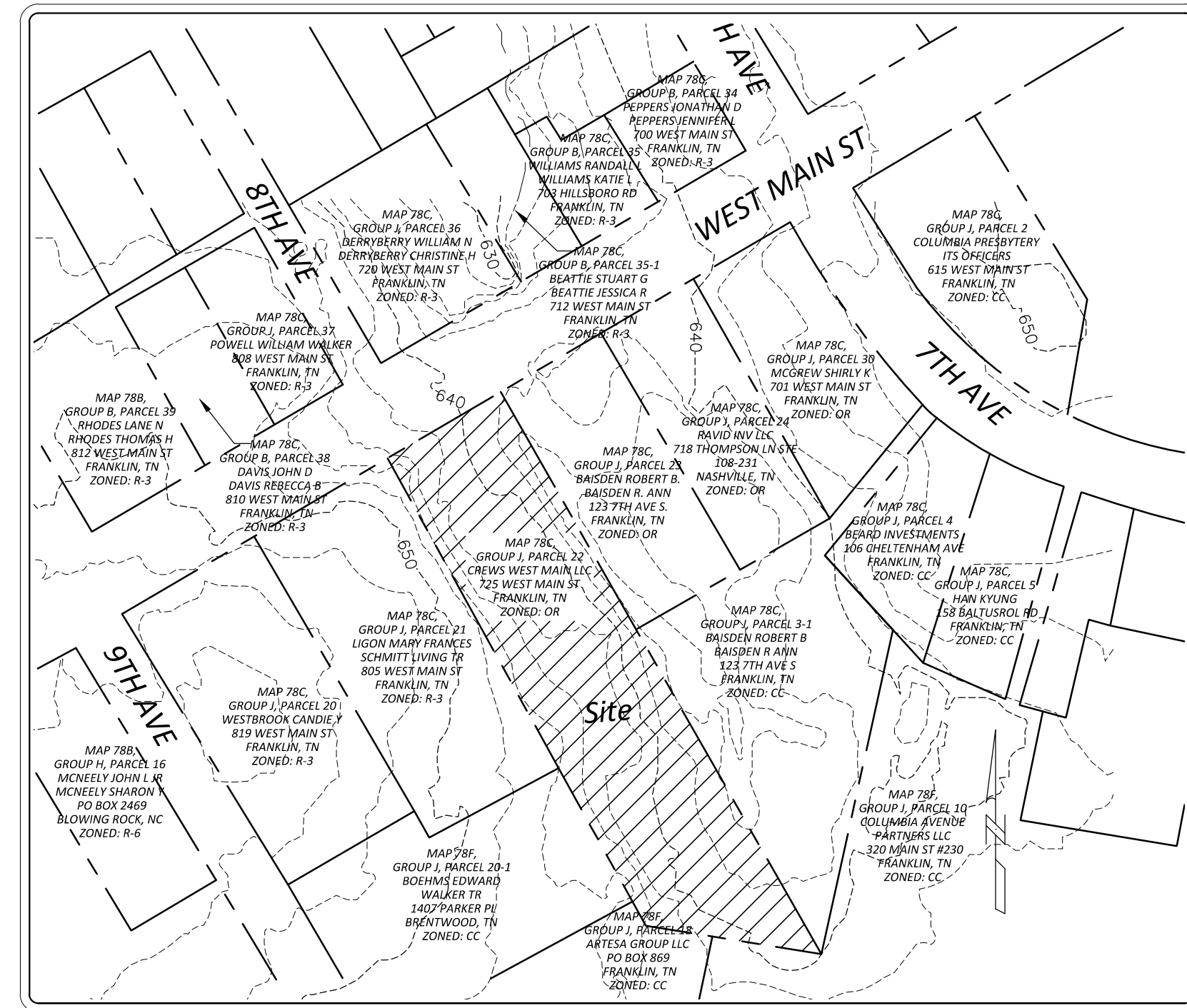
Piedmont Natural Gas
www.piedmontng.com

City of Franklin Water and Sewer
124 Lumber Dr.
Franklin, Tennessee 37064
615.794.4554

Crews West Main ,LLC
131 Third Avenue North
Franklin, TN 37064

Dale & Associates (Adam Seger, PE)
516 Heather Place
Nashville, Tennessee 37204
615.297.5166

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



Overall Existing Conditions Plan

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



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:

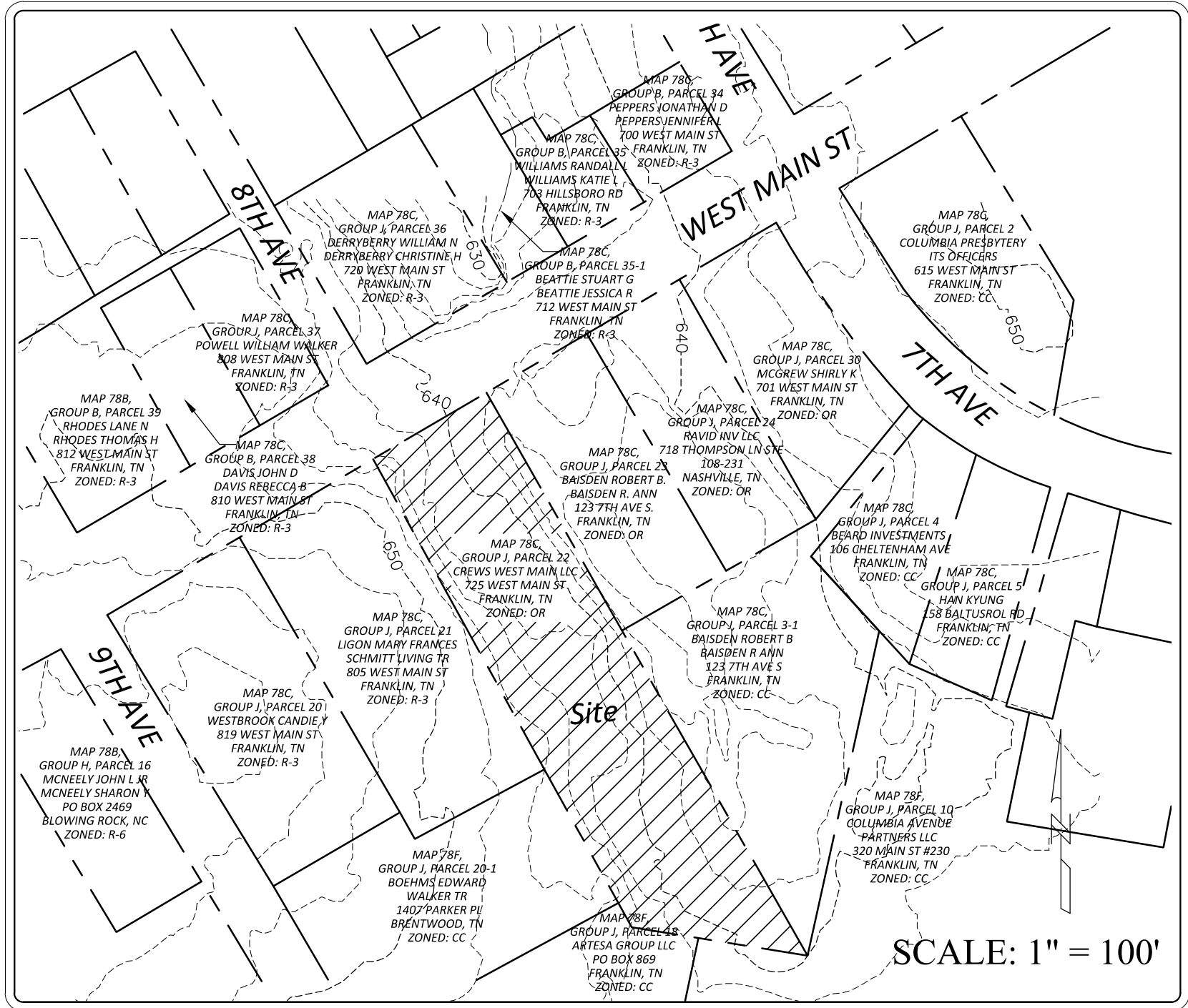
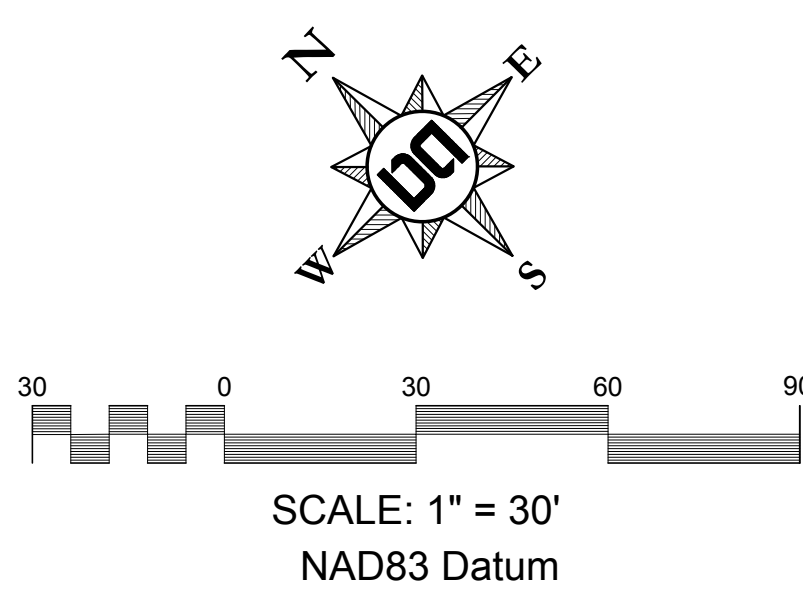
- St. Paul's Episcopal Church - Located approximately 700' Northeast at 510 West Main St.

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

Site Data

PROJECT NAME:	The Arlington at West Main
CITY OF FRANKLIN PROJECT #	6148
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 DEVELOPMENT 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 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

General Notes

- 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.
- Parking for this development shall be provided by a structured parking lot underneath the building.
- 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 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.

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- 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.



Dale & Associates
Consulting Civil Engineering
Land Planning & Zoning
Surveying
516 Heather Place
Nashville, TN 37204
(615) 977-5166

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



PERMITS:

Overall Development Plan

D&A Project #15153
The Arlington at
West Main

C2.0

Sheet 3 of 5

**Middle Tennessee Electric
Membership Corporation
2156 Edward Curd Lane
Franklin, Tennessee 37067
615.794.1102**

Piedmont Natural Gas
www.piedmontng.com

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124 Lumber Dr.
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City of Franklin Water and Sewer
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Franklin, Tennessee 37064
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725 West Main Street
Franklin, TN 37064
Tax Map 78C Group J, Parcel 22
Zoned: OR

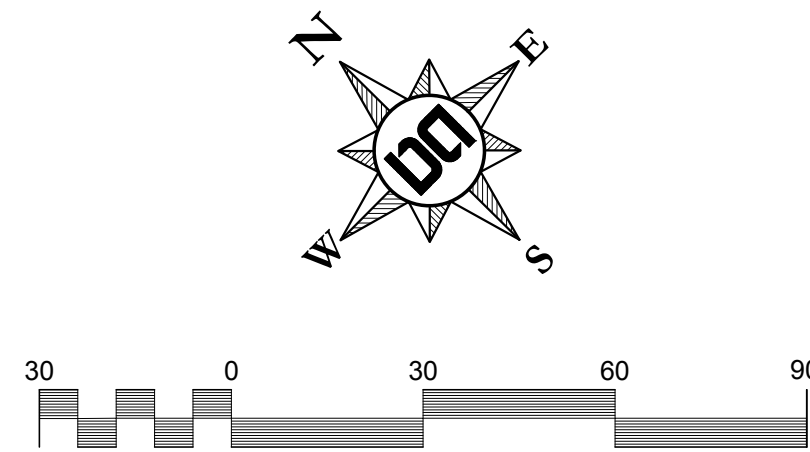
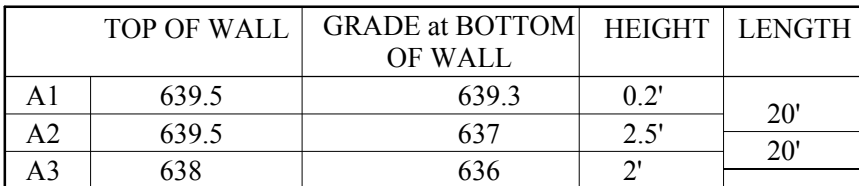
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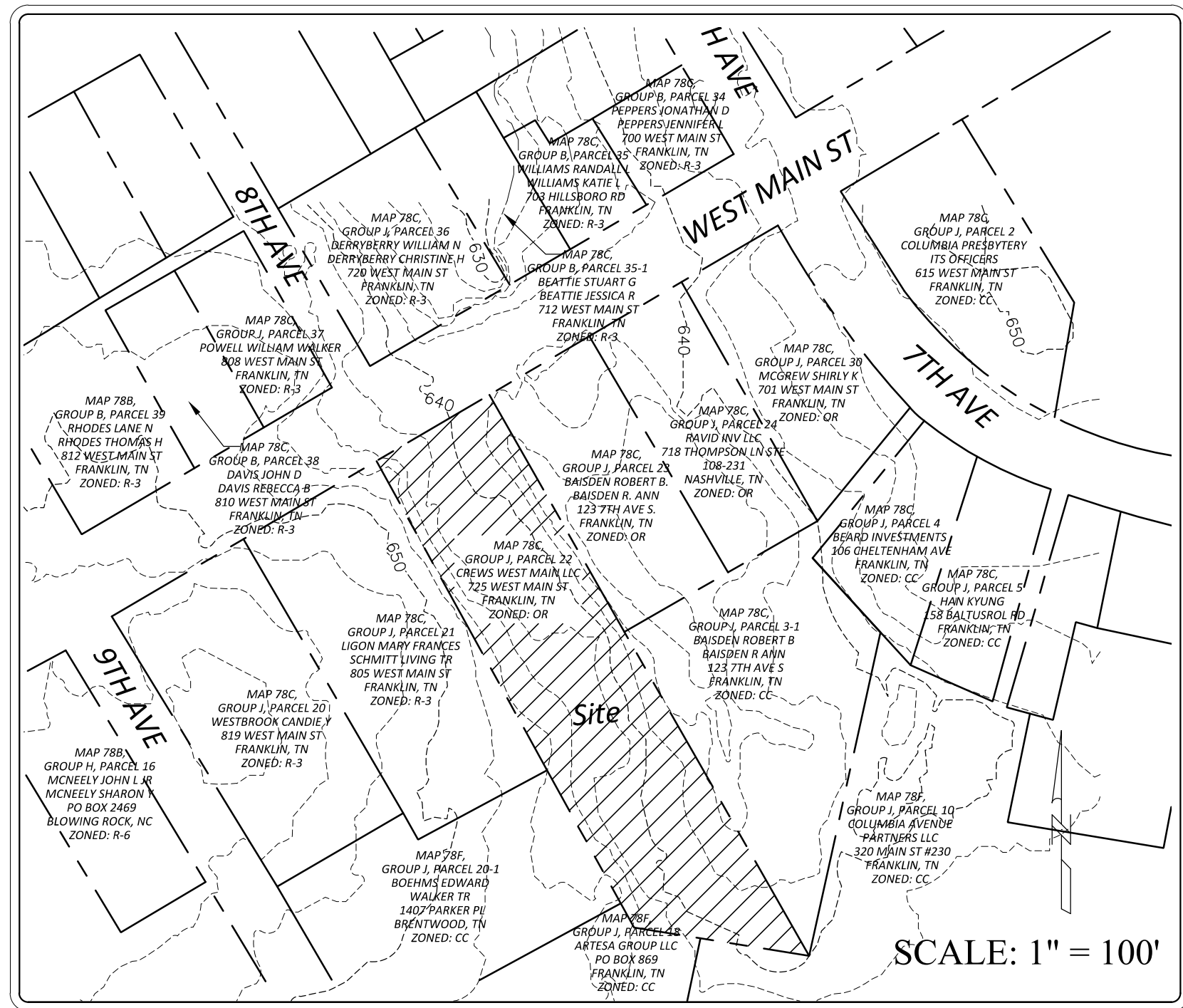
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Wilson and Associates, P.C.
108 Beasley Drive
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615.794.2275

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



SCALE: 1" = 30'
NAD83 Datum



SCALE: 1" = 100'

Site Data

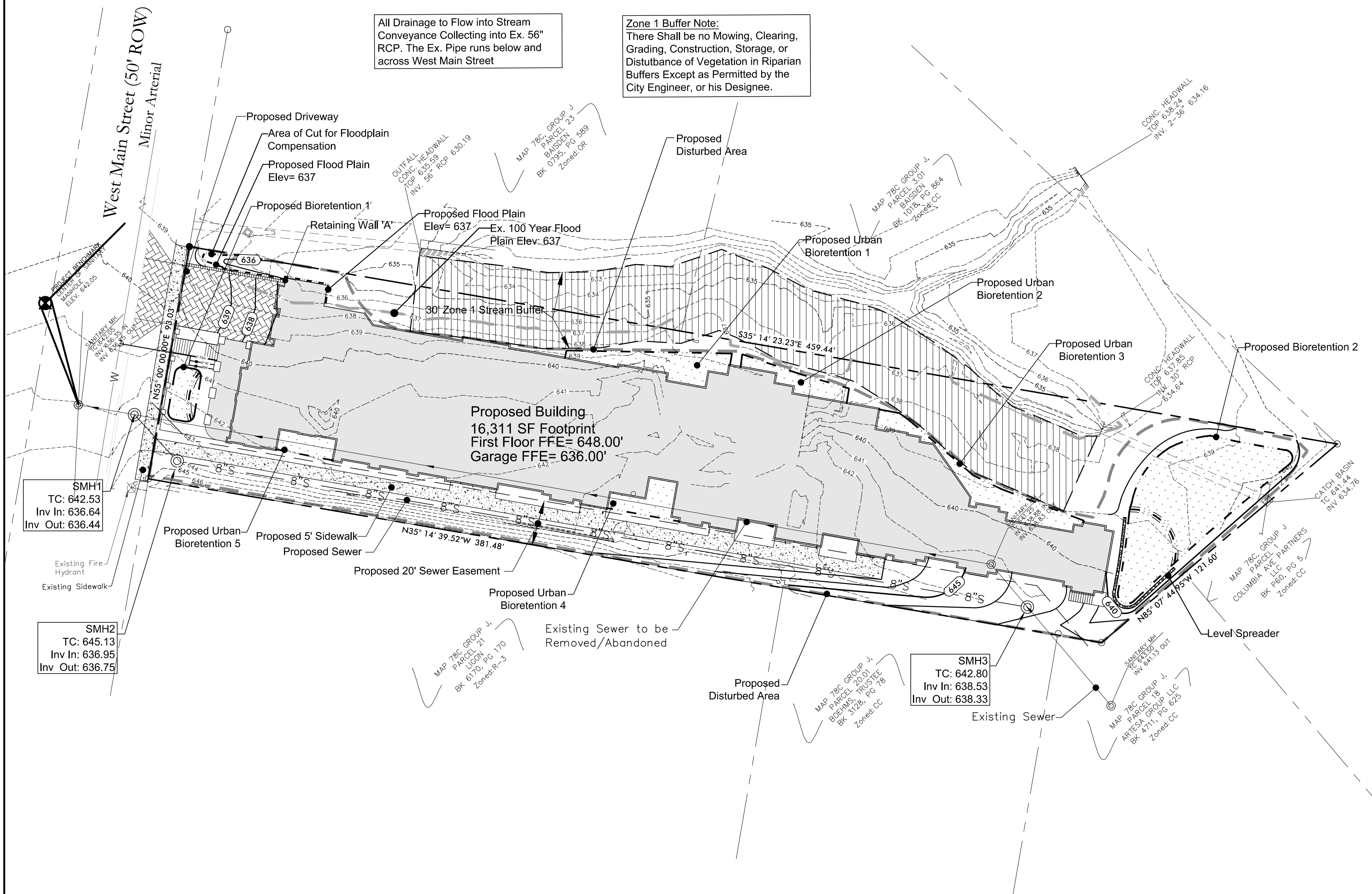
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CITY OF FRANKLIN PROJECT #	6148
SUBDIVISION:	Plan of Hincheyville Subdivision
LOT NUMBER:	6
ADDRESS:	725 West Main Street
CITY:	Franklin
COUNTY:	Williamson County
STATE:	Tennessee
ALDERMANIC WARD:	4
EXISTING ZONING & CHARACTER OV:	Office Residential / CFCO -3, CFCO-7
PROPOSED ZONING:	SD-R 10.00
OTHER APPLICABLE OVERLAYS:	HPO/Downtown Franklin Local Historic District
APPLICABLE DEVELOPMENT 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 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

1. Grading Permit is required for any project disturbing more than 10,000 sq ft, adding more than 5,000 sq ft 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.

- Site Area: 39,108 SF
- Impervious Area: 11,558 SF Existing, 20,400 SF Proposed
- Disturbed Area on Site (within PUD): 32,292 SF

- 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)

- Value of Fill: 104.76 Cu Ft./ 3.88 Cu Yd.
- Value of Cut: 119.34 Cu Ft./ 4.42 Cu Yd.



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 (Ca2), 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 bio-retention structure. The rest of the building and southwest area of he site will drain into a large bio-retention 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.

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




TOP CALL BEFORE YOU DRILL

DA
Dale & Associates

Complete Civil Engineering
Land Planning & Zoning
Landscape Architecture
Surveying

316 Foster Place
Northridge, Tennessee
(615) 297-5166

D&A Project #
The Arlington
West Main

C3.

Sheet 4 of 4

D&A Project #15153
The Arlington at
West Main

C3.0

Sheet 4 of 5

Overall Grading and Drainage Plan

**Middle Tennessee Electric
Membership Corporation
2156 Edward Curd Lane
Franklin, Tennessee 37067
615.794.1102**

City of Franklin Water and Sewer
124 Lumber Dr.
Franklin, Tennessee 37064
615.794.4554

City of Franklin Water and Sewer
124 Lumber Dr.
Franklin, Tennessee 37064
615.794.4554

725 West Main Street
Franklin, TN 37064
Tax Map 78C Group J, Parcel 22
Zoned: OR

131 Third Avenue North
Franklin, TN 37064

Bernie Butler
D9 Development, LLC
131 Third Avenue North
Franklin, TN 37064
615.419.6933

Dale & Associates (Adam Seger, PE)
516 Heather Place
Nashville, Tennessee 37204
615.297.5166

Wilson and Associates, P.C.
108 Beasley Drive
Franklin, TN 37064
615.794.2275

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

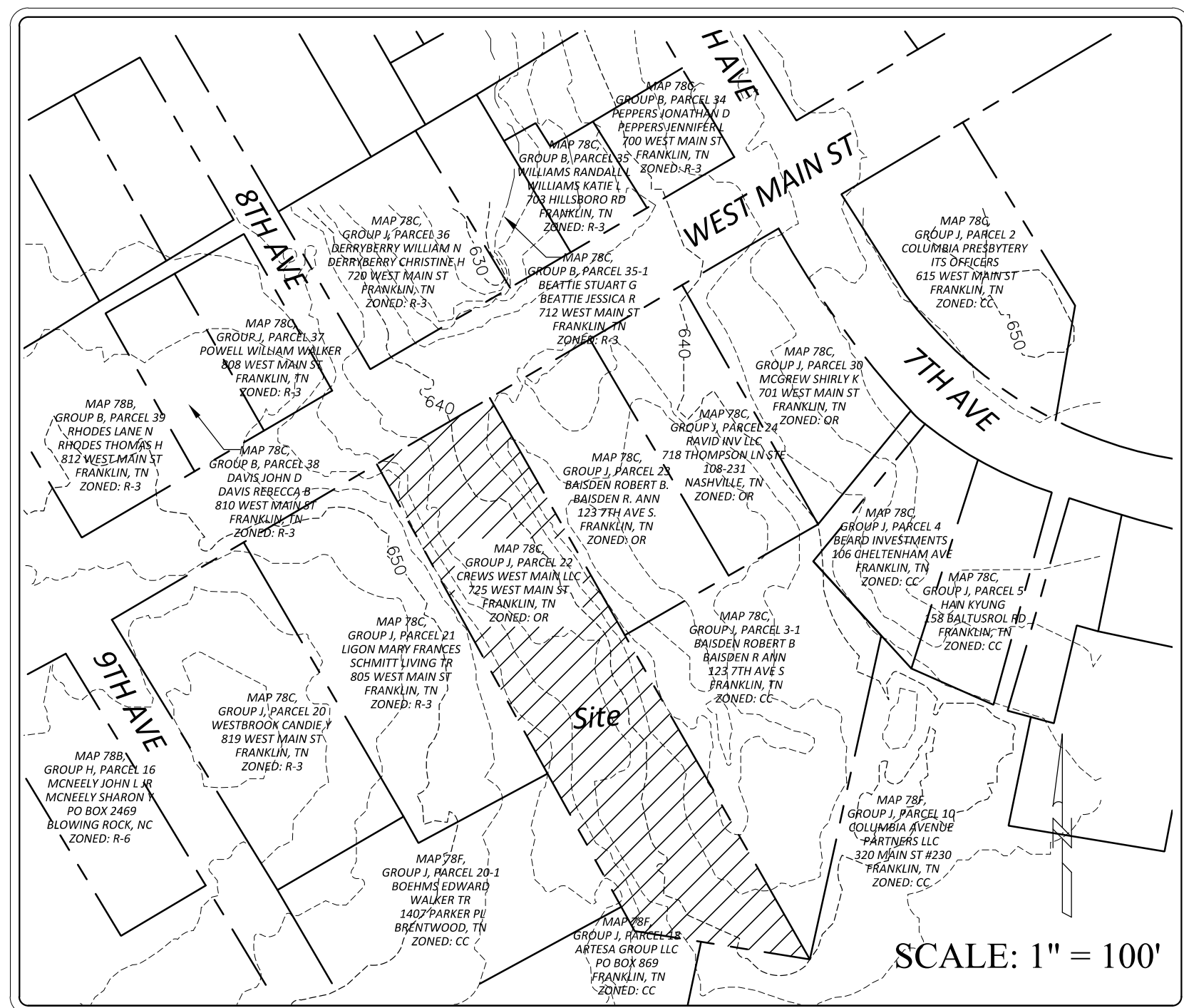
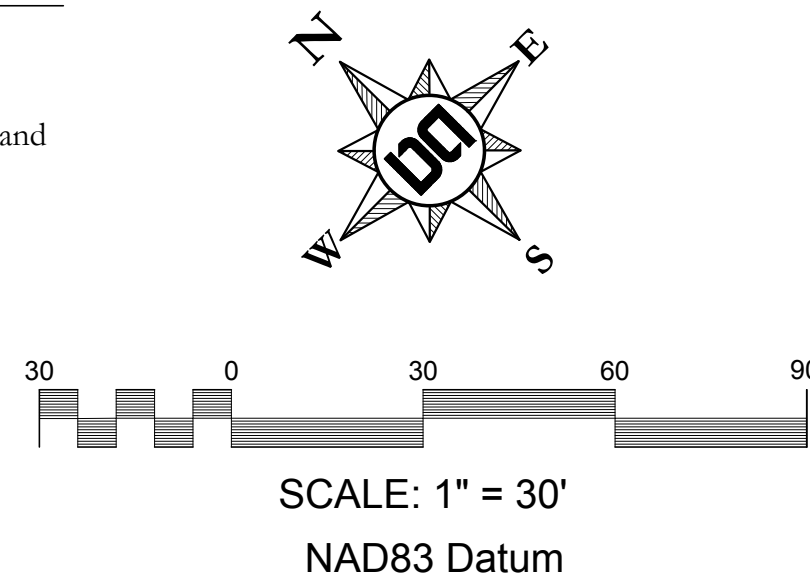
- Existing water tap to remain and be utilized, however, an all new service line will be installed off the existing tap as well as an RBPB inside the building. Existing sewer tap to remain and be utilized, new pipe to be installed from clean out

- Facility Type: 9 Multifamily Units
- Total Flow in GPD: 3,000 GPD

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



1. Prior to beginning 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-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.
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 damages 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.

Site Data

PROJECT NAME:	The Arlington at West Main
CITY OF FRANKLIN PROJECT #	6148
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 / CF-CO -3, CF-CO-7
PROPOSED ZONING:	SD-R 10.00
OTHER APPLICABLE OVERLAYS:	HPO/Downtown Franklin Local Historic District
APPLICABLE DEVELOPMENT 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 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

- 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.



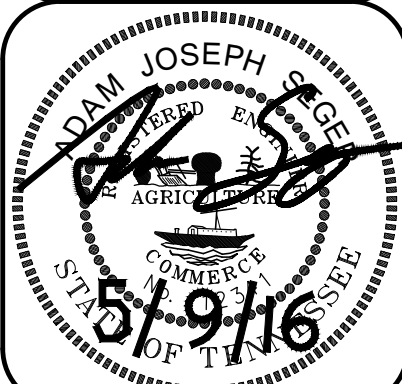
Revisions:
5/24/2016
DRT comments

The Arlington at West Main

A PUD Subdivision

725 West Main St.

Franklin, Williamson County, Tennessee



PERMITS:

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.

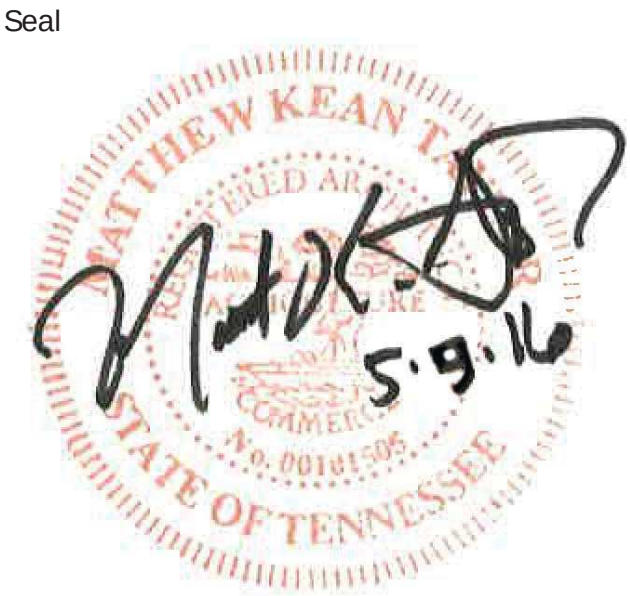
Overall Utility/ROW & Access Plan

D&A Project #15153
The Arlington at
West Main

C4.0

Sheet 5 of 5

Issues and Revisions	
PUD Initial Submittal	09 May 2016
PUD Resubmittal	02 June 2016



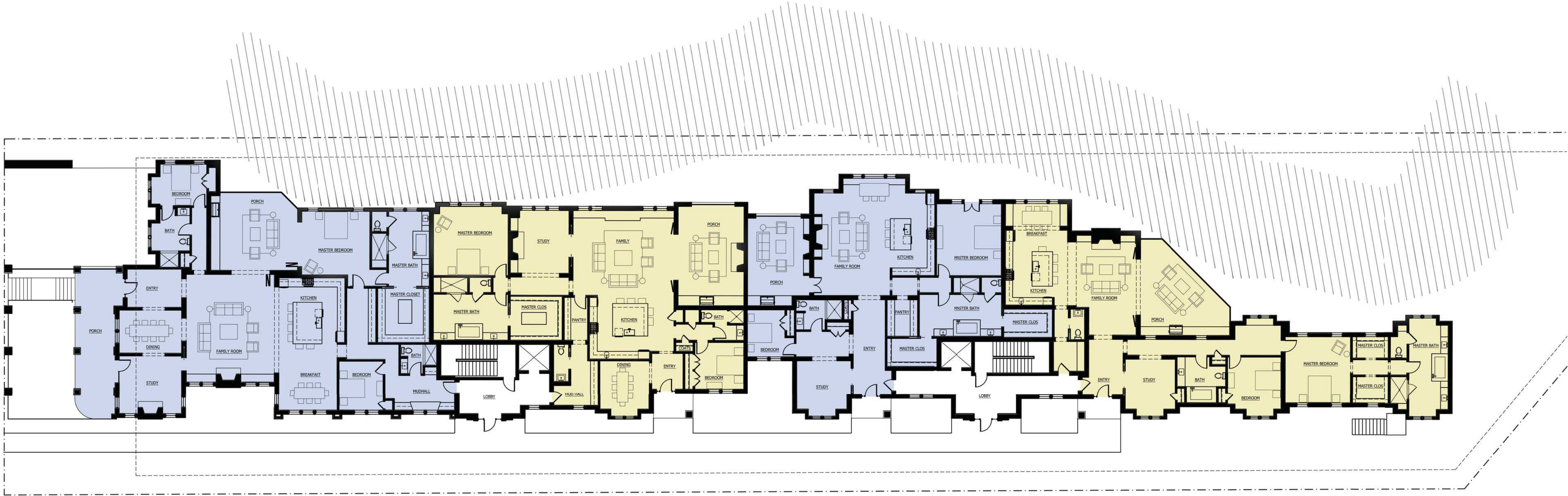
SECOND FLOOR
1/16" = 1' - 0"

HEATED AND COOLED 14058
OUTDOOR 1565
TOTAL 15623



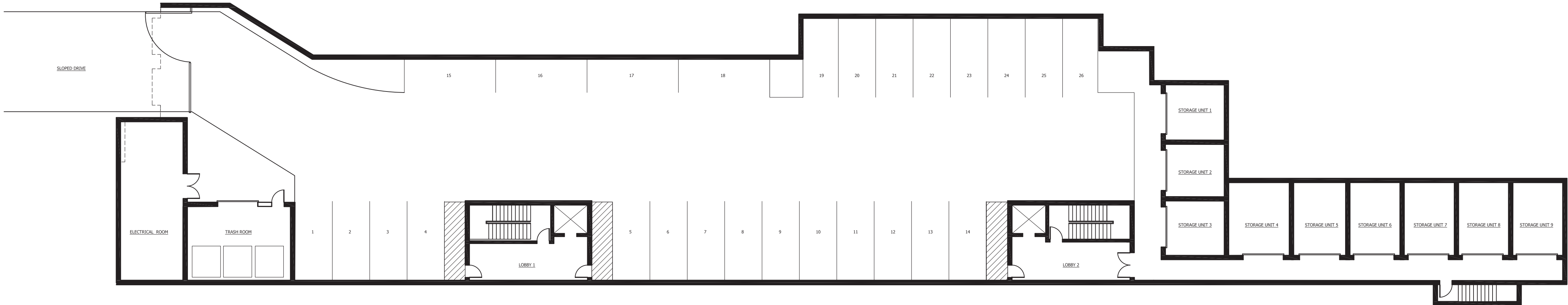
FIRST FLOOR
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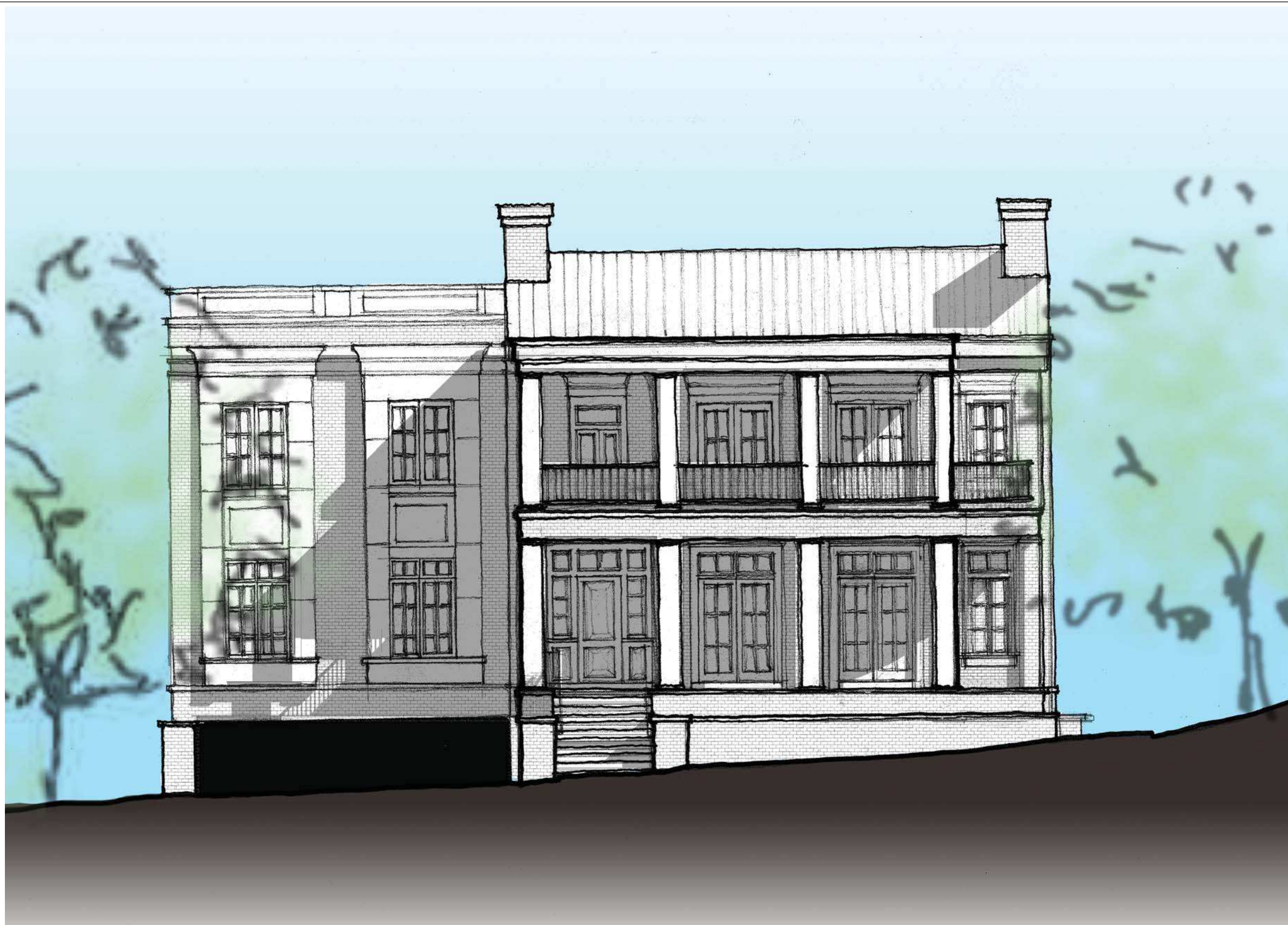
HEATED AND COOLED 13497
OUTDOOR 2126
TOTAL 15623



PARKING PLAN
1/16" = 1' - 0"

TOTAL 18234





Front Elevation



Perspective From Downtown



Street View Sketch of Proposed Design

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

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Seal



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

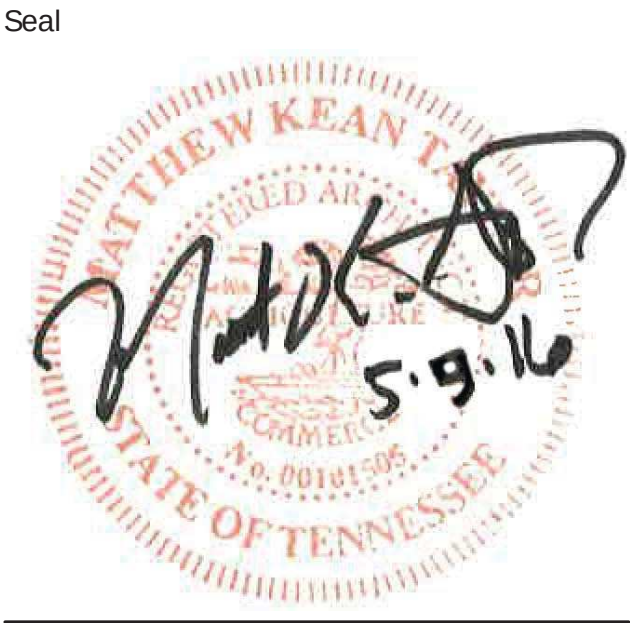
Manager:

D9HP VENTURES, LLC
131 THIRD AVENUE NORTH
FRANKLIN, TENNESSEE
37064

COF # 6148
JOB # 1512.00

Issues and Revisions	
PUD Initial Submittal	09 May 2016
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Conceptual Building
Elevations and Renderings

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.

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:

ALRINGTON AT WEST MAIN PUD SUBDIVISION, DEVELOPMENT PLAN
 RESOLUTION 2016-32
 FRANKLIN MUNICIPAL PLANNING COMMISSION
 6/23/2016

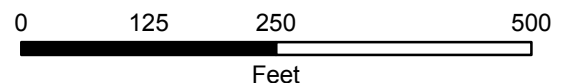
Project Information

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

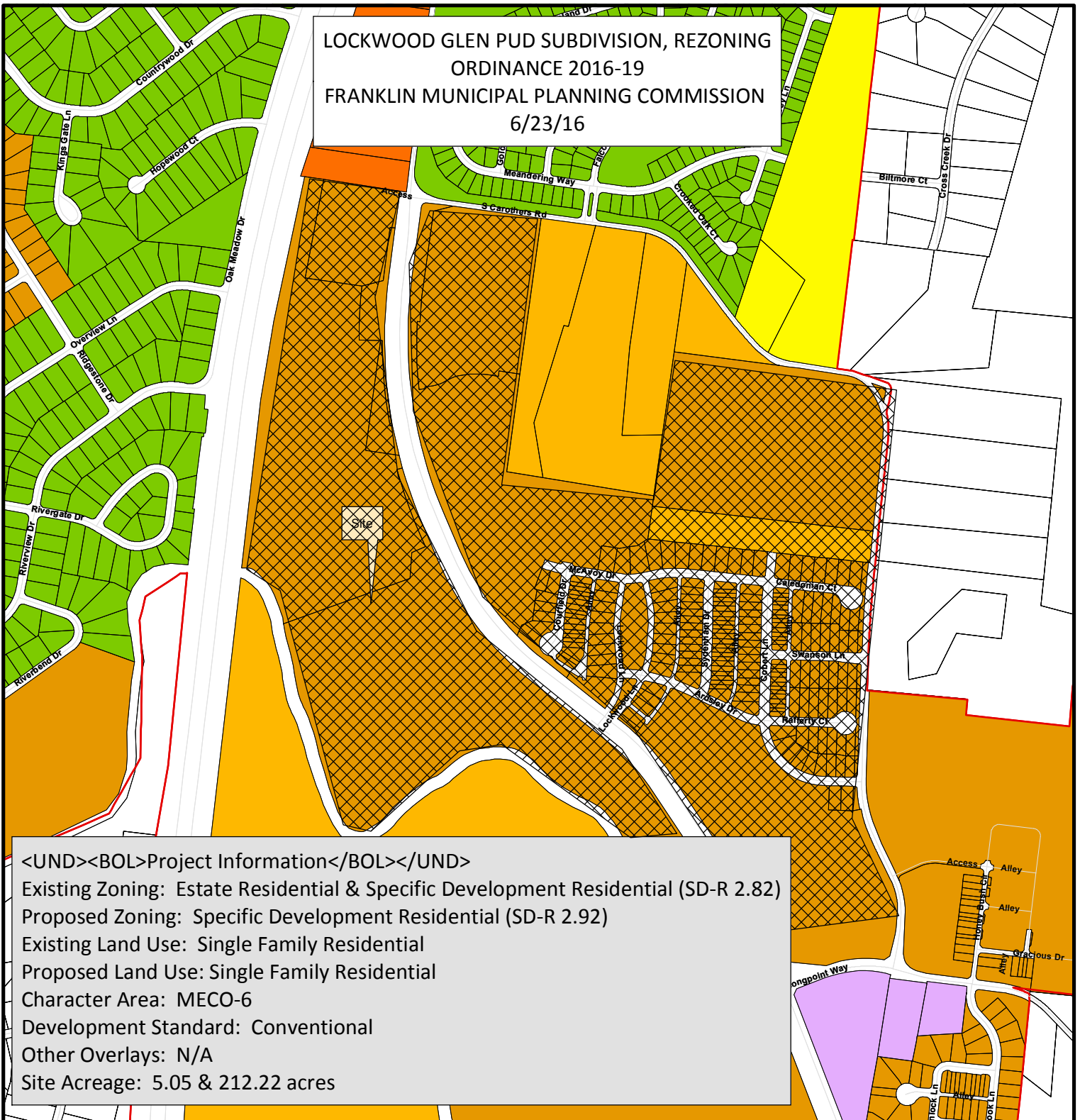
PARCEL_TYP

	Arlington at West Main		RM-10 Attached 10 Residential District		GC General Commercial District
	AG Agricultural District		RM-15 Attached 15 Residential District		LI Light Industrial District
	ER Estate Residential		RM-20 Attached 20 Residential District		HI Heavy Industrial District
	R-1 Residential District		SD-R Specific Development-Residential		CI Civic and Institutional District
	R-2 Residential District		SD-X Specific Development-Variety		
	R-3 Residential District		OR Office Residential District		
	R-6 Residential District		GO General Office District		
			CC Central Commercial District		
			NC Neighborhood Commercial District		



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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 | SD-X Specific Development-Variety |
| ER Estate Residential | OR Office Residential District |
| R-1 Residential District | GO General Office District |
| R-2 Residential District | CC Central Commercial District |
| R-3 Residential District | NC Neighborhood Commercial District |
| R-6 Residential District | GC General Commercial District |
| RM-10 Attached 10 Residential District | LI Light Industrial District |
| RM-15 Attached 15 Residential District | HI Heavy Industrial District |
| RM-20 Attached 20 Residential District | CI Civic and Institutional District |
| SD-R Specific Development-Residential | |



0 250 500 1,000
Feet

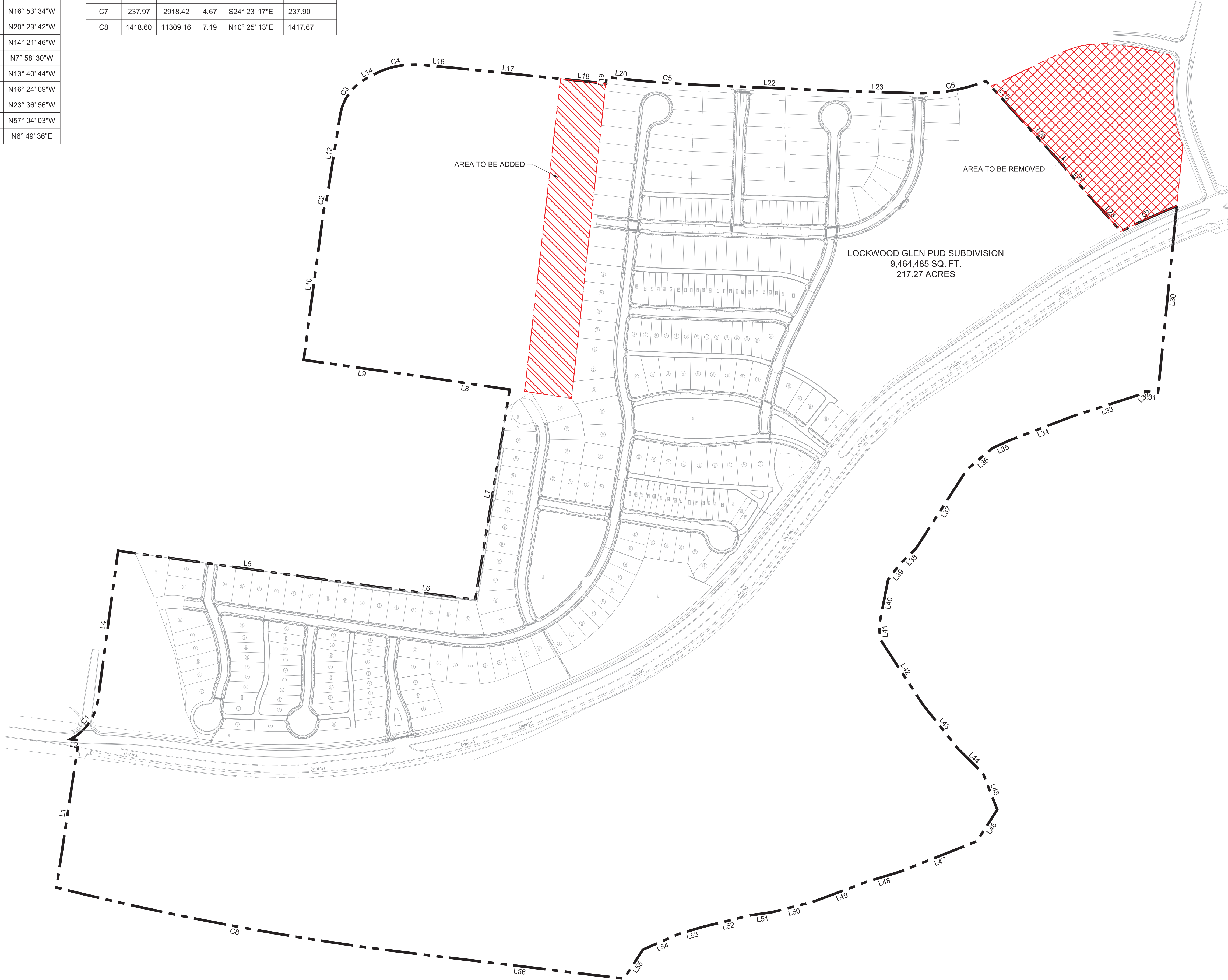
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Parcel Line Table		
Line #	Length	Direction
L1	577.00	S81° 25' 13"E
L2	31.70	N7° 13' 56"E
L4	582.26	S82° 20' 54"E
L5	1007.65	S7° 57' 01"W
L6	387.69	S7° 26' 55"W
L7	824.24	S80° 41' 16"E
L8	343.04	N8° 26' 26"E
L9	462.57	N8° 01' 21"E
L10	586.85	S82° 24' 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

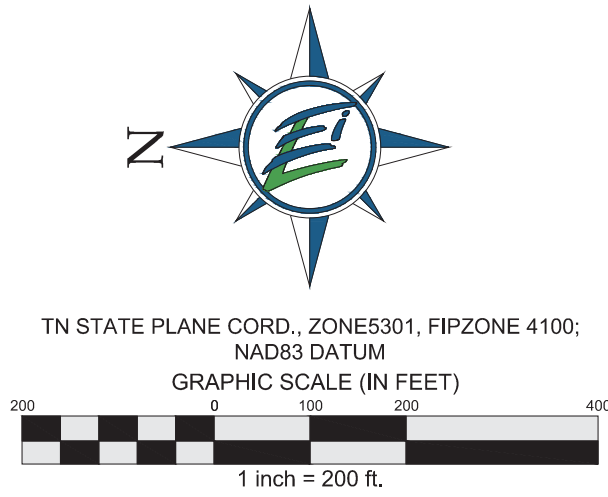
Curve Table					
Curve #	Length	Radius	Delta	Chord Direction	Chord Length
C1	192.68	202.54	54.51	S55° 05' 41"E	185.50
C2	66.85	432.00	8.87	S76° 30' 31"E	66.78
C3	178.08	195.00	52.32	S54° 46' 48"E	171.95
C4	191.97	325.00	33.84	S11° 41' 48"E	189.19
C5	249.92	3953.11	3.62	S4° 15' 48"W	249.88
C6	278.91	700.00	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, L.L.C. property of record in Book 6302, 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 277.06' 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° 05' 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' 17" 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 08° 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.



EDGE

PLANNING LANDSCAPE ARCHITECTURE URBAN DESIGN
210 Twelfth Avenue South
Suite 202
Nashville, Tennessee 37203
P 615-250-8154
F 615-250-8155

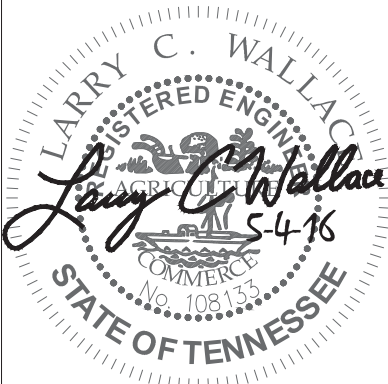
ENERGY LAND & INFRASTRUCTURE
1420 DONELSON PIKE, SUITE A12 • NASHVILLE, TN 37217
OFFICE 615-383-6300 • WWW.ELI-LLC.COM
ENGINEERS • SURVEYORS • INFRASTRUCTURE • ENVIRONMENTAL

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KING PARCEL REZONING

CITY OF FRANKLIN PROJECT NO. 6121
FRANKLIN, TENNESSEE

Rev.	Date	Per City of Franklin Comments	Revision Description
1	5/4/16		



Issue Date:	11 April 2016
ELI Project No:	14-11-1102.4
Drafted By:	BDP
Checked By:	LCW

Sheet Title:

REVISED
BOUNDARY
DESCRIPTION

Sheet No.

C 0.4



CONSULTANTS



SEAL

PROJECT TITLE

**ADJUDICATING PARCEL
REZONING
C.O.F. #6121
FRANKLIN, TN**

CLIENT

**CRESCENT
LOCKWOOD LLC.
FRANKLIN, TN.**

PROJECT NO.	6121
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Date 04/11/16

Revisions

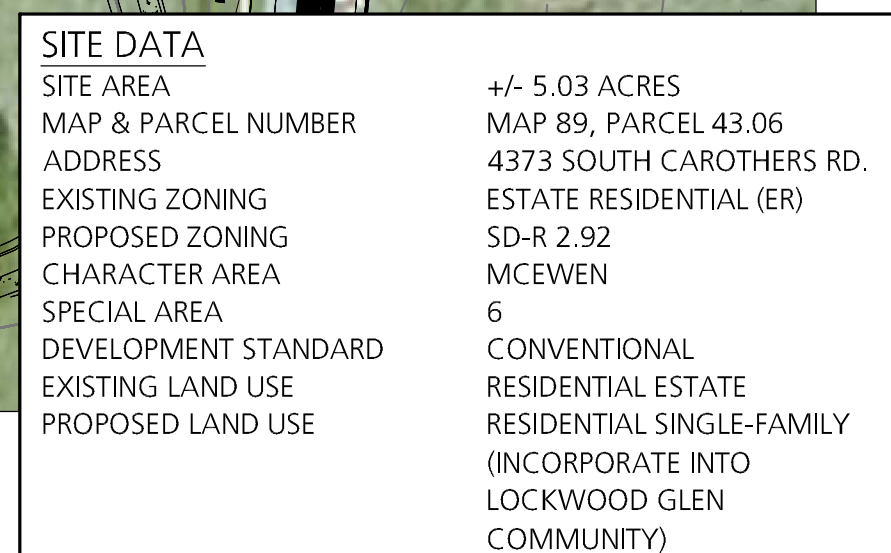
05.05.16 PER C.O.F. COMMENTS

Sheet Title

REZONING SHEET

Sheet Number

R-1.0



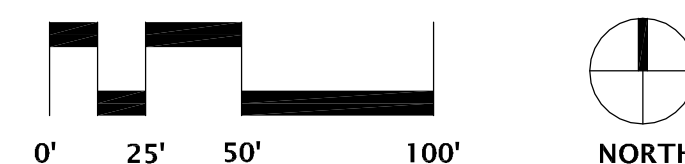
PROPERTY DESCRIPTION

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' 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 PRESENT 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 NORTHEAST 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



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

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: _____
Eric Stuckey
City Administrator/Recorder

By: _____
Dr. Ken Moore
Mayor

Approved as to form by:

Shauna R. Billingsley
City Attorney

PLANNING COMMISSION RECOMMENDED:

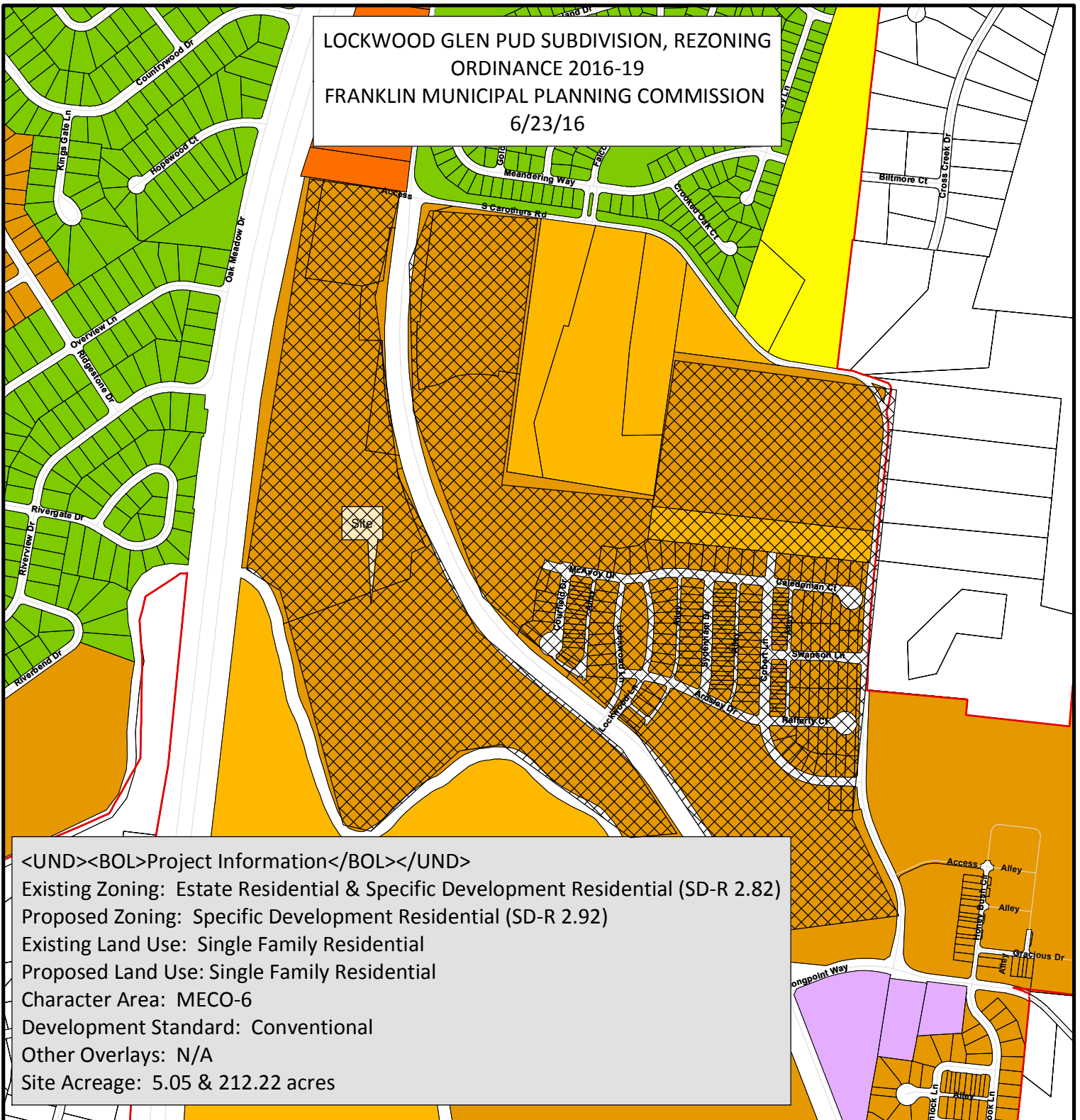
PASSED FIRST READING:

PUBLIC HEARING HELD:

PASSED SECOND READING:

PASSED THIRD READING:

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 | SD-X Specific Development-Variety |
| ER Estate Residential | OR Office Residential District |
| R-1 Residential District | GO General Office District |
| R-2 Residential District | CC Central Commercial District |
| R-3 Residential District | NC Neighborhood Commercial District |
| R-6 Residential District | GC General Commercial District |
| RM-10 Attached 10 Residential District | LI Light Industrial District |
| RM-15 Attached 15 Residential District | HI Heavy Industrial District |
| RM-20 Attached 20 Residential District | CI Civic and Institutional District |
| SD-R Specific Development-Residential | |



0 250 500 1,000
Feet

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It was compiled from the most authentic information available.
The City is not responsible for any errors or omissions contained hereon.
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LOCKWOOD GLEN PUDSUBDIVISION, REZONING,
KING PARCEL
(ORDINANCE 2016-19)
FRANKLIN MUNICIPAL PLANNING COMMISSION
5/26/2016

Site

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



0 250 500 1,000
Feet

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It was compiled from the most authentic information available.
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CONDITIONS OF APPROVAL:

Engineering - Final Plat Checklist

General Comments

1. C. Final Plat

- Per Sec. 23-106.(2)(f)(iii) of the Stormwater Ordinance, all new development and redevelopment shall be designed to provide a minimum twenty (20) foot drainage easement on all Stormwater infrastructure serving more than two (2) properties. This includes storm lines:
 - between lots 1118 and 1119
 - between lot 1190 and lots 1175 and 1176
 - along the rear of lots 1189 and 1190
 - between lots 1187 and 1188
 - between lots 1142 and 1143
 - along the rear of lots 1139 through 1142
- as per previous sections, Ladd Park was designed and approved allowing for 10' easements for up to 18" pipes. We cannot redesign the rest of the subdivision per the revised rule. In the past we were not made to comply. thank you
- The previous comment, "*Per Sec. 23-106.(2)(f)(iii) of the Stormwater Ordinance, all new development and redevelopment shall be designed to provide a minimum twenty (20) foot drainage easement on all Stormwater infrastructure serving more than two (2) properties. This includes storm lines:*
 - *between lots 1118 and 1119*
 - *between lot 1190 and lots 1175 and 1176*
 - *along the rear of lots 1189 and 1190*
 - *between lots 1187 and 1188*
 - *between lots 1142 and 1143*
 - *along the rear of lots 1139 through 1142"* remains.

Applicant's response that Ladd Park was only required to provide 10' easements on drainage infrastructure with previous sections is insufficient.

Whereas previous versions of Ladd Park were submitted under previous versions of the Stormwater Ordinance which did not include the 20' easement requirement for drainage infrastructure, the current Stormwater Ordinance, which was in effect when Ladd Park Section 33 Site Plan was submitted and approved, does require this easement width.

Performance Agreement and Surety

General Comments

2. Engineering Sureties

- Any unposted sureties associated with this development from site plan 6028 shall be transferred to this final plat as a condition of approval. No action is necessary from applicant.
- Noted
-

Any unposted sureties associated with this development from site plan 6028 shall be transferred to this final plat as a condition of approval. No action is necessary from applicant.

(Previous comment restated for informational purposes only, no response necessary.)

Planning (Landscape)

General Comments

3. Fencing

- No opaque fences are allowed to abut the open space lot. Provide a note on the plat.

Stormwater

General Comments

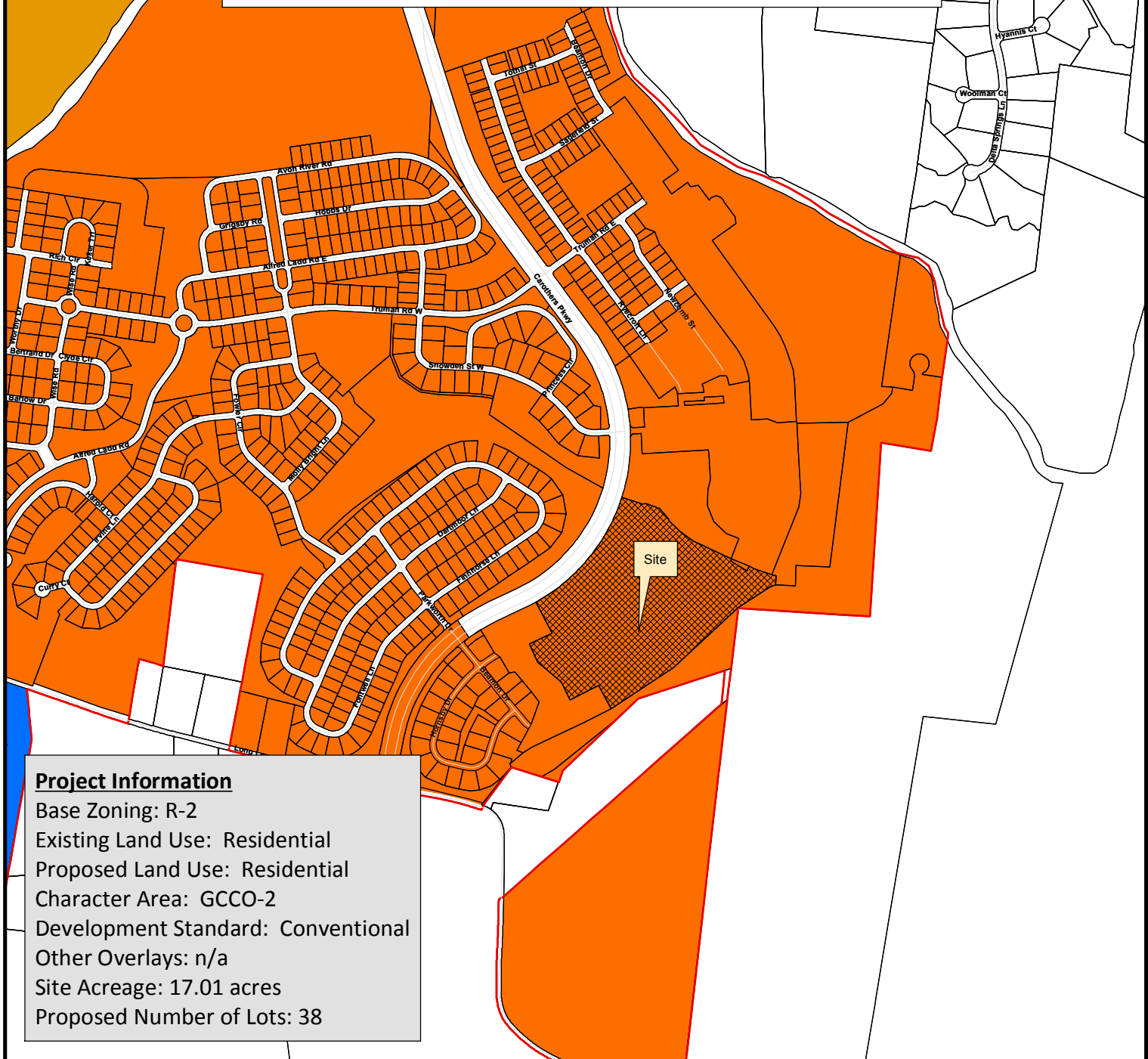
4. Water Quality

- Provide a green infrastructure easement for the reforestation area since this is being used to meet site Rv values
- Green Infrastructure Easement added
- Please label easements as Green Infrastructure Easement or GIE

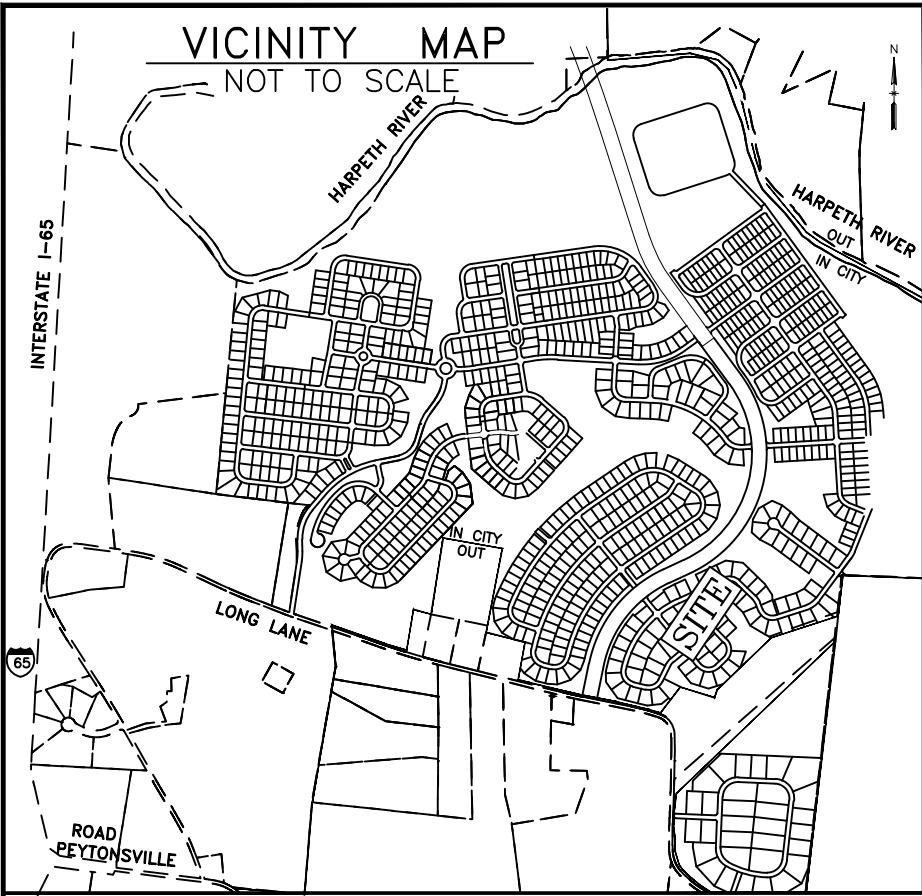
HIGHLANDS AT LADD PARK PUD SUBDIVISION, FINAL PLAT, SECTION 33

FRANKLIN MUNICIPAL PLANNING COMMISSION

6/23/16



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.



LEGEND

PROPOSED FIRE HYDRANT	MANHOLE DEPTH TAKEN FROM PLANS D=11.2'
LIGHT POLE	
CURB INLET	
MANHOLE	
5/8" IRON PIN SET THIS PLAT	
UTILITY STUB OUT	
STREET ADDRESS	
PROPERTY/R.O.W. LINE	
PUBLIC UTILITY & DRAINAGE EASEMENT	
PROPOSED WATER LINE	10" W
PROPOSED SEWER LINE	8" S
SANITARY SEWER EASEMENT	20' SSE
MILCROFTON EASEMENT	15' MUDEE
SEE NOTE 17	
ACCESS & PUBLIC UTILITY & DRAINAGE EASEMENT	5' AE & PUDE
MIDDLE TENNESSEE ELECTRIC MEMBERSHIP CORPORATION EASEMENT	15' MTE
SEE NOTE 17	

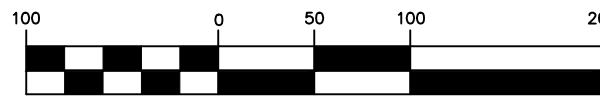
- NOTES:
- THE PURPOSE OF THIS PLAT IS TO CREATE 38 NEW RESIDENTIAL LOTS, 4 OPEN SPACE LOTS AND DEDICATE ROW AND EASEMENTS FOR HIGHLANDS AT LADD PARK SECTION 33 AND TO REVISE LOT 1180 FROM SECTION 32 RECORDED IN PLAT BOOK P63, PG. 93.
 - ALL DISTANCES WERE MEASURED WITH E.D.M. EQUIPMENT AND HAVE BEEN ADJUSTED FOR TEMPERATURE.
 - UTILITIES HAVE BEEN PLOTTED FROM SURFACE FEATURES FOUND AT THE TIME OF SURVEY AND AVAILABLE MAPS AND RECORDS. THERE MAY BE OTHER UTILITIES, THE EXISTENCE OF WHICH ARE NOT KNOWN TO THE UNDERSIGNED. SIZE AND LOCATION OF ALL UNDERGROUND UTILITIES MUST BE VERIFIED BY THE APPROPRIATE UTILITY COMPANY PRIOR TO ANY CONSTRUCTION.
 - BY SCALING, GRAPHIC INTERPOLATION AND PLOTTING PORTIONS OF THE SUBJECT PROPERTY IS LOCATED IN ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE SPECIAL FLOOD HAZARD AREA AS SHOWN ON F.E.M.A. "FLOOD RATE INSURANCE MAP", MAP NOS. 47187C0355F & 47187C0360F, BOTH DATED: 9-29-06.
 - 5' DRAINAGE AND UTILITY EASEMENT ALONG ALL EXTERIOR BOUNDARY LINES AND ALONG ROAD RIGHT-OF-WAYS, AND 5' ALONG EACH SIDE OF INTERIOR LOT LINES. SEE TYPICAL LOT DETAIL.
 - 5/8" IRON RODS WITH CAPS (●) SET AT ALL CORNERS UNLESS OTHERWISE SHOWN.
 - WITHIN NEW DEVELOPMENTS AND FOR OFF-SITE LINES CONSTRUCTED AS A RESULT OF, OR TO PROVIDE SERVICE TO, THE NEW DEVELOPMENT, ALL UTILITIES (INCLUDING CABLE TELEVISION, ELECTRICAL, NATURAL GAS SEWER, TELEPHONE AND WATER LINES) SHALL BE PLACED UNDERGROUND.
 - THERE SHALL BE NO CLEARING, GRADING, CONSTRUCTION, STORAGE OR DISTURBANCE OF VEGETATION ALLOWED IN THE STREAM BUFFER EXCEPT AS PERMITTED BY THE CITY ENGINEER.
 - STREET LIGHTS LOCATIONS AND QUANTITIES ARE APPROXIMATE. FINAL POSITIONING AND QUANTITY SHALL BE AT DIRECTION OF MTEMC.
 - THIS PROPERTY IS FOUND ON WILLIAMSON COUNTY TAX MAP 106.
 - THIS PROPERTY IS ZONED R2 AND GC00-6/CONVENTIONAL; MINIMUM DEPTH=100', WIDTH AT SETBACK=63'. SEE TYPICAL LOT DETAIL ON FOR SPECIFIC SETBACK INFORMATION.
 - ALL MILCROFTON UTILITY DISTRICT EASEMENTS SHOWN ARE EXCLUSIVE EASEMENTS. NO EXCAVATION, BUILDING, STRUCTURE OR OBSTRUCTION OF ANY KIND WILL BE CONSTRUCTED OR PERMITTED WITHIN THE EASEMENTS EXCEPT FOR THE INSTALLATION OF PAVEMENT FOR PRIVATE OR PUBLIC DRIVEWAYS WHICH CROSS AN EASEMENT. NO TREES OR SHRUBBERY PLANTED WITHIN THE EASEMENTS WILL BE THE RESPONSIBILITY OF MILCROFTON UTILITY DISTRICT. TREES OR SHRUBBERY PLANTED WITHIN THE MILCROFTON UTILITY DISTRICT EASEMENT ARE THE HOMEOWNER'S RESPONSIBILITY.
 - THE 5' ACCESS EASEMENTS (AE) AS SHOWN HEREON SHALL CONTAIN CONCRETE SIDEWALK AND AND BE MAINTAINED BY THE HOA OR PROPERTY OWNERS.
 - ALL OPEN SPACE IS PUBLIC UTILITY AND DRAINAGE EASEMENT (PUDE) AND SHALL BE MAINTAINED BY THE HOA OR PROPERTY OWNERS. ALL DRAINAGE EASEMENTS AND STORMWATER MANAGEMENT FEATURES SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER(S) OR THE HOA. ALL SIDEWALKS AND TRAILS OUTSIDE OF PUBLIC RIGHT-OF-WAY SHALL BE WITHIN PUBLIC ACCESS EASEMENTS AND SHALL BE MAINTAINED BY THE HOA. ALL PUBLIC FEATURES AND STRUCTURES PLACED WITHIN ANY OPEN SPACE SHALL HAVE PUBLIC ACCESS EASEMENT.
 - THERE IS A 3' MINIMUM GARAGE SETBACK FOR ALL STREET LOADED GARAGES MEASURED FROM THE FRONT FACADE OF THE HOUSE.
 - CURRENT OWNER HAS NO KNOWLEDGE OF ANY ENTITY HAVING MINERAL RIGHTS TO THE SUBJECT PROPERTY.
 - THERE SHALL BE A 15' MIDDLE TENNESSEE ELECTRIC MEMBERSHIP CORPORATION EASEMENT ALONG ALL ROW CREATED HEREON, ACCEPTED WHERE THERE IS A PROPOSED MILCROFTON UTILITY DISTRICT WATERLINE (SEE NOTE 12).
 - ALL FRONT PROPERTY CORNERS THAT FALL WITHIN THE CONCRETE SIDEWALKS WILL NOT BE SET IN THE CONCRETE SIDEWALK, BUT SHALL HAVE AN OFFSET INSIDE THE LOT FOR A WITNESS PIN APPROXIMATELY 1' FROM BACK OF WALK.
 - THE RECORDING OF THIS PLAT VOIDS, VACATES, AND SUPERCEDES THE RECORDING OF LOT 1180 ON THE FINAL PLAT FOR HIGHLANDS AT LADD PARK PUD SUBDIVISION, SECTION 32 AS RECORDED IN PLAT BOOK P63, PAGE 93.
 - NO OBSTRUCTIONS OR ENCROACHMENTS WHICH IMPEDE THE FLOW OF STORMWATER SHALL BE PERMITTED WITHIN PUBLIC DRAINAGE EASEMENTS BETWEEN LOTS. THE CITY OF FRANKLIN IS NOT RESPONSIBLE FOR REPAIR OR REPLACEMENT OF ANY ENCROACHMENTS THAT ARE DAMAGED OR REMOVED IN THE COURSE OF MAINTENANCE ACTIVITY WITHIN EASEMENTS.
 - THE CITY OF FRANKLIN WATER MANAGEMENT DEPARTMENT HAS UNRESTRICTED ACCESS TO ITS DOMESTIC WATER, SANITARY SEWER, RECLAIM WATER LINES OR SYSTEM IMPROVEMENTS LOCATED WITHIN ITS EXCLUSIVE EASEMENTS WITHIN THE DEVELOPMENT. IN THE EVENT LANDSCAPING, FENCING, CONCRETE OR OTHER STRUCTURES ARE INSTALLED OR PLACED WITHIN A CITY OF FRANKLIN EASEMENT, THE CITY OF FRANKLIN SHALL HAVE THE RIGHT TO REMOVE SUCH ENCROACHMENTS WITHIN THE EASEMENT AS MAY BE NECESSARY FOR THE CITY OF FRANKLIN TO REPAIR, MAINTAIN OR REPLACE ITS INFRASTRUCTURE WHICH IS NOW OR IN THE FUTURE MAY BE LOCATED WITHIN THE EASEMENT WITHOUT OBTAINING ANY FURTHER PERMISSION FROM THE PROPERTY OWNER OR HOA. THE PROPERTY OWNER OR HOA SHALL BE RESPONSIBLE FOR REPAIRING AND/OR REPLACING ANY SUCH LANDSCAPING, FENCING, CONCRETE OR OTHER STRUCTURES REMOVED OR DISTURBED BY THE CITY OF FRANKLIN IN COMMON OPEN SPACE LOTS AND IN AREAS OWNED THE PROPERTY OWNER OR HOA AT NO EXPENSE TO THE CITY OF FRANKLIN. INDIVIDUAL HOMEOWNERS SHALL BE RESPONSIBLE FOR STRUCTURES REMOVED OR DISTURBED BY THE CITY OF FRANKLIN WITHIN AN EASEMENT ON THE HOMEOWNERS' LOT AT THE HOMEOWNERS' EXPENSE.

LOT AREA TABLE				LOT AREA TABLE				LOT AREA TABLE				LOT AREA TABLE				LOT AREA TABLE				LOT AREA TABLE			
LOT NO.	SQ. FT.	ACRES	REQUIRED 3" CALIPER TREES PER LOT	LOT NO.	SQ. FT.	ACRES	REQUIRED 3" CALIPER TREES PER LOT	LOT NO.	SQ. FT.	ACRES	REQUIRED 3" CALIPER TREES PER LOT	LOT NO.	SQ. FT.	ACRES	REQUIRED 3" CALIPER TREES PER LOT	LOT NO.	SQ. FT.	ACRES	REQUIRED 3" CALIPER TREES PER LOT	LOT NO.	SQ. FT.	ACRES	REQUIRED 3" CALIPER TREES PER LOT
1111	11,116.06	0.255	3	1121	13,163.72	0.302	4	1170	12,241.48	0.281	3	1179	17,876.31	0.410	4	TOTAL LOTS	457,690.06						10.507
1112	11,205.90	0.257	3	1122	13,165.19	0.302	4	1171	12,331.61	0.283	3	1180	11,582.08	0.266	3	OPEN SPACE 2040	22,106.50						0.507
1113	11,205.90	0.257	3	1138	11,705.29	0.269	3	1172	11,143.69	0.256	3	1184	11,451.18	0.263	3	OPEN SPACE 2041	28,481.88						0.654
1114	11,205.90	0.257	3	1139	11,250.00	0.258	3	1173	11,225.43	0.258	3	1185	11,527.89	0.265	3	OPEN SPACE 2043	66,020.16						1.516
1115	12,144.26	0.279	3	1140	11,250.00	0.258	3	1174	11,227.66	0.258	3	1186	11,388.59	0.261	3	OPEN SPACE 2042	77,442.62						1.778
1116	13,069.48	0.300	4	1141	11,505.77	0.264	3	1175	11,756.10	0.270	3	1187	12,111.56	0.278	3	TOTAL O.S. LOTS	194,051.14						4.455
1117	11,583.61	0.266	3	1142	11,646.22	0.267	3	1176	12,134.55	0.279	3	1188	13,729.95	0.315	4	ROW	89,419.80						2.053
1118	11,795.95	0.271	3	1143	11,646.22	0.267	3	1177	11,679.64	0.268	3	1189	11,730.41	0.269	3	TOTAL	741,161.00						17.015
1119	11,725.20	0.269	3	1168	14,018.92	0.322	4	1178	11,700.00	0.269	3	1190	11,983.88	0.275	3								
1120	11,994.74	0.275	3	1169	12,469.67	0.286	3																

Owner/Subdivider:
PROPST NASHVILLE, LLC
ATT. JOHN N. HUGHEY MANAGER
305 CHURCH STREET, SUITE 715
HUNTSVILLE, AL 35801
PH. 256-319-7818
TAX MAP 106, PARCEL 181.34
PROPST REALTY NASHVILLE, LLC
BOOK 6337, PAGE 703 &
BOOK 6634, PG. 957

ADSZONE 5501, FIPSONE 4100
S.P.C.S. NAD 83

GRAPHIC SCALE



(IN FEET)
1 inch = 100 ft.

CERTIFICATE OF APPROVAL OF SUBDIVISION NAME, STREET NAMES AND ADDRESSING	
Subdivision name and street names approved by the Williamson County Emergency Management Agency.	
Williamson County Emergency Management Agency	Date
City of Franklin, Tennessee	Date

CERTIFICATE OF OWNERSHIP

I (We) hereby certify that I am (we are) the owner(s) of the property shown hereon of record in Book 6634, pg. 957 and that the plan of subdivision of the property shown hereon is dedicated and all public ways and easements as noted. No lot(s) as shown hereon shall again be subdivided, resubdivided, altered, or changed so as to produce less area than is hereby established until otherwise approved by the Franklin Municipal Planning Commission, and under no condition shall such lot(s) be made to produce less area than is prescribed by the restitutive covenants as of record in Book _____, Page _____, R.O.W.C., Tennessee, running with the title to the property I (We) further certify that there are no liens on this property, except as follows: Book _____, Page _____, R.O.W.C., Tennessee.

By: _____ Date: _____
JOHN N. HUGHEY (PROPST NASHVILLE, LLC) MANAGER PARCELS 181.41 & 180.03
BOOK 6634, PG. 957 & 6337, PG. 703

CERTIFICATE OF APPROVAL OF WATER AND SEWER SYSTEMS

I hereby certify that:
(1) the sewer systems designated in HIGHLANDS AT LADD PARK PUD SUBDIVISION, SECTION 33, Subdivision have been installed in accordance with City specifications, or
(2) a performance agreement and surety in the amount of \$_____ for the sewer system has been posted with the City of Franklin, Tennessee, to assure completion of such systems.

Director Sewer Management _____ Date _____
Department City of Franklin, TN
(Where applicable)

(3) a performance bond in the amount of \$_____ for the on site water system and/or \$_____ for off-site water system has been posted with the Milcrofton Utility District to assure completion of such systems.

General Manager Milcrofton _____ Date _____
Utility District

CERTIFICATE OF APPROVAL OF STREETS, DRAINAGE AND SIDEWALKS

I hereby certify that:
(1) the streets, drainage and sidewalks designated in THE HIGHLANDS AT LADD PARK PUD SUBDIVISION, SECTION 33, have been installed in accordance with City specifications, or

amount of \$_____ for drainage and \$_____ for streets, \$_____ for sidewalks has been posted with the City of Franklin, Tennessee to assure completion of such improvements.

Director Streets Department _____ Date _____
City of Franklin, Tennessee

CERTIFICATE OF APPROVAL FOR RECORDING

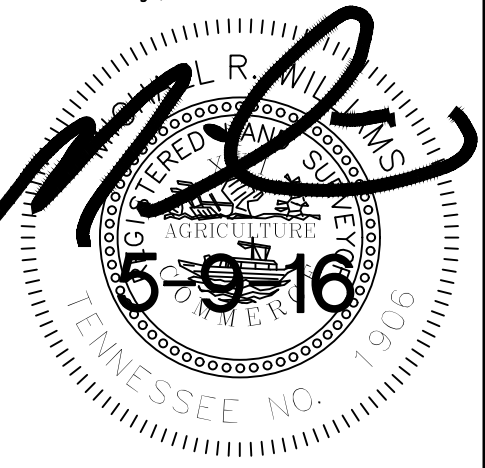
Approved by the Franklin Municipal Planning Commission, Franklin, Williamson County, Tennessee, with the exception of such conditions, if any, as are noted in the Planning Commission minutes for the _____ day of _____, 20____, and this plan has been approved for recording in the Register's Office of Williamson County.

Sectary: Franklin Municipal Planning Commission _____ Date _____

CERTIFICATE OF SURVEY

I (We) hereby certify that the subdivision plat as shown hereon is correct and that all of the monuments shown hereon have been placed as indicated. This subdivision plat correctly represents a survey made under my supervision on the _____ day of _____, 20____.

Michael R. Williams TN RLS # 1906
HFR Design, Inc.



CURVE DATA

NO.	DELTA	RADIUS	TANGENT	LENGTH	CHORD	BEARING
C1	11-59-01	1150.00'	120.70'	240.53'	240.09'	N59-09-07E
C2	05-47-27	1020.00'	51.59'	103.09'	103.05'	N62-14-54E
C3	05-47-27	855.00'	43.24'	86.41'	86.38'	S62-14-54W
C4	05-35-33	815.00'	32.88'	65.33'	65.31'	N62-50-51E
C5	11-08-15	1320.00'	128.70'	256.59'	256.18'	S59-34-30W
C6	07-40-53	1360.00'	91.30'	182.33'	182.19'	N61-18-11E
C7	87-30-29	20.00'	19.15'	30.55'	27.66'	S78-47-01E
C8	89-10-11	20.00'	19.71'	31.13'	28.08'	N09-33-19E
C9	03-47-51	560.00'	37.12'	37.11'	37.11'	S33-07-51E
C10	03-47-51	600.00'	39.77'	39.76'	39.76'	N33-07-51W
C11	91-09-07	20.00'	20.41'	31.82'	28.57'	S76-02-45E
C12	07-20-13	3000.00'	192.35'	384.16'	383.90'	N54-42-54E
C13	07-20-13	3040.00'	195.18'	389.82'	389.55'	N54-43-12E
C14	08-52-08	20.00'	19.61'	31.02'	28.00'	N13-57-52E
C15	12-21-50	300.00'	32.49'	64.74'	64.61'	N37-24-50W
C16	12-21-50	340.00'	36.83'	73.23'	73.23'	S37-24-50E
C17	91-09-49	20.00'	20.41'	31.82'	28.57'	S76-47-37E
C18	90-22-52	20.00'	20.13'	31.55'	28.38'	S13-57-51W
C19	08-28-04	280.00'	23.74'	41.42'	41.42'	N54-34-23E
C20	08-28-04	280.00'	23.74'	41.42'	41.42'	S54-54-25W
C21	67-01-54	130.00'	86.10'	152.09'	143.56'	N84-10-50E
C22	03-52-20	80.00'	90.27'	141.64'	127.47'	S84-14-57W
C23	03-52-20	1360.00'	45.97'	91.91'	91.90'	N52-12-14E

SINGLE FAMILY LOT PLANTING REQUIREMENTS:
The following canopy trees are required for each single-family lot:
There shall be a total of 48 trees required in Section 25.

Lot Size:	Canopy Trees Required (Min. 3" caliper)
Less than 10,000 square feet	2
10,001-12,500	3
12,501-20,000	4

MTEMC CERTIFICATE OF APPROVAL FOR RECORDING

Middle Tennessee Electric Membership Corporation (MTEMC) will provide electric service to the subject property according to the normal operating practices of MTEMC as defined in the rules and regulations, bylaws, policy bulletins and operational bulletins of MTEMC, and in accordance with the plat approval checklist, tree planting guidelines and other regulations contained on the MTEMC website at www.mtemc.com (collectively the "Requirements"). No electric service will be provided until MTEMC's Requirements have been met and approved in writing by an authorized representative of MTEMC. Any approval is, at all times, contingent upon continuing compliance with MTEMC's Requirements.

Middle Tennessee Electric Membership Corporation _____ Date _____

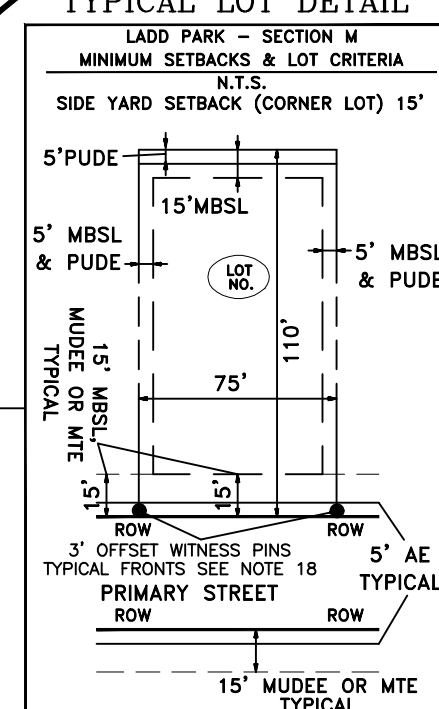
PREPARED BY:

HFR DESIGN

214 Centerview Drive Suite 300
Brentwood, TN 37027
615.370.8530
hfrdesign.com

SURVEY DIVISION mwilliams@hfrdesign.com

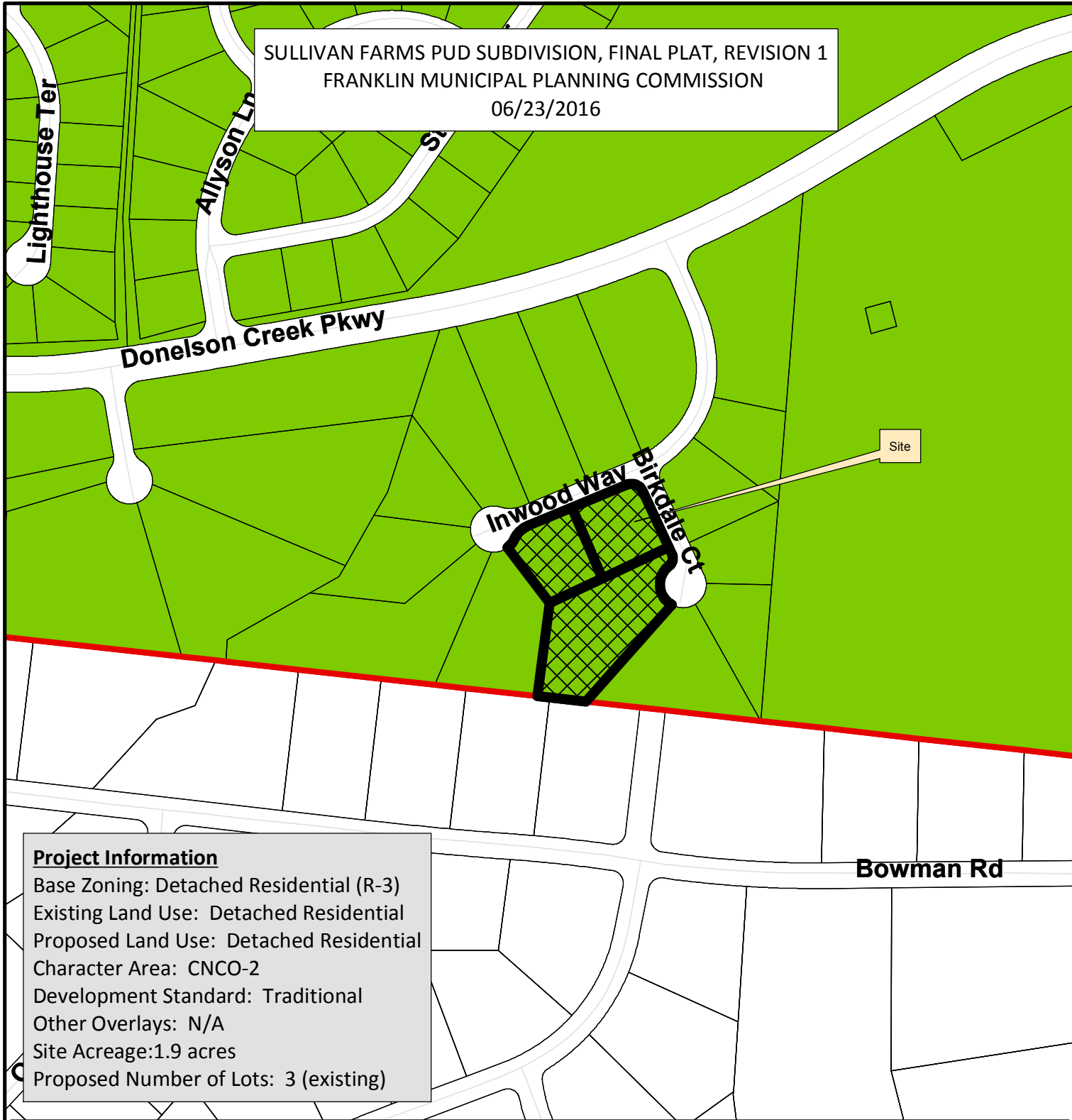
TYPICAL LOT DETAIL



COF PROJECT # (6149)
**THE HIGHLANDS AT LADD PARK PUD
SUBDIVISION, FINAL PLAT, SEC. 33
& RESUB. LOT 1080 SECTION 32**
FRANKLIN, WILLIAMSON COUNTY, TENNESSEE

TOTAL ACRES: 17.015 TOTAL LOTS: 42
ACRES NEW STREETS: 2.053 FEET NEW STREETS: 2,283±
CIVIL DISTRICT: 10TH CLOSURE ERROR: 1:10,000+
SCALE: 1"=100' DATE: 5-9-16

SULLIVAN FARMS PUD SUBDIVISION, FINAL PLAT, REVISION 1
FRANKLIN MUNICIPAL PLANNING COMMISSION
06/23/2016



Project Information

Base Zoning: Detached Residential (R-3)
Existing Land Use: Detached Residential
Proposed Land Use: Detached Residential
Character Area: CNCO-2
Development Standard: Traditional
Other Overlays: N/A
Site Acreage: 1.9 acres
Proposed Number of Lots: 3 (existing)

Parcels selection 2

Parcels selection 2

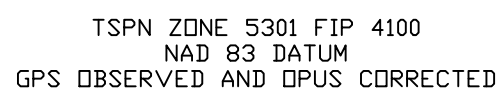
AG Agricultural District
 ER Estate Residential
 R-1 Residential District
 R-2 Residential District
 R-3 Residential District
 R-6 Residential District
 RM-10 Attached 10 Residential District
 RM-15 Attached 15 Residential District
 RM-20 Attached 20 Residential District

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



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.
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(State of Tennessee) Williamson County
Received for record the _____ day of _____
20__ at ____ o'clock ____ M. Noted in Note
Book _____ page _____ and recorded in
Book # _____ page _____ Fee \$ _____
Witness my Hand _____

Register

1. THERE SHALL BE NO CLEARING, GRADING, CONSTRUCTION, OR DISTURBANCE OF VEGETATION EXCEPT AS PERMITTED BY THE WILLIAMSON COUNTY ENGINEERING DEPARTMENT.
2. ANY WATERWAY NATURAL AREA SHOWN HEREON IS SUBJECT TO PROTECTIVE COVENANTS WHICH MAY BE FOUND IN THE LAND RECORDS AND WHICH RESTRICT DISTURBANCE AND USE OF THESE AREAS.

I hereby certify that the subdivision plat shown hereon has been found to comply with the Subdivision Regulations for Williamson County, Tennessee, with the exception of such variances, if any, as are noted in the minutes of the Planning Commission and that it has been approved for recording in the office of the County Register.

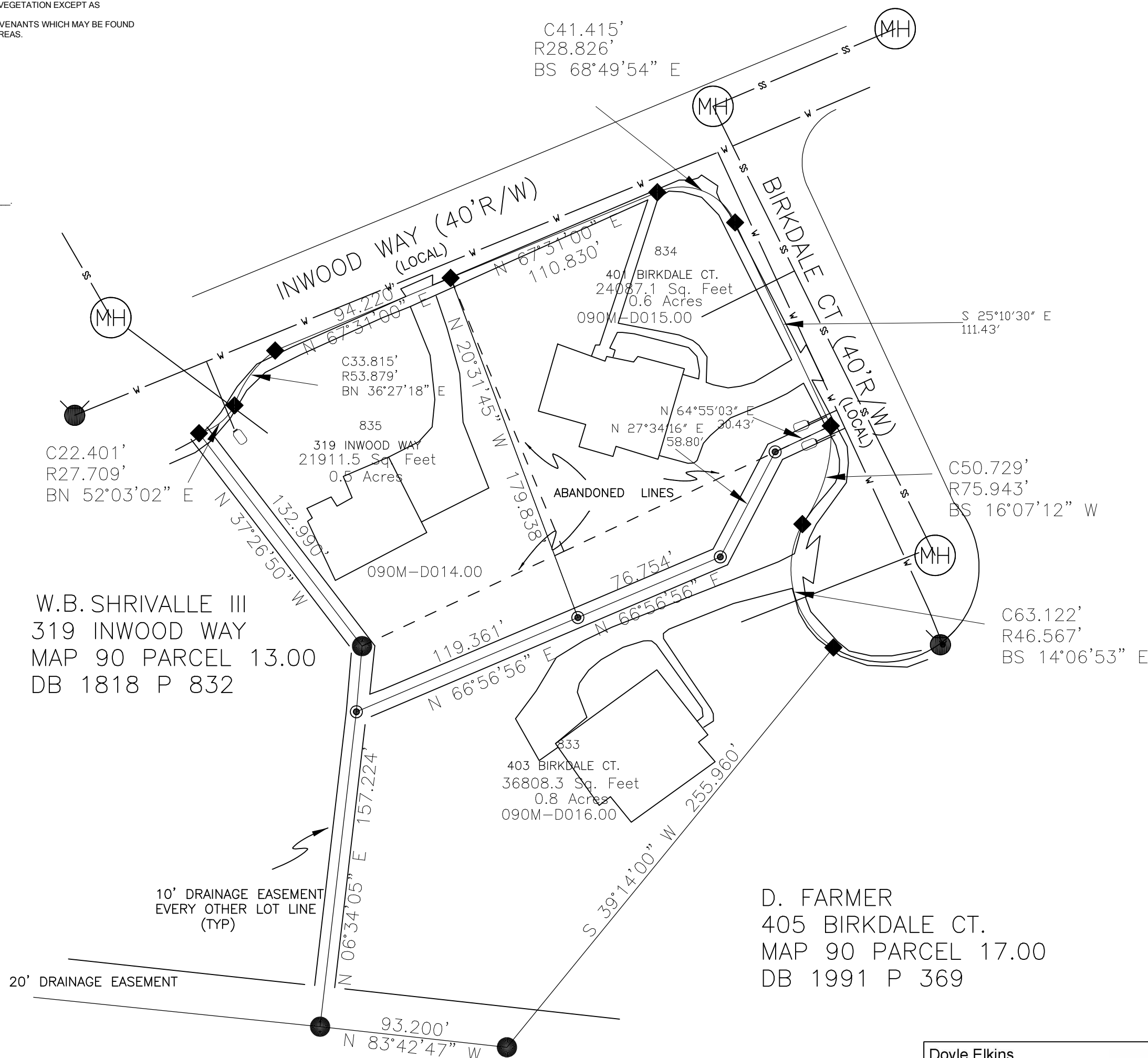
_____, 2016
Date Secretary, Planning Commission

THIS APPROVAL SHALL BE INVALID IF NOT RECORDED BY _____
Date _____

These standard symbols will be found in the drawing.

-  IRON PIN FOUND
 IRON PIN SET
 POINT IN CONC SW
 FIRE HYDRANT
 SANITARY SEWER MANHOLE
 8" WATER
 8" SANITARY SEWER
 WATER METER

1. THE PURPOSE OF THE PLAT IS TO ADJUST THE PROPERTY LINES ON LOTS 833-835 SULLIVAN FARMS SECTION G SUBDIVISION.
2. THIS PARCEL IS SUBJECT TO ANY AND ALL RIGHTS-OF-WAY AND EASEMENTS AS SHOWN OR ANY OTHER RIGHTS-OF-WAY AND EASEMENTS OR RESTRICTIONS EITHER RECORDED OR BY PRESCRIPTION THAT A TITLE SEARCH MAY REVEAL. THIS SURVEY HAS BEEN MADE USING THE LATEST RECORDED DEEDS AND THERE ARE NO ENCROACHMENTS OR PROJECTIONS OTHER THAN THOSE SHOWN HEREON. THIS SURVEY IS SUBJECT TO THE FINDINGS OF A TITLE REPORT. THIS PARCEL IS SUBJECT TO ALL RESTRICTIONS, COVENANTS, AND EASEMENTS APPLICABLE.
3. THE RECORDING OF THIS PLAT VOIDS, VACATES, AND SUPERCEDES THE PREVIOUS RECORDING OF LOTS 833-835 SULLIVAN FARMS SECTION G SUBDIVISION LOCATED IN BOOK 25 P 57 DATED 9/15/1997. THE TOTAL ACREAGE IS 2.0 ACRES.
4. THE CURRENT ZONING IS PLANNED RESIDENTIAL.
5. COUNTY MAP 90 PARCELS 14.00, 15.00, 16.00 ARE INVOLVED IN THIS MINOR REVISION.
6. THE TOTAL ACREAGE IS 1.93 ACRES IN THREE LOTS.
7. WITHIN NEW DEVELOPMENTS AND FOR OFFSITE LINES CONSTRUCTED AS A RESULT OF, OR TO PROVIDE SERVICE TO, THE NEW DEVELOPMENT ALL UTILITIES(INCLUDING CABLE, ELECTRICAL, NATURAL GAS, SEWER, TELEPHONE, AND WATER LINES) SHALL BE PLACED UNDERGROUND.
8. NO OBSTRUCTIONS OR ENCROACHMENTS WHICH IMPEDE THE FLOW OF STORMWATER SHALL BE PERMITTED WITHIN PUBLIC DRAINAGE EASEMENTS BETWEEN LOTS. THE CITY OF FRANKLIN IS NOT RESPONSIBLE FOR REPAIR OR REPLACEMENT OF ANY ENCROACHMENTS THAT ARE DAMAGED OR REMOVED IN THE COURSE OF MAINTENANCE ACTIVITY WITHIN EASEMENTS.
9. PROPERTY OWNERS OR HOA SHALL BE RESPONSIBLE FOR MAINTENANCE OF ALL STORMWATER MANAGEMENT FEATURES.
10. THE CITY OF FRANKLIN WATER MANAGEMENT DEPARTMENT HAS UNRESTRICTED ACCESS TO ITS DOMESTIC WATER, SANITARY SEWER, RECLAIM WATER LINES OR SYSTEM IMPROVEMENTS LOCATED WITHIN ITS EXCLUSIVE EASEMENTS WITHIN THE DEVELOPMENT. IN THE EVENT LANDSCAPING, FENCING, CONCRETE OR OTHER STRUCTURES ARE INSTALLED OR PLACED WITHIN A CITY OF FRANKLIN EASEMENT, THE CITY OF FRANKLIN SHALL HAVE THE RIGHT TO REMOVE SUCH ENCROACHMENTS WITHIN THE EASEMENT AS BE NECESSARY FOR THE CITY OF FRANKLIN TO REPAIR, MAINTAIN OR REPLACE ITS INFRASTRUCTURE WHICH IS NOW OR IN THE FUTURE MAY BE LOCATED WITHIN THE EASEMENT WITHOUT OBTAINING ANY FURTHER PERMISSION FROM THE PROPERTY OWNER OR HOA. THE PROPERTY OWNER OR HOA SHALL BE RESPONSIBLE FOR REPAIRING AND/OR REPLACING ANY SUCH LANDSCAPING, FENCING, CONCRETE OR OTHER STRUCTURES REMOVED OR DISTURBED BY THE CITY OF FRANKLIN IN COMMON OPEN SPACE AND IN AREAS OWNED BY THE PROPERTY OWNER OR HOA AT NO EXPENSE TO THE CITY OF FRANKLIN. INDIVIDUAL HOMEOWNERS SHALL BE RESPONSIBLE FOR STRUCTURES REMOVED OR DISTURBED BY THE CITY OF FRANKLIN WITHIN AN EASEMENT ON THE HOMEOWNER'S LOT AT THE HOMEOWNERS EXPENSE.



D. FARMER
405 BIRKDALE CT.
MAP 90 PARCEL 17.00
DB 1991 P 369

I HEREBY CERTIFY THAT THE PLAN SHOWN AND DESCRIBED HEREON IS A TRUE AND CORRECT SURVEY TO THE ACCURACY REQUIRED BY THE WILLIAMSON COUNTY, TENNESSEE REGIONAL PLANNING COMMISSION AND THAT THE MONUMENTS HAVE BEEN OR WILL BE PLACED AS SHOWN HEREON, TO THE SPECIFICATIONS OF THE SUBDIVISION REGULATIONS, AS APPROVED BY THE COUNTY ENGINEER.

ELKINS SURVEYING COMPANY

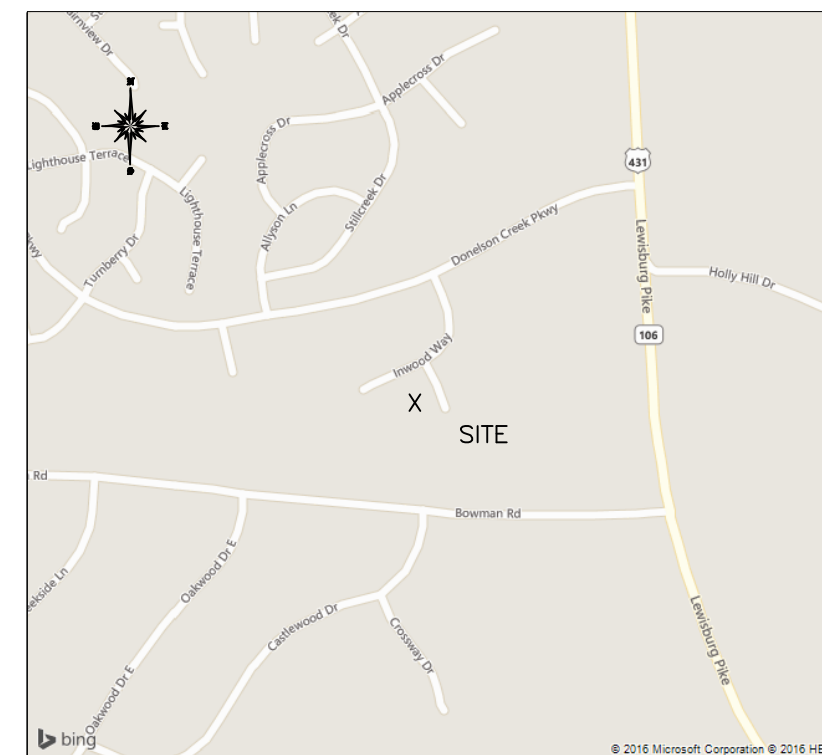
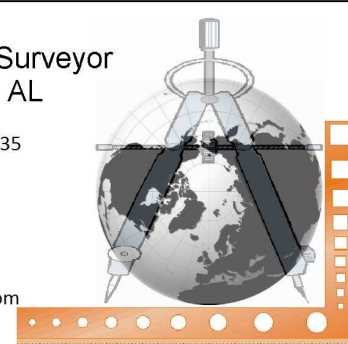
DATE: _____

DOYLE M. ELKNS, TN RLS #2427

Doyle Elkins
Professional Land Surveyor
Registered in TN & AL

610 West College St., Suite 135
Murfreesboro, TN 37130

Phone (615) 907-8625
Fax (615) 907-5956
Cell (931) 636-2414
Email: elkinsdoyle@gmail.com



VICINITY MAP NOT TO SCALE

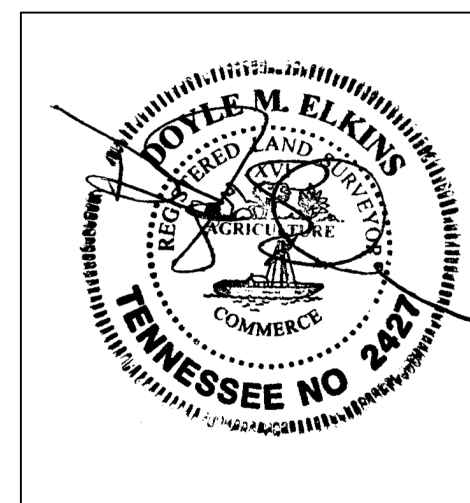
MINIMUM SETBACK REQUIREMENTS
FRONT 25'
SIDE 5' (12' TOTAL BETWEEN DWELLINGS)
REAR 25'

I (we) hereby certify that I am (we are) the owner(s) of the property shown and described hereon as evidenced in Book 5376, page 468 & BOOK 3198 PAGE 709 & BOOK 5033 PAGE 465 P.D.N.C., and that I (we) hereby adopt this plan of subdivision with my (our) free consent, establish the minimum building restriction line, and that offers of Irrevocable dedication for all public streets, utilities and other facilities have been filed as required by these regulations.

BRADLEY SCOTT ET UX

C.A. BENTON ET UX

J. B. MCKENNON ET UX



I HEREBY CERTIFY THIS IS A CATEGORY I SURVEY AND THE RATIO OF PRECISION FOR THE UNADJUSTED SURVEY IS GREATER THAN 1:23,765 AS SHOWN HEREON.

**SULLIVAN FARMS SUBDIVISION, FINAL PLAT
SECTION G REVISION 1 LOTS 833-835**

317 INWOOD WAY, 401 & 403 BIRKDALE CT.
FRANKLIN
WILLIAMSON COUNTY, TENNESSEE 37064

DATE	SCALE	SHEET	DRAWN BY	PROJECT
04-28-2016	1" = 50'	1 OF 1	DME	16025

CERTIFICATE OF APPROVAL OF UTILITY SYSTEMS

I hereby certify that the following utility systems outlined or indicated on the final subdivision plat entitled _____ have been installed in accordance with current local and/or state government requirements or that a surety bond has been posted with the Planning Commission to assure completion of all required improvements in case of default.

Water System _____
date _____

Sewer System _____
Date _____

Name, Title & Agency of Authorized Approving Agent

COF PROJECT NUMBER: 6146

CONDITIONS OF APPROVAL:

Engineering - Final Plat Checklist

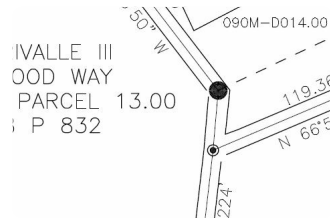
General Comments

1. C. Final Plat

- The previous comment "Applicant shall provide the location of all water and sewer service lines to ensure that moving the property lines will not require relocating the service lines or water meters." was not completely addressed. The location of the water service line from the water meter to the house was not provided. The location of the water service line must be provide to assure an easement is not required.

2. C. Final Plat

- Applicant shall show the lengths of the boundaries of the subdivision, measured to the nearest foot and decimals, with calls. One lot line is still missing this information:



3. C. Final Plat

- Applicant shall show the location and description of all existing man-made structures and site features (including utilities, with line sizes) both above and below ground. Indicate the size of the water and sewer mains on the plat.

Performance Agreement and Surety

General Comments

4. Engineering Sureties

- No sureties are associated with this Final Plat.

(Previous comment restated for informational purposes only, no response necessary.)

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

Watson Glen Subdivision, final plat, Section 1, Revision 17, resubdivision of Lot 24 into 2 lots, on 20.54 acres, located at Oak Meadow Drive.

..body

Project Information

COF Project Number: 6091

Applicant: Adam Crunk, Crunk Engineering

Owner: Warner Bass

Background/Staff Comments

The purpose of this plat is to subdivide a large parcel of land into two buildable lots, and two open-space lots, in order to define the limits of a rezoning and development plan proposed for lot 24. A revision to this final plat will coincide with any site plan associated with lot 24. Access to South Royal Oaks Boulevard is not supported by Engineering, because of the left turn aisle and median along the length of lot 33. Also, the length of the lot line along Oak Meadow Drive for lot 33 is not long enough to allow an access point within lot 33. Under the proposed configuration, lot 33 would only be accessed through lot 24 along Oak Meadow Drive. The proposed rezoning for lot 24 is attached residential, so this plat sets up an undesirable situation of General Commercial traffic crossing in front of residential buildings. Because this plat is only being brought forward to coincide with the proposed rezoning, and the end result creates a situation where lot 33 cannot meet Franklin Street Standards, ultimately setting up an undesirable situation, the P&SD is recommending disapproval of the plat.

Recommendation

..recommendation

Disapproval.

..end

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

PROCEDURAL REQUIREMENTS:

1. In addition to uploading the corrected plat to the online plan review website (<https://franklin.contractorsplanroom.com/secure/>), the applicant shall submit the Mylar, to the Department of Building and Neighborhood Services (Suite 110, Franklin City Hall). The mylar shall

be 18 inches by 24 inches in size. The Certificates of Approval for the Subdivision Name and Street Names, Water System (if not COF Water), Survey, and Ownership shall be signed when the plat is resubmitted. The Mylar shall be submitted to BNS within five (5) business days of the corrected electronic plat being uploaded to the online plan review website (or vice versa) or the item shall be rejected as incomplete for City review. 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.
3. The applicant shall upload a .dwg copy of the final plat through the IDT system (link above) in Tennessee state plan coordinates, NAD 83, NAVD 88, zone 4100/5301 for incorporation of the plat into the Franklin GIS database.

CONDITIONS OF APPROVAL:

Engineering - Final Plat Checklist

General Comments

1. C. Final Plat

- 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 lot 33 would one day be provided through a cross access easement from lot 24. 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 final plat 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. Lot 33 does not have 230 feet of frontage. Lot 33 needs to have a commercial access to Oak Meadow Drive for engineering to support this subdivision.

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 will not be evaluated or approved until we have a traffic impact study and an access plan for lot 33 so that we can look at trip generation and distribution. The applicant shall change the lot lines and provide the necessary roadway frontage along Oak Meadow Drive to allow for a shared access to lot 33. The shared access shall be designed to handle the existing/proposed use (commercial/office).

Engineering is recommending disapproval of the proposed plat.

Performance Agreement and Surety

General Comments

2. Engineering Sureties

- No sureties are associated with this Final Plat. Another final plat will be submitted at the site plan stage. Applicant shall be informed that sureties are calculated on the site plan, and transferred to the final plat. Whatever work is proposed on said site plan, sureties will be expected to be posted for that site plan. If multiple parties or phases are involved, applicant shall take this into consideration when setting the limits of construction for each site plan.

(Previous comment restated for informational purposes only, no response necessary.)

Planning

[WATSON GLEN SEC 1 REV 17 klb 2016-03-14.pdf](#)

3. Mineral rights

- The applicant shall list who holds mineral rights on this property.

4. Iron Pins

- An iron pin needs to be shown at the south terminus of the new lot line.

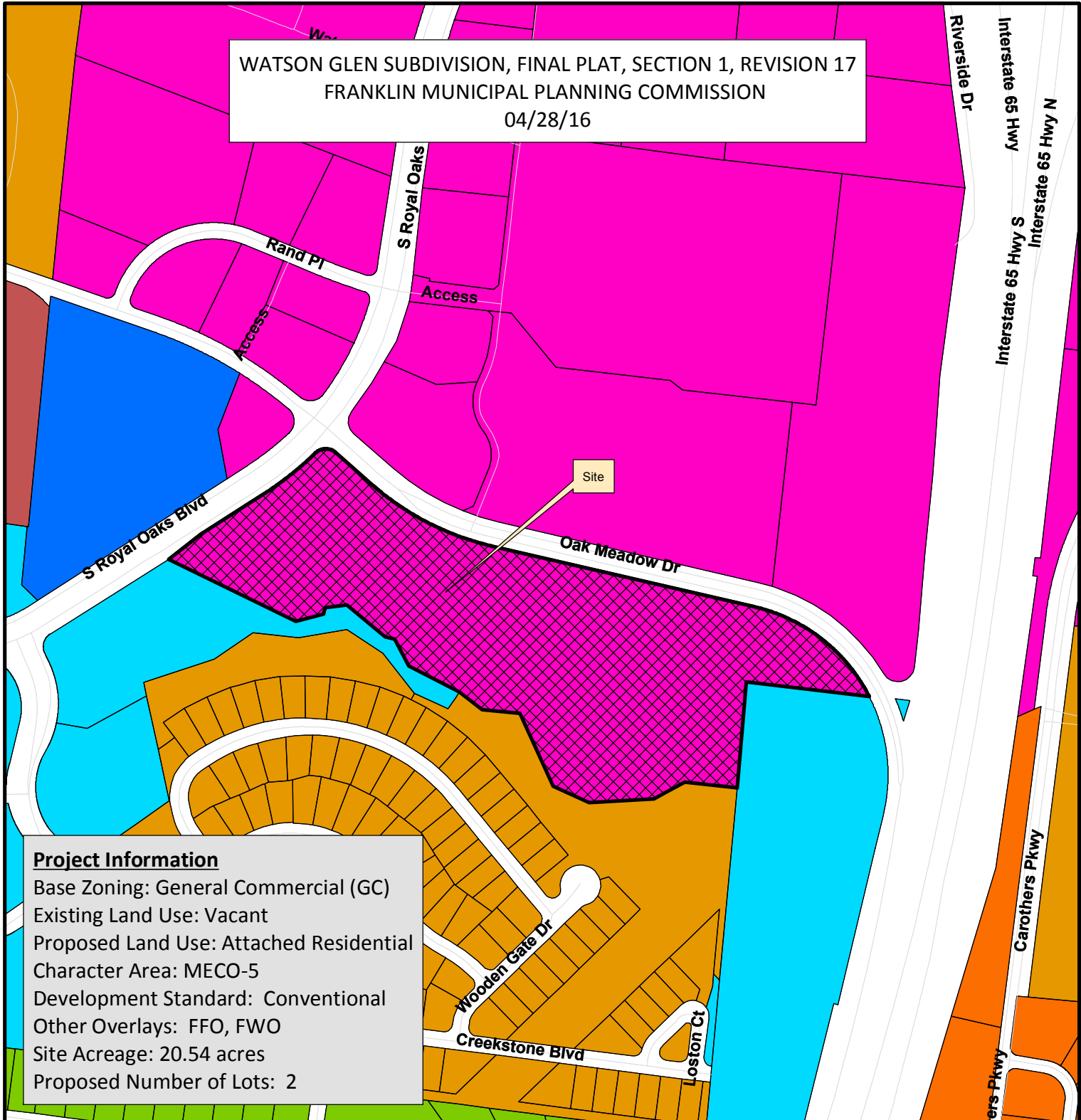
Stormwater

General Comments

5. Stream Buffer

- Watson Branch drains greater than 1 square mile thus a 60' Zone 1 buffer is required. Zone 2 buffers only apply on area than drain less than 1 square mile. Please revise.

WATSON GLEN SUBDIVISION, FINAL PLAT, SECTION 1, REVISION 17
 FRANKLIN MUNICIPAL PLANNING COMMISSION
 04/28/16



Project Information

Base Zoning: General Commercial (GC)
 Existing Land Use: Vacant
 Proposed Land Use: Attached Residential
 Character Area: MECO-5
 Development Standard: Conventional
 Other Overlays: FFO, FWO
 Site Acreage: 20.54 acres
 Proposed Number of Lots: 2

- | | |
|--|-------------------------------------|
| Watson Glen Subd FP Sec 1 Rev 17 | SD-X Specific Development-Variety |
| AG Agricultural District | OR Office Residential District |
| ER Estate Residential | GO General Office District |
| R-1 Residential District | CC Central Commercial District |
| R-2 Residential District | NC Neighborhood Commercial District |
| R-3 Residential District | GC General Commercial District |
| R-6 Historic Core Residential District | LI Light Industrial District |
| RM-10 Attached 10 Residential District | HI Heavy Industrial District |
| RM-15 Attached 15 Residential District | CI Civic and Institutional District |
| RM-20 Attached 20 Residential District | |
| SD-R Specific Development-Residential | |



0 275 550 1,100 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.
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PROPERTY MAP REFERENCE

BEING A PORTION OF PARCEL NUMBER 088.00 AS SHOWN ON WILLIAMSON COUNTY PROPERTY MAP NUMBER 079.

PLAT REFERENCE

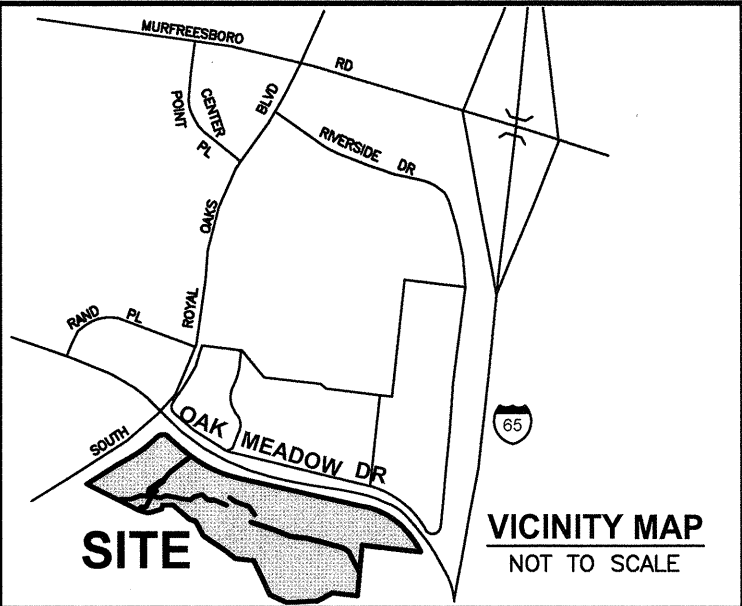
BEING A PORTION OF LOT 24 AS SHOWN ON THE FINAL PLAT ENTITLED "WATSON GLEN SUBDIVISION, SECTION ONE, REVISION 10, RESUBDIVISION OF LOT 2 AND OF RIVERSIDE BUSINESS PARK SUBDIVISION, SECTION 1, REVISION 4, LOT 11" OF RECORD IN PLAT BOOK 29, PAGE 139, REGISTER'S OFFICE FOR WILLIAMSON COUNTY, TENNESSEE.

DEED REFERENCE

BEING A PORTION OF THE SAME PROPERTY CONVEYED TO E. WARNER BASS BY QUITCLAIM DEED OF RECORD IN DEED BOOK 1347, PAGE 645 AND DEED BOOK 1347, PAGE 641, REGISTER'S OFFICE FOR WILLIAMSON COUNTY, TENNESSEE.

GENERAL NOTES

- THE PURPOSE OF THIS PLAT IS TO RE-SUBDIVIDE LOT 24 INTO 2 BUILDABLE AND 2 OPEN SPACE LOTS.
- BEARINGS SHOWN HEREON ARE BASED ON THE TENNESSEE COORDINATE SYSTEM OF 1983. GPS EQUIPMENT WAS USED DURING THE COURSE OF THE SURVEY ON THE SITE TO DETERMINE THE POSITION OF TWO CONTROL POINTS FOR ESTABLISHING THE BEARING BASE. THE EQUIPMENT USED: LEICA, MODEL GX 1230, DUAL FREQUENCY RECEIVER. THE TYPE OF SURVEY: NETWORK ADJUSTED REAL TIME KINEMATIC.
- BY SCALED MAP LOCATION AND GRAPHIC PLOTTING ONLY, THIS PROPERTY LIES WITHIN FLOOD ZONE "X", AS DESIGNATED ON CURRENT FEDERAL EMERGENCY MANAGEMENT AGENCY MAP NO. 47187C0212F, WITH AN EFFECTIVE DATE OF SEPTEMBER 29, 2009, WHICH MAKES UP A PART OF THE NATIONAL FLOOD INSURANCE ADMINISTRATION REPORT; COMMUNITY NO. 47206, PANEL NO. 212, SUFFIX F, WHICH IS THE CURRENT FLOOD INSURANCE RATE MAP FOR THE COMMUNITY IN WHICH SAID PREMISES IS SITUATED. SAID MAP DEFINES ZONE "X" UNDER "OTHER AREAS" AS AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.
- THIS PROPERTY IS CURRENTLY ZONED GC - (GENERAL COMMERCIAL). CHARACTER AREA OVERLAY: MECO-5, CONVENTIONAL DEVELOPMENT. FFO AND FWO OVERLAYS. MINIMUM YARD REQUIREMENTS PER CITY OF FRANKLIN ZONING ORDINANCE, DATED SEPTEMBER 29, 2014, ARE AS FOLLOWS:
FRONT - 30' SIDE - 15' REAR - 25'
- WITHIN NEW DEVELOPMENTS AND FOR OFF-SITE LINES CONSTRUCTED AS A RESULT OF, OR TO PROVIDE SERVICE TO, THE NEW DEVELOPMENT, ALL UTILITIES, SUCH AS CABLE TELEVISION, ELECTRICAL (EXCLUDING TRANSFORMERS), GAS, SEWER, TELEPHONE, AND WATER LINES SHALL BE PLACED UNDERGROUND.
- THE RECORDING OF THIS PLAT VOIDS, VACATES, AND SUPERSEDES THE RECORDING OF LOT 24 AS SHOWN ON THE FINAL PLAT OF "WATSON GLEN SUBDIVISION, SECTION ONE, 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, REGISTER'S OFFICE FOR WILLIAMSON COUNTY, TENNESSEE.
- 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.
- ALL STREET LIGHT LOCATIONS AND QUANTITIES ARE APPROXIMATE. FINAL POSITIONING A ND QUANTITY SHALL BE AT THE DIRECTION OF MTEM.
- THIS SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES. ABOVE GRADE AND UNDERGROUND UTILITIES SHOWN WERE TAKEN FROM VISIBLE APPURTENANCES AT THE SITE, PUBLIC RECORDS AND/OR MAPS PREPARED BY OTHERS. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED. THEREFORE, RELIANCE UPON THE TYPE, SIZE AND LOCATION OF UTILITIES SHOWN SHOULD BE DONE SO WITH THIS CIRCUMSTANCE CONSIDERED. DETAILED VERIFICATION OF EXISTENCE, LOCATION AND DEPTH SHOULD ALSO BE MADE PRIOR TO ANY DECISION RELATIVE THERETO IS MADE. AVAILABILITY AND COST OF SERVICE SHOULD BE CONFIRMED WITH THE APPROPRIATE UTILITY COMPANY. IN TENNESSEE IT IS A REQUIREMENT, PER "THE UNDERGROUND UTILITY DAMAGE PREVENTION ACT", THAT ANYONE WHO ENGAGES IN EXCAVATION MUST NOTIFY ALL KNOWN UNDERGROUND UTILITY OWNERS, NO LESS THAN (3) THREE OR MORE THAN (10) TEN WORKING DAYS PRIOR TO THE DATE OF THEIR INTENT TO EXCAVATE AND ALSO TO AVOID ANY POSSIBLE HAZARD OR CONFLICT. TENNESSEE ONE CALL 811.
- MAINTENANCE OF ALL STORMWATER MANAGEMENT FEATURES SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER(S) OR HOA.
- WETLAND LOCATION SHOWN HEREON WAS TAKEN FROM MAPS AND COORDINATES OF WETLAND PERIMETER POINTS; AS PROVIDED BY BDY NATURAL SCIENCES CONSULTANTS DATE 12/22/2015.



LEGEND

- CONCRETE MONUMENT (OLD)
- IRON ROD (OLD)
- IRON ROD (NEW) (5/8" X 18" W/CAP STAMPED "RAGAN SMITH & ASSOCIATES")
- CATCH BASIN/CURB INLET
- REINFORCED CONCRETE PIPE
- SANITARY SEWER MANHOLE
- ELECTRIC BOX
- TRANSFORMER PAD
- INVERT
- HEADWALL
- FIRE HYDRANT
- FIBER OPTIC BOX
- UNDERGROUND ELECTRIC LINE
- UTILITY POLE
- FENCE
- STORM STRUCTURE
- FEMA ZONE "AE"
- FEMA FLOODWAY AREA ZONE "AE"
- FEMA ZONE "X" (OTHER FLOOD AREAS)
- FLOODWAY OVERLAY DISTRICT
- FLOODWAY FRINGE OVERLAY DISTRICT
- LOT NUMBER
- SIGN
- WATER VALVE
- LIGHT STANDARD
- ELECTRIC STUBOUT
- REGISTER'S OFFICE FOR WILLIAMSON COUNTY, TN

SHEET 2

SHEET 3

CREEKSTONE COMMONS SUBDIVISION, REVISION 4 (RE-SUBDIVISION OF LOTS 15 AND 27) PLAT BOOK P49, PAGE 110 R.O.W.C.T.

PORTION OF MAP 079, PARCEL 88.00 E. WARNER BASS, TRUSTEE DEED BOOK 1347, PAGE 645 DEED BOOK 1347, PAGE 641 R.O.W.C.T.

WATSON GLEN SUBDIVISION SECTION 1, REVISION 10 PLAT BOOK 29, PAGE 139 R.O.W.C.T.

MAP 079, PARCEL 101.05 NASHVILLE LODGE NO. 72 B.P.O. ELKS DEED BOOK 1708, PAGE 12 R.O.W.C.T.

SURVEYOR

RAGAN-SMITH ASSOCIATES, INC. KEVIN BIRDWELL, RLS 315 WOODLAND STREET NASHVILLE, TENNESSEE 37206 (615) 244-8591 kbirdwell@ragansmith.com

OWNER

E. WARNER BASS, TRUSTEE 150 THIRD AVENUE SOUTH SUITE 2800 NASHVILLE, TENNESSEE 37201 (615) 742-6210

DEVELOPER

EPOCH RESIDENTIAL MCCARLEY DAVIS EXECUTIVE VICE PRESIDENT CHIEF INVESTMENT OFFICER OFFICE (321)316-8005 CELL (407)489-2993

RECORDER'S INFORMATION

CERTIFICATE OF OWNERSHIP

I (WE) HEREBY CERTIFY THAT I AM (WE ARE) THE OWNER(S) OF THE PROPERTY SHOWN HEREON AS OF RECORD IN DEED BOOK 1347, PAGE 645 AND DEED BOOK 1347, PAGE 641, R.O.W.C.T. AND ADOPT THE PLAN OF SUBDIVISION OF THE PROPERTY AS SHOWN HEREON AND DEDICATED ALL PUBLIC WAYS AND EASEMENTS AS NOTED. NO LOT(S) AS SHOWN HEREON SHALL AGAIN BE SUBDIVIDED, RESUBDIVIDED, ALTERED OR CHANGED SO AS TO PRODUCE LESS AREA THAN IS HEREBY ESTABLISHED UNTIL OTHERWISE APPROVED BY THE FRANKLIN MUNICIPAL PLANNING COMMISSION, AND UNDER NO CONDITION SHALL LOT(S) BE MADE TO PRODUCE LESS AREA THAN IS PRESCRIBED BY THE RESTRICTIVE COVENANTS AS OF RECORD IN BOOK _____ PAGE _____ R.O.W.C., TENNESSEE, RUNNING WITH THE TITLE TO THE PROPERTY. I (WE) FURTHER CERTIFY THAT THERE ARE NO LIENS ON THIS PROPERTY, EXCEPT AS FOLLOWS: BOOK _____ PAGE _____ R.O.W.C.

E. WARNER BASS, TRUSTEE DATE

PRINT NAME AND TITLE

CERTIFICATE OF SURVEY

I (WE) HEREBY CERTIFY THAT THE SUBDIVISION PLAT AS SHOWN HEREON IS CORRECT AND THAT ALL OF THE MONUMENTS SHOWN HEREON HAVE BEEN PLACED AS INDICATED. THIS SUBDIVISION PLAT CORRECTLY REPRESENTS A SURVEY MADE UNDER MY SUPERVISION ON THE 11th DAY OF MARCH, 2011.

SURVEYOR KEVIN BIRDWELL LICENSE NO. 17947/10 DATE 3/11/2011

CERTIFICATE OF APPROVAL OF WATER AND SEWER SYSTEMS

I HEREBY CERTIFY THAT:

- THE WATER AND SEWER SYSTEMS DESIGNATED IN "WATSON GLEN SUBDIVISION SECTION 2, REVISION 1" HAVE BEEN INSTALLED IN ACCORDANCE WITH CITY SPECIFICATIONS, OR
- A PERFORMANCE AGREEMENT AND SURETY IN THE AMOUNT OF \$_____ FOR THE WATER SYSTEM AND \$_____ FOR THE SEWER SYSTEM HAS BEEN POSTED WITH THE CITY OF FRANKLIN, TENNESSEE, TO ASSURE COMPLETION OF SUCH SYSTEMS.

DIRECTOR WATER MANAGEMENT DEPARTMENT CITY OF FRANKLIN, TENNESSEE DATE

CERTIFICATE OF APPROVAL OF STREETS AND DRAINAGE

I HEREBY CERTIFY THAT:

- THE STREETS AND DRAINAGE IN MEDCORE MEDICAL BUILDING HAVE BEEN INSTALLED IN ACCORDANCE WITH CITY SPECIFICATIONS, OR
- A PERFORMANCE BOND IN THE AMOUNT OF \$_____ FOR STREETS AND \$_____ FOR DRAINAGE HAS BEEN POSTED WITH THE CITY OF FRANKLIN, TENNESSEE, TO ASSURE COMPLETION OF SUCH IMPROVEMENTS.

SUPERINTENDENT, STREETS FRANKLIN, TENNESSEE DATE

CERTIFICATE OF THE APPROVAL OF SUBDIVISION NAME AND STREET NAMES

SUBDIVISION NAME AND STREET NAMES APPROVED BY THE WILLIAMSON COUNTY EMERGENCY MANAGEMENT AGENCY.

WILLIAMSON COUNTY EMERGENCY MANAGEMENT AGENCY DATE

CERTIFICATE OF APPROVAL FOR RECORDING

APPROVED BY THE FRANKLIN MUNICIPAL PLANNING COMMISSION, FRANKLIN, WILLIAMSON COUNTY, TENNESSEE, WITH THE EXCEPTION OF SUCH CONDITIONS, IF ANY, AS ARE NOTED IN THE PLANNING COMMISSION MINUTES FOR THE _____ DAY OF OCTOBER, 2010, AND THIS PLAT HAS BEEN APPROVED FOR RECORDING IN THE REGISTER'S OFFICE FOR WILLIAMSON COUNTY.

SECRETARY FRANKLIN MUNICIPAL PLANNING COMMISSION DATE

FINAL PLAT WATSON GLEN SUBDIVISION SECTION 1, REVISION 17 C.O.F. # 6091

2ND REVISION DATE: APRIL 7, 2016 PER REVIEW COMMENTS REVISION DATE: MARCH 14, 2016 PER REVIEW COMMENTS SUBMITTAL DATE: FEBRUARY 29, 2016

DRAWN BY: S. NAVE SCALE: 1"=100'

FINAL SUBDIVISION PLAT

CITY OF FRANKLIN

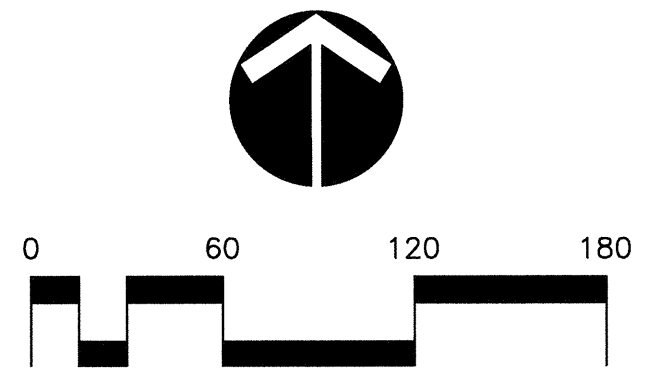
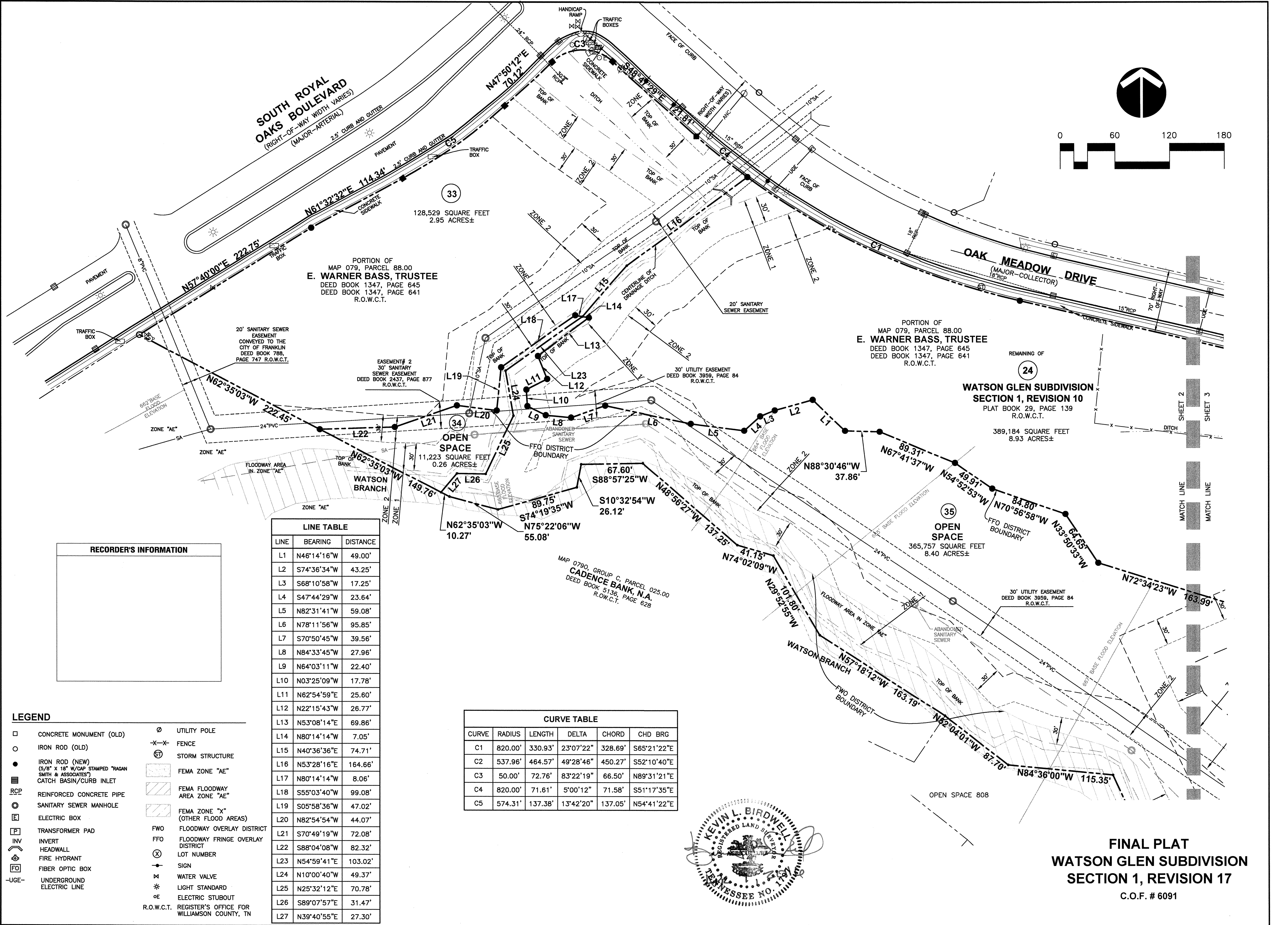
WILLIAMSON COUNTY, TENNESSEE

NET AREA: 20.54 Acres± TOTAL LOTS: 2 ACRES NEW ROAD: N/A CIVIL DISTRICT: 9th MILES NEW ROAD: N/A CLOSURE ERROR: 1:15000±

OWNER: E. WARNER BASS, TRUSTEE

SURVEYOR: RAGAN - SMITH - ASSOCIATES, INC.

SCALE: 1"=100' 0 50' 100' 200'

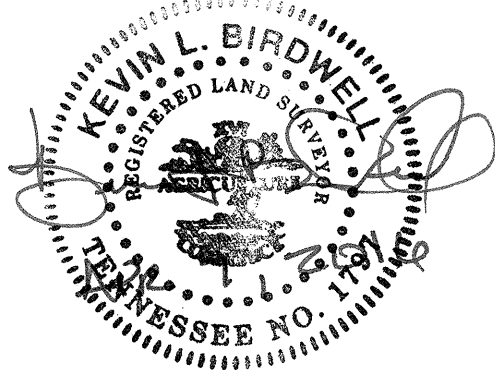


RECORDER'S INFORMATION	

LINE TABLE		
LINE	BEARING	DISTANCE
L1	N46°14'16"W	49.00'
L2	S74°36'34"W	43.25'
L3	S68°10'58"W	17.25'
L4	S47°44'29"W	23.64'
L5	N82°31'41"W	59.08'
L6	N78°11'56"W	95.85'
L7	S70°50'45"W	39.56'
L8	N84°33'45"W	27.96'
L9	N64°03'11"W	22.40'
L10	N03°25'09"W	17.78'
L11	N62°54'59"E	25.60'
L12	N22°15'43"W	26.77'
L13	N53°08'14"E	69.86'
L14	N80°14'14"W	7.05'
L15	N40°36'36"E	74.71'
L16	N53°28'16"E	164.66'
L17	N80°14'14"W	8.06'
L18	S55°03'40"W	99.08'
L19	S05°58'36"W	47.02'
L20	N82°54'54"W	44.07'
L21	S70°49'19"W	72.08'
L22	S88°04'08"W	82.32'
L23	N54°59'41"E	103.02'
L24	N10°00'40"W	49.37'
L25	N25°32'12"E	70.78'
L26	S89°07'57"E	31.47'
L27	N39°40'55"E	27.30'

CURVE TABLE					
CURVE	RADIUS	LENGTH	DELTA	CHORD	CHD BRG
C1	820.00'	330.93'	23°07'22"	328.69'	S65°21'22"E
C2	537.96'	464.57'	49°28'46"	450.27'	S52°10'40"E
C3	50.00'	72.76'	83°22'19"	66.50'	N89°31'21"E
C4	820.00'	71.61'	5°00'12"	71.58'	S51°17'35"E
C5	574.31'	137.38'	13°42'20"	137.05'	N54°41'22"E

LEGEND	
	CONCRETE MONUMENT (OLD)
	IRON ROD (OLD)
	IRON ROD (NEW)
	CATCH BASIN/CURB INLET
	REINFORCED CONCRETE PIPE
	SANITARY SEWER MANHOLE
	ELECTRIC BOX
	TRANSFORMER PAD
	INVERT
	HEADWALL
	FIRE HYDRANT
	FIBER OPTIC BOX
	UNDERGROUND ELECTRIC LINE
	UTILITY POLE
	FENCE
	STORM STRUCTURE
	FEMA ZONE "AE"
	FEMA FLOODWAY AREA ZONE "AE"
	FEMA ZONE "X" (OTHER FLOOD AREAS)
	FLOODWAY OVERLAY DISTRICT
	FLOODWAY FRINGE OVERLAY DISTRICT
	LOT NUMBER
	SIGN
	WATER VALVE
	LIGHT STANDARD
	ELECTRIC STUBOUT
R.O.W.C.T. REGISTER'S OFFICE FOR WILLIAMSON COUNTY, TN	



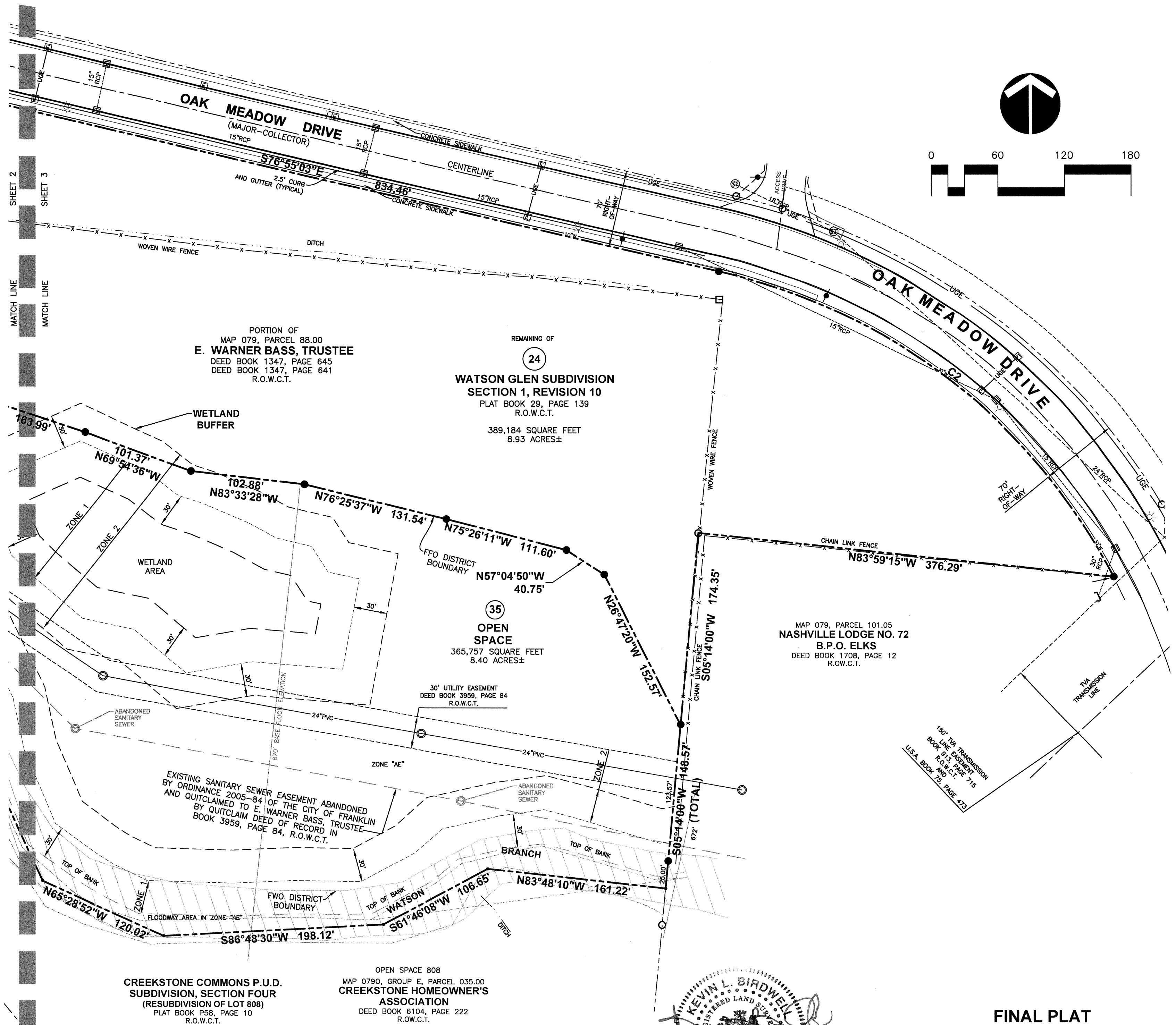
FINAL PLAT
WATSON GLEN SUBDIVISION
SECTION 1, REVISION 17
C.O.F. # 6091

LINE TABLE		
LINE	BEARING	DISTANCE
L1	N46°14'16"W	49.00'
L2	S74°36'34"W	43.25'
L3	S68°10'58"W	17.25'
L4	S47°44'29"W	23.64'
L5	N82°31'41"W	59.08'
L6	N78°11'56"W	95.85'
L7	S70°50'45"W	39.56'
L8	N84°33'45"W	27.96'
L9	N64°03'11"W	22.40'
L10	N03°25'09"W	17.78'
L11	N62°54'59"E	25.60'
L12	N22°15'43"W	26.77'
L13	N53°08'14"E	69.86'
L14	N80°14'14"W	7.05'
L15	N40°36'36"E	74.71'
L16	N53°28'16"E	164.66'
L17	N80°14'14"W	8.06'
L18	S55°03'40"W	99.08'
L19	S05°58'36"W	47.02'
L20	N82°54'54"W	44.07'
L21	S70°49'19"W	72.08'
L22	S88°04'08"W	82.32'
L23	N54°59'41"E	103.02'
L24	N10°00'40"W	49.37'
L25	N25°32'12"E	70.78'
L26	S89°07'57"E	31.47'
L27	N39°40'55"E	27.30'

CURVE TABLE					
CURVE	RADIUS	LENGTH	DELTA	CHORD	CHD BRG
C1	820.00'	330.93'	23°07'22"	328.69'	S65°21'22"E
C2	537.96'	464.57'	49°28'46"	450.27'	S52°10'40"E
C3	50.00'	72.76'	83°22'19"	66.50'	N89°31'21"E
C4	820.00'	71.61'	5°00'12"	71.58'	S51°17'35"E
C5	574.31'	137.38'	13°42'20"	137.05'	N54°41'22"E

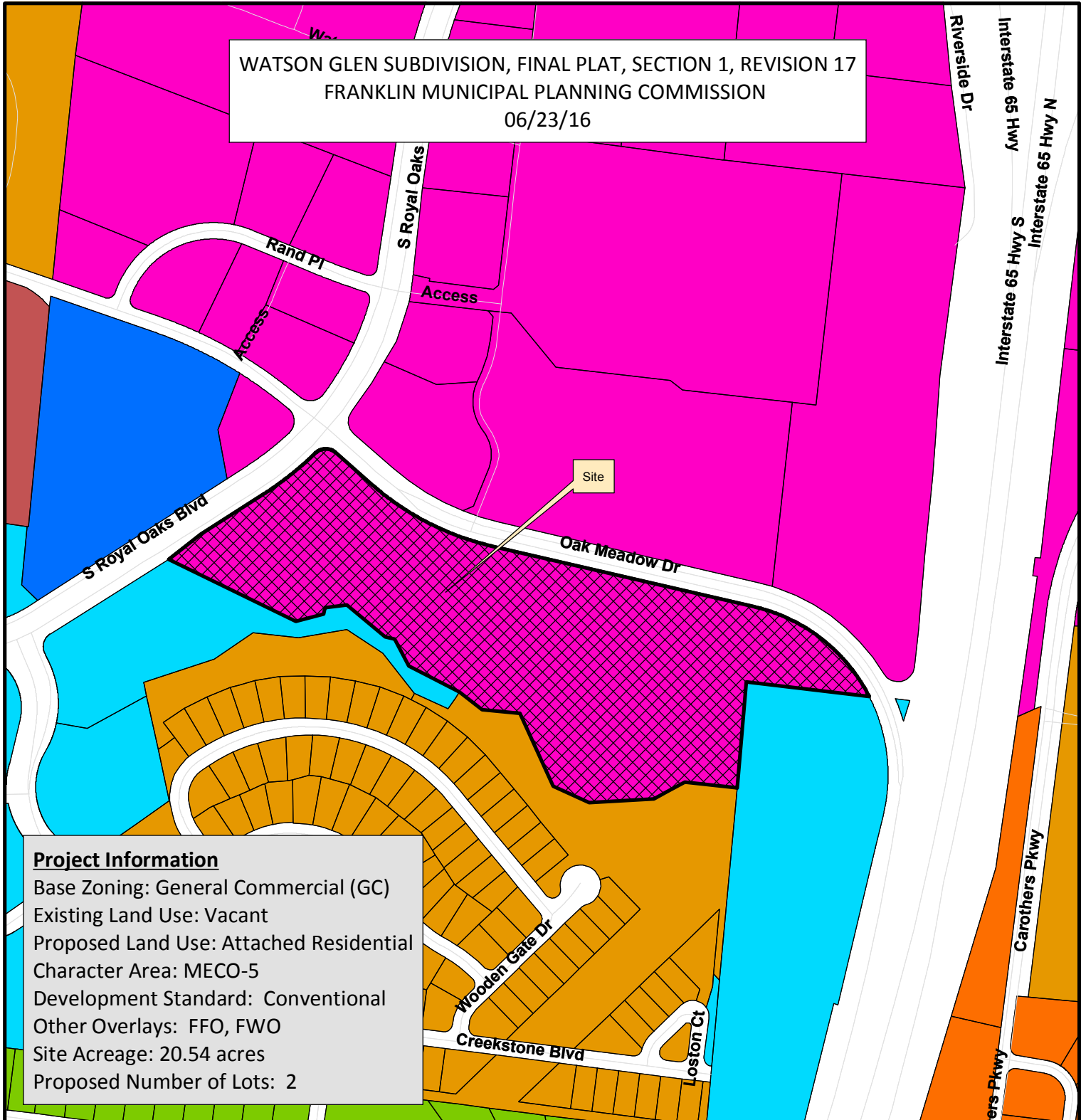
RECORDER'S INFORMATION

LEGEND	
□	CONCRETE MONUMENT (OLD)
○	IRON ROD (OLD)
●	IRON ROD (NEW) (5/8" x 18" W/CAP STAMPED "RAGAN SMITH & ASSOCIATES")
■	CATCH BASIN/CURB INLET
RCP	REINFORCED CONCRETE PIPE
⊙	SANITARY SEWER MANHOLE
⊞	ELECTRIC BOX
⊞	TRANSFORMER PAD
INV	INVERT
⊞	HEADWALL
⊞	FIRE HYDRANT
⊞	FIBER OPTIC BOX
-UGE-	UNDERGROUND ELECTRIC LINE
⊙	UTILITY POLE
-X-X-	FENCE
⊞	STORM STRUCTURE
⊞	FEMA ZONE "AE"
⊞	FEMA FLOODWAY AREA ZONE "AE"
⊞	FEMA ZONE "X" (OTHER FLOOD AREAS)
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⊞	LIGHT STANDARD
⊞	ELECTRIC STUBOUT
R.O.W.C.T. REGISTER'S OFFICE FOR WILLIAMSON COUNTY, TN	



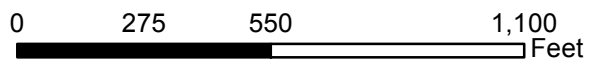
FINAL PLAT
WATSON GLEN SUBDIVISION
SECTION 1, REVISION 17
C.O.F. # 6091

WATSON GLEN SUBDIVISION, FINAL PLAT, SECTION 1, REVISION 17
 FRANKLIN MUNICIPAL PLANNING COMMISSION
 06/23/16



Project Information
 Base Zoning: General Commercial (GC)
 Existing Land Use: Vacant
 Proposed Land Use: Attached Residential
 Character Area: MECO-5
 Development Standard: Conventional
 Other Overlays: FFO, FWO
 Site Acreage: 20.54 acres
 Proposed Number of Lots: 2

- | | |
|--|-------------------------------------|
| Watson Glen Subd FP Sec 1 Rev 17 | SD-X Specific Development-Variety |
| AG Agricultural District | OR Office Residential District |
| ER Estate Residential | GO General Office District |
| R-1 Residential District | CC Central Commercial District |
| R-2 Residential District | NC Neighborhood Commercial District |
| R-3 Residential District | GC General Commercial District |
| R-6 Historic Core Residential District | LI Light Industrial District |
| RM-10 Attached 10 Residential District | HI Heavy Industrial District |
| RM-15 Attached 15 Residential District | CI Civic and Institutional District |
| RM-20 Attached 20 Residential District | |
| SD-R Specific Development-Residential | |



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PROPERTY MAP REFERENCE

BEING A PORTION OF PARCEL NUMBER 088.00 AS SHOWN ON WILLIAMSON COUNTY PROPERTY MAP NUMBER 079.

PLAT REFERENCE

BEING A PORTION OF LOT 24 AS SHOWN ON THE FINAL PLAT 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, REGISTER'S OFFICE FOR WILLIAMSON COUNTY, TENNESSEE.

DEED REFERENCE

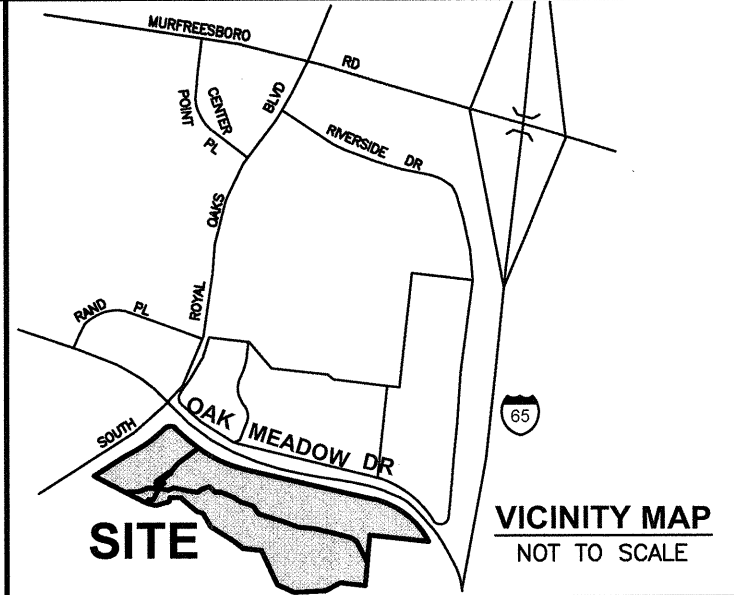
BEING A PORTION OF THE SAME PROPERTY CONVEYED TO E. WARNER BASS BY QUITCLAIM DEED OF RECORD IN DEED BOOK 1347, PAGE 645 AND DEED BOOK 1347, PAGE 641, REGISTER'S OFFICE FOR WILLIAMSON COUNTY, TENNESSEE.

GENERAL NOTES

1. THE PURPOSE OF THIS PLAT IS TO RE-SUBDIVIDE LOT 24 INTO 2 BUILDABLE AND 2 OPEN SPACE LOTS.
2. BEARINGS SHOWN HEREON ARE BASED ON THE TENNESSEE COORDINATE SYSTEM OF 1983. GPS EQUIPMENT WAS USED DURING THE COURSE OF THE SURVEY ON THE SITE TO DETERMINE THE POSITION OF TWO CONTROL POINTS FOR ESTABLISHING THE BEARING BASE. THE EQUIPMENT USED: LEICA, MODEL GX 1230, DUAL FREQUENCY RECEIVER. THE TYPE OF SURVEY: NETWORK ADJUSTED REAL TIME KINEMATIC.
3. BY SCALED MAP LOCATION AND GRAPHIC PLOTTING ONLY, THIS PROPERTY LIES WITHIN FLOOD ZONE "X", AS DESIGNATED ON CURRENT FEDERAL EMERGENCY MANAGEMENT AGENCY MAP NO. 47187C0212F, WITH AN EFFECTIVE DATE OF SEPTEMBER 29, 2009, WHICH MAKES UP A PART OF THE NATIONAL FLOOD INSURANCE ADMINISTRATION REPORT; COMMUNITY NO. 47206, PANEL NO. 212, SUFFIX F, WHICH IS THE CURRENT FLOOD INSURANCE RATE MAP FOR THE COMMUNITY IN WHICH SAID PREMISES IS SITUATED. SAID MAP DEFINES ZONE "X" UNDER "OTHER AREAS" AS AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.
4. THIS PROPERTY IS CURRENTLY ZONED GC -- (GENERAL COMMERCIAL). CHARACTER AREA OVERLAY: MECO-5, CONVENTIONAL DEVELOPMENT. FFO AND FWO OVERLAYS. MINIMUM YARD REQUIREMENTS PER CITY OF FRANKLIN ZONING ORDINANCE, DATED SEPTEMBER 29, 2014, ARE AS FOLLOWS:

FRONT - 30' SIDE - 15' REAR - 25'
5. WITHIN NEW DEVELOPMENTS AND FOR OFF-SITE LINES CONSTRUCTED AS A RESULT OF, OR TO PROVIDE SERVICE TO, THE NEW DEVELOPMENT, ALL UTILITIES, SUCH AS CABLE TELEVISION, ELECTRICAL (EXCLUDING TRANSFORMERS), GAS, SEWER, TELEPHONE, AND WATER LINES SHALL BE PLACED UNDERGROUND.

6. THE RECORDING OF THIS PLAT VOIDS, VACATES, AND SUPERSEDES THE RECORDING OF LOT 24 AS SHOWN ON THE FINAL PLAT OF "WATSON GLEN SUBDIVISION, SECTION ONE, 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, REGISTER'S OFFICE FOR WILLIAMSON COUNTY, TENNESSEE.
7. 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.
8. ALL STREET LIGHT LOCATIONS AND QUANTITIES ARE APPROXIMATE. FINAL POSITIONING AND QUANTITY SHALL BE AT THE DIRECTION OF MTEM.
9. THIS SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES. ABOVE GRADE AND UNDERGROUND UTILITIES SHOWN WERE TAKEN FROM VISIBLE APPURTENANCES AT THE SITE, PUBLIC RECORDS AND/OR MAPS PREPARED BY OTHERS. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED. THEREFORE, RELIANCE UPON THE TYPE, SIZE AND LOCATION OF UTILITIES SHOWN SHOULD BE DONE SO WITH THIS CIRCUMSTANCE CONSIDERED. DETAILED VERIFICATION OF EXISTENCE, LOCATION AND DEPTH SHOULD ALSO BE MADE PRIOR TO ANY DECISION RELATIVE THERETO IS MADE. AVAILABILITY AND COST OF SERVICE SHOULD BE CONFIRMED WITH THE APPROPRIATE UTILITY COMPANY. IN TENNESSEE IT IS A REQUIREMENT, PER "THE UNDERGROUND UTILITY DAMAGE PREVENTION ACT", THAT ANYONE WHO ENGAGES IN EXCAVATION MUST NOTIFY ALL KNOWN UNDERGROUND UTILITY OWNERS, NO LESS THAN (3) THREE OR MORE THAN (10) TEN WORKING DAYS PRIOR TO THE DATE OF THEIR INTENT TO EXCAVATE AND ALSO TO AVOID ANY POSSIBLE HAZARD OR CONFLICT. TENNESSEE ONE CALL 811.
10. MAINTENANCE OF ALL STORMWATER MANAGEMENT FEATURES SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER(S) OR HOA.
11. WETLAND LOCATION SHOWN HEREON WAS TAKEN FROM MAPS AND COORDINATES OF WETLAND PERIMETER POINTS; AS PROVIDED BY BDY NATURAL SCIENCES CONSULTANTS DATE 12/22/2015.
12. THERE ARE NO MINERAL RIGHTS THAT AFFECT THIS PROPERTY PER FINDINGS DISCLOSED IN FIDELITY NATIONAL TITLE INSURANCE COMPANY'S COMMITMENT FOR TITLE INSURANCE NO. 1514121CTN, DATED AUGUST 27, 2015.



LEGEND

- | | |
|--|---|
| □ CONCRETE MONUMENT (OLD) | ○ UTILITY POLE |
| ○ IRON ROD (OLD) | -X-X- FENCE |
| ● IRON ROD (NEW)
(5/8" X 18" W/CAP STAMPED "RAGAN
SMITH & ASSOCIATES") | ⊕ STORM STRUCTURE |
| ■ CATCH BASIN/CURB INLET | ▨ FEMA FLOODWAY
AREA ZONE "AE" |
| RCP REINFORCED CONCRETE PIPE | ▨ FEMA ZONE "X"
(OTHER FLOOD AREAS) |
| ⊙ SANITARY SEWER MANHOLE | FWO FLOODWAY OVERLAY DISTRICT |
| ⊞ ELECTRIC BOX | FFO FLOODWAY FRINGE OVERLAY
DISTRICT |
| ⊞ TRANSFORMER PAD | ⊗ LOT NUMBER |
| INV INVERT | — SIGN |
| ⊞ HEADWALL | — WATER VALVE |
| ⊞ FIRE HYDRANT | ※ LIGHT STANDARD |
| ⊞ FIBER OPTIC BOX | ⊞ ELECTRIC STUBOUT |
| -UGE- UNDERGROUND
ELECTRIC LINE | R.O.W.C.T. REGISTER'S OFFICE FOR
WILLIAMSON COUNTY, TN |

SHEET 2

SHEET 3

RECORDER'S INFORMATION

SURVEYOR

RAGAN-SMITH ASSOCIATES, INC.
KEVIN BIRDWELL, RLS
315 WOODLAND STREET
NASHVILLE, TENNESSEE 37206
(615) 244-8591
kbirdwell@ragansmith.com

OWNER

E. WARNER BASS, TRUSTEE
150 THIRD AVENUE SOUTH
SUITE 2800
NASHVILLE, TENNESSEE 37201
(615) 742-6210

DEVELOPER

EPOCH RESIDENTIAL
MCCARLEY DAVIS
EXECUTIVE VICE PRESIDENT
CHIEF INVESTMENT OFFICER
OFFICE (321)316-6005
CELL (407)489-2993

CERTIFICATE OF OWNERSHIP

I (WE) HEREBY CERTIFY THAT I AM (WE ARE) THE OWNER(S) OF THE PROPERTY SHOWN HEREON AS OF RECORD IN DEED BOOK 1347, PAGE 645 AND DEED BOOK 1347, PAGE 641, R.O.W.C.T. AND ADOPT THE PLAN OF SUBDIVISION OF THE PROPERTY AS SHOWN HEREON AND DEDICATED ALL PUBLIC WAYS AND EASEMENTS AS NOTED. NO LOT(S) AS SHOWN HEREON SHALL AGAIN BE SUBDIVIDED, RESUBDIVIDED, ALTERED OR CHANGED SO AS TO PRODUCE LESS AREA THAN IS HEREBY ESTABLISHED UNTIL OTHERWISE APPROVED BY THE FRANKLIN MUNICIPAL PLANNING COMMISSION, AND UNDER NO CONDITION SHALL LOT(S) BE MADE TO PRODUCE LESS AREA THAN IS PRESCRIBED BY THE RESTRICTIVE COVENANTS AS OF RECORD IN BOOK _____ PAGE _____, R.O.W.C., TENNESSEE, RUNNING WITH THE TITLE TO THE PROPERTY. I (WE) FURTHER CERTIFY THAT THERE ARE NO LIENS ON THIS PROPERTY, EXCEPT AS FOLLOWS: BOOK _____ PAGE _____, R.O.W.C.

E. WARNER BASS, TRUSTEE DATE

PRINT NAME AND TITLE

CERTIFICATE OF SURVEY

I (WE) HEREBY CERTIFY THAT THE SUBDIVISION PLAT AS SHOWN HEREON IS CORRECT AND THAT ALL OF THE MONUMENTS SHOWN HEREON HAVE BEEN PLACED AS INDICATED. THIS SUBDIVISION PLAT CORRECTLY REPRESENTS A SURVEY MADE UNDER MY SUPERVISION ON THE 11th DAY OF MARCH, 2011.

KEVIN L. BIRDWELL
REGISTERED LAND SURVEYOR
AGENCY NO. 1797
TENNESSEE NO. 1797
SURVEYOR KEVIN BIRDWELL
DATE 3-2-16

CERTIFICATE OF APPROVAL OF WATER AND SEWER SYSTEMS

I HEREBY CERTIFY THAT:

- (1) THE WATER AND SEWER SYSTEMS DESIGNATED IN "WATSON GLEN SUBDIVISION SECTION 2, REVISION 1" HAVE BEEN INSTALLED IN ACCORDANCE WITH CITY SPECIFICATIONS, OR
- (2) A PERFORMANCE AGREEMENT AND SURETY IN THE AMOUNT OF \$ _____ FOR THE WATER SYSTEM AND \$ _____ FOR THE SEWER SYSTEM HAS BEEN POSTED WITH THE CITY OF FRANKLIN, TENNESSEE, TO ASSURE COMPLETION OF SUCH SYSTEMS.

DIRECTOR WATER MANAGEMENT DEPARTMENT
CITY OF FRANKLIN, TENNESSEE DATE

CERTIFICATE OF APPROVAL OF STREETS AND DRAINAGE

I HEREBY CERTIFY THAT:

- (1) THE STREETS AND DRAINAGE IN MEDCORE MEDICAL BUILDING HAVE BEEN INSTALLED IN ACCORDANCE WITH CITY SPECIFICATIONS, OR
- (2) A PERFORMANCE BOND IN THE AMOUNT OF \$ _____ FOR STREETS AND \$ _____ FOR DRAINAGE HAS BEEN POSTED WITH THE CITY OF FRANKLIN, TENNESSEE, TO ASSURE COMPLETION OF SUCH IMPROVEMENTS.

SUPERINTENDENT, STREETS
FRANKLIN, TENNESSEE DATE

CERTIFICATE OF THE APPROVAL OF SUBDIVISION NAME AND STREET NAMES

SUBDIVISION NAME AND STREET NAMES APPROVED BY THE WILLIAMSON COUNTY EMERGENCY MANAGEMENT AGENCY.

WILLIAMSON COUNTY EMERGENCY
MANAGEMENT AGENCY DATE

CERTIFICATE OF APPROVAL FOR RECORDING

APPROVED BY THE FRANKLIN MUNICIPAL PLANNING COMMISSION, FRANKLIN, WILLIAMSON COUNTY, TENNESSEE, WITH THE EXCEPTION OF SUCH CONDITIONS, IF ANY, AS ARE NOTED IN THE PLANNING COMMISSION MINUTES FOR THE _____ DAY OF OCTOBER, 2010, AND THIS PLAT HAS BEEN APPROVED FOR RECORDING IN THE REGISTER'S OFFICE FOR WILLIAMSON COUNTY.

SECRETARY
FRANKLIN MUNICIPAL PLANNING COMMISSION DATE

FINAL PLAT
WATSON GLEN SUBDIVISION
SECTION 1, REVISION 17
C.O.F. # 6091

4TH REVISION DATE: JUNE 2, 2016 PER REVIEW COMMENTS
3RD REVISION DATE: MAY 9, 2016 PER REVIEW COMMENTS
2ND REVISION DATE: APRIL 7, 2016 PER REVIEW COMMENTS
REVISION DATE: MARCH 14, 2016 PER REVIEW COMMENTS
SUBMITTAL DATE: FEBRUARY 28, 2016

DRAWN BY: S. NAVE
JOB NO: 14034 W.O: 0338 SCALE: 1"=100'

FINAL SUBDIVISION PLAT

CITY OF FRANKLIN

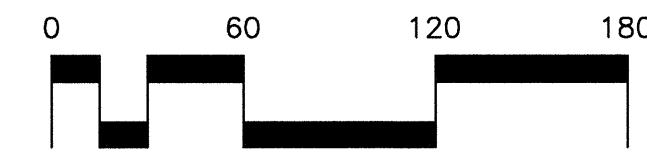
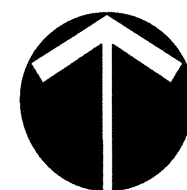
WILLIAMSON COUNTY, TENNESSEE

NET AREA: 20.53 TOTAL LOTS: 2
ACRES NEW ROAD: N/A CIVIL DISTRICT: 9th
MILES NEW ROAD: N/A CLOSURE ERROR: 1:15000+

OWNER: E. WARNER BASS, TRUSTEE

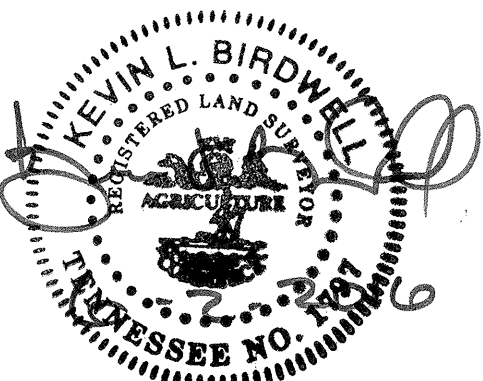
SURVEYOR: RAGAN - SMITH - ASSOCIATES, INC.

SCALE: 1"=100' 0 50' 100' 200'



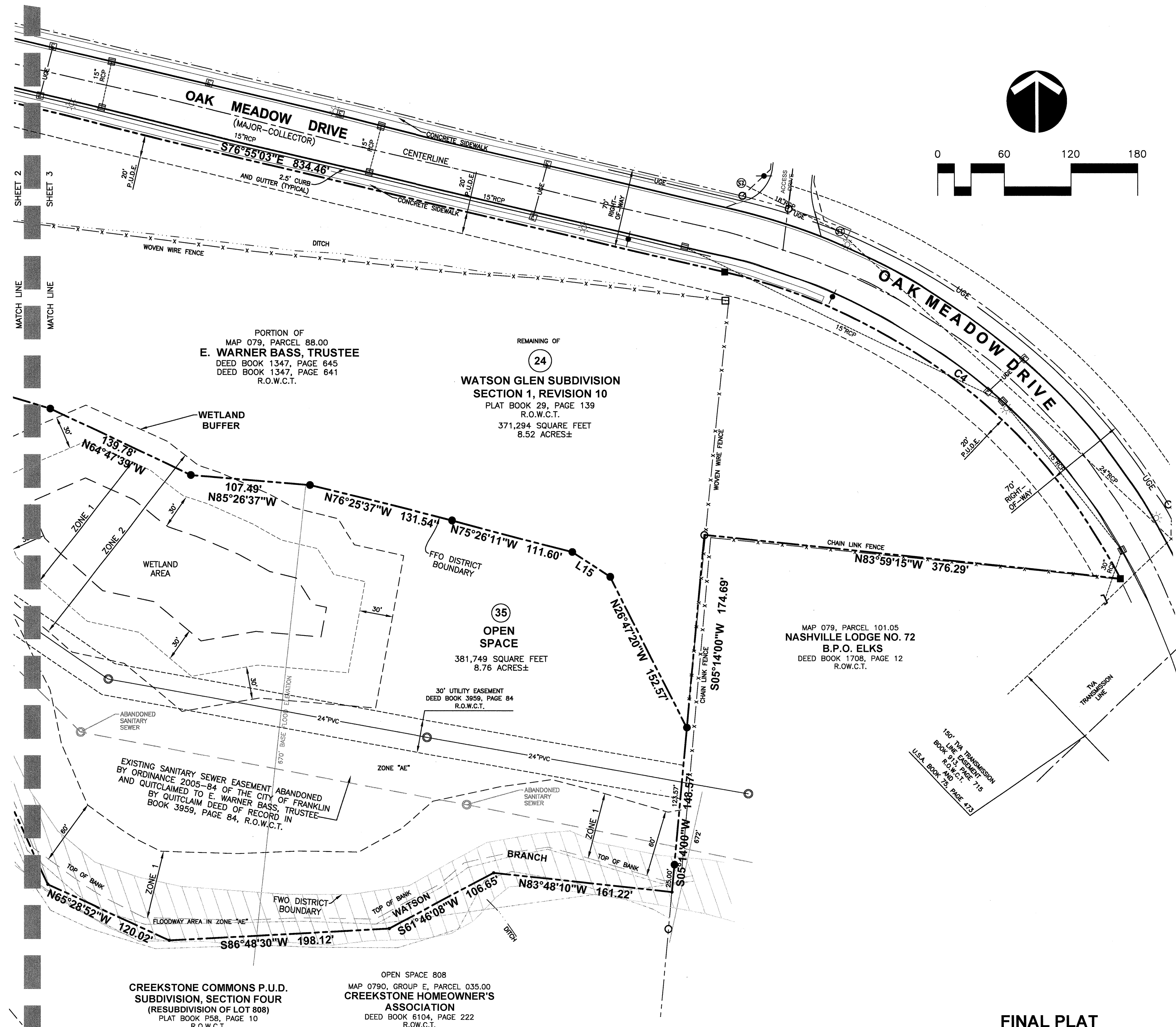
CURVE TABLE					
CURVE	RADIUS	LENGTH	DELTA	CHORD	CHD BRG
C4	537.96'	464.57'	49°28'46"	450.27'	S52°10'40"E

LINE TABLE		
LINE	BEARING	DISTANCE
L15	N57°04'50"W	40.75'



RECORDER'S INFORMATION

- LEGEND**
- | | |
|--|--|
| □ CONCRETE MONUMENT (OLD) | ○ UTILITY POLE |
| ○ IRON ROD (OLD) | -X-X- FENCE |
| ● IRON ROD (NEW) | ⊕ STORM STRUCTURE |
| ■ (5/8" x 18" W/CAP STAMPED "RAGAN SMITH & ASSOCIATES") CATCH BASIN/CURB INLET | ▨ FEMA ZONE "AE" |
| RCP REINFORCED CONCRETE PIPE | ▨ FEMA FLOODWAY AREA ZONE "AE" |
| ⊙ SANITARY SEWER MANHOLE | ▨ FEMA ZONE "X" (OTHER FLOOD AREAS) |
| ⊠ ELECTRIC BOX | FWD FLOODWAY OVERLAY DISTRICT |
| ⊡ TRANSFORMER PAD | FFO FLOODWAY FRINGE OVERLAY DISTRICT |
| INV INVERT | ⊗ LOT NUMBER |
| HEADWALL | — SIGN |
| ⊕ FIRE HYDRANT | ⊕ WATER VALVE |
| ⊠ FIBER OPTIC BOX | * LIGHT STANDARD |
| -UGE- UNDERGROUND ELECTRIC LINE | oe ELECTRIC STUBOUT |
| | R.O.W.C.T. REGISTER'S OFFICE FOR WILLIAMSON COUNTY, TN |



FINAL PLAT
WATSON GLEN SUBDIVISION
SECTION 1, REVISION 17
C.O.F. # 6091

CONDITIONS OF APPROVAL:

Zoning

COF PROJ 6091 WATSON GLEN SEC 1 REV 17 2016-05-09.pdf

1. FFO

- The Floodway Fringe Overlay (FFO) is an overlay zoning district. This zoning district line matches the FEMA 100 year flood plain line. The property line that is shown between Lots 24 and 35 does not correspond with the zoning district line. Please show and label the existing FFO boundary.

2. FFO

- This issue has not been addressed. Please show and label the existing FFO. This line is not the line that is shown and labeled as the property line and FFO. The FFO line is a very undulating, meandering line. The line shown on the plat is not undulating or meandering so it is clear that the line shown is not the FFO.

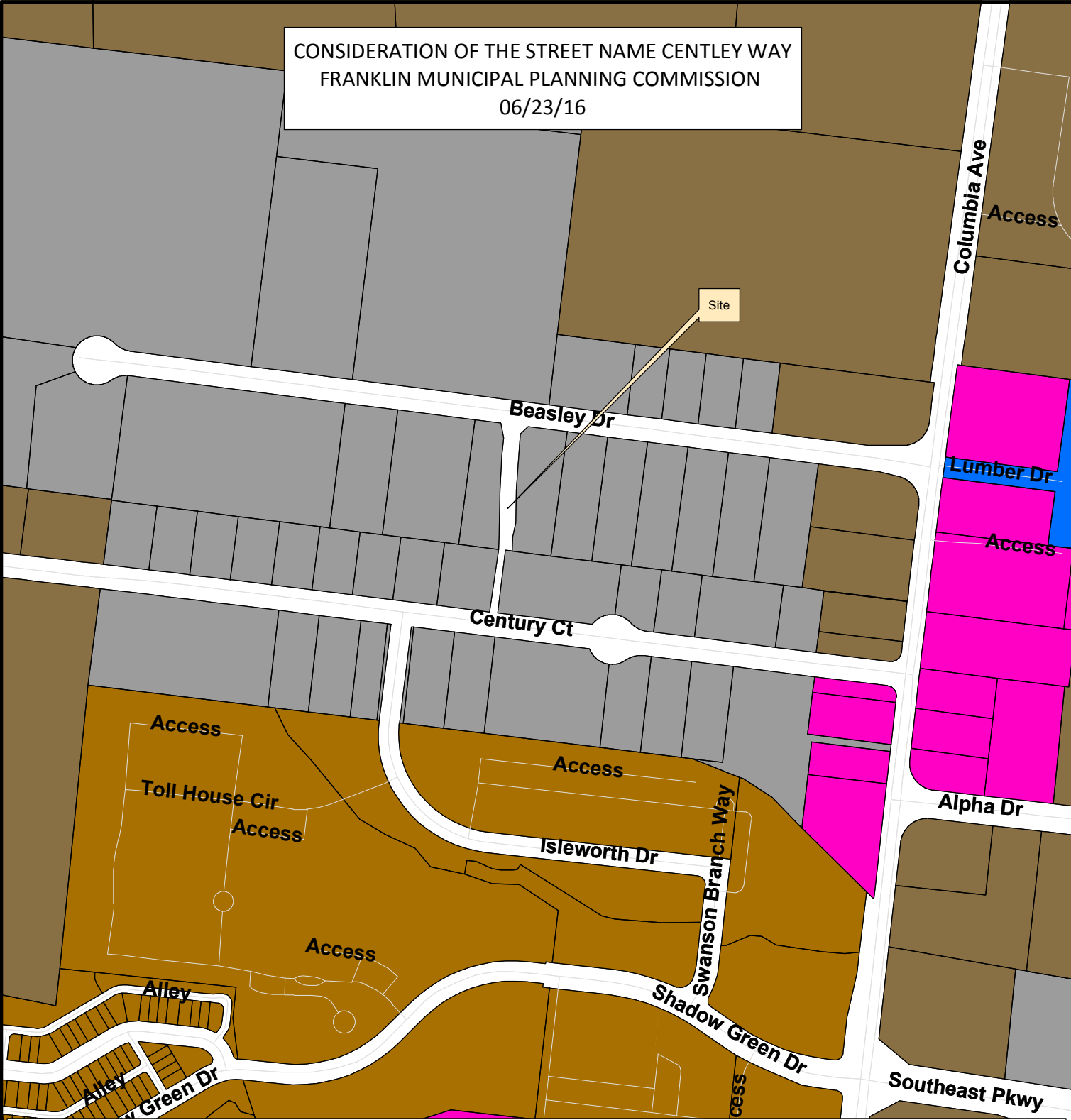
3. Property Line

- This issue has not been fully addressed. Since the actual FFO is not shown on the plat, it is not clear that Lot 35 contains all of the flood plain. No new buildable lots can be created that contain flood plain. Please clearly show that Lot 24 does not contain flood plain.

4. FFO

- It is not clear that this issue has been addressed. Please show the existing FFO so it is clear that no FFO is located on a buildable lot.

CONSIDERATION OF THE STREET NAME CENTLEY WAY
FRANKLIN MUNICIPAL PLANNING COMMISSION
06/23/16



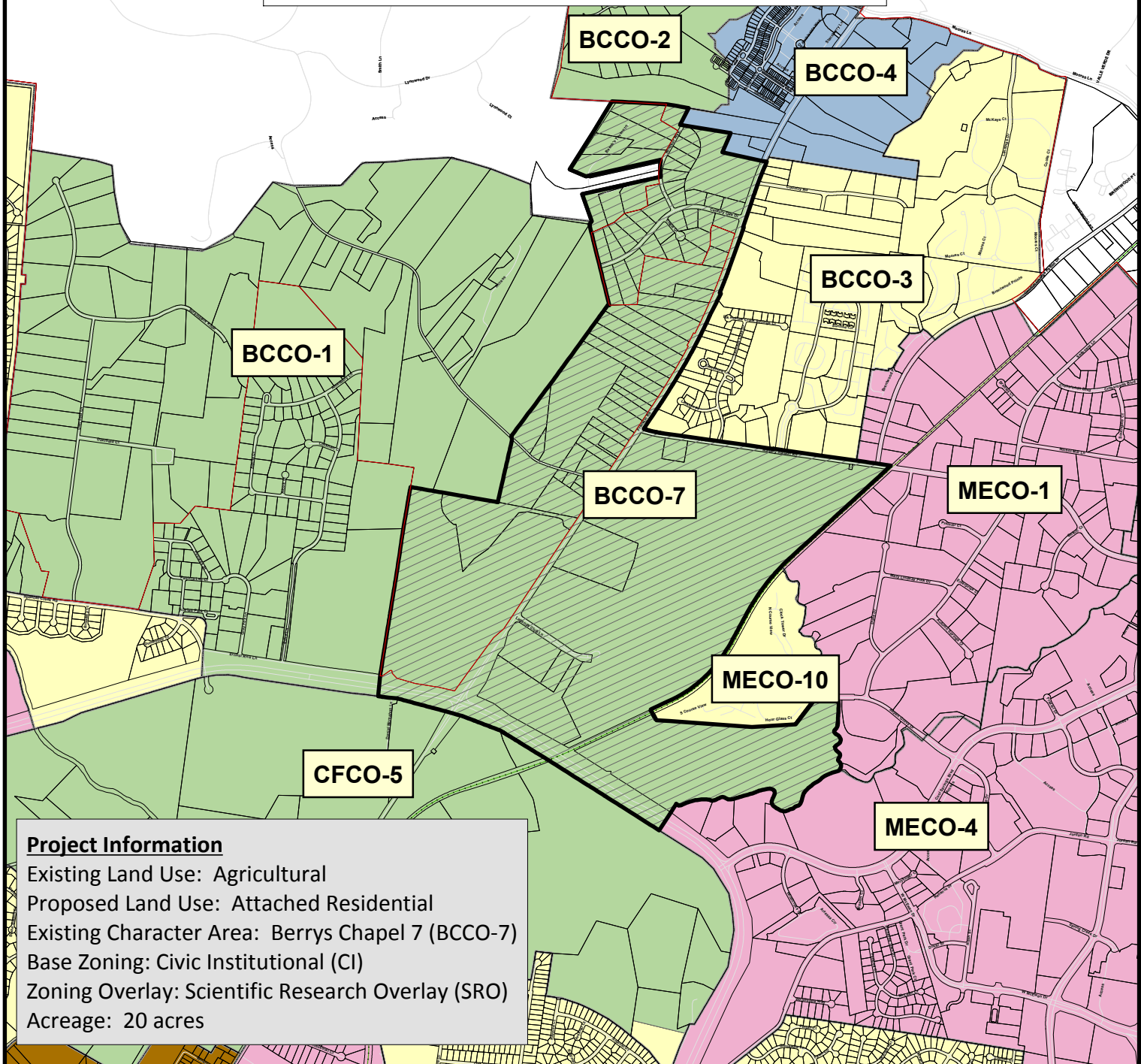
- | | |
|--|-------------------------------------|
| AG Agricultural District | OR Office Residential District |
| ER Estate Residential | GO General Office District |
| R-1 Residential District | CC Central Commercial District |
| R-2 Residential District | NC Neighborhood Commercial District |
| R-3 Residential District | GC General Commercial District |
| R-6 Residential District | LI Light Industrial District |
| RM-10 Attached 10 Residential District | HI Heavy Industrial District |
| RM-15 Attached 15 Residential District | CI Civic and Institutional District |
| RM-20 Attached 20 Residential District | |
| SD-R Specific Development-Residential | |
| SD-X Specific Development-Variety | |



0 220 440 880 Feet

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LAND USE PLAN AMENDMENT TO BERRYS CHAPEL 7 (BCCO-7)
AND FRANKLIN ROAD SMALL AREA PLAN
FRANKLIN MUNICIPAL PLANNING COMMISSION
6/23/16



Project Information

Existing Land Use: Agricultural
Proposed Land Use: Attached Residential
Existing Character Area: Berrys Chapel 7 (BCCO-7)
Base Zoning: Civic Institutional (CI)
Zoning Overlay: Scientific Research Overlay (SRO)
Acreage: 20 acres

Legend

- | | |
|--|---|
|  BCCO7 | Design Concepts |
|  Special Area Boundary |  Activity Center |
|  Streets |  Mixed Use |
| Railroad |  Rural |
|  |  Suburban |
|  Limits |  TND |

0 750 1,500 3,000
Feet



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CHARACTER AREAS

Open Space

1. A well-integrated network of connected open space and parks shall be encouraged to add public amenities and to preserve the existing qualities of the area.
2. Common design elements, such as fieldstone walls and wood plank fencing, shall be used to create and maintain the land-use character of the area.

SPECIAL AREA 7

Character

1. Franklin Road in this area is considered to be the last rural gateway into Central Franklin. This area is unique and has tremendous scenic value to the community. As such, it will remain a prominent and important gateway and corridor into Central Franklin.
3. Substantial areas of open space exist. Future land uses will be carefully developed to respect the rural character of the area.

Land Use

1. Established land uses include homesteads, farmsteads and large estate single family residential uses. Future development will be limited and may include clustered residential and institutional uses that maintain substantial areas of open space and preserve rural viewsheds.
2. Clustered development and open space conservation of surrounding areas shall be encouraged (FRSAP).
3. Appropriate uses include detached and attached residential. Commercial uses shall not be considered (FRSAP).
4. New growth should be encouraged only in areas where adequate public water, sewer and streets are currently available or are planned.

Development Form

1. The area should follow standards for the Rural Design Concept, unless the clustering option is employed. In the use of clustering, the traditional standards would be appropriate for the developed portion of the project.
2. Recommendations originally identified in the Franklin Road Small Area Plan, included herein, shall be applied to the area.
3. Building scale should be limited to 1-2 stories with an exception for civic and institutional buildings, which are subject to the PUD review process during which an alternative maximum height may be established.
4. Civic and institutional buildings may be appropriate in places other than Hamlets if designed in campus settings keeping with the character of the area.

CHARACTER AREAS

5. Appropriate scale and architecture (FRSAP)
 - a. Attached Residential may be appropriate if it has the massing and scale of Detached Residential, such as the “Big House” or “Farmstead Compound” concept, which would have multiple town house or flat units but resembles detached residential.
 - b. Architectural sensitivity for new development shall be held in the utmost regard. The style and architecture shall draw from the surrounding area and historically significant buildings. Some of the historic dwellings in the area were built in the early 19th century and possess Federal and/or Greek Revival architecture.

Connectivity

1. The Major Thoroughfare Plan identifies the expansion of Franklin Road from 2 to 4 lanes between Mack Hatcher Parkway and Moores Lane in its short range projects. In addition, the Mallory Station Road intersection is set to be realigned with South Berrys Chapel Road at Franklin Road by 2025.
2. Coordination with TDOT is needed in the design and construction of proposed intersections with Mack Hatcher Memorial Parkway. Also, construction with TDOT is needed to ensure that Context Sensitive Design for Mack Hatcher Memorial Parkway is fully implemented for the entire loop.
3. Context Sensitive Solutions (CSS) shall be used for street infrastructure improvements to the Franklin Road/Mack Hatcher Memorial Parkway area in coordination with TDOT and City Streetscape Plans. Alternative options as appropriate shall be taken to avoid widening Franklin Road and the intersection (FRSAP).
4. New local streets shall be rural in character, with swales instead of curbs, informal street-tree plantings and traditional rural elements, such as wood plank fencing and stone walls (FRSAP).
5. The rural, scenic character of Franklin Road and Mack Hatcher Memorial Parkway shall be retained and enhanced. Streetscape improvements to Franklin Road shall be rural in nature, including informal, natural landscaping and traditional rural elements (FRSAP).
6. Corridor setbacks shall be a minimum of 150 feet. There shall not be parallel drives within the setback. A viewshed study shall be submitted by the applicant with any request to modify the minimum 150 feet. The purpose of this shall be to achieve optimal placement of clustered development in each quadrant to preserve the scenic viewshed and important natural features (FRSAP).
7. Orientation of structures shall address the streets with no rear yards between the structures and Mack Hatcher Memorial Parkway and Franklin Road. There shall be an emphasis on viewing open space from Franklin Road and Mack Hatcher Memorial Parkway, as opposed to structures (FRSAP).
8. Pedestrian crossings at the Franklin Road/Mack Hatcher Memorial Parkway intersection should be further studied. The pedestrian crossing shall emphasize safety for all modes of travel (FRSAP).
9. A pedestrian crossing of Franklin Road is an important connection that needs to be established. Appropriate field placement of this connection should be studied, and it may result in a pedestrian tunnel or an at-grade crossing (FRSAP).

CHARACTER AREAS

10. Trail interconnectivity should be promoted in the plan area using current and future planned trails, together with trails along the Harpeth River (FRSAP).
11. It shall be the policy of the city to create an outstanding, award winning greenway system and wildlife corridor in this area that serves to connect Aspen Grove Park to Harlinsdale Park to Bicentennial Park and downtown Franklin. This system shall include a pedestrian trail along Spencer Creek through this area (FRSAP).
12. Development shall be coordinated with appropriate improvements to infrastructure and public facilities and provided in a timely manner relative to the growth the facilities are intended to serve (FRSAP).

Open Space

1. Open space should predominate the landscape. Significant areas of open space should be located along Franklin Road, hillsides, and hillslopes. Of significant interest is the Meadows Farm on the West of Franklin Road, and Jackson Lake and Legends Club on the East.
2. An emphasis shall be placed on preserving significant amounts of open space south of Mack Hatcher Memorial Parkway (FRSAP).
3. Land conservation and viewshed preservation need to be sensitive to maintaining existing land-development rights (FRSAP).
4. There shall be a restriction on over-lot grading techniques that dramatically alter site vegetation and topography. Development shall use the natural, existing topography and minimize grading to the maximum extent practicable (FRSAP).



*Rural viewshed along
Franklin Road*



*Detached residential conservation
subdivision,
Athens-Clarke County, GA*



*Big House concept,
New Town of St. Charles, IL*



*Farmland Compound concept,
Steve Bell rendering*

CHARACTER AREAS

SPECIAL AREA 8

Character

1. This area currently comprised of residential, civic/institutional, neighborhood retail, and commercial uses.

Land Use

1. Existing uses are predominantly Neighborhood Retail and Commercial, although Civic/Institutional Uses and Attached Residential are part of the Activity Center Concept as well. Additional similar uses are appropriate. If these uses are proposed, a master plan is encouraged.
2. New growth should be encouraged only in areas where adequate public water, sewer and streets are currently available or are planned.

Development Form

1. This area should follow standards for the Activity Center Design Concept.
2. Associated uses are limited to those identified in the section above.

Connectivity

1. The Major Thoroughfare Plan does not identify any roadway enhancements or construction in its long range plans.
2. Greenways should be encouraged as they provide an open space network between neighborhoods, mixed use centers, office and commercial developments, business districts, parks, schools and historic sites. The Greenway and Open Space Plan calls for a multi-use path and bike lanes along Hillsboro Road.

Open Space

1. A well-integrated network of connected open space and parks shall be encouraged to add public amenities and to preserve the existing qualities of the area.
2. Common design elements, such as fieldstone walls and wood plank fencing, shall be used to create and maintain the land-use character of the area.

CHARACTER AREAS

FRANKLIN ROAD SMALL AREA PLAN

The Franklin Land Use Plan and the Central Franklin Area Plan were adopted in February and May 2004, respectively. Both plans called for further study of the Franklin Road/Mack Hatcher Parkway intersection area because of its importance as a gateway into downtown Franklin, its exemplary scenic quality and rural character along Franklin Road, and the historical significance of surrounding key parcels, such as Harlinsdale Park and Ropers Knob and National Register properties located in the plan area.

The Franklin Road Small Area Plan (SAP) was drafted by the Franklin Municipal Planning Commission (FMPC) with valuable input from the community. Four special meetings, including a mobile workshop, were held over a period of five months. The SAP was adopted on June 22, 2006. The SAP specifies the future land uses and land use character for the area, identifies targeted development standards to preserve the scenic quality of key parcels, and provides the framework to develop the area in an environmentally sensitive way.

FRANKLIN MUNICIPAL PLANNING COMMISSION

Mike Hathaway, Chair
Carol Croop
Scott Harrison
Roger Lindsey
Alma McLemore
Mayor Tom Miller
Ann Petersen
Dennis Phillips
Fred Reynolds
Chris Ude

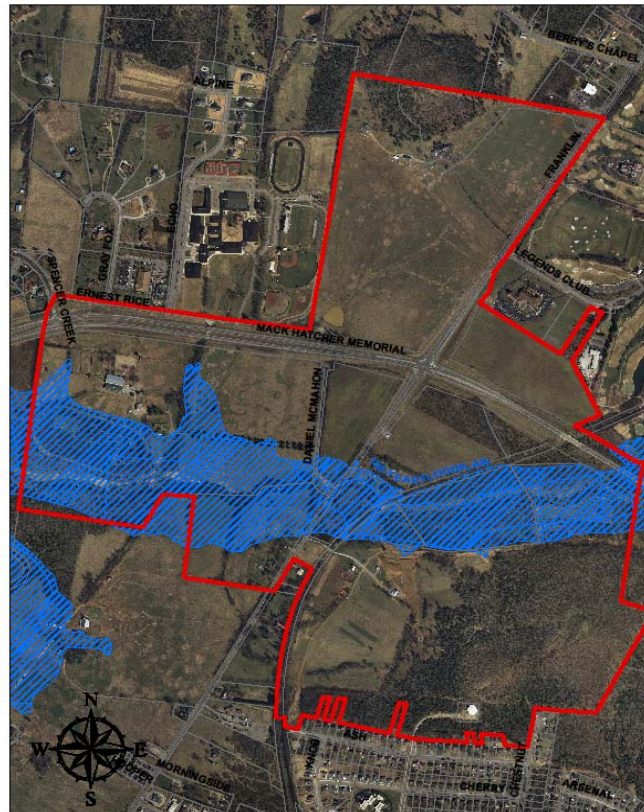
CHARACTER AREAS

EXISTING CONDITIONS

As part of the study process, existing conditions and pressing issues were identified by the FMPC, citizens, and property owners.

The following list outlines some of the major issues:

1. The area is unique and has tremendous scenic value to the community.
2. The land around the intersection is highly visible due to topography rises and elevation changes.
3. Most of the structures have significant setbacks from Franklin Road.
4. Downtown Franklin is a “charming” and economically viable city center with rural uses along Franklin Road as it transitions into the traditional town.
5. Existing street infrastructure is inadequate, and the Franklin Road/Mack Hatcher Parkway intersection is dangerous.
6. Pedestrians and bicyclists do not have a safe passage across the wide expanse of asphalt, which disconnects Central Franklin from the surrounding neighborhoods north of Mack Hatcher Parkway.
7. Private property rights should be considered alongside community desires for viewshed and corridor preservation.



***FRANKLIN ROAD SMALL
AREA BOUNDARIES***

CHARACTER AREAS

GENERAL RECOMMENDATIONS

The following principles will guide City decision-making within the Franklin Road and Mack Hatcher Parkway area:



*Detached Residential Conservation Subdivision
Assabet, MA*



*Detached Residential Conservation Subdivision,
Athens-Clarke County, GA*

Desired Land Uses and Design Parameters

1. Land use character
 - A) Appropriate uses include Detached and Attached Residential.
 - B) Commercial uses shall not be considered.
 - C) Clustered development and open space conservation of surrounding areas shall be encouraged.
 - D) Trail interconnectivity should be promoted in the plan area using current and future planned trails, together with trails along the Harpeth River.



*Big House Concept, New Town of St.
Charles, IL*



*Farmstead Compound Concept,
Steve Bell Rendering*



Big House Concept, San Francisco

2. Appropriate scale and architecture
 - A) Attached Residential may be appropriate if it has the massing and scale of Detached Residential, such as the “Big House” or “Farmstead Compound” concept, which would have multiple town house or flat units but resembles Detached Residential.
 - B) Architectural sensitivity for new development shall be held in the utmost regard. The style and architecture shall draw from the surrounding area and historically significant buildings. Some of the historic dwellings in the area were built in the early 19th century and possess Federal and/or Greek Revival architecture. See the photos on the next page.

CHARACTER AREAS



*Gruider House,
National Register Eligible Property*



*Thomas Shute House, "Creeside",
National Register Property*



*Wyatt Hall,
National Register Property*



*Daniel McMahan House,
National Register Property*

CHARACTER AREAS

Street Corridor Character

1. Context Sensitive Solutions (CSS) shall be used for street infrastructure improvements to the Franklin Road/Mack Hatcher Parkway area in coordination with TDOT and City Streetscape Plans. Alternative options as appropriate shall be taken to avoid widening Franklin Road and the intersection.
2. New local streets shall be rural in character, with swales instead of curbs, informal street-tree plantings and traditional rural elements, such as wood-plank fencing and stone walls.
3. The rural, scenic character of Franklin Road and Mack Hatcher Parkway shall be retained and enhanced. Streetscape improvements to Franklin Road shall be rural in nature, including informal, natural landscaping and traditional rural elements.
4. Corridor setbacks shall be a minimum of 150 feet. There shall not be parallel drives within the setback. A viewshed study shall be submitted by the applicant with any request to modify the minimum 150 feet. The purpose of this shall be to achieve optimal placement of clustered development in each quadrant to preserve the scenic viewshed and important natural features.
5. Orientation of structures shall address the streets with no rear yards between the structures and Mack Hatcher Parkway and Franklin Road. There shall be an emphasis on viewing open space from Franklin Road and Mack Hatcher Parkway, as opposed to structures.

Vehicular Circulation and Access

1. Legends Club Lane shall be the only vehicular access on Franklin Road for future development in the northeast quadrant of the intersection. If the northwest quadrant develops, then access shall be coordinated to create a four-way intersection with signalization, subject to TDOT approval.
2. Future development in the northwest quadrant shall have a street network that connects to Ernest Rice Lane.
3. A left-turn lane shall be installed for Legends Club Lane in conjunction with development in the northeast quadrant, subject to TDOT approval.
4. Daniel McMahon Lane shall be the closest access on Franklin Road from Mack Hatcher Parkway in the southwest quadrant, but may be relocated due to environmental constraints. Access to the southeast quadrant should be studied further to ensure appropriate field placement due to topography and floodplain constraints.
5. Extension of Spencer Creek Road into the southwest quadrant shall be encouraged, in conjunction with TDOT approval.

Pedestrian Circulation and Access

1. Pedestrian crossings at the Franklin Road/Mack Hatcher Parkway intersection should be further studied. The pedestrian crossing shall emphasize safety for all modes of travel.
2. A pedestrian crossing of Franklin Road is an important connection that needs to be established. Appropriate field placement of this connection should be studied, and it may result in a pedestrian tunnel or an at-grade crossing.

CHARACTER AREAS



Franklin Road Corridor



Harlinsdale Farm

Open Space and Protection of Natural Features

1. It shall be the policy of the City to create an outstanding, award-winning greenway system and wildlife corridor in this area that serves to connect Aspen Grove Park to Harlinsdale Park to Bicentennial Park and downtown Franklin. This system shall include a pedestrian trail along Spencer Creek through this area.
2. An emphasis shall be placed on preserving significant amounts of open space south of Mack Hatcher Parkway.
3. Harlinsdale Park should be expanded if opportunities arise.
4. Land conservation and viewshed preservation need to be sensitive to maintaining existing land-development rights.
5. There shall be a restriction on over-lot grading techniques that dramatically alter site vegetation and topography. Development shall use the natural, existing topography and minimize grading to the maximum extent practicable.

Public Facilities and Service Delivery

1. Development shall be coordinated with appropriate improvements to infrastructure and public facilities and provided in a timely manner relative to the growth the facilities are intended to serve.

Berrys Chapel Character Area, Special Area 7

Land Use Plan Map Amendment

Prepared for Embrey Partners

May 9, 2016

Revised: June 2, 2016

COF # 6142

Land Use Plan Amendment

DESCRIPTION

Embrey Partners requests an amendment to the City of Franklin Land Use Plan text for the property located at 145 Legends Club Lane. This property is located in the Berry's Chapel, Special Area 7 and is currently zoned Civil Institutional with a Scientific Research Overlay.

Embrey Partners is currently developing a proposal for a Master Plan PUD and Rezoning Request for the subject property.

The request for the Land Use Plan Text Amendment is to permit greater flexibility in designing a PUD development proposal.

Two text amendments are being proposed and will be detailed in this request.

1. Berrys Chapel Special Area 7 text to permit three story residential in a PUD.

2. Franklin Road Small Area Plan text to permit an emergency access onto Franklin Road from the property located at the Northeast Corner of the intersection.

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■ BCCO-7 PROPOSED TEXT AMENDMENT	7
■ FRANKLIN RD SMALL AREA PLAN PROPOSED TEXT AMENDMENT	8
■ JUSTIFICATION	9

Location Map and Site Data



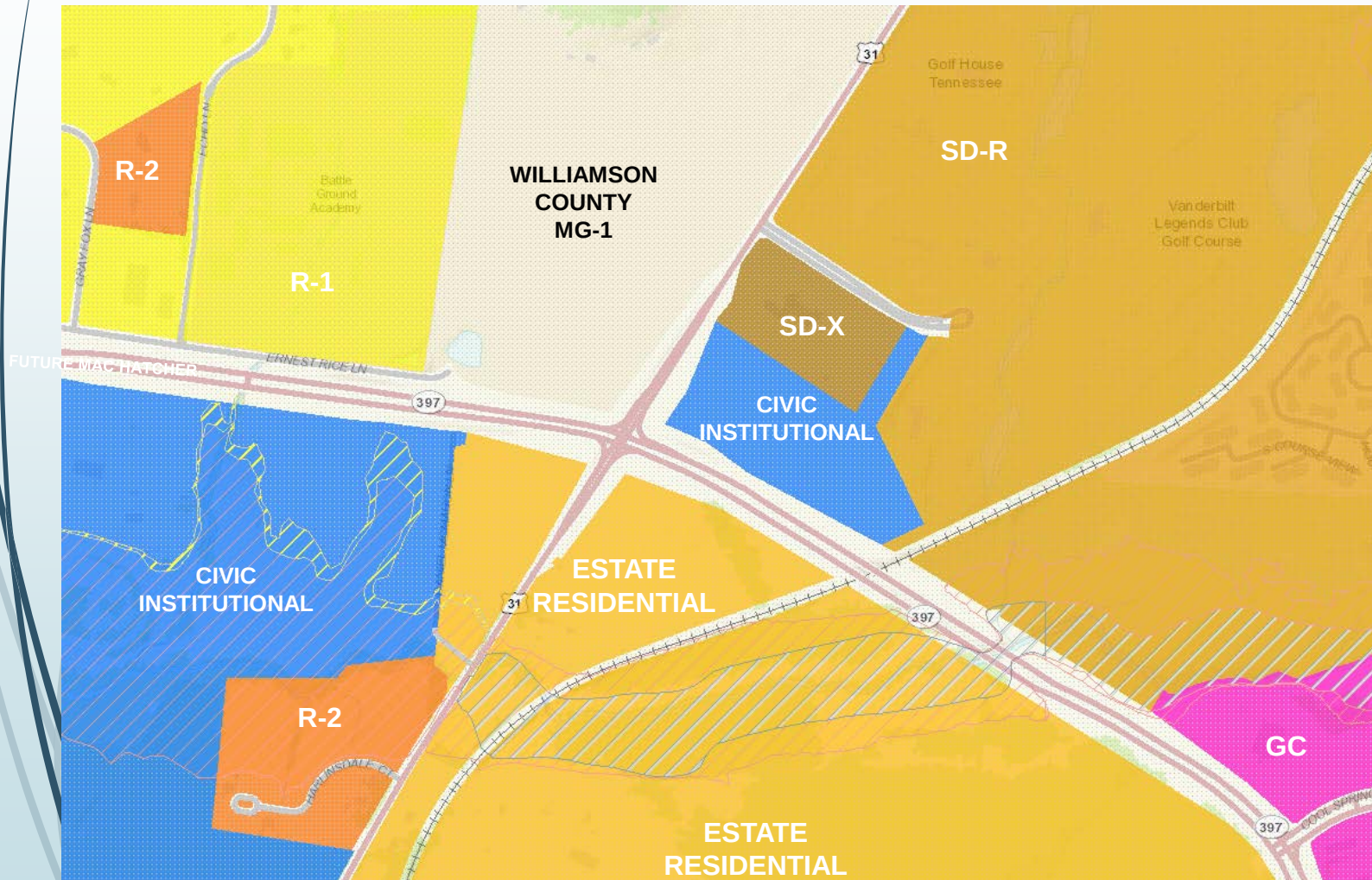
PROJECT NAME: IRON HORSE
SUBDIVISION NAME: IRON HORSE
ADDRESS: 145 LEGENDS CLUB LANE
MAP AND PARCEL: MAP 62, PARCEL 43
CITY: FRANKLIN
COUNTY: WILLIAMSON
STATE: TENNESSEE

EXISTING ZONING: CIVIC INSTITUTIONAL
EXISTING CHARACTER AREA: BCCO-7
OTHER APPLICABLE OVERLAYS: SCIENTIFIC RESEARCH OVERLAY
ACREAGE OF SITE: +/-20 ACRES

OWNER: IRON HORSE PARK, LLC
Address: 145 LEGENDS CLUB LANE,
FRANKLIN, TN

APPLICANT: GAMBLE DESIGN COLLABORATIVE
Address: 144 S.E.PARKWAY, SUITE 200
FRANKLIN, TN 37064
Phone No.: (615) 975-5765
E-mail address: greg.gamble@gdc-tn.com
Contact Name: GREG GAMBLE

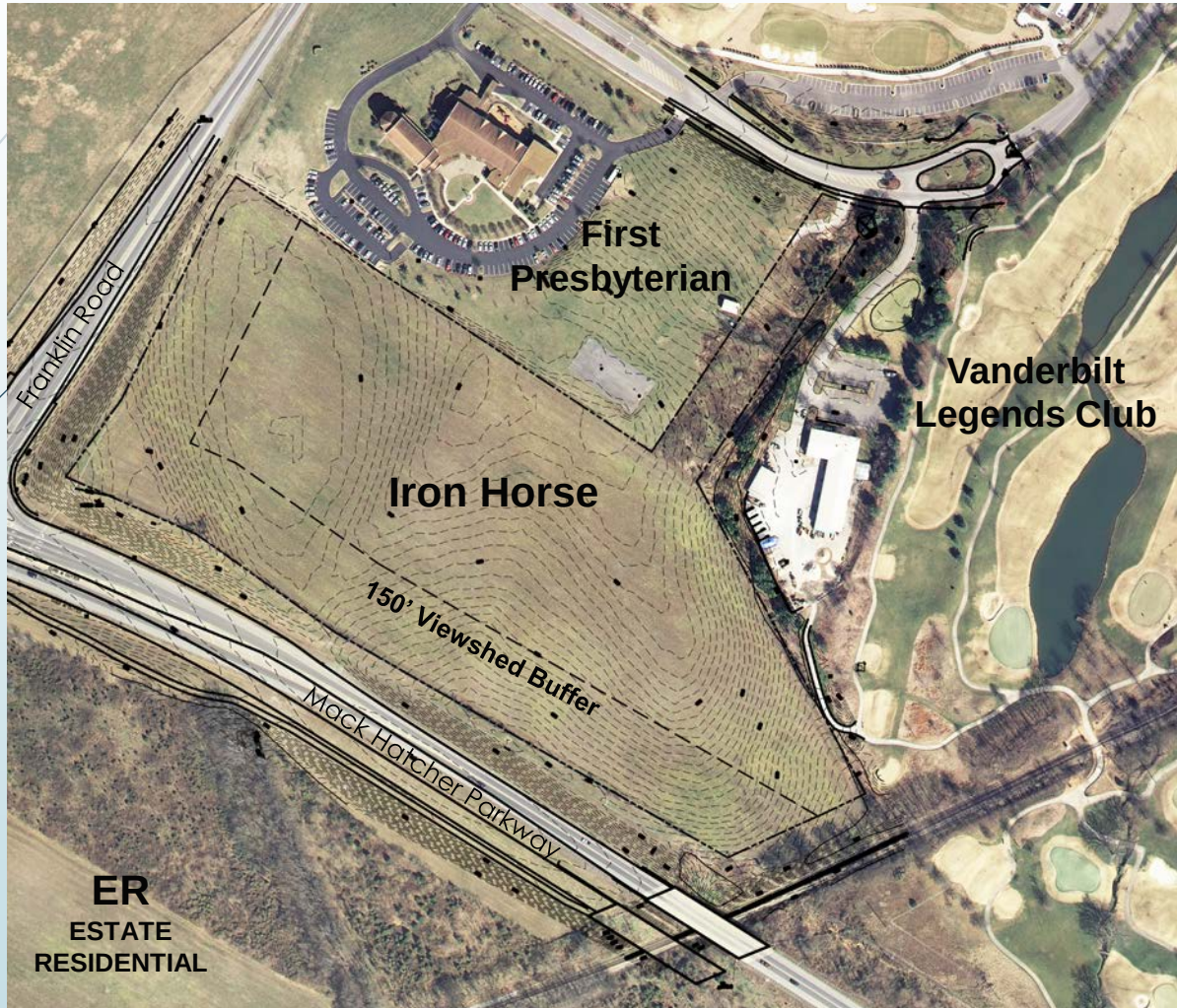
Zoning and Existing Uses



Berrys Chapel Character Area, Special Area 7 LUP Amendment, COF#6142

- Property is zoned Civic Institutional with a Scientific Research Overlay
- The property is currently an undeveloped property in agricultural use.

Physical Features Map



Berrys Chapel Character Area, Special Area 7 LUP Amendment, COF#6142

Base Zoning District: Civic Institutional
Special Area Designation: BCCO 7
Overlay Zoning Districts: SRO
Existing Land Use: Agricultural

Existing or Planned Road Network:

- accessed by Legends Club Drive

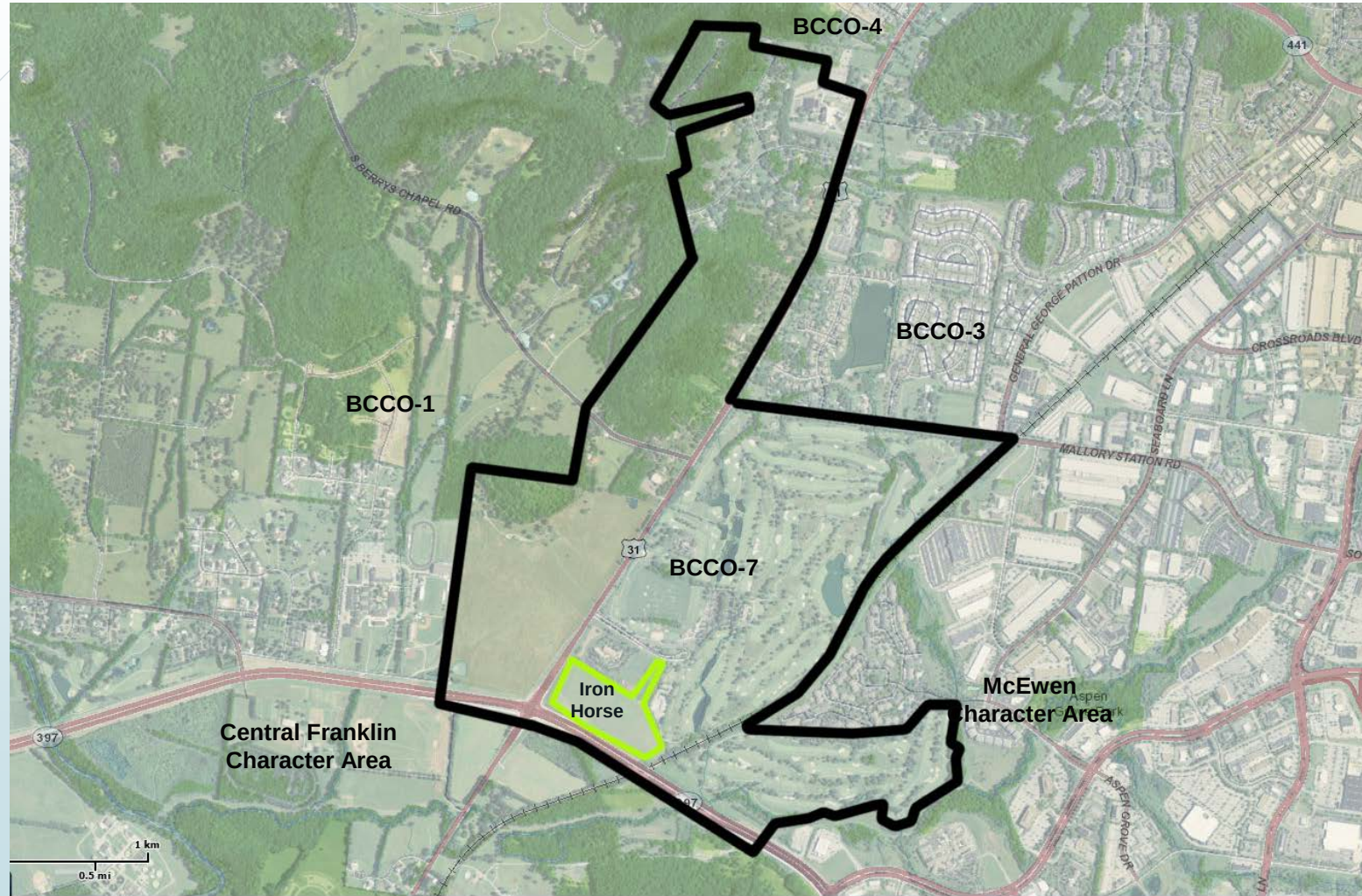
Railroad infrastructure or ROW:
located adjacent to the property's
southeastern border

Historic Properties: N/A

Natural Features that may limit development:

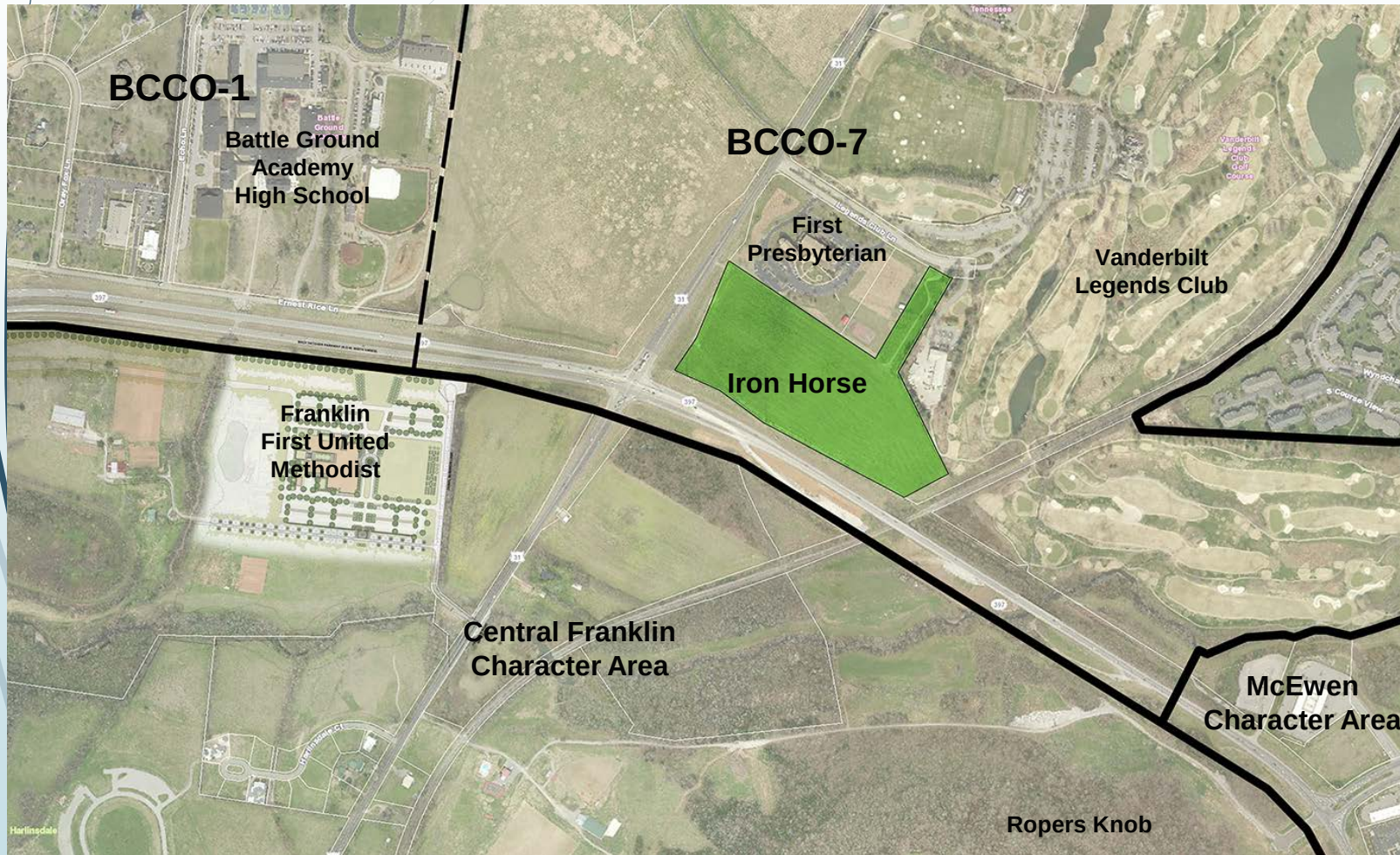
- 150' Viewshed Buffer along Franklin Road and Mack Hatcher Parkway

Berrys Chapel Special Area 7



Berrys Chapel Character Area, Special Area 7 LUP Amendment, COF#6142

BCCO-7 Proposed Text Amendment



Berrys Chapel Character Area, Special Area 7

This text amendment request proposes a change to item 3 under the “Development Form” category. Text revision is shown in **red**.

Current LUP Text

#3 Building scale should be limited to 1 – 2 stories with an exception for civic and institutional buildings, which are subject to the PUD review process during which an alternative maximum height may be established.

Proposed LUP Text

#3 Building scale should be limited to 1 – 2 stories. **In certain circumstances, buildings may be at a height up to 3 stories pursuant to a PUD.**

Justification: The Development Plan level review will provide FMPC/BOMA with adequate architectural details of form, massing and setbacks for an informed decision concerning appropriate building heights.

Franklin Road Small Area Plan



Berrys Chapel Character Area, Special Area 7 LUP Amendment, COF#6142

Franklin Road Small Area Plan, Vehicular Circulation and Access

This text amendment request proposes a change to item 1 under the “Vehicular Circulation and Access” category. Text revision is shown in red.

Current LUP Text

#1. Legends Club Lane shall be the only vehicular access on Franklin Road for future development in the northeast quadrant of the intersection. If the north west quadrant develops, then access shall be coordinated to create a four-way intersection with signalization, subject to TDOT approval.

Proposed LUP Text

#1 Legends Club Lane shall be the **primary** vehicular access on Franklin Road for future development in the northeast quadrant of the intersection. **Emergency access to Franklin Road may be considered subject to City Engineer and TDOT approval.** If the north west quadrant develops, then access shall be coordinated to create a four-way intersection with signalization, subject to TDOT approval.

Land Use Plan Amendment

Justification:

Within BOCO-7, large and highly visible land tracts will be developing in the future. As this corridor is identified as a “gateway” into the City, special care should be given to the architectural forms and architectural transitions proposed.

Previously, a heavier emphasis on Civic and Institutional buildings were imagined for the corner of Mack Hatcher and Franklin Road. Specifically, the Iron Horse property was assigned a “scientific research overlay.” As development patterns have shifted, this property is seeking rezoning for an alternative use. The request to remove the Civic and Institutional use restriction on building height, with PUD approval, will allow not only this property, but others along this corridor to carefully examine architectural form and propose buildings that are appropriately transitioned in comparison to the existing Churches along this corridor, whose heights range from 30 feet to 60 feet in height.

Heights of Buildings along Franklin Road within BOCO-7



First Presbyterian Church BOCO-7



Clearview Baptist Church BOCO-7

A three story residential building is typically 45 to 50 feet in height with 10' floor to floor with a 15' gabled roof.

Architectural Design and Creativity:

Currently, the LUP for Special Area 7, Development Forms, item 5, states that attached residential can be proposed if the architecture takes on the form of a Big House style, or a historic farm house. Local examples of this type of architecture, such as Homestead Manor in Thompsons Station, are three stories.

This type of architecture could be explored within the limits of a PUD process where the architectural form, massing, setbacks and proximity/transition to existing structures can be appropriately vetted and approved by FMPC and BOMA.



“Big House Style”



Homestead Manor

Setback:

Currently, the LUP for Special Area 7, Development Forms, item 5, states Franklin Road and Mack Hatcher shall have a corridor setback of 150 feet.

Scale of architecture is important in this Character Area between the existing churches and the arterial roadways. This large setback is critical along these roadways to maintain the pastoral qualities of the Character Area.

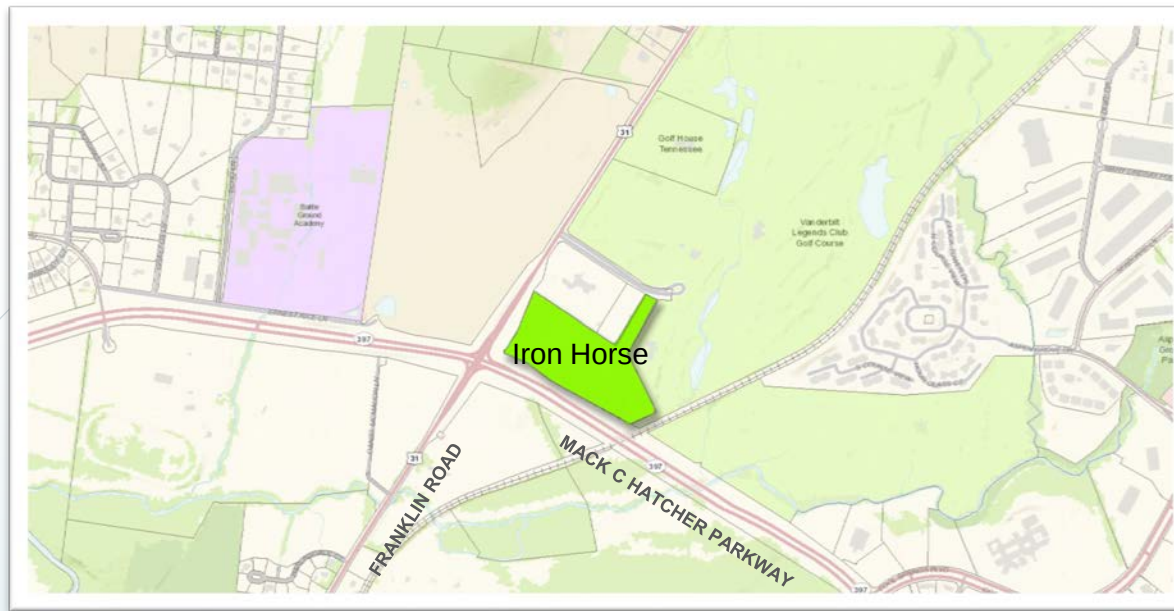
Shown here is a three story building located on Belle Meade Boulevard. The large setback allows for a park-like setting along the road and is an appropriate scale for a 4-lane, median divided roadway.



Belle Meade Boulevard



The PUD Development Plan process allows for the Planning Commission and Board of Mayor and Alderman to critically evaluate the context and relationship of a plan to its setting.



Density and Design:

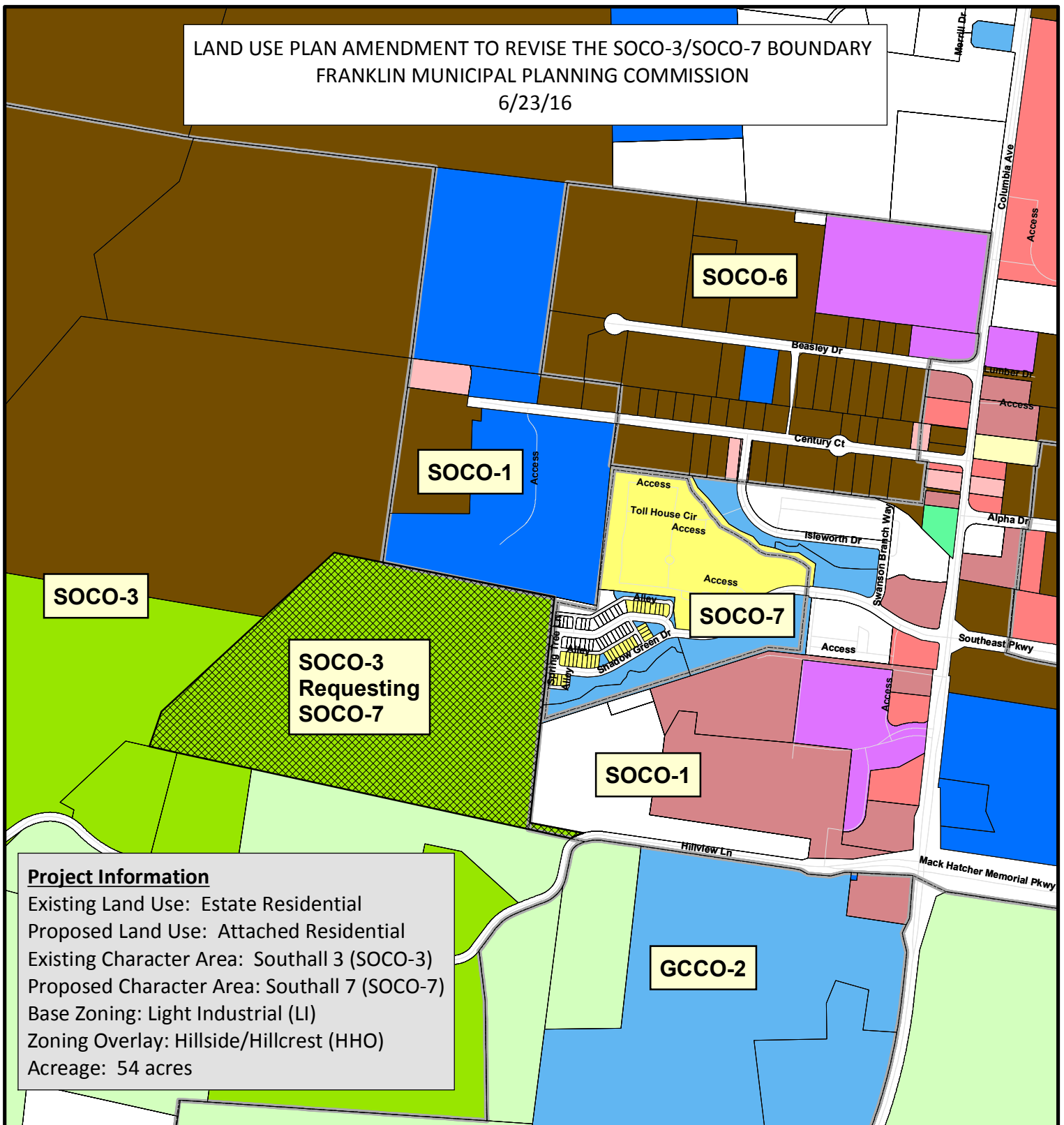
The Land Use Plan Guidelines State “The city will strive to achieve an overall density that is sustainable, compatible, and protective of community character. However, density will be viewed within the context of other important community planning needs, such as design, infrastructure and the recognition that land must be used wisely and efficiently.”

Appropriate density is site specific and plan specific. A combination of two and three story buildings within a residential development allows for variation in the architecture and an increase in density appropriately located adjacent to two arterial roadways.

A full traffic Impact analysis will be prepared and submitted to the City of Franklin with a PUD Submittal. It is anticipated that off-site roadway improvements will be required for access to Legends Club Lane and a new traffic signal is desired (to be installed by the developer).

The request to permit a three story building only within the context of a Development Plan PUD is purposeful to allow the Planning Commission and Board of Mayor and Aldermen ultimate approval of the appropriateness of the design and heights within a site by site context and dependent on the availability of infrastructure.

LAND USE PLAN AMENDMENT TO REVISE THE SOCO-3/SOCO-7 BOUNDARY
FRANKLIN MUNICIPAL PLANNING COMMISSION
6/23/16



Project Information

Existing Land Use: Estate Residential
Proposed Land Use: Attached Residential
Existing Character Area: Southall 3 (SOCO-3)
Proposed Character Area: Southall 7 (SOCO-7)
Base Zoning: Light Industrial (LI)
Zoning Overlay: Hillside/Hillcrest (HHO)
Acreage: 54 acres

Legend

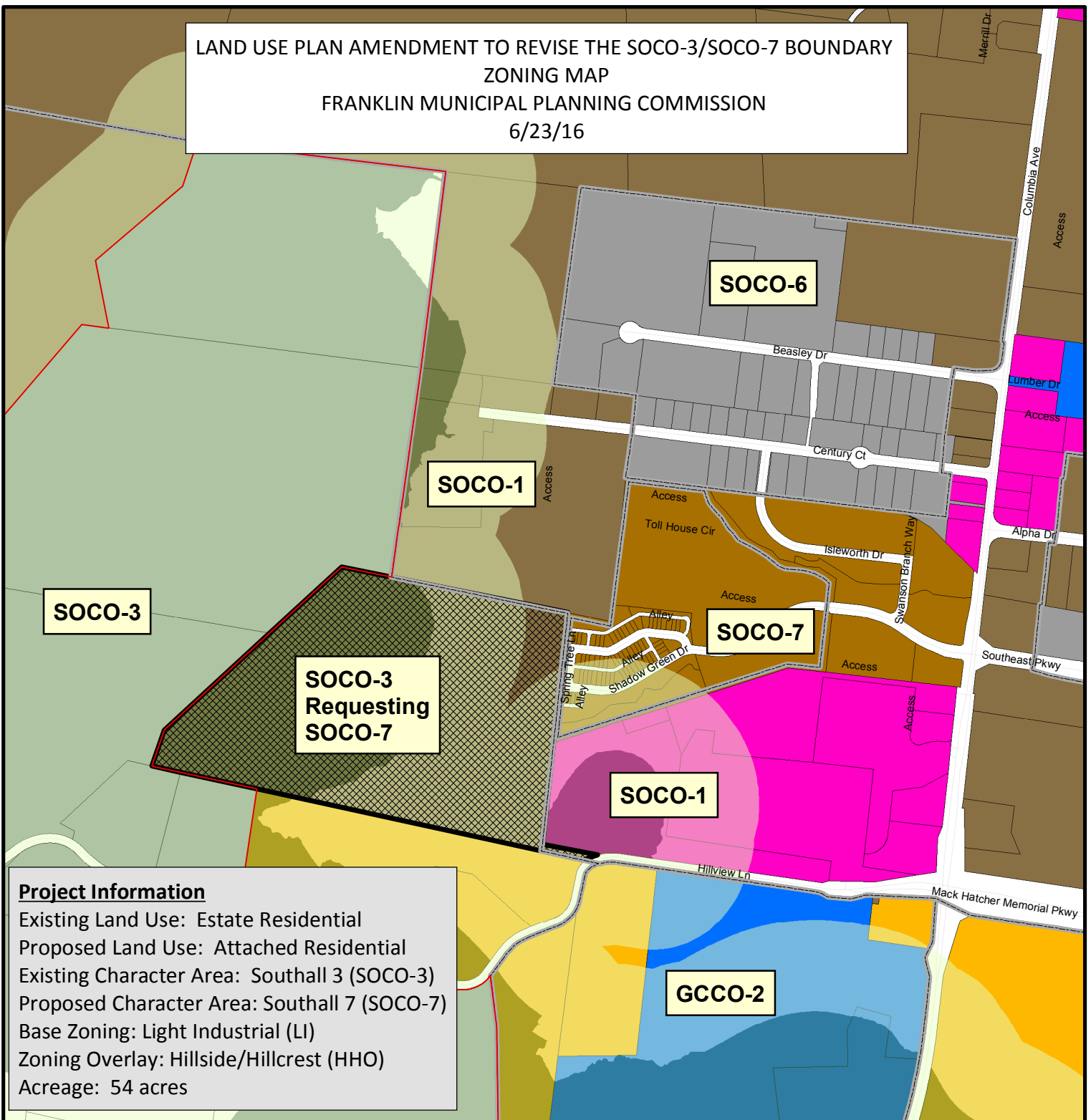
	Requesting SOCO-7		MNR		UTIL
	Special Area Boundary		MR		V
	Streets		MU		
Land Use			OFF		
	AG		R2		
	COM		REC		
	EST		RET		
	IND		RM		
	INST		RS		

0 250 500 1,000
Feet



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LAND USE PLAN AMENDMENT TO REVISE THE SOCO-3/SOCO-7 BOUNDARY
ZONING MAP
FRANKLIN MUNICIPAL PLANNING COMMISSION
6/23/16



Project Information

Existing Land Use: Estate Residential
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Existing Character Area: Southall 3 (SOCO-3)
Proposed Character Area: Southall 7 (SOCO-7)
Base Zoning: Light Industrial (LI)
Zoning Overlay: Hillside/Hillcrest (HHO)
Acreage: 54 acres

Legend

- Special Area Boundary
- Requesting SOCO-7
- Streets

Zoning Base Districts

- 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

- Zoning Overlays Districts**
- 500 Ft Buffer of Hillside Overlay
 - Hillside/Hillcrest Overlay District
 - CI Civic and Institutional District



0 250 500 1,000
Feet

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CHARACTER AREAS

SPECIAL AREA 1

1. The Columbia Avenue corridor shall be improved pursuant to the Franklin Major Thoroughfare Plan.
2. Streetscape improvements, including sidewalks, shall be implemented along this corridor.
3. The existing land-use pattern is expected to remain along the Columbia Avenue corridor, with the application of the city's improved design standards gradually improving the quality of development in this area.
4. Appropriate land uses include Light Industry and related uses.

SPECIAL AREA 2

1. The minimum lot size shall be five acres with Detached Residential.
2. Given the existing development pattern, the size of the area and topographic constraints, Hamlets would not be appropriate.

SPECIAL AREA 3

1. Hamlets or Conservation Subdivisions that respect the extensive hillside and hilltop constraints in the area shall be approved when designed around small neighborhoods consisting of approximately 150 dwelling units accommodating approximately 400 residents.
2. Smaller lots should not be located on the exterior of a proposed development adjacent to, or across the street from, larger lots of an existing development. However, if the applicant proposes an alternative, and if potential conflicts will be created, the applicant shall give justification as to how they will be mitigated or avoided.

SPECIAL AREA 4

1. This area shall have vehicular and pedestrian connections to Westhaven and Willow Springs PUD Subdivisions.

CHARACTER AREAS

SPECIAL AREA 5

1. As the Southall Character Area develops, Special Area 5 will be appropriate for Local Retail.

SPECIAL AREA 6

1. This Special Area shall be reserved for Heavy Industry uses.

SPECIAL AREA 7

1. Attached residential units shall be permitted.
2. Open space shall be oriented to preserve existing natural features of the site. The major streams and associative vegetation shall be preserved and enhanced as a community amenity.
3. The development shall include planned open spaces and pedestrian connections to the surrounding land uses and Conservation Areas.
4. Interconnectivity to the north shall be prohibited. Interconnectivity shall be provided to the east and west and in addition require north/south interconnectivity to the east within Special Area 1 to Century Court.
5. Existing stream and perimeter vegetation shall be preserved to provide buffer to adjacent retail/office and industrial uses. Additional buffering techniques shall be implemented to supplement existing perimeter vegetation.

Southall Character Area, Special Area 7

PROPOSED LAND USE PLAN MAP AMENDMENT

PREPARED FOR GOODALL HOMES

MAY 9, 2016

REVISED JUNE 2, 2016

COF # 6140



LAND USE PLAN AMENDMENT

DESCRIPTION

Goodall Homes requests an amendment to the City of Franklin Land Use Plan map for a property located at 1152 Hillview Lane. **The request is to removed the property from Special Area 3 and add it to the adjacent Special Area 7**

Special Area 7 was created with the Through the Green redevelopment plan. The subject property is bound by existing development, Hilltop/Hillside Overlay and the future Mack Hatcher Parkway. Therefore, future growth in this area is limited as these features create a natural boundary.

Current Land Use Category: Special Area 3

- Land Use Guideline: Residential
- Current Zoning: Light Industrial

This use would be create an incompatible pocket of development, which would derive its access through the residential streets of the Through the Green PUD subdivision. Currently, the only access for this property is through the residential Through the Green neighborhood or Hillview Lane.

If the Land Use Plan map is amended as requested and the property becomes a part of Southall Special Area 7, it would allow for an extension of the development pattern already established with the Through the Green PUD subdivision. The natural development boundaries would contain this neighborhood enclave and buffer it from the surrounding area.

Goodall Homes intends to request the rezoning of this property from Light Industrial to an SD-X neighborhood with an PUD Master Plan. This PUD would be an extension of the Shadow Green Townhome Community and would include additional amenities for the new and existing residents.

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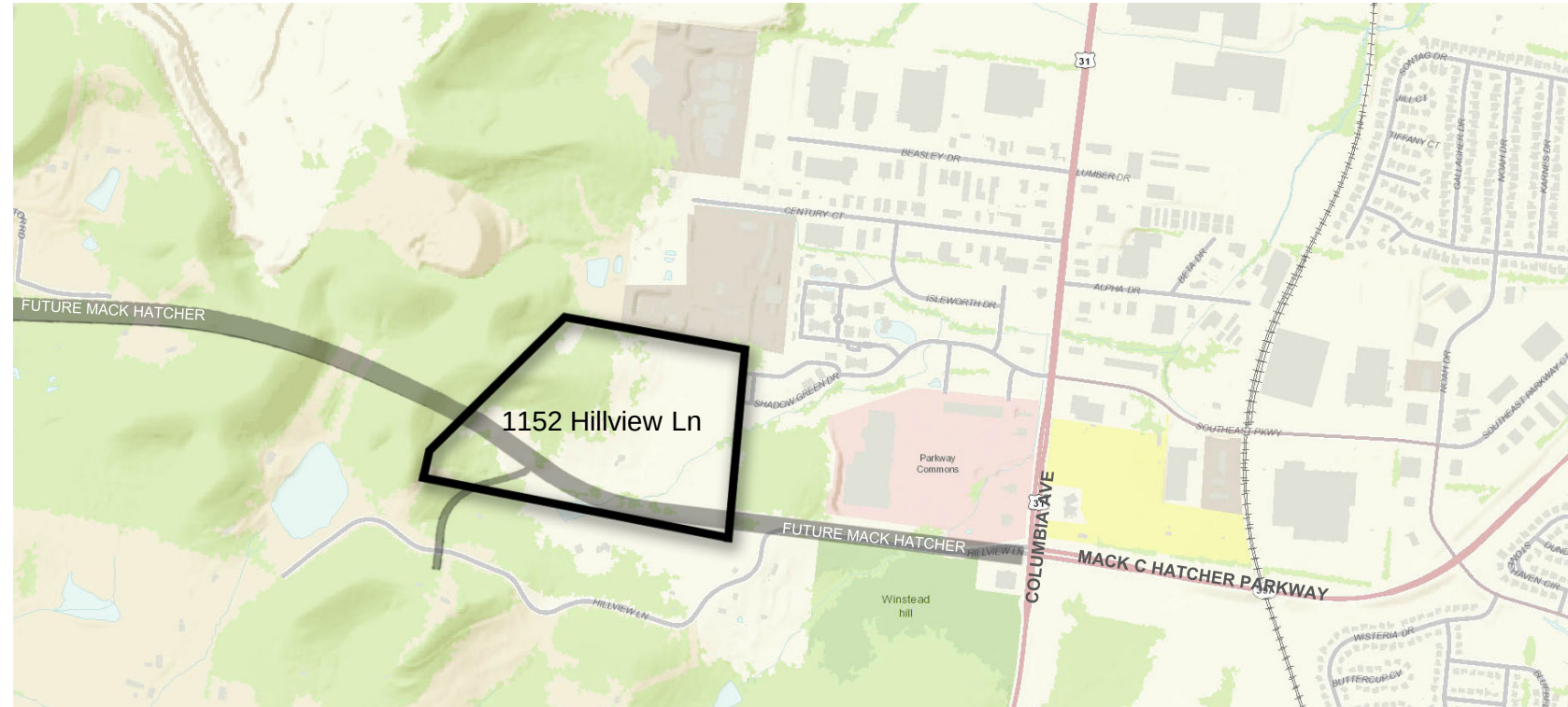
Location Map and Site Data

PROJECT NAME: Southall Character Area, Special Area 7
SUBDIVISION NAME: Proposed - Shadow Green Town Homes
ADDRESS: 1152 Hillview Lane
MAP AND PARCEL: MAP 90, PARCEL 28
CITY: FRANKLIN
COUNTY: WILLIAMSON
STATE: TENNESSEE

EXISTING ZONING: LIGHT INDUSTRIAL
EXISTING CHARACTER AREA: SOCO-3
PROPOSED CHARACTER AREA: SOCO-7
OTHER APPLICABLE OVERLAYS: HHO Overlay & 500' HHO Buffer
ACREAGE OF SITE: +/-54 ACRES

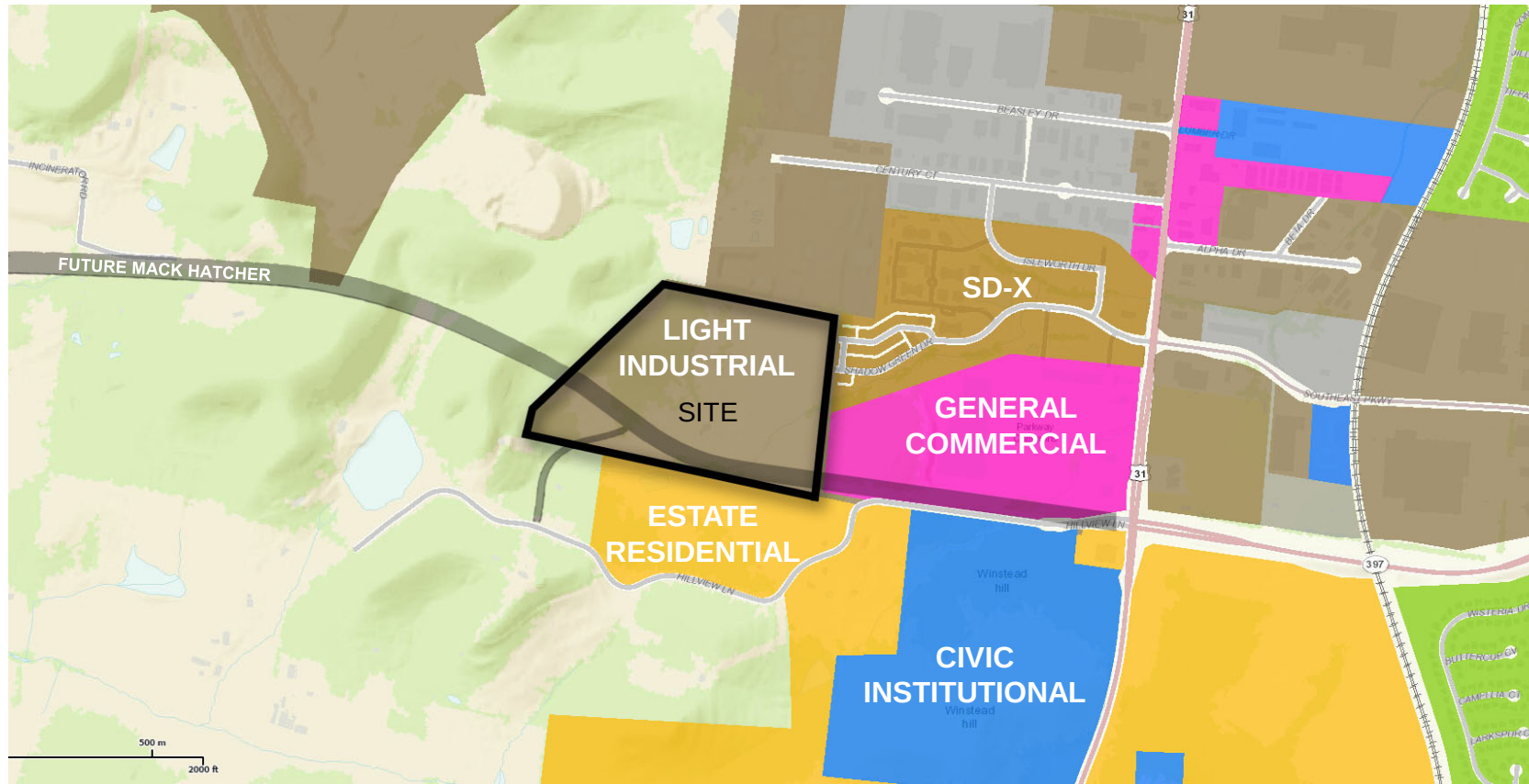
OWNER: Barbara Holt
Address: 208 Ashboro Pl, Franklin TN 37064
Phone No.:

APPLICANT: GAMBLE DESIGN COLLABORATIVE
Address: 144 S.E.PARKWAY, SUITE 200
FRANKLIN, TN 37064
Phone No.: (615) 975-5765
E-mail address: greg.gamble@gdc-tn.com
Contact Name: GREG GAMBLE



Note: Future Mack Hatcher Parkway is shown traversing the subject property in a slightly different location than currently approved by the City of Franklin. This proposed alignment is subject to review and approval by the City of Franklin and TDOT.

Zoning and Existing Uses

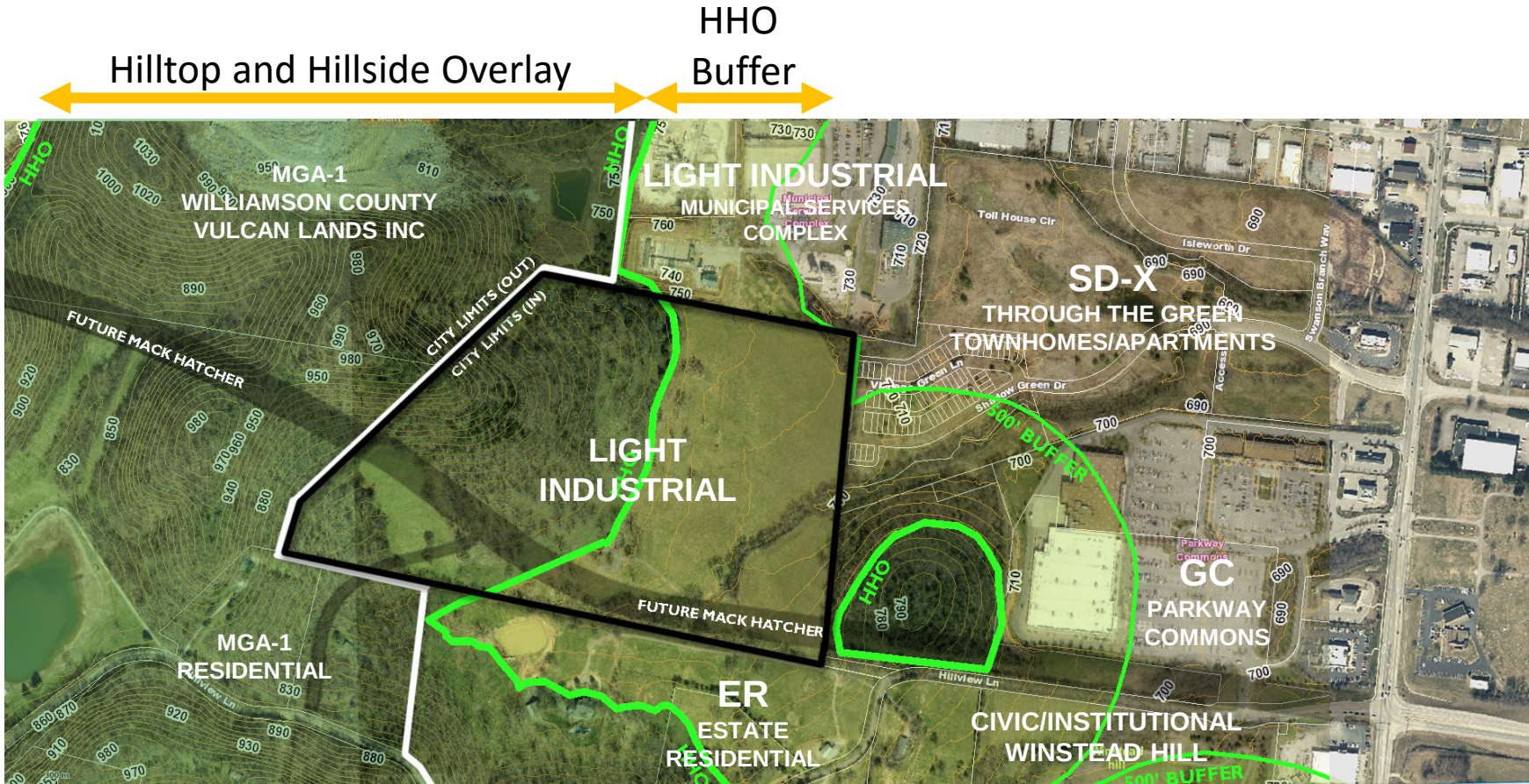


Existing Condition

- Property is zoned Light Industrial
- If property developed as a LI use, it would negatively impact the entry, roadways, and residents of the Shadow Green Townhomes.
- Light Industrial has a much higher noise and nuisance creation than residential

Due to the limited site access and natural/existing development boundaries, a continuation of the Shadow Green neighborhood is a more appropriate use for this site.

Physical Features Map



Note: Future Mack Hatcher Parkway is shown traversing the subject property in a slightly different location than currently approved by the City of Franklin. This proposed alignment is subject to review and approval by the City of Franklin and TDOT.

Base Zoning District: Light Industrial
Special Area Designation: SOCO – 3
Overlay Zoning Districts: HHO, 500' HHO Buffer
Existing Land Use: Residential

Existing or Planned Road Network:

- accessed by local roads Village Green Lane, Shadow Green Drive, and Hillview Lane
- Future Mack Hatcher planned to cross site

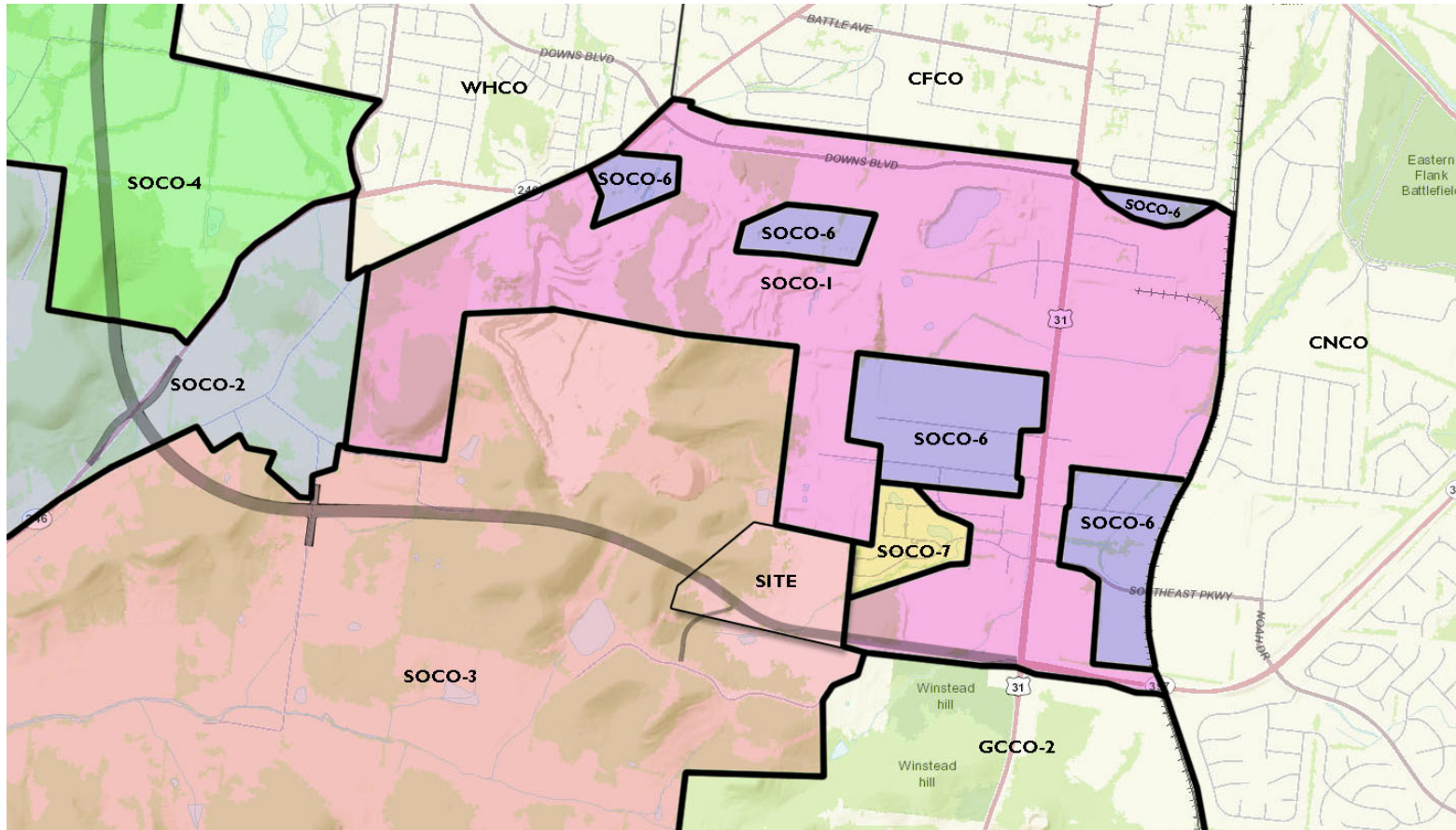
Railroad infrastructure or ROW: N/A

Historic Properties: N/A

Natural Features that may limit development:

- Hilltop/Hillside Overlay

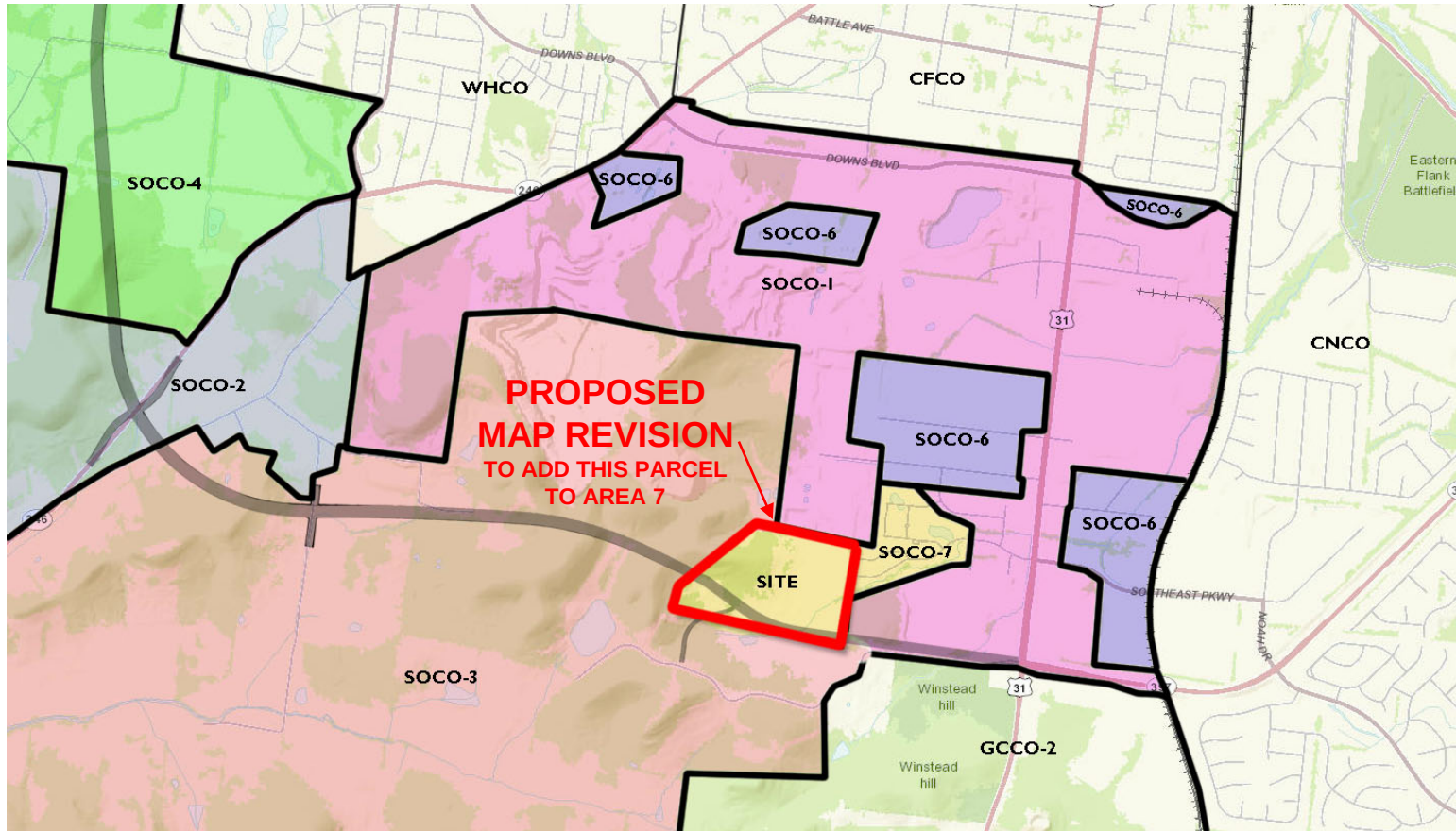
Existing Character Area



Current Character Area: Southall Special Area 3

- 1. *Hamlets or Conservation Subdivision that respect the extensive hillside and hilltop constraints in the area shall be approved when designed around small neighborhoods consisting of approximately 150 dwelling units accommodating approximately 400 residents.*
- The subject property would be more appropriately classified as Special Area 7 due to the natural boundaries separating it from the rest of Special Area 3 (Mack Hatcher to the south and the HHO to the west).
- If approved, Goodall Homes intends to submit a PUD Master Plan for this Site that would be a continuation of the Shadow Green Townhome Community. This development would be buffered from the rest of Special Area 3 by the Hilltops and future Mack Hatcher.

Proposed Character Area Change

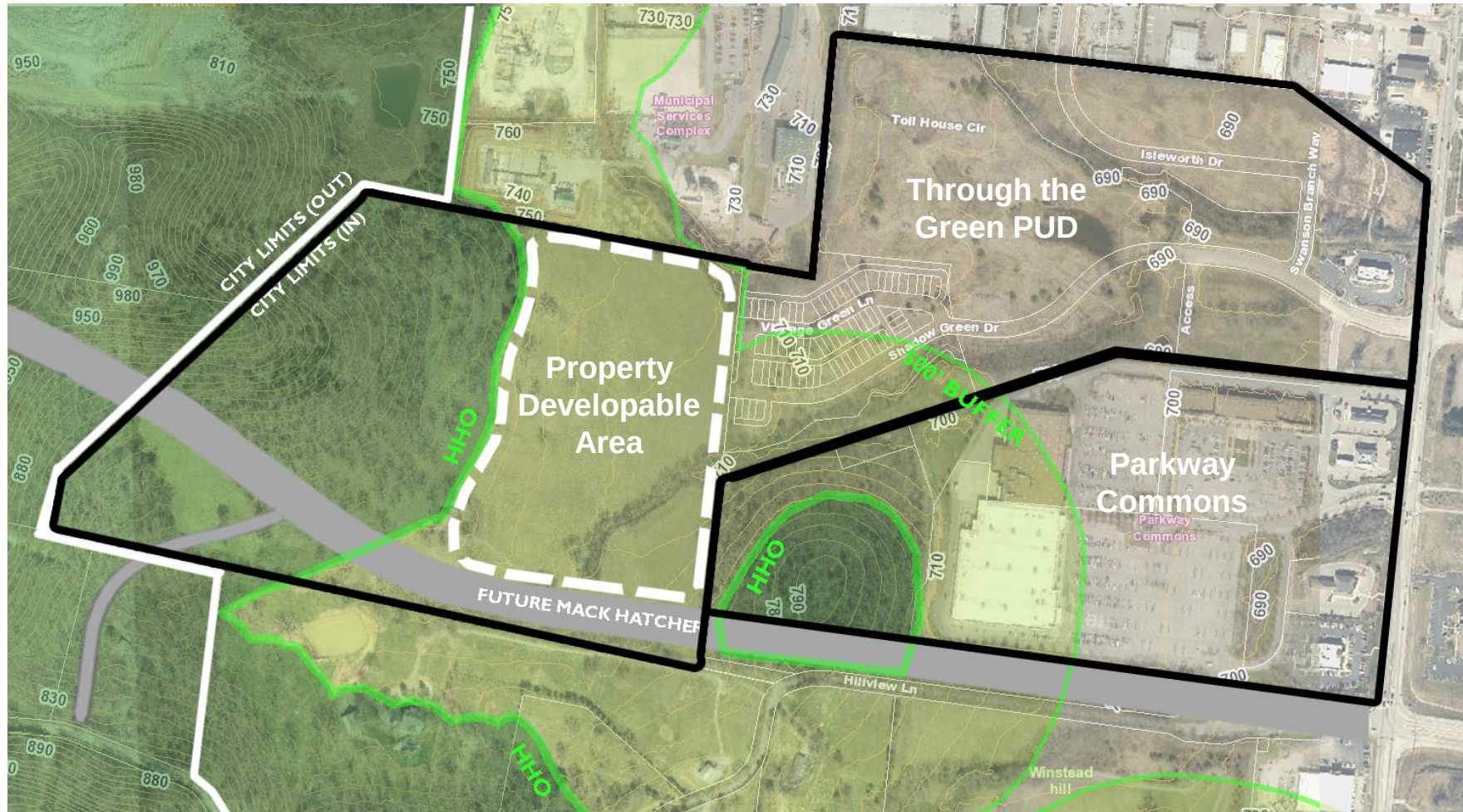


Proposed Character Area: Southall Special Area 7

Proposed **map line revision** and **text revision** as shown below:

1. Attached residential units shall be permitted.
 2. Open Space shall be oriented to preserve existing natural features of the site. The major streams and associated vegetation shall be preserved and enhances as a community amenity.
 3. The development shall include planned open spaces and pedestrian connections to the surrounding land uses and Conservation Areas.
 4. ~~Interconnectivity to the north shall be prohibited.~~
Interconnectivity shall be provided to the east and west and in addition require north/south interconnectivity to the east within Special Area 1 to Century Court. (REMOVE this bullet point)
 5. Existing stream and perimeter vegetation shall be preserved to provide buffer to adjacent retail/office and industrial uses. Additional buffering techniques shall be implemented to supplement existing perimeter vegetation.
- **Add:** Where a property is adjacent to single-family homes or lands intended for a detached residential use, attached residential dwellings should be in the form of townhomes or big houses, where multiple dwelling units resemble detached residential.
 - **Add:** Future Mack Hatcher ROW should be the southern limit of multifamily residential dwelling units.

Land Use Plan Amendment



Note: Future Mack Hatcher Parkway is shown traversing the subject property in a slightly different location than currently approved by the City of Franklin. This proposed alignment is subject to review and approval by the City of Franklin and TDOT.

JUSTIFICATION

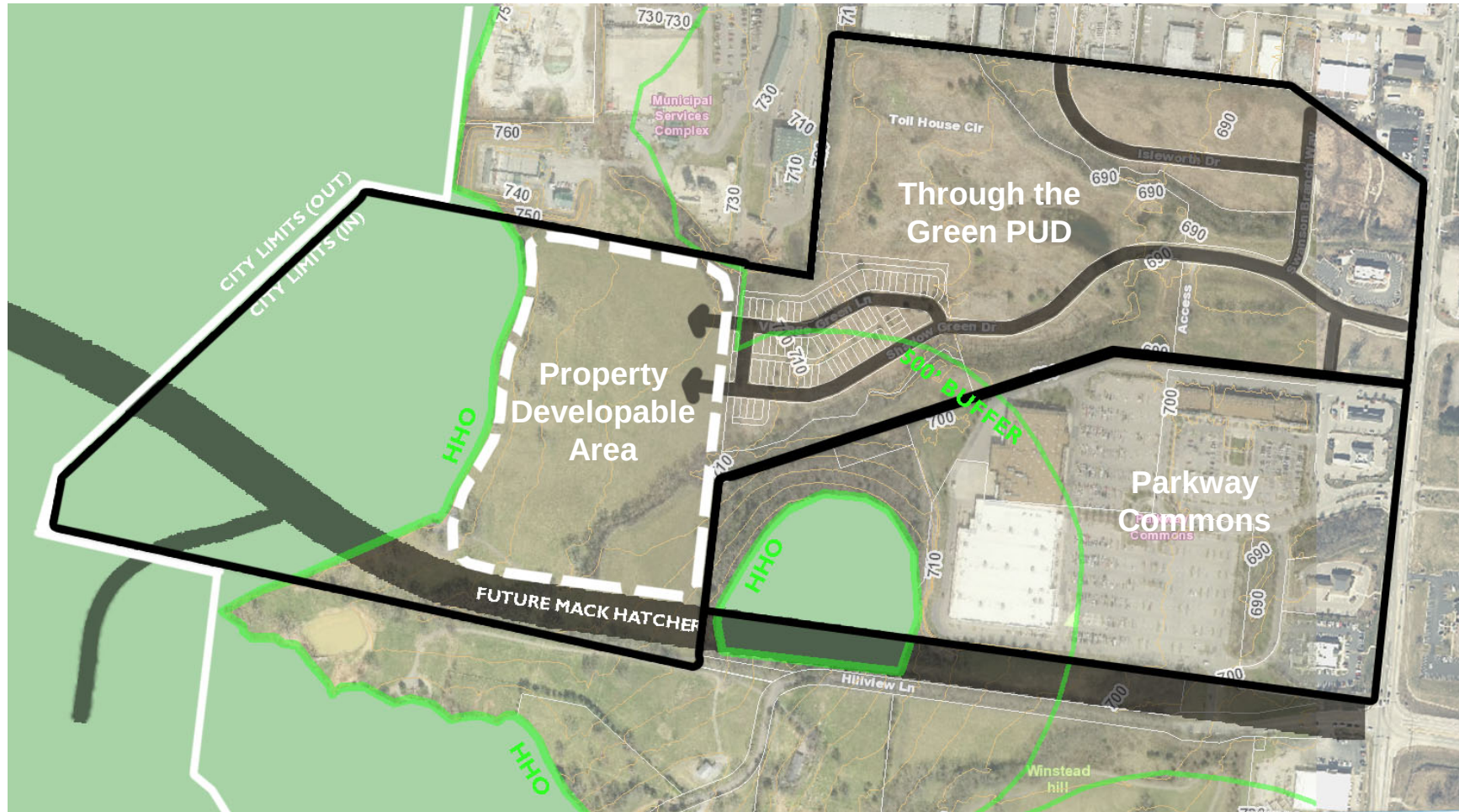
The subject property is in a unique situation in that it has natural and constructed boundaries on all sides, thereby limiting its future development.

- Natural barriers created by the Hilltop/Hillside overlay confine development to the eastern portion of the property.
- The COF Municipal Services Complex limits connections to the North
- Future Mack Hatcher Parkway creates a boundary to the South.

Currently, the only access to the property is through the roadway connections from the Through the Green PUD neighborhood to the east.

The property has limited access to properties surrounding it, creating a small enclave available for future development that is contiguous with the Through the Green PUD.

Land Use Plan Amendment



Established Boundaries

The guiding principals of the Land Use Plan discuss the use of well defined boundaries when evaluating new development.

The defining boundaries firmly established around this property are:

- The Hilltop/Hillside Overlay
- Future Mack Hatcher Parkway
- Parkway Commons
- The Municipal Services Complex

Additionally, in the LUP guiding principals under the managed growth category, “leap frog” style development is discouraged.

By allowing the established boundaries of the Hilltop/Hillside overlay and future Mack Hatcher parkway to serve as a boundary to Special Area 7, this reinforces this principal and discourages a potential enclave of Light Industrial development that would be incompatible with its neighbors.

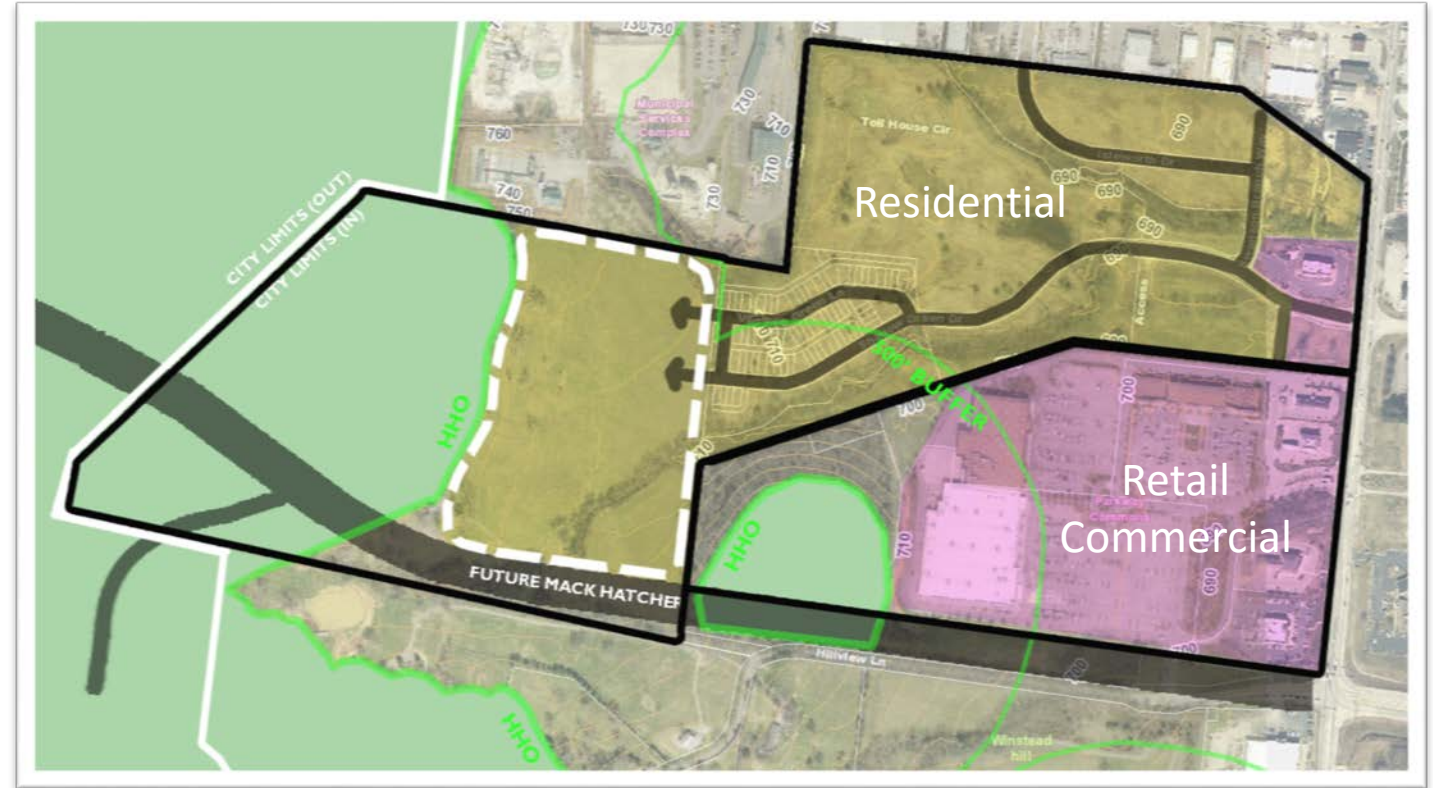
Land Use Plan Amendment

Encouraged Land Use Relationships

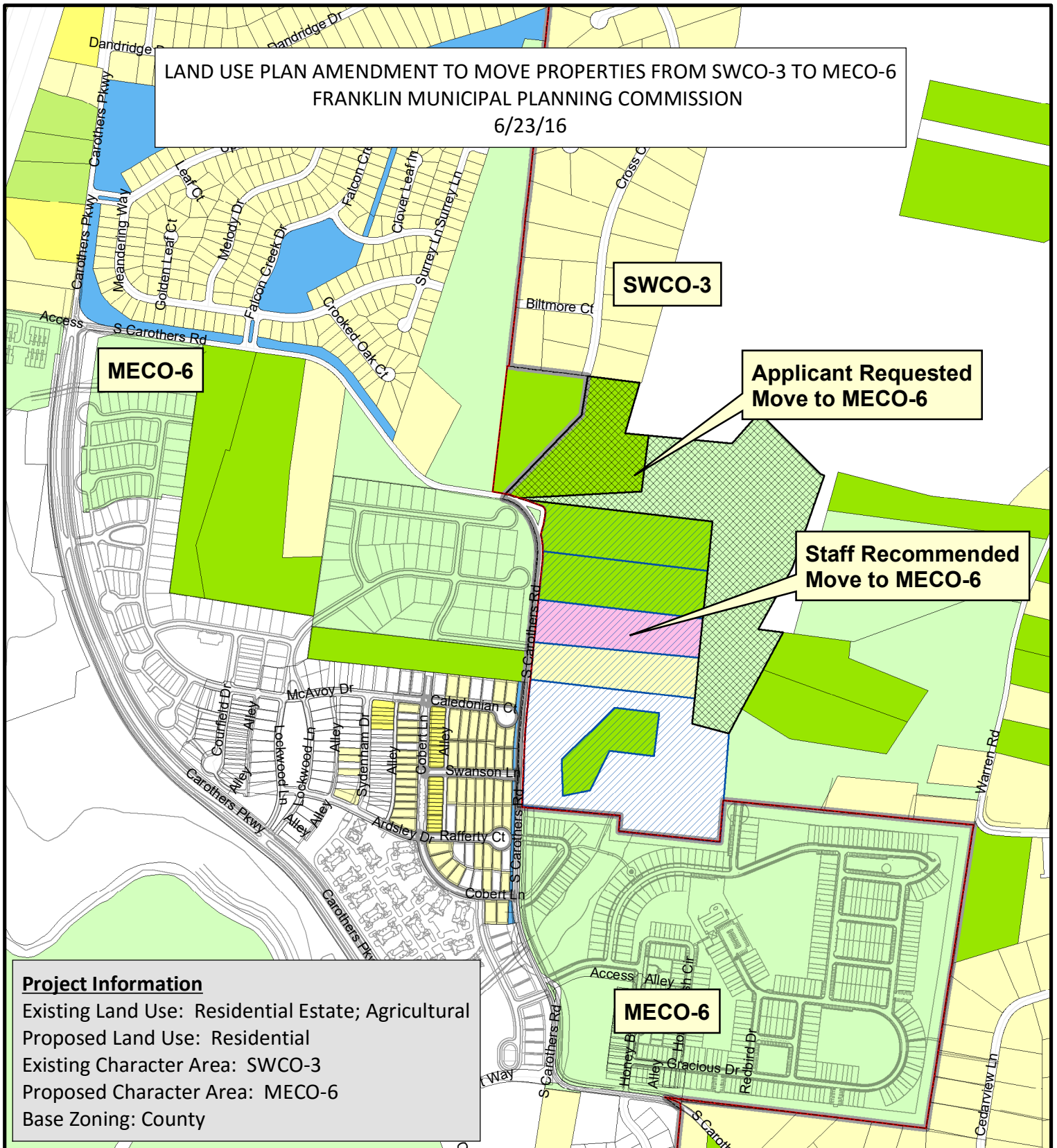
Allowing the expansion of Special Area 7 into this pocket of developable land also supports several themes in the LUP guiding principals concerning the connection between residential and commercial development.

As a residential neighborhood, both sidewalks and walking trails will connect back into an established pedestrian corridor in Through the Green. The pedestrian ways connect to Parkway Commons and the commercial properties in Through the Green.

Additional residential in character with the existing residential pattern will complement and add to the walkable neighborhood infrastructure.



LAND USE PLAN AMENDMENT TO MOVE PROPERTIES FROM SWCO-3 TO MECO-6
FRANKLIN MUNICIPAL PLANNING COMMISSION
6/23/16



Project Information

Existing Land Use: Residential Estate; Agricultural
Proposed Land Use: Residential
Existing Character Area: SWCO-3
Proposed Character Area: MECO-6
Base Zoning: County

Legend

City Limits	EST	REC
Streets	IND	RET
Applicant Requested Site	INST	RM
Staff Requested Sites	MNR	RS
Special Area Boundary	MR	UTIL
Land Use	MU	V
AG	OFF	
COM	R2	

0 250 500 1,000
Feet



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MCEWEN CHARACTER AREA, SPECIAL AREA 6

PROPOSED LAND USE PLAN MAP AMENDMENT

PREPARED FOR LAND SOLUTIONS

MAY 9, 2016

RESUBMITTAL: JUNE 2, 2016

COF # 6141



LAND USE PLAN AMENDMENT

TABLE OF CONTENTS

DESCRIPTION AND JUSTIFICATION.

Land Solutions requests an amendment to the City of Franklin Land Use Plan map for the properties located at 4344 S. Carothers Rd and 4350 S. Carothers Rd. These properties are currently in the Franklin UGB, adjacent to the City of Franklin City Limits.

Request:

That the subject properties be removed from Seward Hall Special Area 3 and added to McEwen Special Area 6.

With the current development pattern along the Carothers Parkway corridor, these properties, as well as the next five properties to the south, should serve as a transitional feature from the smaller lots and higher densities of the Carothers Parkway developments to the larger lots of the established Williamson County neighborhoods.

With the Land Use Plan map amendment, the Character Area boundary would be relocated to the rear property lines instead of the center line of S. Carothers Road. An existing drainage conveyance channel and sewer line, running at the rear of these properties, would further enforce the boundary location.

If this request is supported by the Franklin Planning Commission, Land Solutions intends to request the rezoning and annexation of these properties as a party of the Ashcroft Valley PUD Master Plan. In addition to serving as a lot size transition, these parcels will allow an additional ingress/egress for Ashcroft Valley onto South Carothers Road.

■ LOCATION MAP	3
■ PHYSICAL FEATURES MAP	4
■ ZONING AND EXISTING USES	5
■ EXISTING CHARACTER AREA BOUNDARY	6
■ PROPOSED CHARACTER AREA BOUNDARY	7
■ JUSTIFICATION	8

LOCATION MAP AND SITE DATA

PROJECT NAME: Carothers Rd Properties

SUBDIVISION NAME: Proposed – Ashcroft Valley PUD

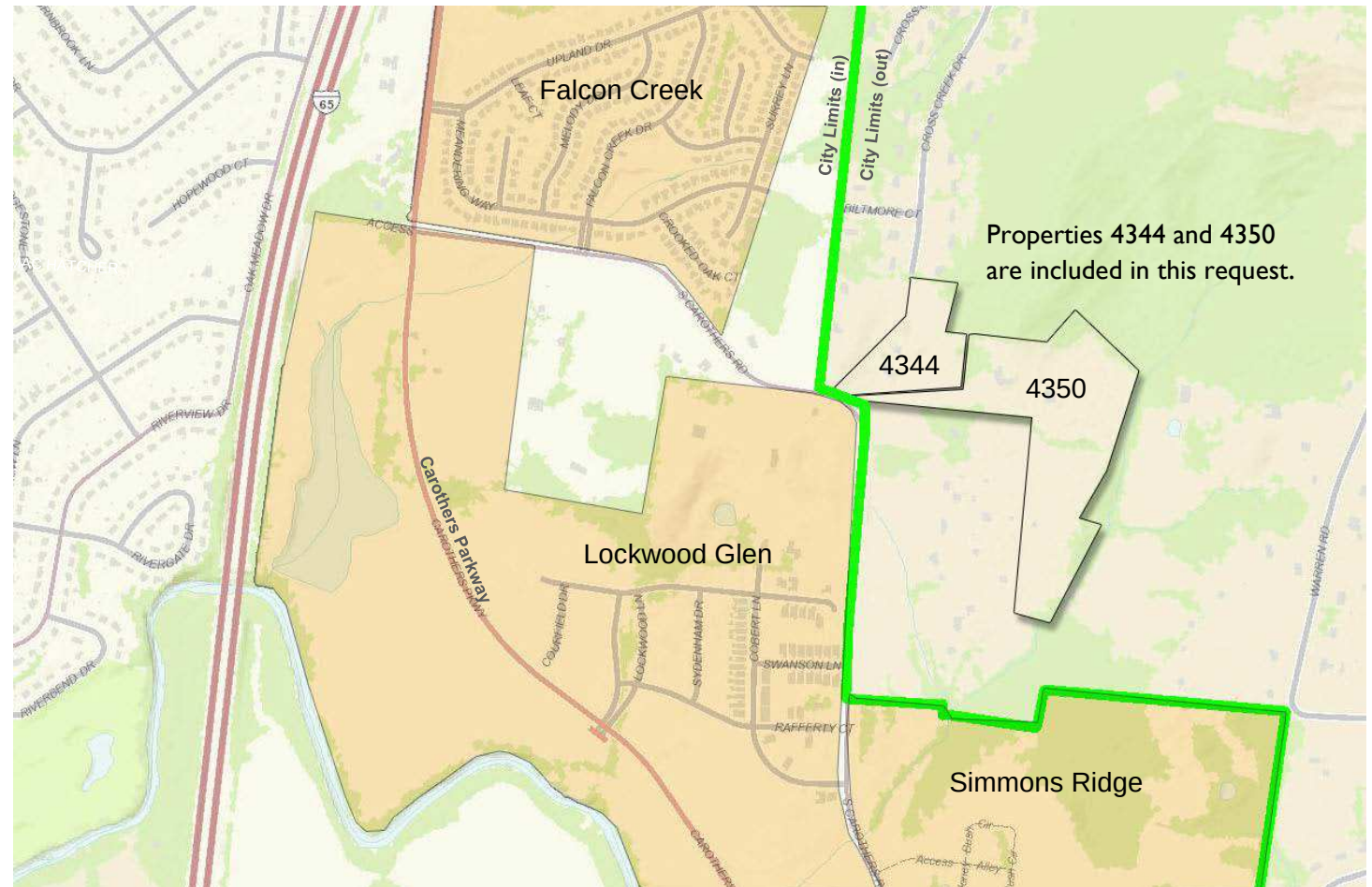
ADDRESS: 4344 & 4350 S. Carothers Road
MAP AND PARCEL : MAP 89, PARCEL 43.02, 43.03
CITY: FRANKLIN
COUNTY: WILLIAMSON
STATE: TENNESSEE

EXISTING ZONING Williamson County,
EXISTING CHARACTER AREA: SWCO-3
PROPOSED CHARACTER AREA: MECO-6
OTHER APPLICABLE OVERLAYS: None
ACREAGE OF SITE: +/- 11.6 AC total

OWNER: Patti Sue Watkins
Address: 4344 S. Carothers Rd, Franklin TN 37064

OWNER: George Durnin V
Address: 4350 S. Carothers Rd, Franklin, TN 706

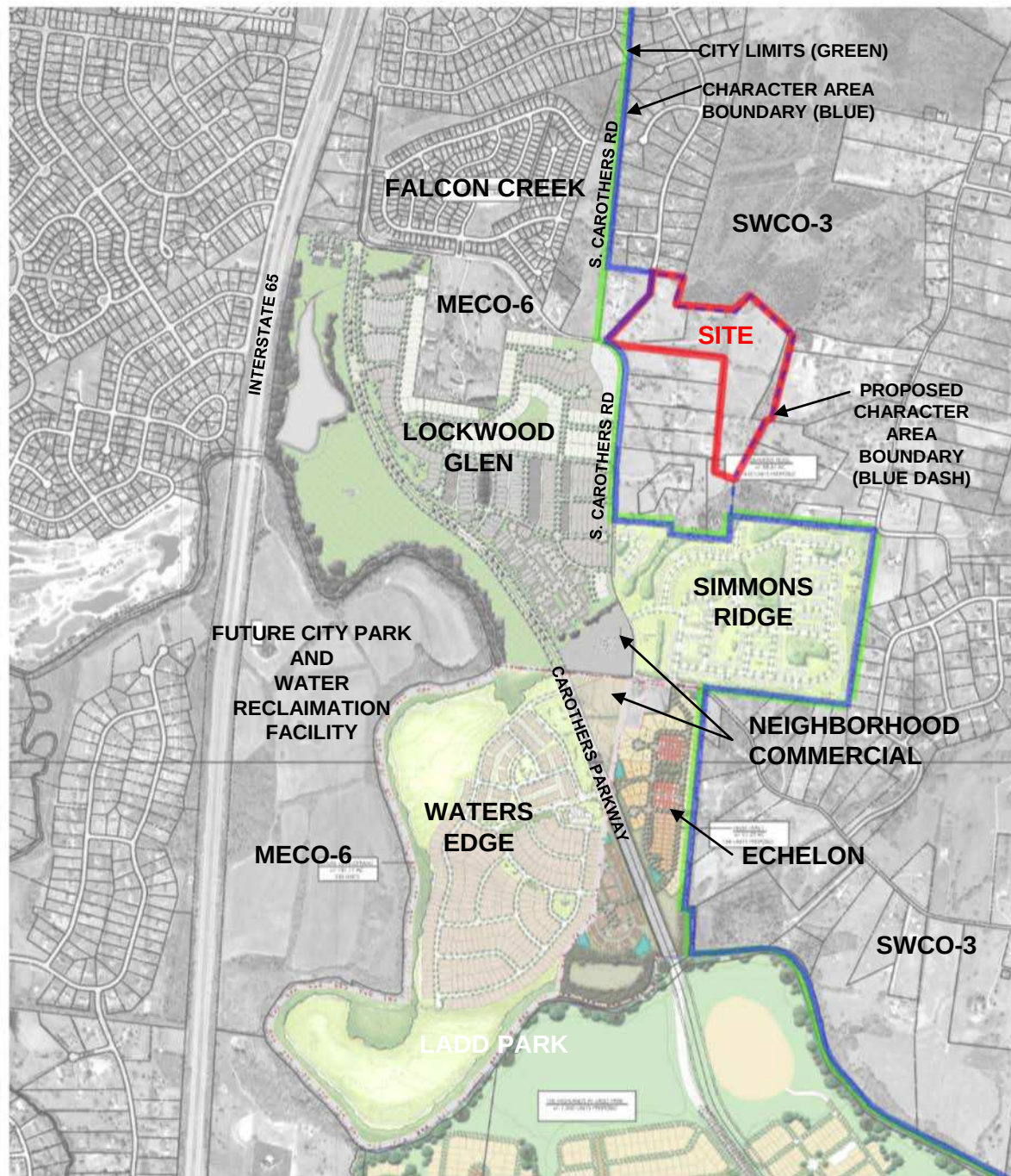
APPLICANT: GAMBLE DESIGN COLLABORATIVE
Address: 144 S.E.PARKWAY, SUITE 200
FRANKLIN, TN 37064
(615) 975-5765
greg.gamble@gdc-tn.com
GREG GAMBLE



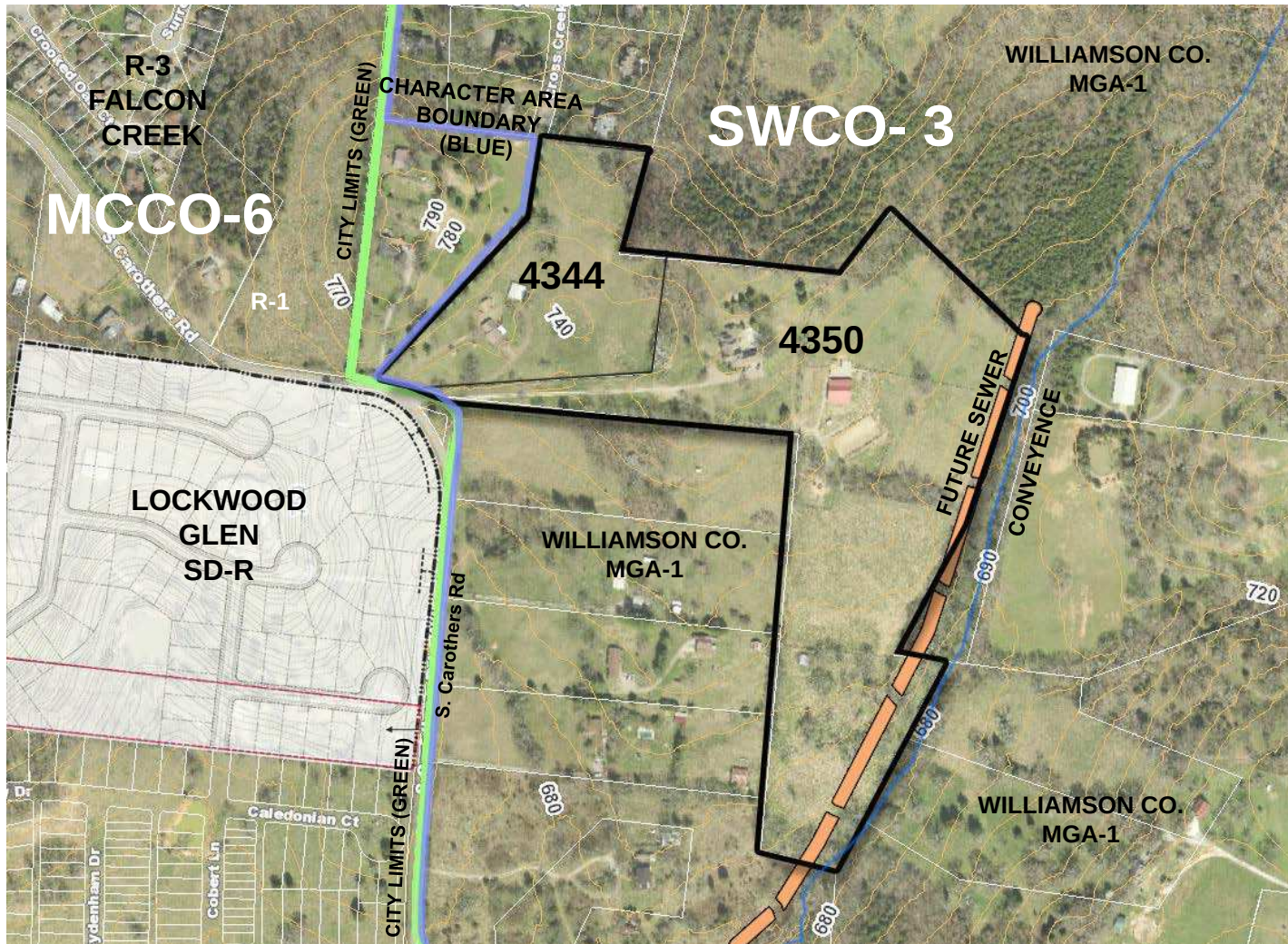
CAROTHERS CORRIDOR CONTEXT

- Currently, the character areas change along the center of S. Carothers Road creating a situation where the SWCO-3 dictates larger lots across the road from MOCO-6, containing smaller lots, greater density, and attached product.
- A better transition should occur between the small lots on the west side of the road to the more established, larger single family lots of the county to the east.

Changing character areas along the back of the lot, and where natural development breaks occur, will create a better transition between residential communities.



PHYSICAL FEATURES MAP



Property: 4344 & 4350 S. Carothers Rd.

Base Zoning District: Williamson County, MGA-1

Special Area Designation: SWCO-3

Overlay Zoning Districts: None

Existing Land Use: Residential

Existing or Planned Road Network:

- accessed by S. Carothers Rd.
- Future connection to the northeast through the proposed Ashcroft Valley

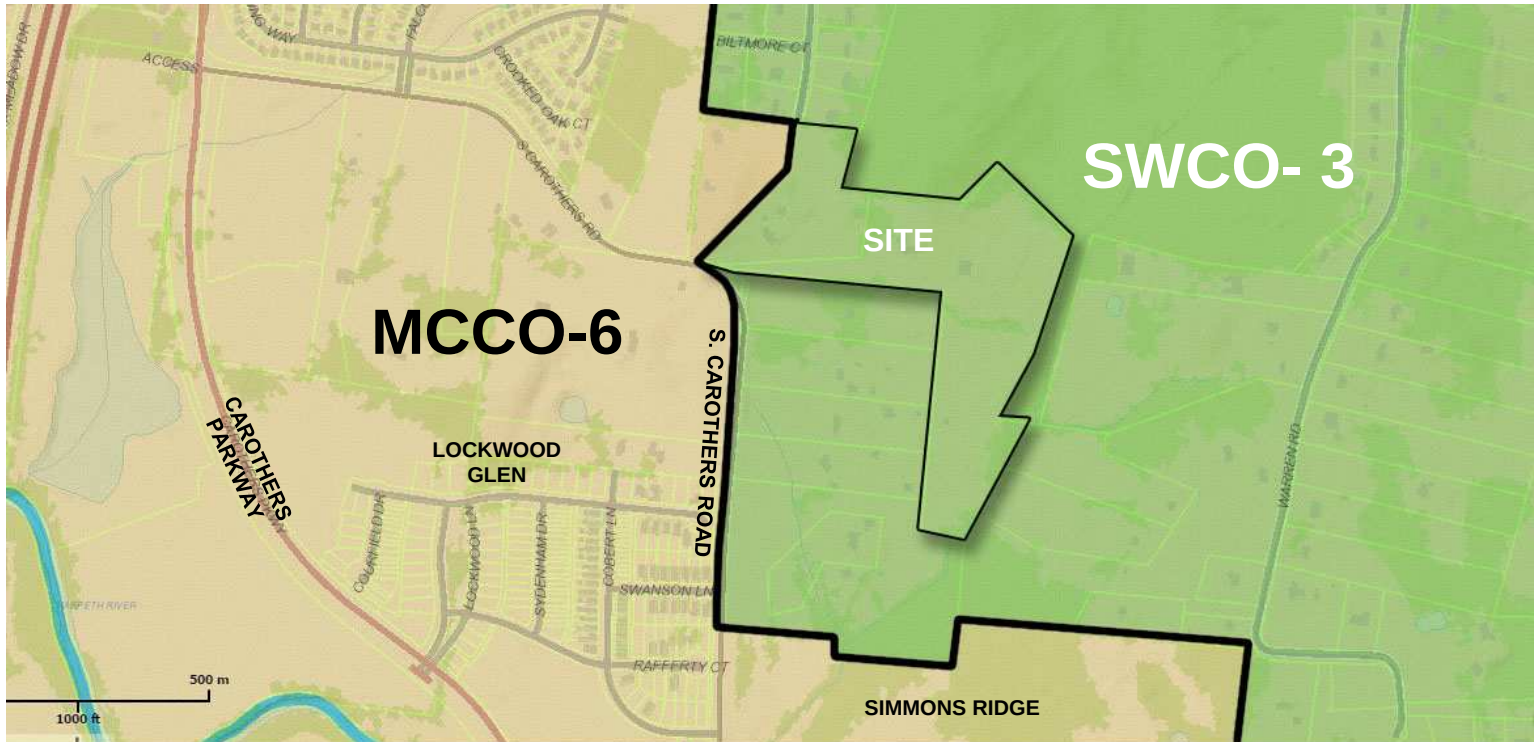
Railroad infrastructure or ROW: N/A

Historic Properties: N/A

Natural Features that may limit development:

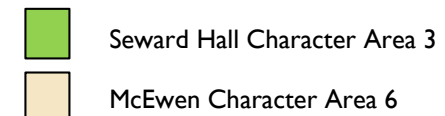
- Drainage conveyance to the east

EXISTING CHARACTER AREA

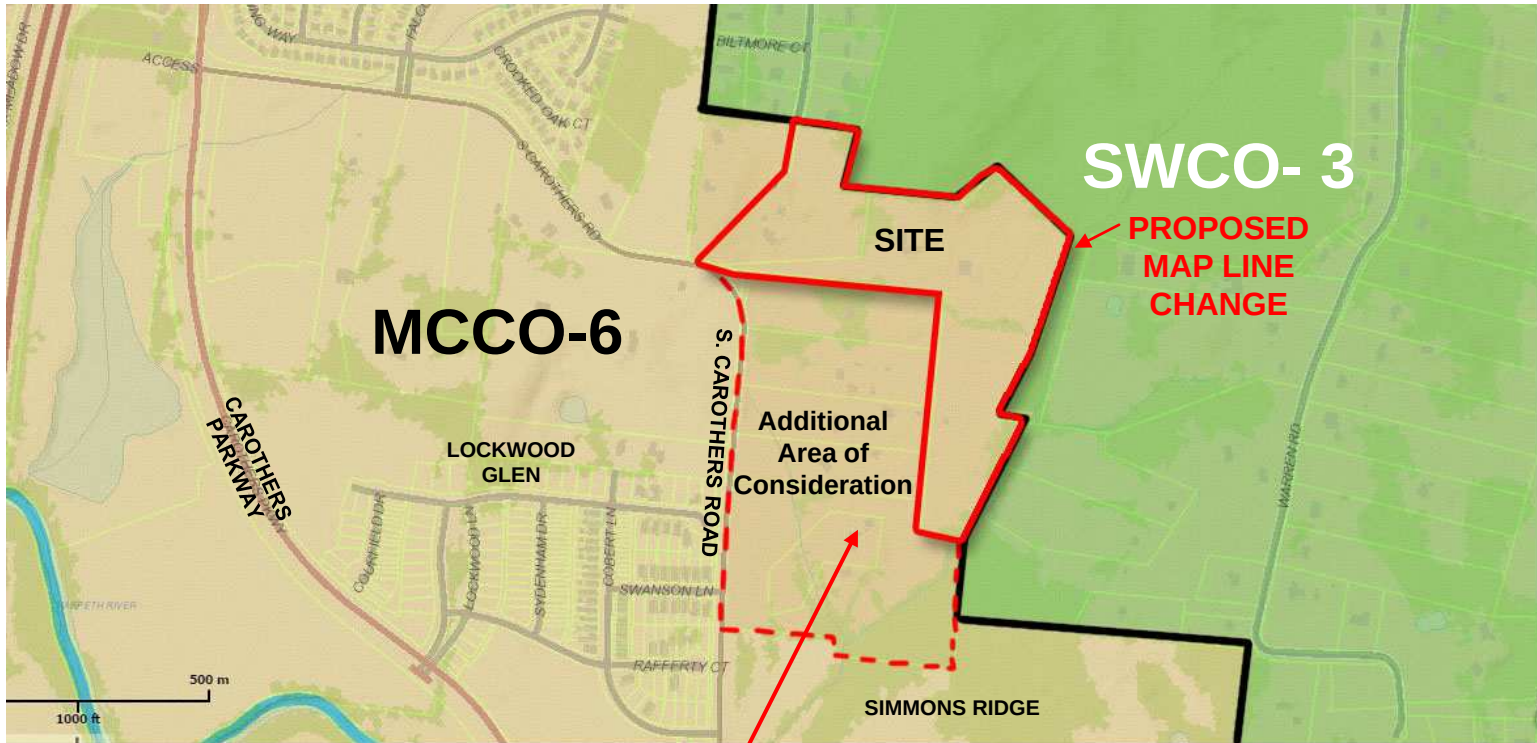


Existing Character Area: Seward, Special Area 3

- The Land Use Plan and Chapter 3 of the Zoning Ordinance both describe the character of Special Area 3 as largely established and that new development should take on the pattern of detached single family lots of between one and five acres. Smaller lots are encouraged to be placed on the interior of developments.
- Currently, S. Carothers Rd. is the only transition between the smaller, higher density neighborhoods to the west of the established Williamson County neighborhoods in SWCO-3. By allowing the character area boundary to be at the rear of these lots, instead of the center line of the road, the transition adheres to the Land Use Plan Guidelines



PROPOSED CHARACTER AREA



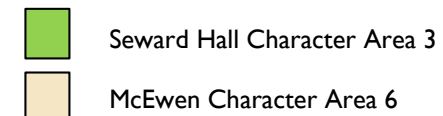
The lots in this area are not a portion of this request; however, due to their proximity, we are suggesting that City staff and Planning Commissioners should also consider a change in character area for these lots.

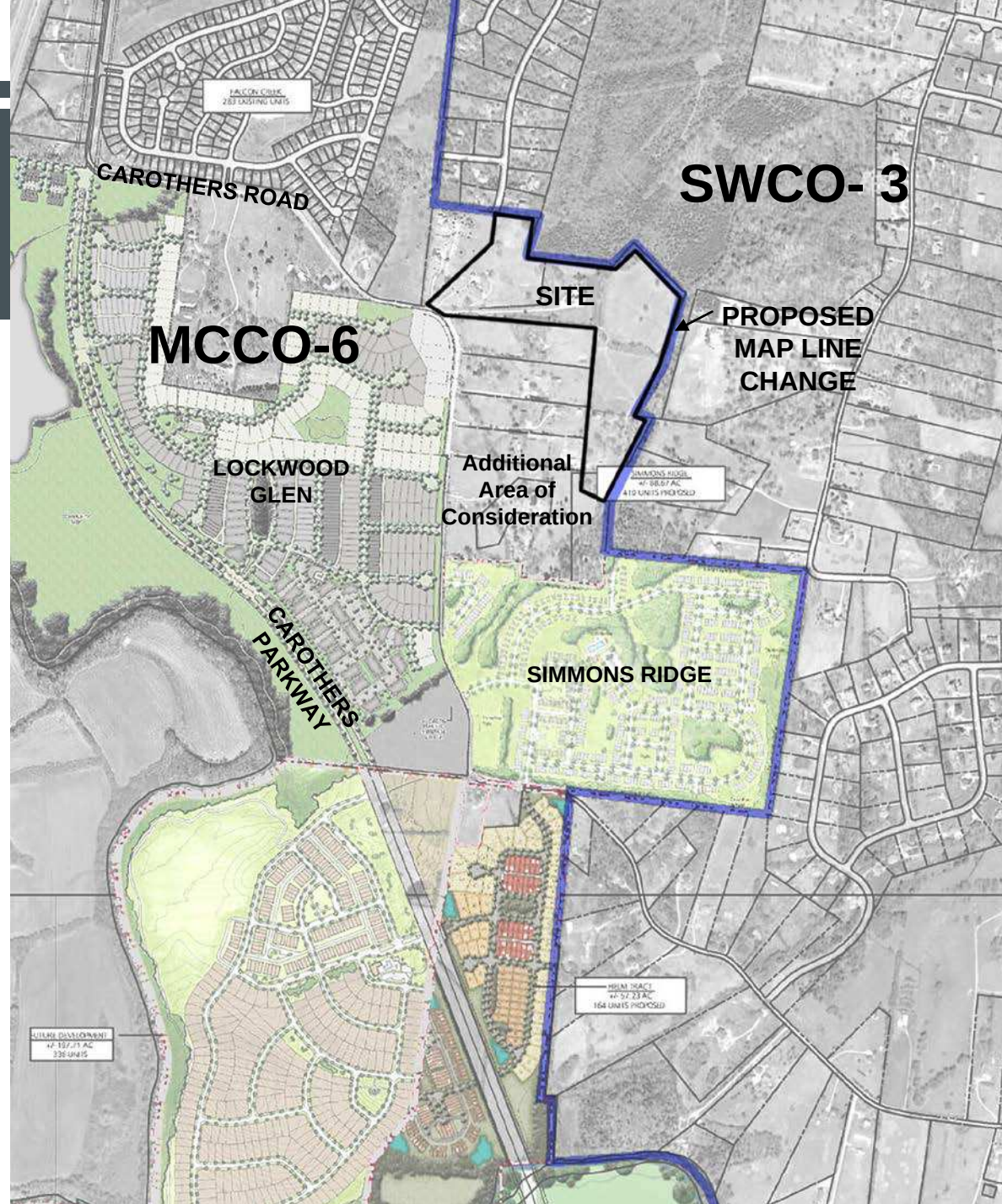
Proposed Character Area:

The relocation of the McEwen, Special Area 6 Boundary. (No LUP text changes are requested.)

Existing Land Use Plan Guidelines for MCCO – 6

1. The character of this area is largely established.
2. New development shall reflect the same character as the established area.
3. Neighborhood commercial uses are appropriate for the three lots fronting the connector street between Carothers Parkway and S. Carothers Road and for the lot located immediately to the east of these three lots on the south side of S. Carothers Rd.





JUSTIFICATION

Justification for this Land Use Plan amendment is rooted in the “managed growth” and the “mix and balance of land uses” guidelines of the Land Use Plan guiding principals.

These guidelines emphasize the transitions between land uses, densities, and the need to have clearly defined boundaries.

1. Easily identifiable boundaries, such as environmental features or the back of lots can provide a more appropriate transitional boundary than the center of a road.
2. Incorporating these lots into Special Area 6 will allow future development to have the same character as the development across the street in Lockwood Glen.
3. Per the zoning ordinance requirement for transitional features, smaller lots will transition to larger lots at the boundary of the character area providing more appropriate transition to the existing single family homes in SWCO-3/Williamson County.

CHARACTER AREAS

SPECIAL AREA 3

Character

1. This area is largely built out and typically includes detached residential uses on larger lots. However, there are significantly sized parcels that are currently vacant or agricultural which may be considered for development in the future.
2. The protection of environmental features is important to this area's unique community character and should be protected. Of particular importance in this area is the floodplain.
3. Historic preservation helps to maintain a connection to a community's history, and it helps to maintain community identity in times of high growth. This special area is home to Cedarmon, constructed between 1816 and 1823 and placed on the National Register of Historic Places in 1984. Cedarmon is received its name from the row of cedars which lined the driveway to the house. This residence is located at 2030 Cedarmon Drive near what is now the Cedarmon Subdivision.

Land Use

4. Existing uses are predominately detached residential. New development shall be consistent with these predominate uses.
5. There are currently limited Civic and Institutional uses sprinkled throughout this special area. Additional Civic and Institutional uses are appropriate so long as the site design and traffic implications are adequately addressed.
6. Because of there is the potential for Activity Centers within Seward Hall Character Area, additional commercial, office or retail uses are not supported.
7. New growth should be encouraged only in areas where adequate public water, sewer and streets are currently available or are planned.

Development Form

8. This area should follow standards for the Conventional/Suburban Design Concept. There are also many areas that are environmentally sensitive which have been assigned the Conservation Design Concept.
9. Smaller lots should not be located on the exterior of a proposed development adjacent to, or across the street from, larger lots of an existing development. Lot sizes shall transition to address existing development patterns. However, if the applicant proposes an alternative, and if potential conflicts will be created, the applicant shall give justification as to how they will be mitigated or avoided.

CHARACTER AREAS

Connectivity

10. The Major Thoroughfare Plan identifies roadway improvements to South Carothers Road and Arno Road and roadway widening to Highway 96/Murfreesboro Road.
11. Greenways should be encouraged as they provide an open space network between neighborhoods, mixed use centers, office and commercial developments, business districts, parks, schools and historic sites. The Greenway and Open Space Plan calls for a multi-use path and bike lanes along Highway 96/Murfreesboro Road as well as secondary routes along South Carothers Road and Arno Road.
12. New subdivisions should provide street connections in all directions and should be planned to connect with adjacent planned or existing roads. Establishing more local street connections helps disperse traffic thereby reducing the volume on major corridors and easing congestion. Additionally, more local street connections increases accessibility and can reduce vehicle miles traveled and average trip length.

Open Space

13. Areas identified for the Conservation Design Concept include key environmentally sensitive sites such as floodplain but also private open-space over five acres, utilities and cemeteries. Although they may not be graphically indicated, all private open space and cemeteries should be considered under the Conservation Design Concept, regardless of size.
14. Redevelopment of any existing private open spaces should be considered in conjunction with the overall subdivision layout and the City's open space requirements.
15. Cemeteries shall be governed by all federal, state and local laws, as appropriate.
16. A well-integrated network of connected open space and parks shall be encouraged to add public amenities and to preserve the existing qualities of the area.
17. Common design elements, such as fieldstone walls and wood plank fencing, shall be used to create and maintain a community identity.

CHARACTER AREAS

SPECIAL AREA 6

1. The character of this area is largely established.
2. New development shall reflect the same character as the established area.

SPECIAL AREA 7

1. The character of this area is fully established.
2. New development shall reflect the same character as the established area.

SPECIAL AREA 8

1. The character of this area is fully established.
2. New development shall reflect the same character as the established area, but no additional Attached Residential shall be permitted
3. Transitional Office use is appropriate for the four lots at the southeast corner of this area, on London Lane and North Royal Oaks Boulevard, but only if North Royal Oaks Boulevard is widened.

SPECIAL AREA 9

1. Murfreesboro Road shall be redeveloped pursuant to a comprehensive land use and economic strategy and shall be a quality gateway from I-65.
2. High-quality design shall be encouraged through heightened standards and site design to reinforce the small-town appeal of Franklin.

SPECIAL AREA 10

1. The character of this area is fully established.
2. New development shall reflect the same character as the established area.