



Meeting Agenda

Board of Mayor & Aldermen and Franklin Municipal Planning Commission

Thursday, July 22, 2021

5:30 PM

Boardroom

Notice is hereby given that a joint, non-voting workshop of the Board of Mayor and Aldermen and the Franklin Municipal Planning Commission will be held on the date, time and in the location stated above. Additional information can be found at www.franklinton.gov/planning. For accommodations due to disabilities, contact the Human Resource Department at 791-3216, at least 24 hours prior to the meeting.

The typical process for discussing an item in this workshop setting is as follows:

- 1. Applicant / staff presentation, and*
- 2. BOMA and FMPC comments*

Accommodations have been made to ensure that the public is able to view the meeting. The public may view the workshop in the following ways: • Watch the meeting on FranklinTV or the City of Franklin website. • Watch the live stream through the City of Franklin Facebook and YouTube accounts. • Attend in-person in the Boardroom. The public may also watch the meeting on the TV in the lobby.

CALL TO ORDER

NEW BUSINESS

1. (5:30 -6:00 PM) Discussion of a revision to the Berry Farms Town Center Development Plan, which includes an increase of 406 residential units, a decrease of 83, 699 square feet of commercial space, and the removal of 25.18 acres of land from the development plan limits.
2. (6:00 - 6:30 PM) Presentation by Aaron Rogge of CDM Smith on high intensity and high volume rainfall events in Middle Tennessee.

OTHER BUSINESS

ADJOURN



BERRY FARMS TOWN CENTER JOINT CONCEPTUAL WORKSHOP

Welcome: Gary Vogrin of Kiser + Vogrin Design
Anticipated Planning Commission: August 26th





LEGEND	
	RETAIL
	OFFICE
	MULTI - FAMILY
	MIXED - USE
	HOTEL
	SINGLE - FAMILY



LEGEND	
	RETAIL
	OFFICE
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	MIXED - USE
	HOTEL
	SINGLE - FAMILY

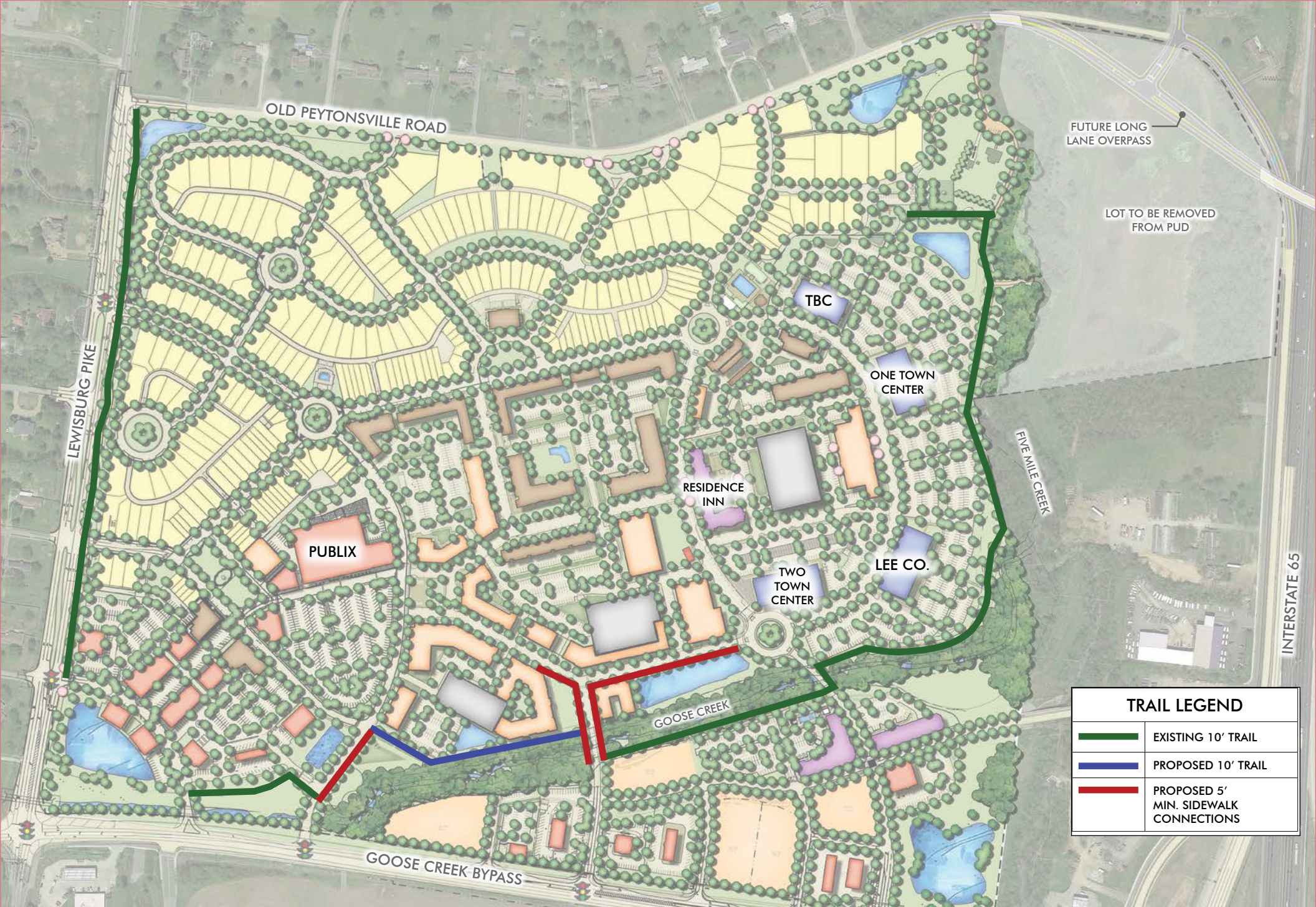


FLYOVER VIDEO OF BERRY FARMS TOWN CENTER

<https://www.youtube.com/watch?v=KM-PsQ2hBCg>







TRAIL LEGEND

	EXISTING 10' TRAIL
	PROPOSED 10' TRAIL
	PROPOSED 5' MIN. SIDEWALK CONNECTIONS



SECTION 11
PHASE 1 UNDER
CONSTRUCTION

CAPTAIN FREEMAN PKWY

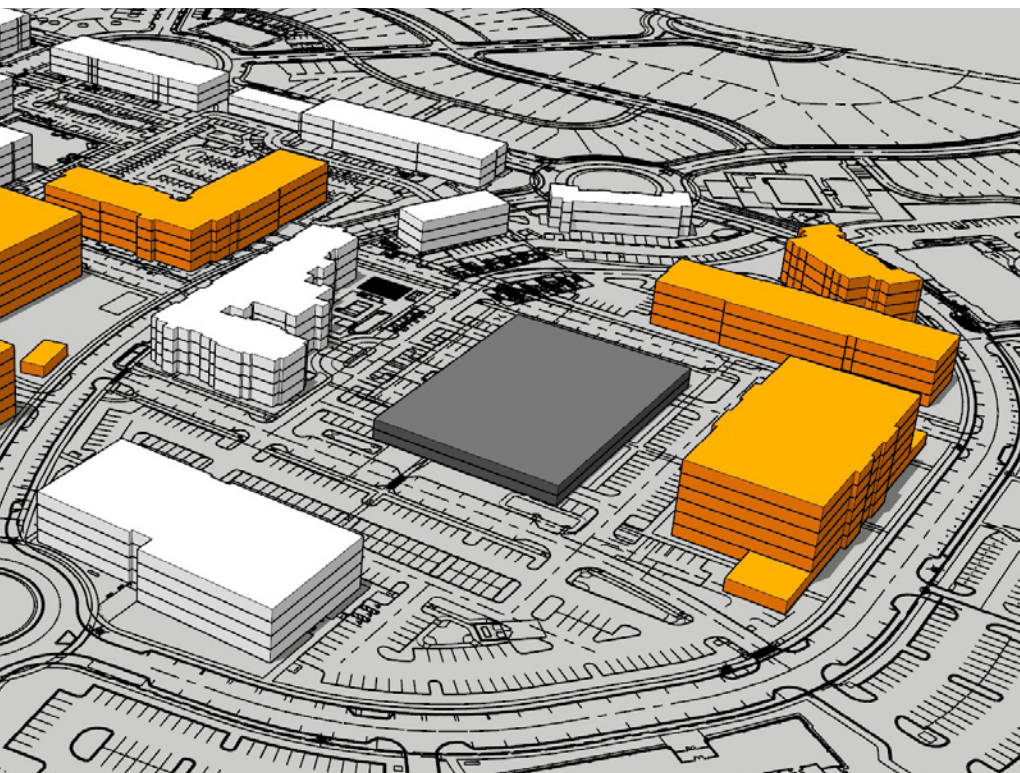




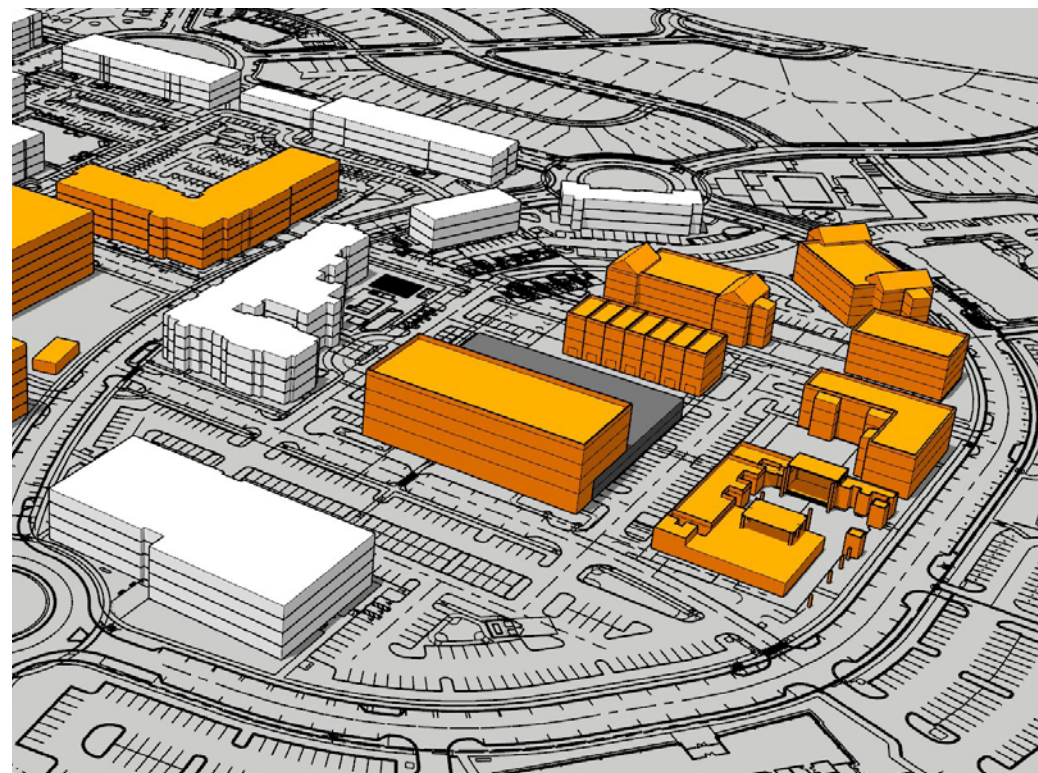
SCENARIO	LAND USE	SIZE	DAILY TRAFFIC	GENERATED TRAFFIC			
				AM PEAK		PM PEAK	
				Enter	Exit	Enter	Exit
Approved	Single Family Residential (LUC 210)	143 d.u.	1,445	26	80	90	53
	Multifamily Residential (Mid-Rise) (LUC 221)	528 d.u.	2,872	49	141	142	90
	Office (LUC 710)	549,578 sq. ft.	5,541	467	76	92	483
	Retail (LUC 820)	585,038 sq. ft.	22,085	341	209	964	1044
	TOTAL		31,943	883	506	1,288	1,670
				1,389		2,958	
Proposed	Single Family Residential (LUC 210)	166 d.u.	1,657	31	92	104	61
	Multifamily Residential (Mid-Rise) (LUC 221)	911 d.u.	4,956	85	243	245	156
	Office (LUC 710)	720,332 sq. ft.	7,203	605	99	119	624
	Retail (LUC 820)	335,637 sq. ft.	12,670	195	120	639	692
	Hotel (LUC 310)	345 rooms	3,468	99	68	106	101
	TOTAL		29,954	1,015	622	1,213	1,634
				1,637		2,847	
DIFFERENCE			-1,989	+132	+116	-75	-36
				+248		-111	



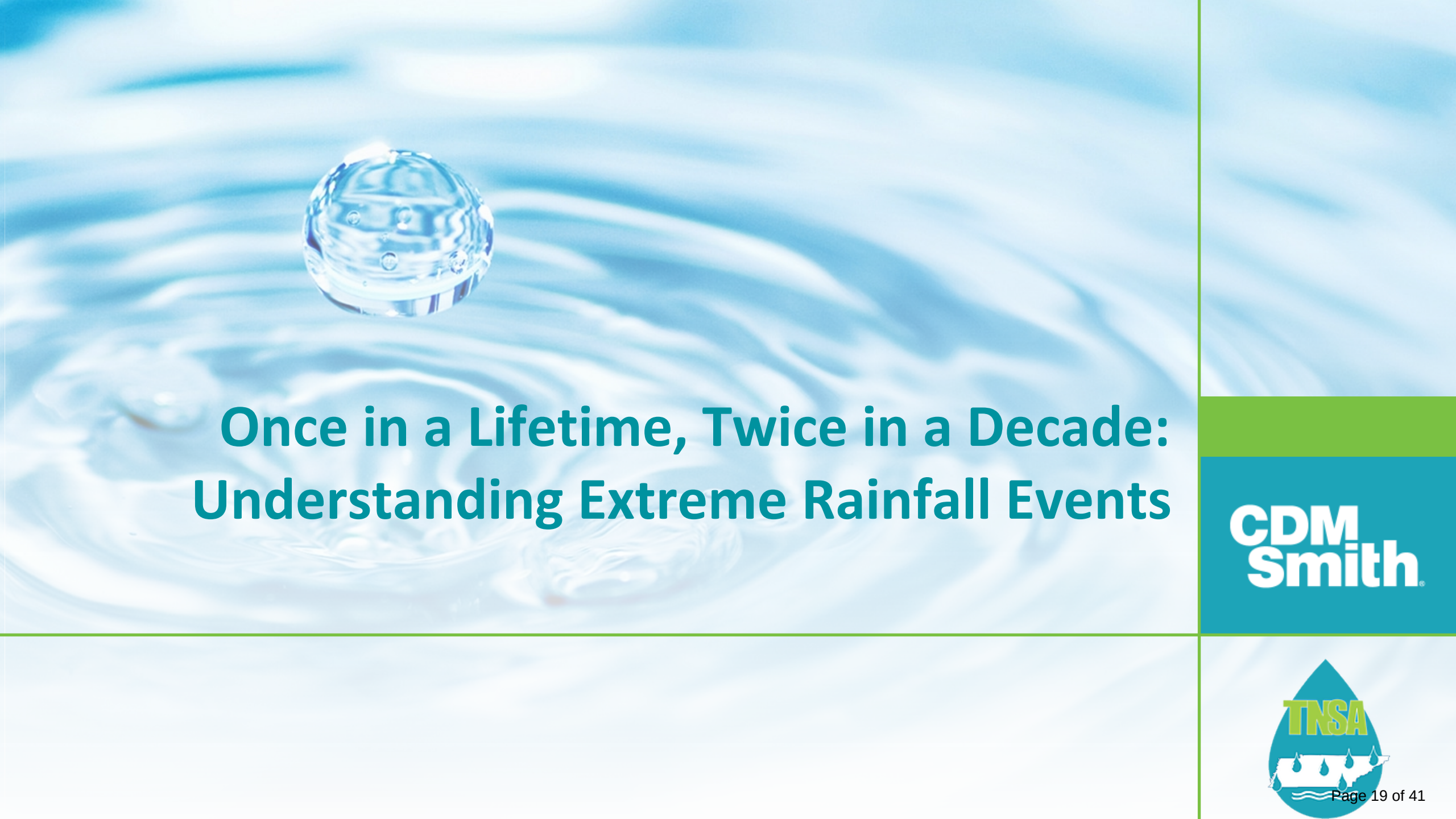
Section 10 Massing- Scenario 1



Section 10 Massing- Scenario 2







Once in a Lifetime, Twice in a Decade: Understanding Extreme Rainfall Events

**CDM
Smith**



The Presenter

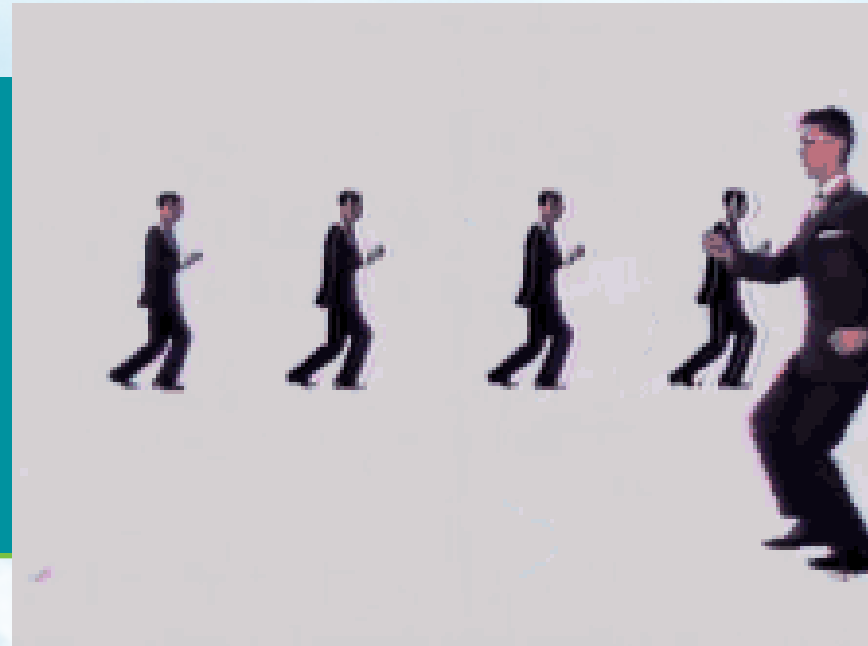
- Aaron Rogge
- BS Industrial Engineering, Univ. South Florida
- ME Environmental Engineering, Univ. South Florida
- 2 years with Southwest Florida Water Mgmt. District
- 10 years with CDM Smith
 - Project Technical Leader
- Licensed PE in FL, TN
- Based in Nashville, Tennessee
- TNSA Communications Chair



Takeaways:

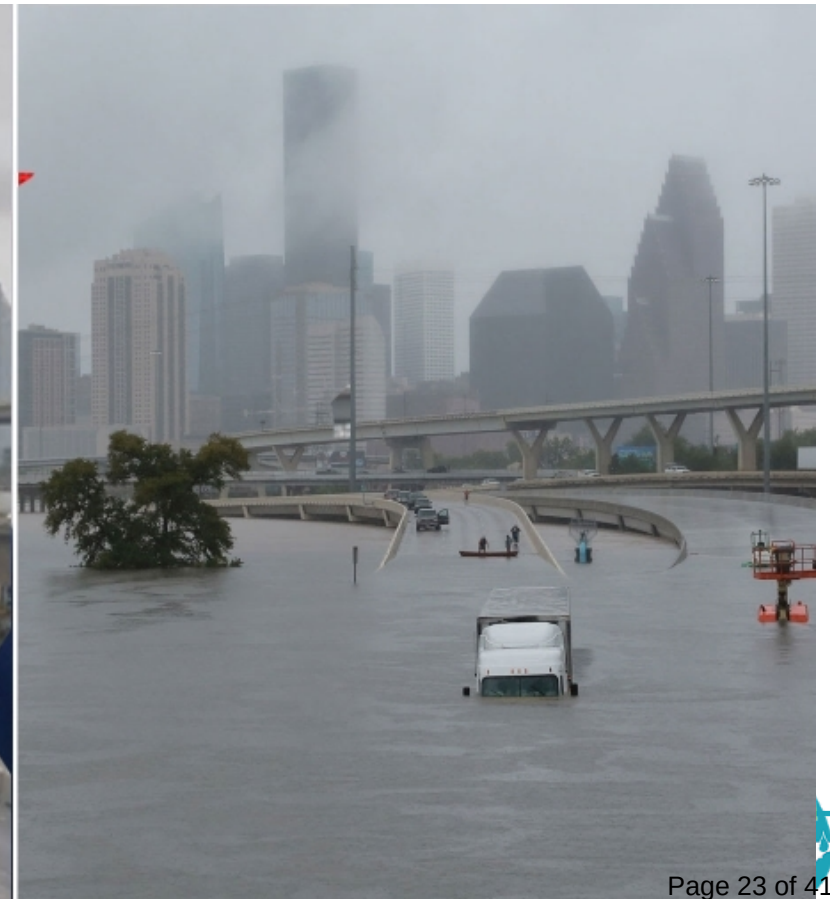
- **“Our context for flooding is often only as bad as the most recent flood”**
- Weather is not *random*, it is *chaotic*
- There are a lot of trees falling in a lot of forests
- They paved paradise, put up a parking lot, and now it floods all the time
- **Citizens should understand that they are subject to a monetary risk calculation being made by every element of society**

What is Time?



Recency Bias

- **“Our context for flooding is often only as bad as the most recent flooding”**
- “...such as the lawyer's closing argument a jury hears before being dismissed to deliberate.”
- Before and after:
 - Hurricane Harvey



Defined: A 100-yr Storm

- Rainfall that has a one-percent probability of occurring at one location in one year.
- More specifically, it is a one-percent chance of being *equaled or exceeded*
- *A 100-yr storm may or may not produce a 100-yr flood*
- *Image credit: James Eychaner, ASFPM*



Return Intervals

- Anecdotally, it “feels like” high return period events are occurring more frequently
- Formula for Probability of Occurrence: A **BINOMIAL DISTRIBUTION**

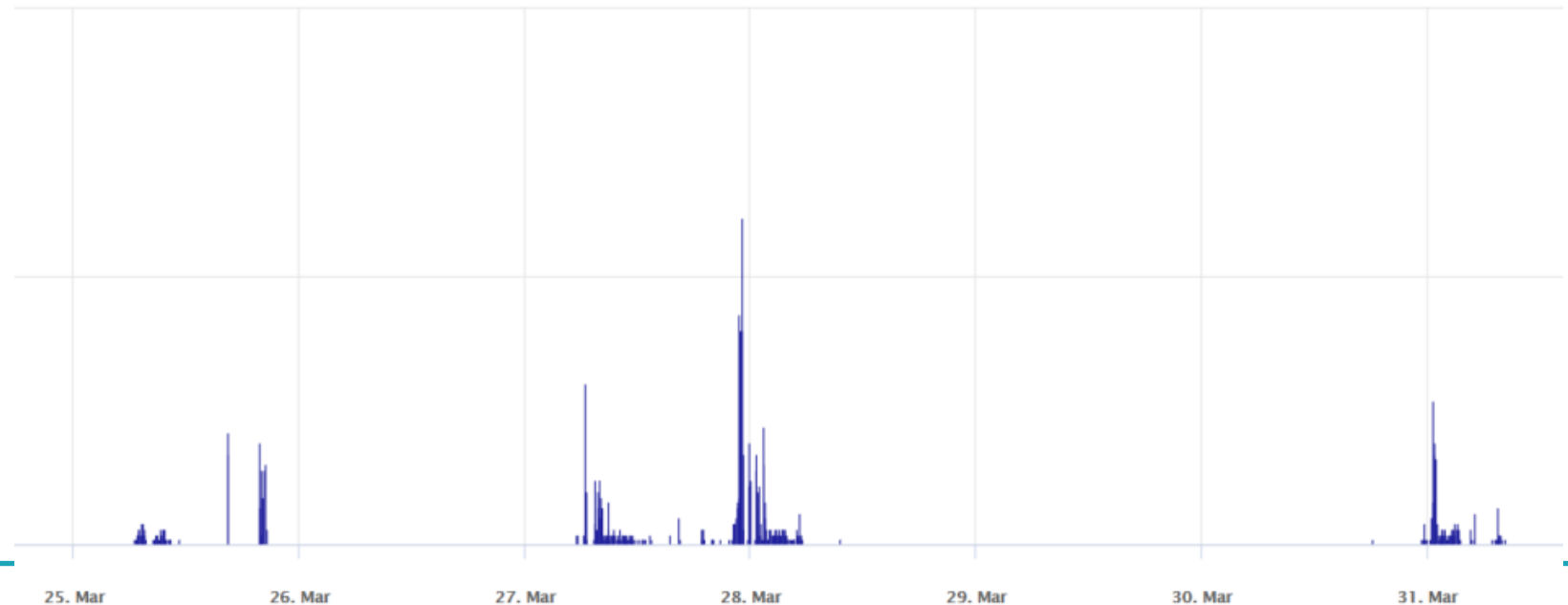
$$p_N = 1 - (1 - p)^N$$

- Example, 36% chance of there NOT being a 25-year storm in a 25-year period
- **The equation is a random “coin flip”** – it is not dependent on any prior occurrences



The Coin Flip problem

- It's only “true-ish” that a storm event's **frequency** is independent of any prior events and is thus not predictable
- A storm's frequency is also related to its **duration and intensity**
- The most dangerous events are back-to-back events
 - “Antecedent Moisture Conditions”
 - “Tailwater”
- I-D-F Curve...



IDF “Spray”

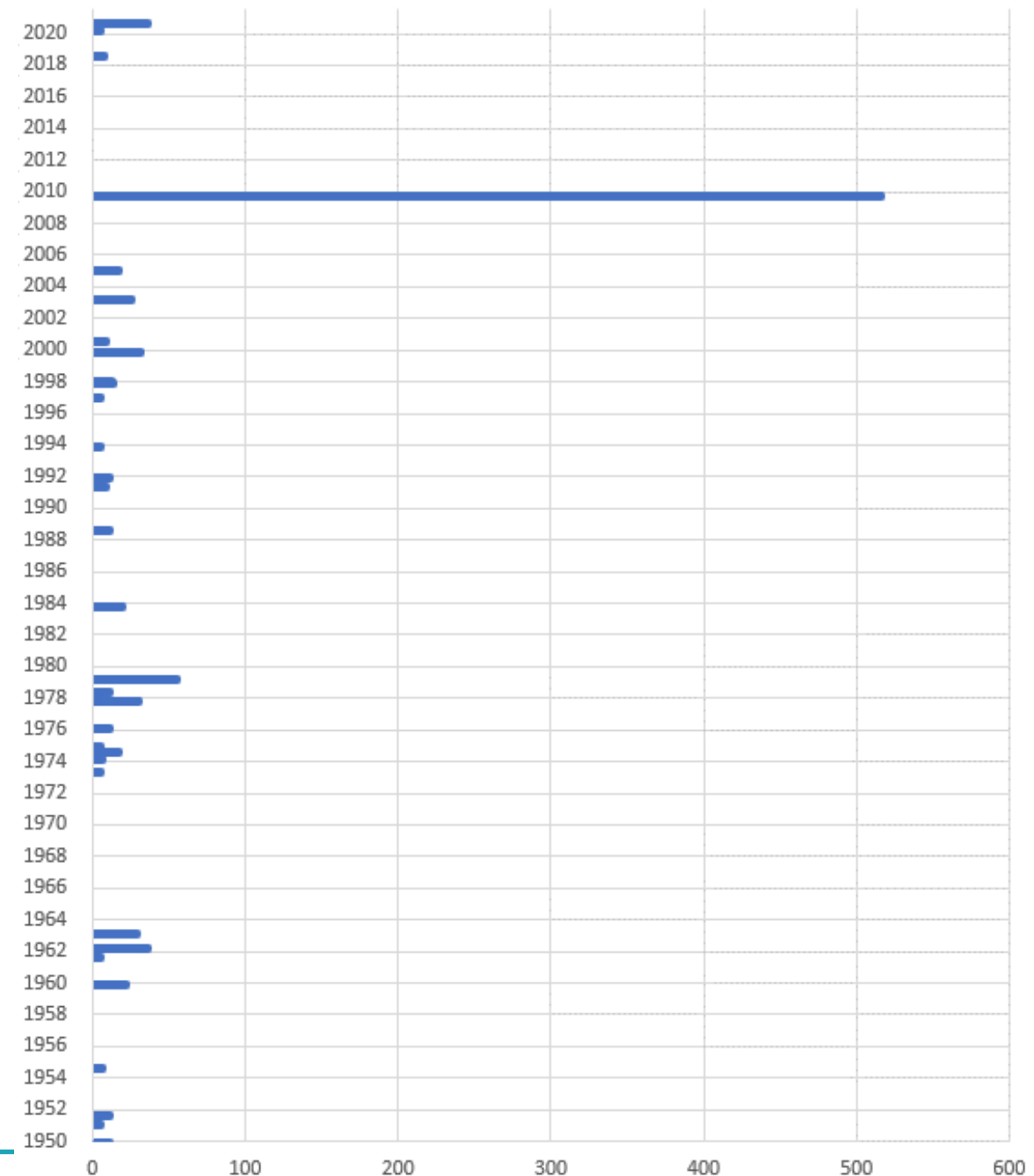
- NOAA Atlas 14
- Rain Gage near Whites Creek
- February 2019
 - “Wettest February on Record”
 - 2019 3rd wettest yr on record
- We mainly plan for these 2:

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.381 (0.352-0.413)	0.446 (0.414-0.485)	0.514 (0.473-0.559)	0.568 (0.523-0.617)	0.636 (0.583-0.691)	0.687 (0.625-0.746)	0.736 (0.666-0.800)	0.784 (0.704-0.853)	0.843 (0.749-0.920)	0.888 (0.782-0.973)
10-min	0.608 (0.563-0.659)	0.714 (0.661-0.776)	0.823 (0.758-0.895)	0.908 (0.837-0.987)	1.01 (0.929-1.10)	1.09 (0.996-1.19)	1.17 (1.06-1.27)	1.24 (1.12-1.35)	1.33 (1.18-1.46)	1.40 (1.23-1.53)
15-min	0.760 (0.704-0.824)	0.897 (0.831-0.975)	1.04 (0.959-1.13)	1.15 (1.06-1.25)	1.29 (1.18-1.40)	1.39 (1.26-1.50)	1.48 (1.34-1.61)	1.57 (1.41-1.71)	1.68 (1.49-1.83)	1.76 (1.55-1.92)
30-min	1.04 (0.965-1.13)	1.24 (1.15-1.35)	1.48 (1.36-1.61)	1.67 (1.53-1.81)	1.90 (1.74-2.07)	2.09 (1.90-2.26)	2.27 (2.05-2.46)	2.44 (2.19-2.66)	2.67 (2.37-2.92)	2.84 (2.50-3.11)
60-min	1.30 (1.20-1.41)	1.56 (1.44-1.69)	1.90 (1.75-2.06)	2.17 (2.00-2.36)	2.54 (2.32-2.75)	2.83 (2.57-3.07)	3.12 (2.82-3.39)	3.42 (3.08-3.73)	3.83 (3.40-4.18)	4.15 (3.65-4.55)
2-hr	1.54 (1.42-1.67)	1.83 (1.69-1.99)	2.23 (2.06-2.41)	2.54 (2.34-2.76)	2.97 (2.72-3.22)	3.31 (3.02-3.60)	3.67 (3.31-3.99)	4.03 (3.61-4.38)	4.52 (4.00-4.93)	4.91 (4.30-5.37)
3-hr	1.67 (1.54-1.82)	1.99 (1.84-2.17)	2.41 (2.23-2.62)	2.76 (2.54-3.00)	3.23 (2.95-3.51)	3.61 (3.28-3.93)	4.01 (3.61-4.36)	4.41 (3.94-4.81)	4.97 (4.38-5.43)	5.41 (4.72-5.92)
6-hr	2.00 (1.82-2.20)	2.38 (2.19-2.62)	2.88 (2.64-3.18)	3.31 (3.02-3.64)	3.90 (3.53-4.28)	4.38 (3.93-4.81)	4.88 (4.35-5.37)	5.41 (4.78-5.96)	6.15 (5.35-6.79)	6.73 (5.79-7.46)
12-hr	2.37 (2.19-2.59)	2.82 (2.60-3.08)	3.42 (3.15-3.73)	3.92 (3.60-4.27)	4.62 (4.21-5.03)	5.19 (4.69-5.64)	5.79 (5.19-6.30)	6.41 (5.70-6.98)	7.28 (6.37-7.94)	7.96 (6.89-8.74)
24-hr	2.83 (2.67-3.01)	3.44 (3.19-3.59)	4.14 (3.88-4.39)	4.70 (4.44-4.99)	5.53 (5.21-5.87)	6.20 (5.82-6.57)	6.89 (6.45-7.30)	7.61 (7.08-8.06)	8.60 (7.95-9.09)	9.37 (8.61-9.91)
2-day	3.37 (3.18-3.59)	4.03 (3.80-4.28)	4.92 (4.64-5.23)	5.65 (5.33-6.00)	6.69 (6.28-7.08)	7.53 (7.05-7.97)	8.41 (7.84-8.89)	9.34 (8.66-9.87)	10.6 (9.78-11.2)	11.7 (10.7-12.4)
3-day	3.56 (3.37-3.79)	4.25 (4.02-4.52)	5.18 (4.90-5.50)	5.94 (5.60-6.29)	6.99 (6.58-7.39)	7.84 (7.35-8.29)	8.73 (8.15-9.21)	9.64 (8.96-10.2)	10.9 (10.1-11.5)	11.9 (10.9-12.6)
4-day	3.76 (3.55-3.99)	4.48 (4.24-4.75)	5.45 (5.15-5.77)	6.23 (5.88-6.58)	7.30 (6.87-7.71)	8.15 (7.66-8.60)	9.04 (8.45-9.54)	9.94 (9.26-10.5)	11.2 (10.3-11.8)	12.1 (11.2-12.8)
7-day	4.56 (4.31-4.84)	5.44 (5.13-5.78)	6.63 (6.24-7.03)	7.58 (7.13-8.03)	8.93 (8.37-9.44)	10.0 (9.35-10.6)	11.1 (10.4-11.8)	12.3 (11.4-13.0)	14.0 (12.8-14.8)	15.3 (13.9-16.2)
10-day	5.24 (4.96-5.54)	6.24 (5.91-6.60)	7.51 (7.12-7.94)	8.63 (8.06-9.01)	9.91 (9.34-10.5)	11.0 (10.3-11.6)	12.1 (11.4-12.8)	13.3 (12.4-14.0)	14.8 (13.7-15.6)	16.0 (14.7-16.9)
20-day	7.08 (6.75-7.46)	8.39 (7.99-8.83)	9.90 (9.42-10.4)	11.0 (10.5-11.6)	12.6 (11.9-13.2)	13.7 (13.0-14.4)	14.8 (14.0-15.6)	15.9 (15.0-16.8)	17.3 (16.3-18.3)	18.4 (17.2-19.4)
30-day	8.72 (8.32-9.13)	10.3 (9.80-10.8)	12.0 (11.4-12.6)	13.3 (12.7-13.9)	15.0 (14.3-15.7)	16.3 (15.5-17.1)	17.6 (16.6-18.4)	18.9 (17.8-19.8)	20.5 (19.2-21.5)	21.7 (20.2-22.8)
45-day	10.9 (10.4-11.4)	12.8 (12.2-13.3)	14.7 (14.0-15.4)	16.2 (15.4-16.9)	18.0 (17.2-18.9)	19.5 (18.5-20.4)	20.8 (19.8-21.8)	22.1 (20.9-23.2)	23.7 (22.4-24.9)	24.9 (23.4-26.2)
60-day	13.1 (12.5-13.6)	15.3 (14.7-16.0)	17.6 (16.8-18.3)	19.2 (18.4-20.0)	21.3 (20.3-22.2)	22.8 (21.7-23.8)	24.2 (23.0-25.3)	25.5 (24.2-26.6)	27.1 (25.7-28.3)	28.2 (26.7-29.5)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

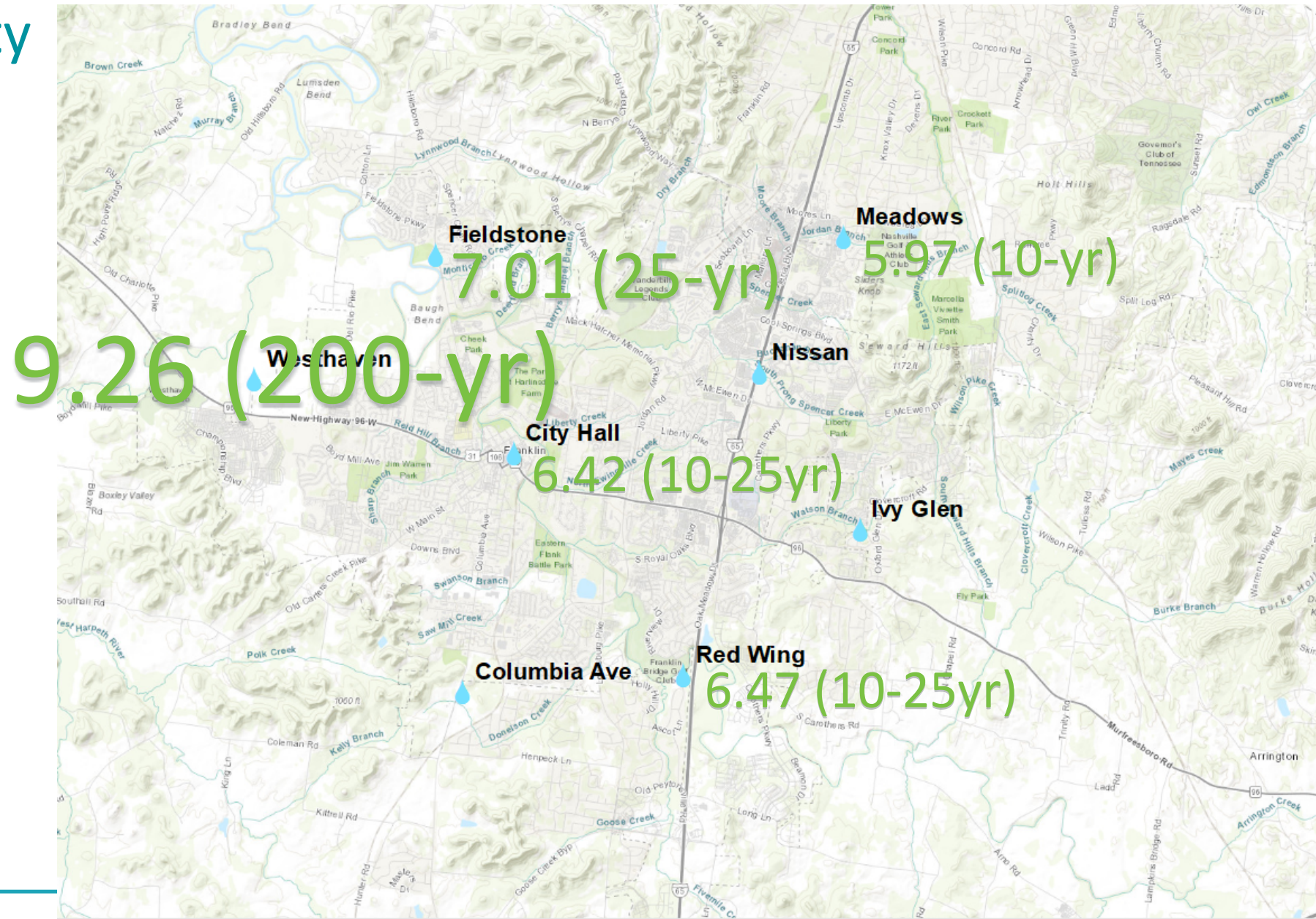
1949-2021

- All events registering 5-yr and above on *any timeframe between 1hr and 3 days*
- First: what you'd sort of expect
- 8 events from 1974-1979
- 0 events from 1963-1973
- But what about 2019? Wettest Feb on record?
- *Just one gauge at the Nashville Airport*



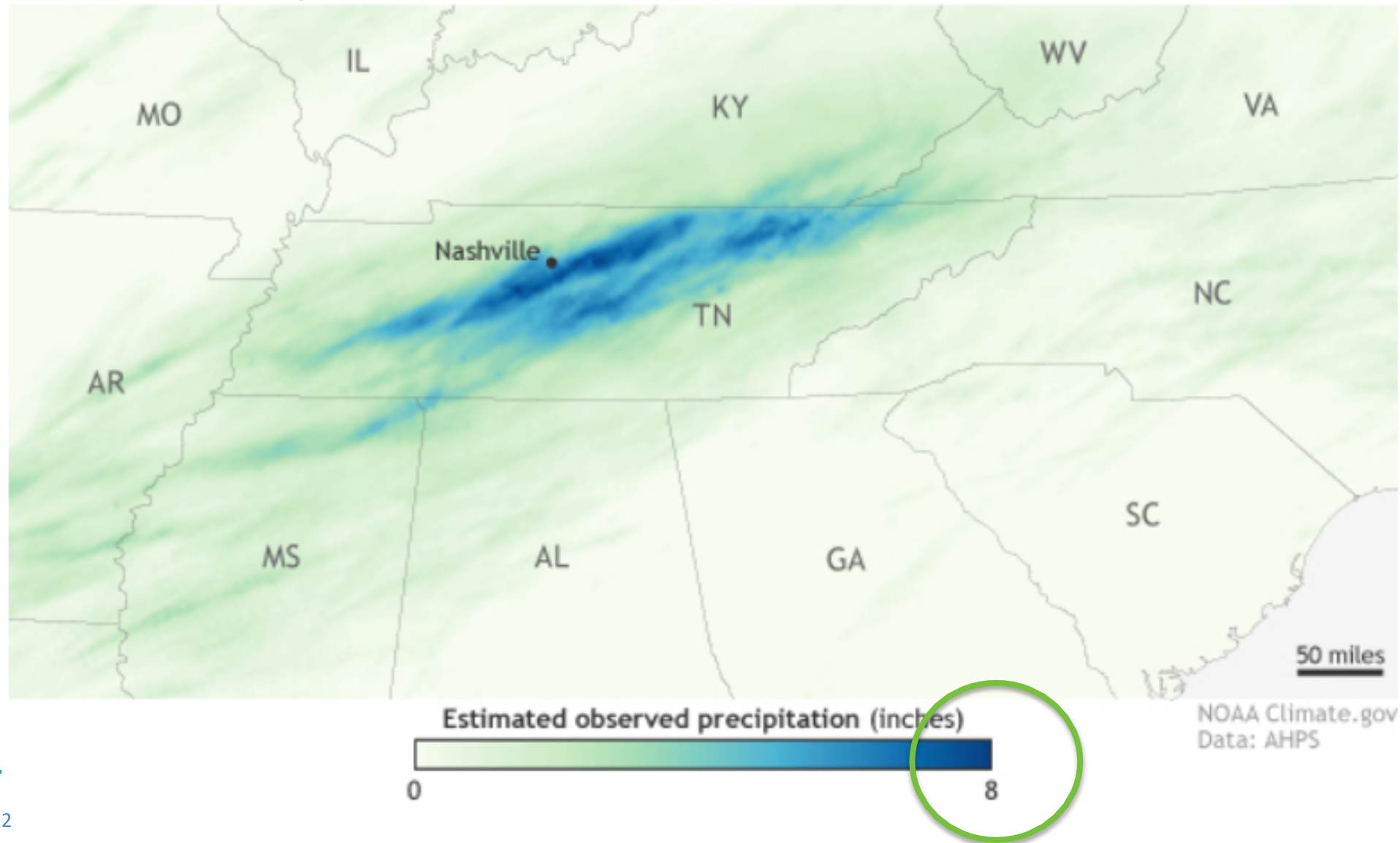
Spatial Variability

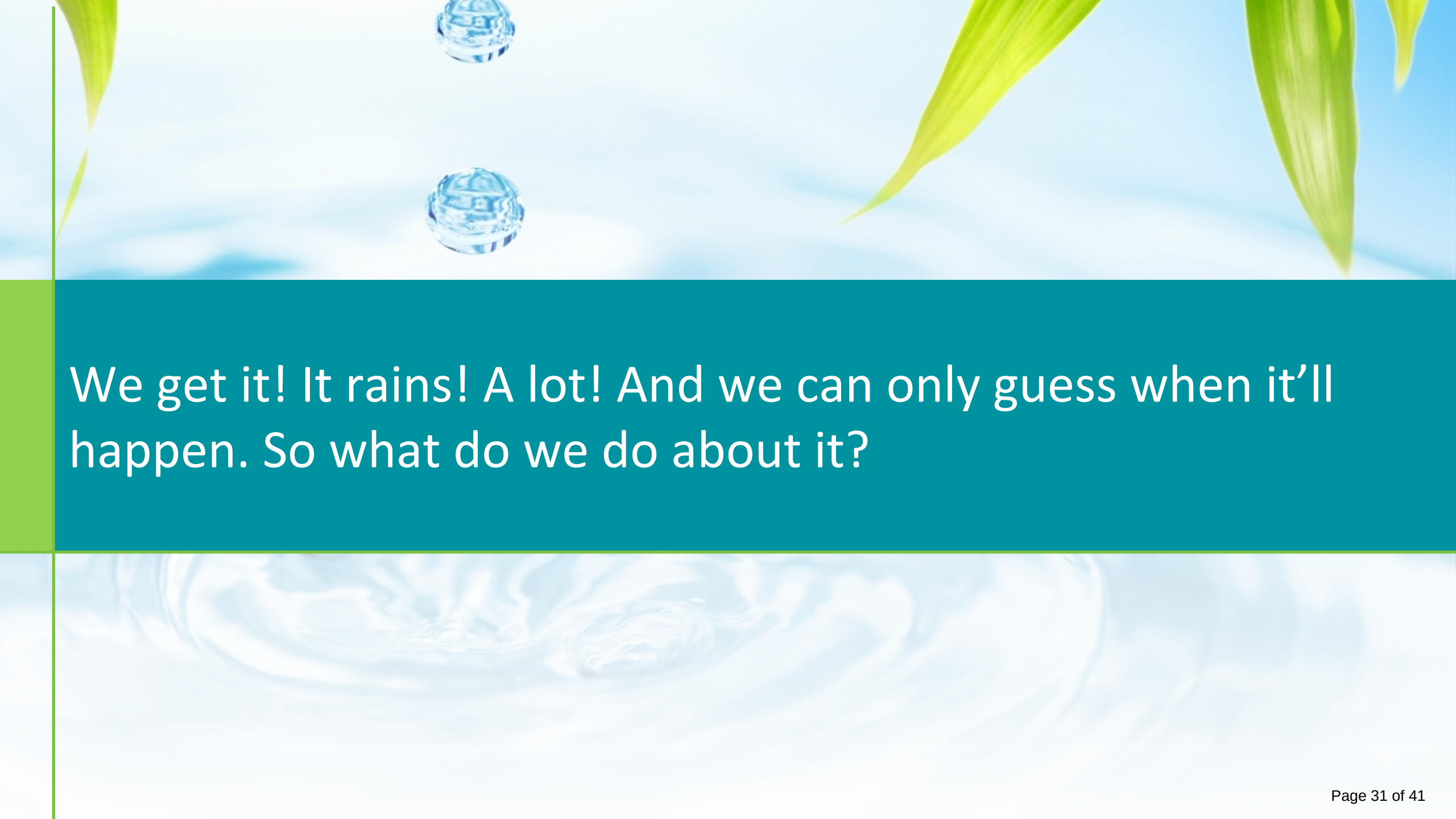
- Rainfall is extremely spatially variable
- A tree falls in the forest: with more gages, are we cataloguing more events?
- If so, what are the implications?



We have excellent reports like this:

Rainfall on March 27, 2021

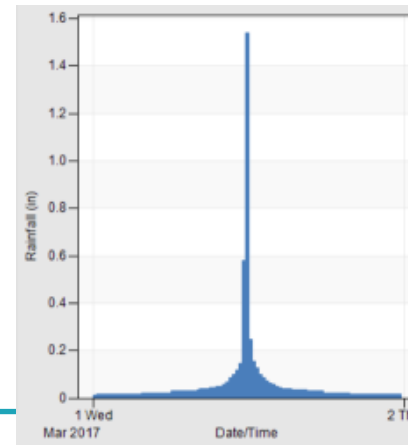
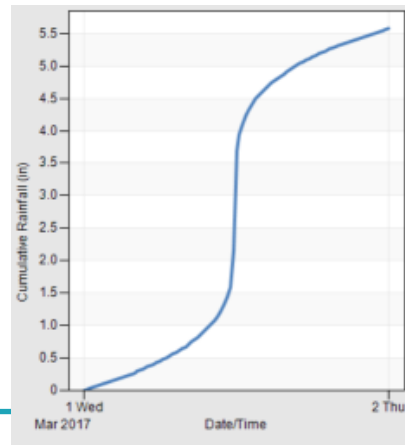




We get it! It rains! A lot! And we can only guess when it'll happen. So what do we do about it?

The Repercussions

- From the journal **Geophysical Research Letters**:
 - U.S. Hydrologic Design Standards Insufficient Due to Large Increases in Frequency of Rainfall Extremes – Carnegie Mellon and UW
- “Numerous studies have shown that heavy rainfall in the United States and elsewhere is becoming ***more common*** and ***more severe***”
- “much of the existing and planned hydrologic infrastructure in the United States based on published rainfall design standards is and will continue to underperform its intended reliability due to these rainfall changes.”



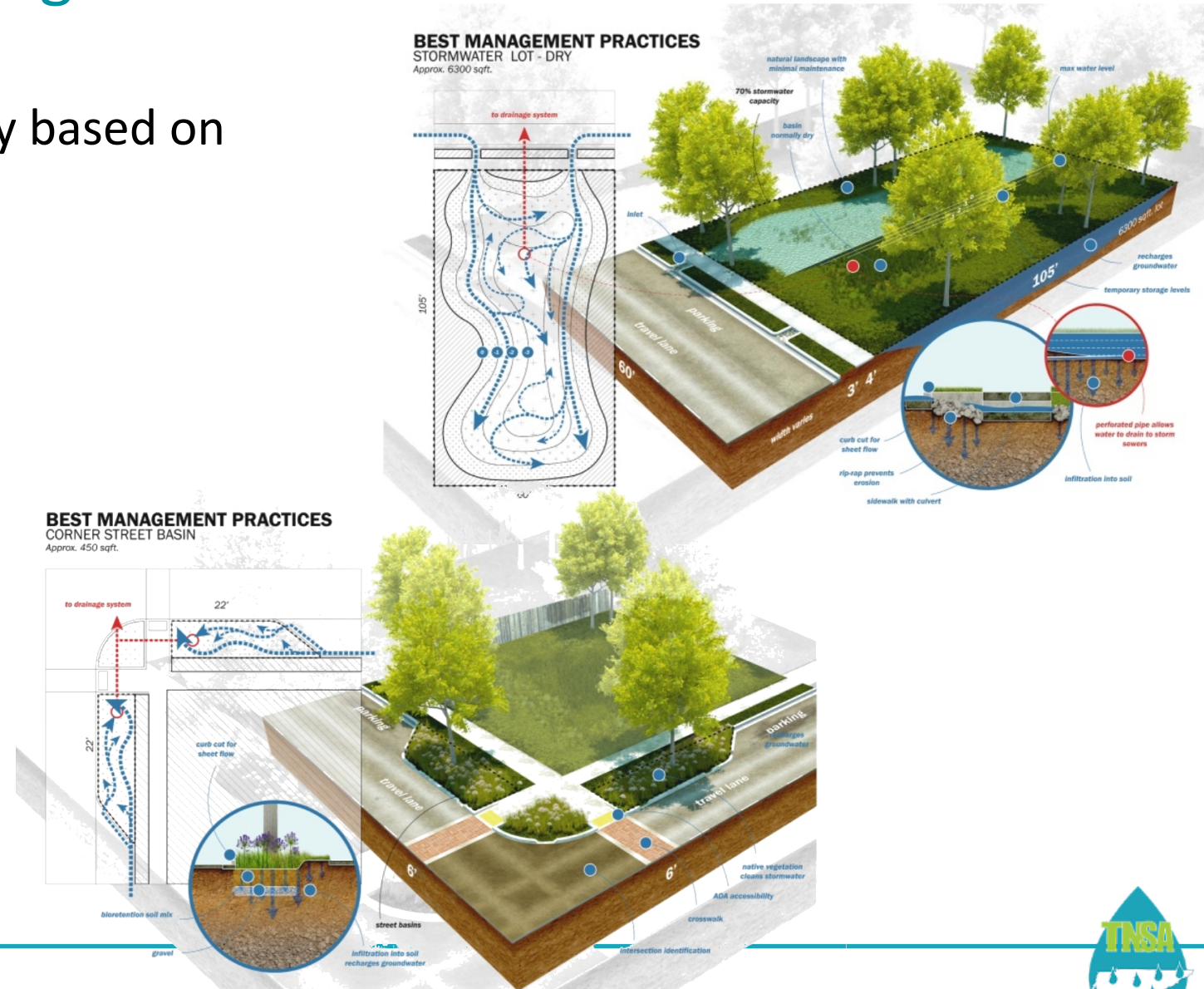
The Repercussions

- **Atlas 14 in TN not updated since 2004**
- Cities in VA and FL have funded their own rainfall studies
- **100-yr storms happening two to three times as often as Atlas 14 predicts**

C.J. Bodnar worked in the private sector before becoming a city engineer with Virginia Beach in 2015. “You did what you needed to meet the requirements, which means you used Atlas 14,” Bodnar said. “You were trying to keep your client’s costs to a minimum.”

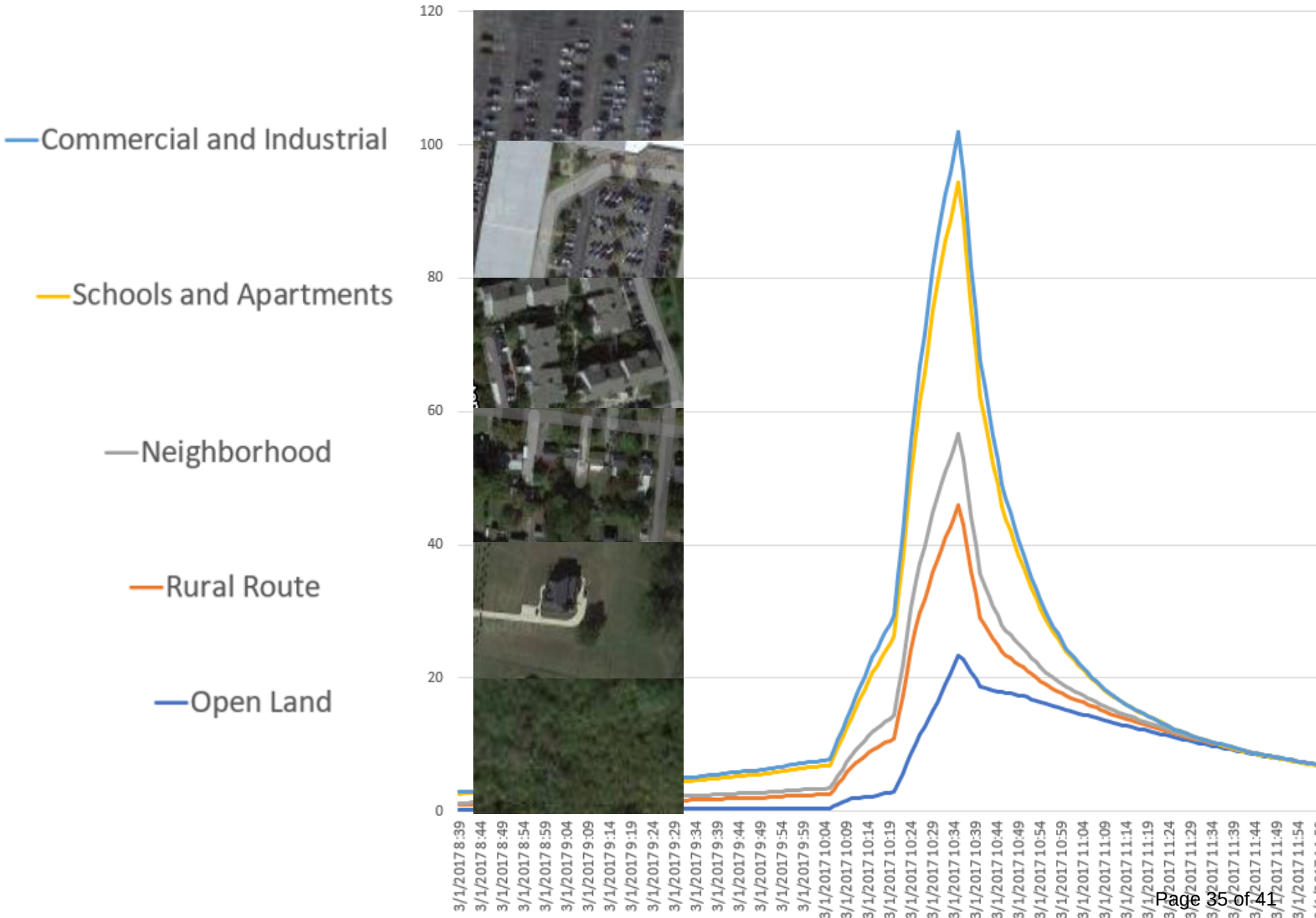
Rainfall is one thing, flooding is another

- TN's design standards are heavily based on water quality
 - "First flush"
 - Capture, infiltrate
 - "Massively distributed local scale"
 - NPDES requires first inch of rainfall

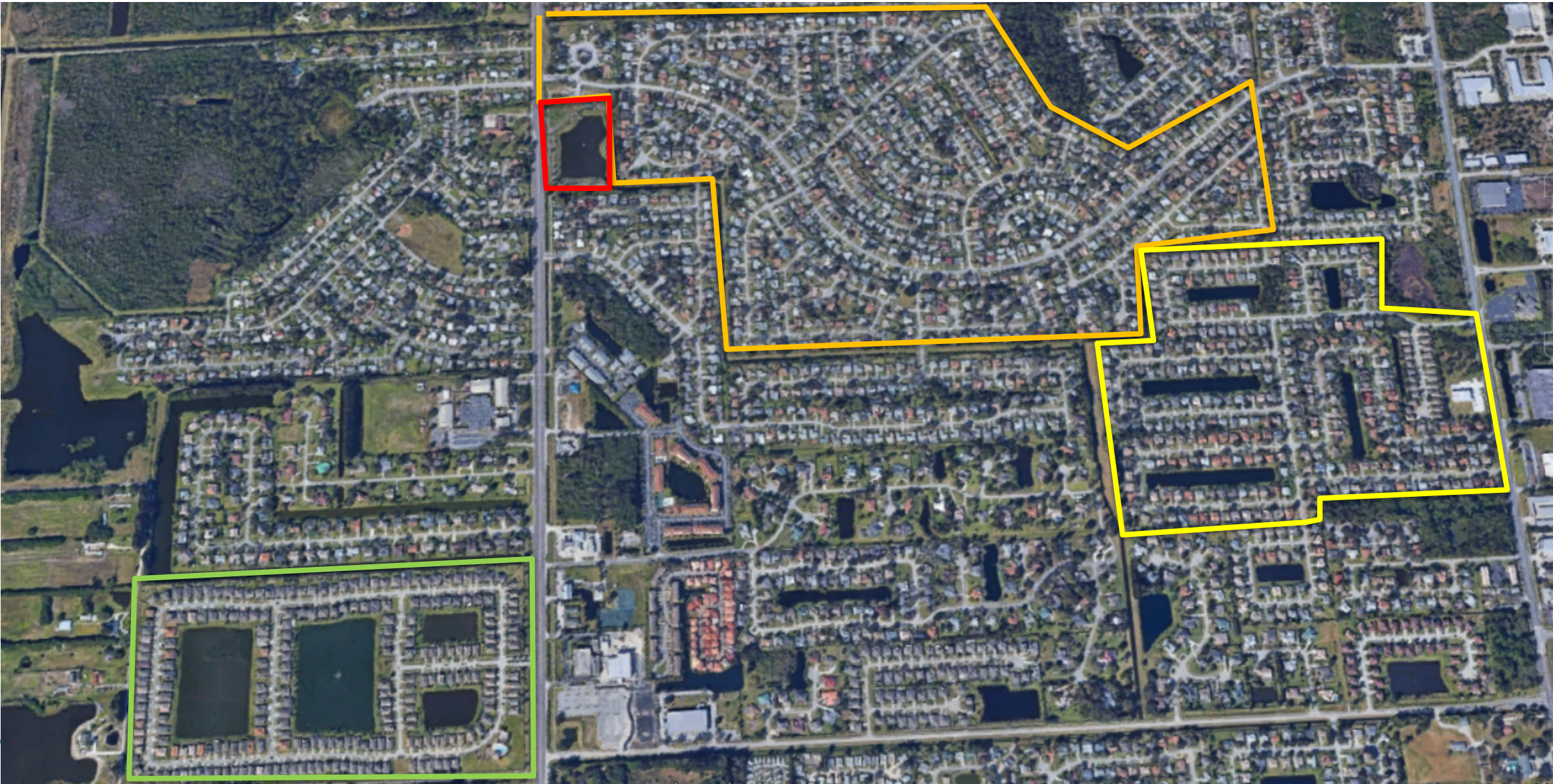


Growing Impervious Area

- Effect of development on runoff in a 10-yr storm (cfs)
- Over 4fold increase



Design Standards in Transition: My Hometown of Rockledge FL



No Adverse Impacts

Protecting the Property Rights of All: No Adverse Impact Floodplain and Stormwater Management

Edward A. Thomas, Esq.

Sustainable Community Development Code
Research Monologue Series
Urban Form, Transportation

The Rocky Mountain Land Use Institute

Examples of Situations where Governments Have Been Held Liable

- Construction of a Road Blocks Drainage
- Stormwater System Increases Flows
- Structure Blocks Watercourse
- Bridge Built Without Adequate Opening
- Grading Land Increases Runoff
- Flood Control Structure Causes Damage
- Filling Wetland Causes Damage
- Issuing Permits for Development that Causes Harm to a Third Party

In review of these cases, there is a common theme that clarifies what communities failed to do:

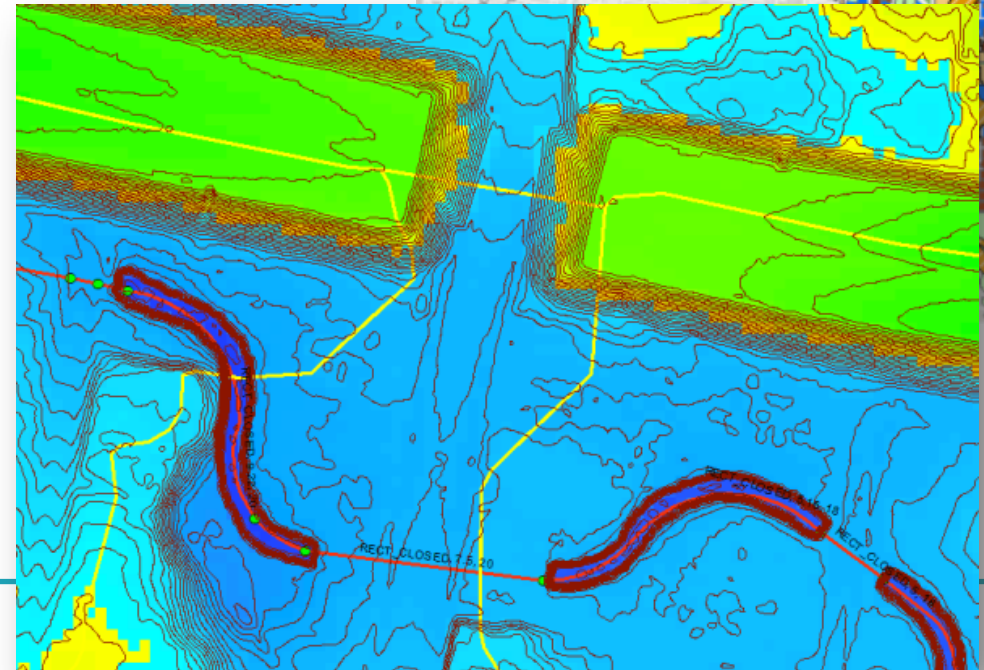
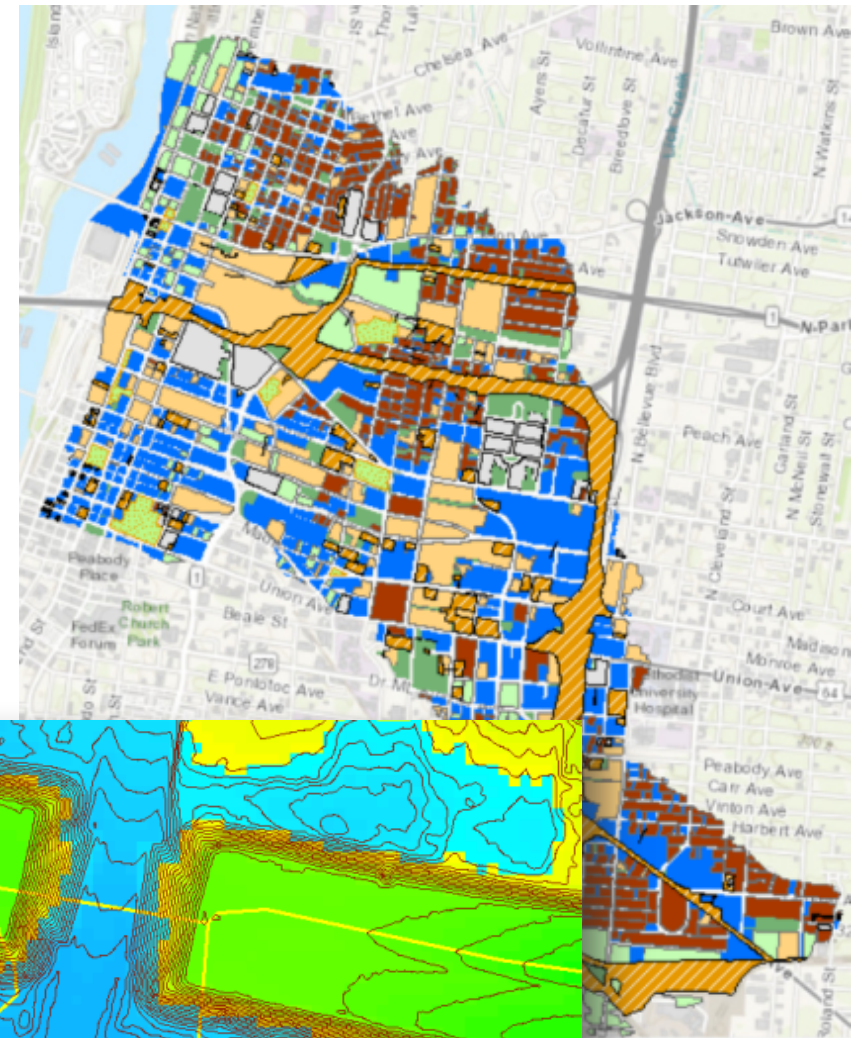
- a) They did not do No Adverse Impact planning.
- b) They did not identify the impacts of the development activity.
- c) They did not notify the soon to be afflicted members of the community.
- d) They did not redesign or reconsider the project.
- e) They did not require appropriate and necessary mitigation measures.

For every column A, we have column B



No matter what happens:

- We are dragging 20th century architecture along with us
- We are the sum of our mistakes (and successes)
- Is it fair to ask new development to pay for what was designed with different standards?
 - Private *and* public
- Is it fair for the burden to fall on individual consumers?



No matter what happens:

- Stormwater utility fees are equitable by design
- **Design standards can and should be reassessed**
- Solutions derived from planning should be conscientious of funding limitations
- Citizens should understand that they are subject to a risk calculation being made by everyone, but especially corporations, politicians, and interests



1979 “flood of record” Credit: Tennessean

Aaron Rogge | roggea@cdmsmith.com | 615-340-6518

**CDM
Smith**

