Berry / University Urban Village

Development Plan & Form Based Code

Stormwater Workshop

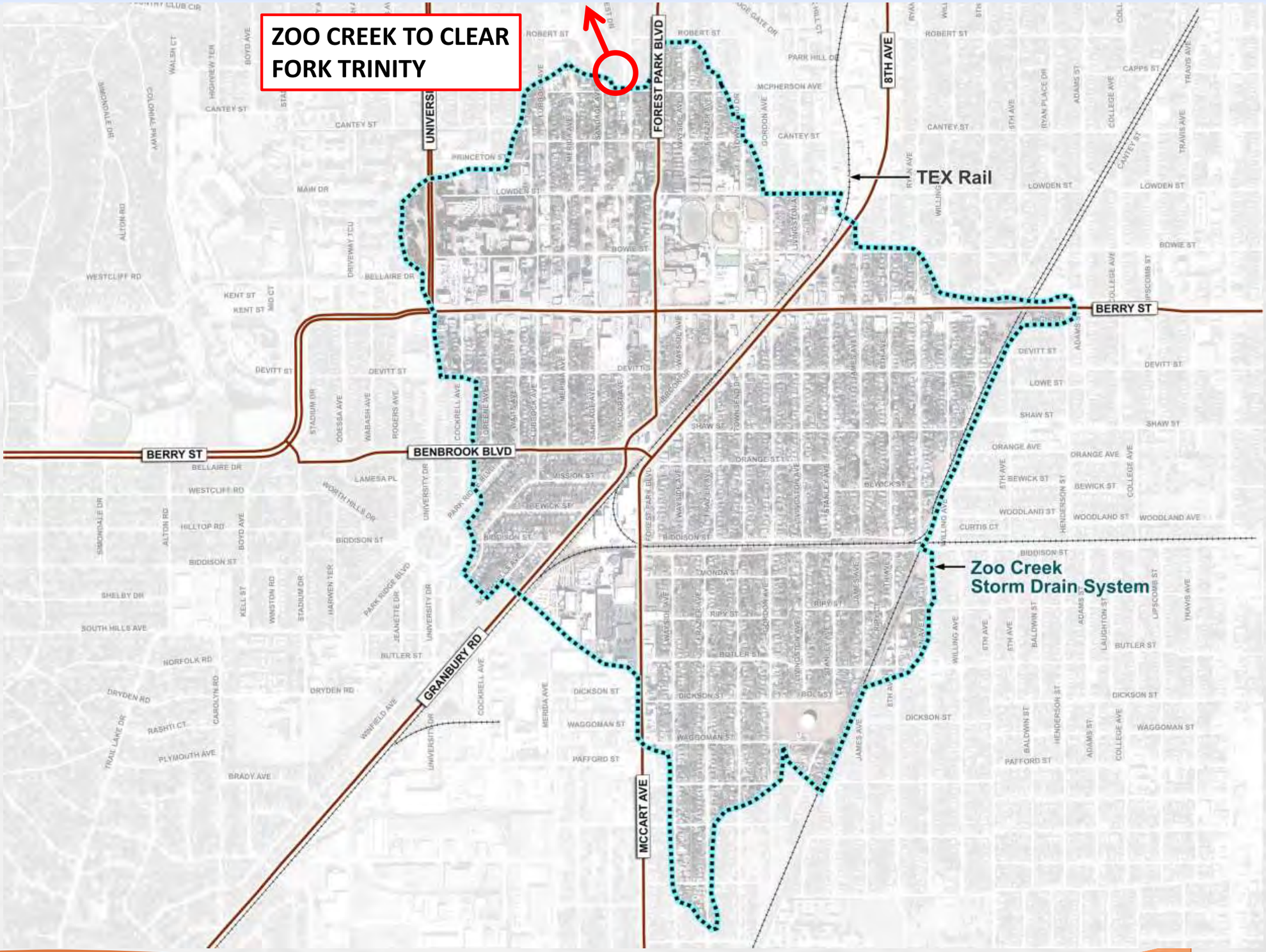
October 14, 2014

Why are we here?

- Economic Growth and Revitalization
- Existing Stormwater Issues
- Zoo Creek Storm Drain Flood Mitigation Study
- Berry/University Urban Village
- Stormwater Challenges & Opportunities with Form Based Code
- Next Steps

Berry / University Urban Village

Development Plan and Form Based Code


ZOO CREEK TO CLEAR FORK TRINITY
TEX Rail
Zoo Creek Storm Drain System
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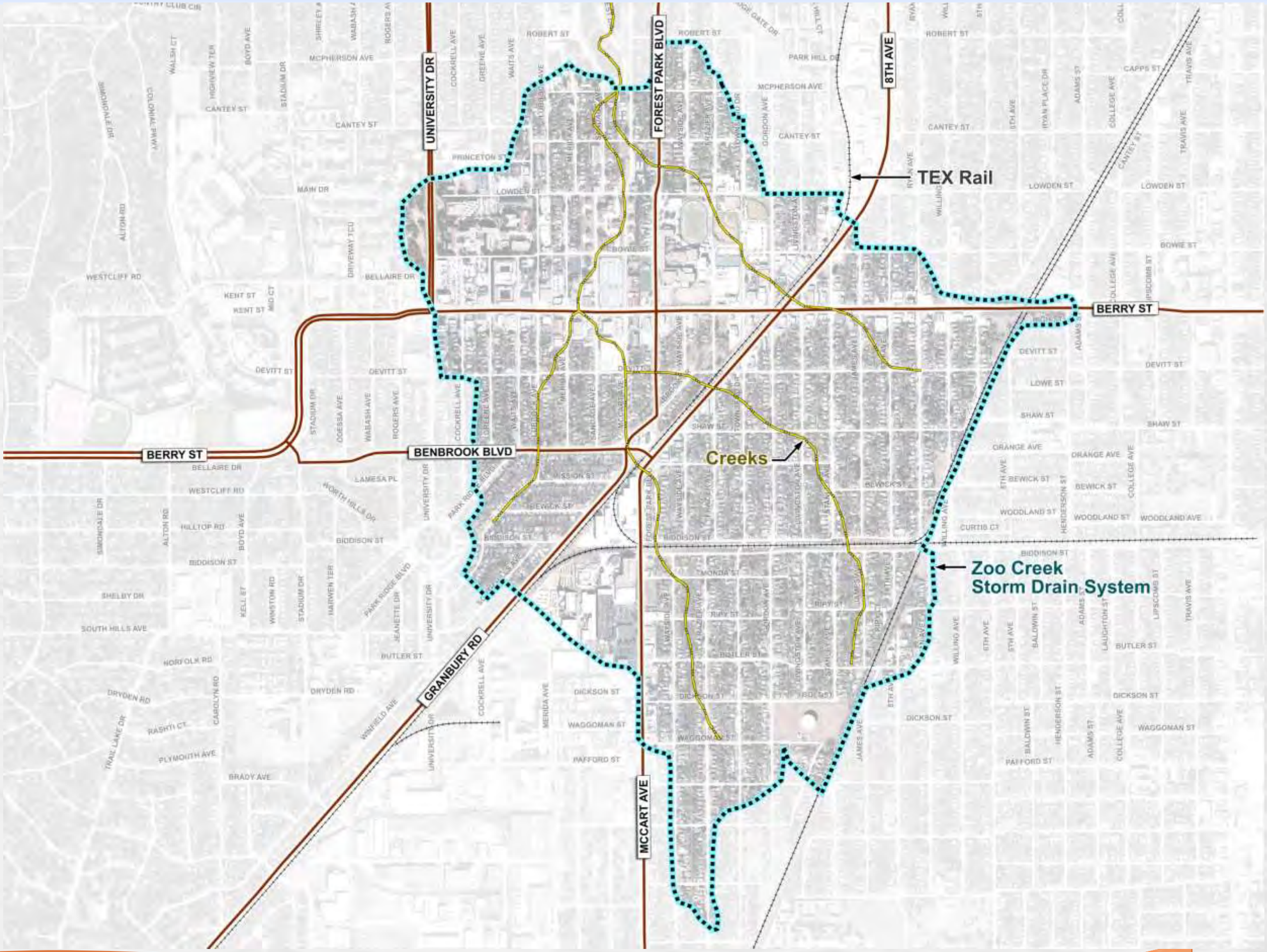
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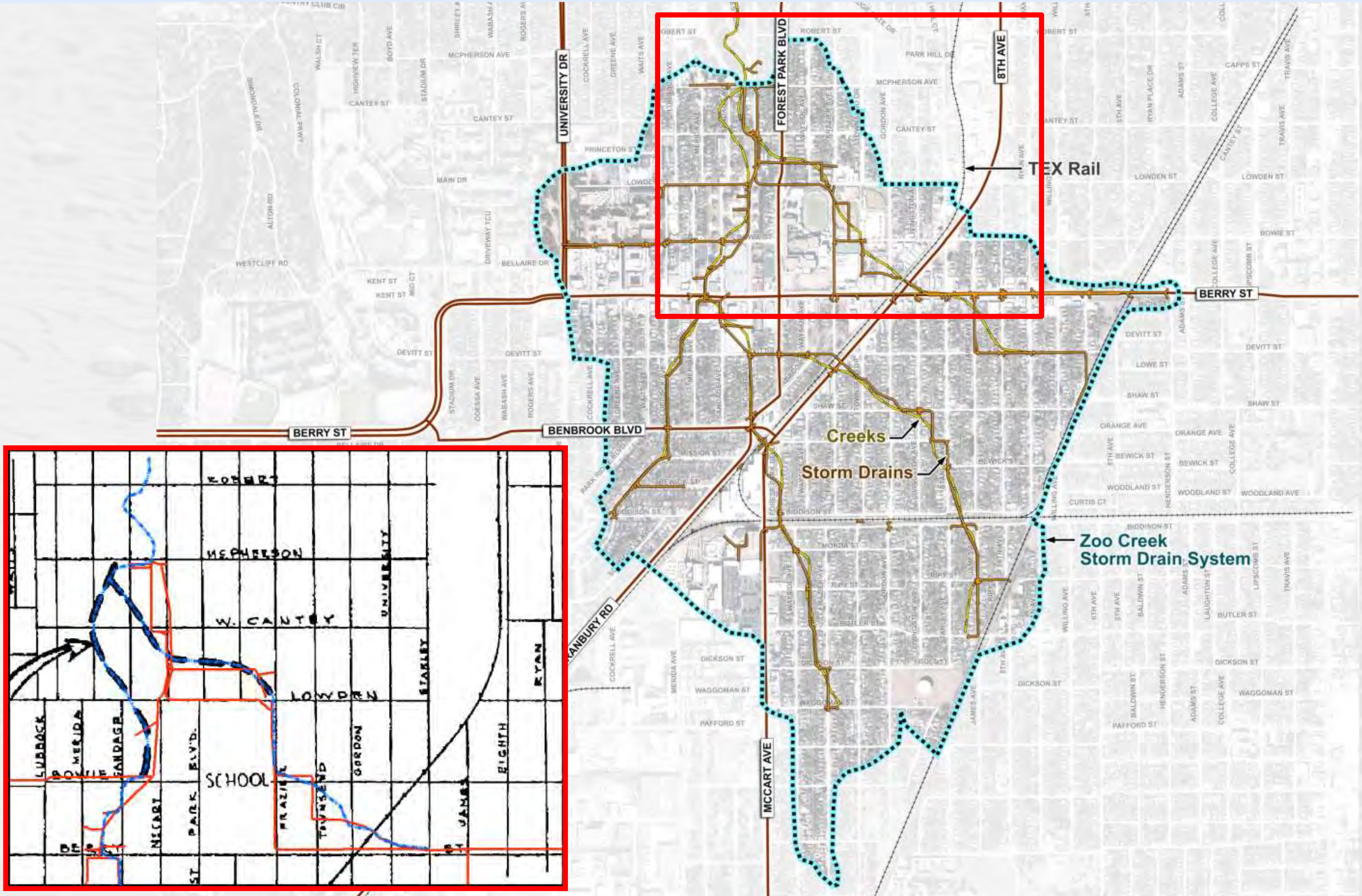
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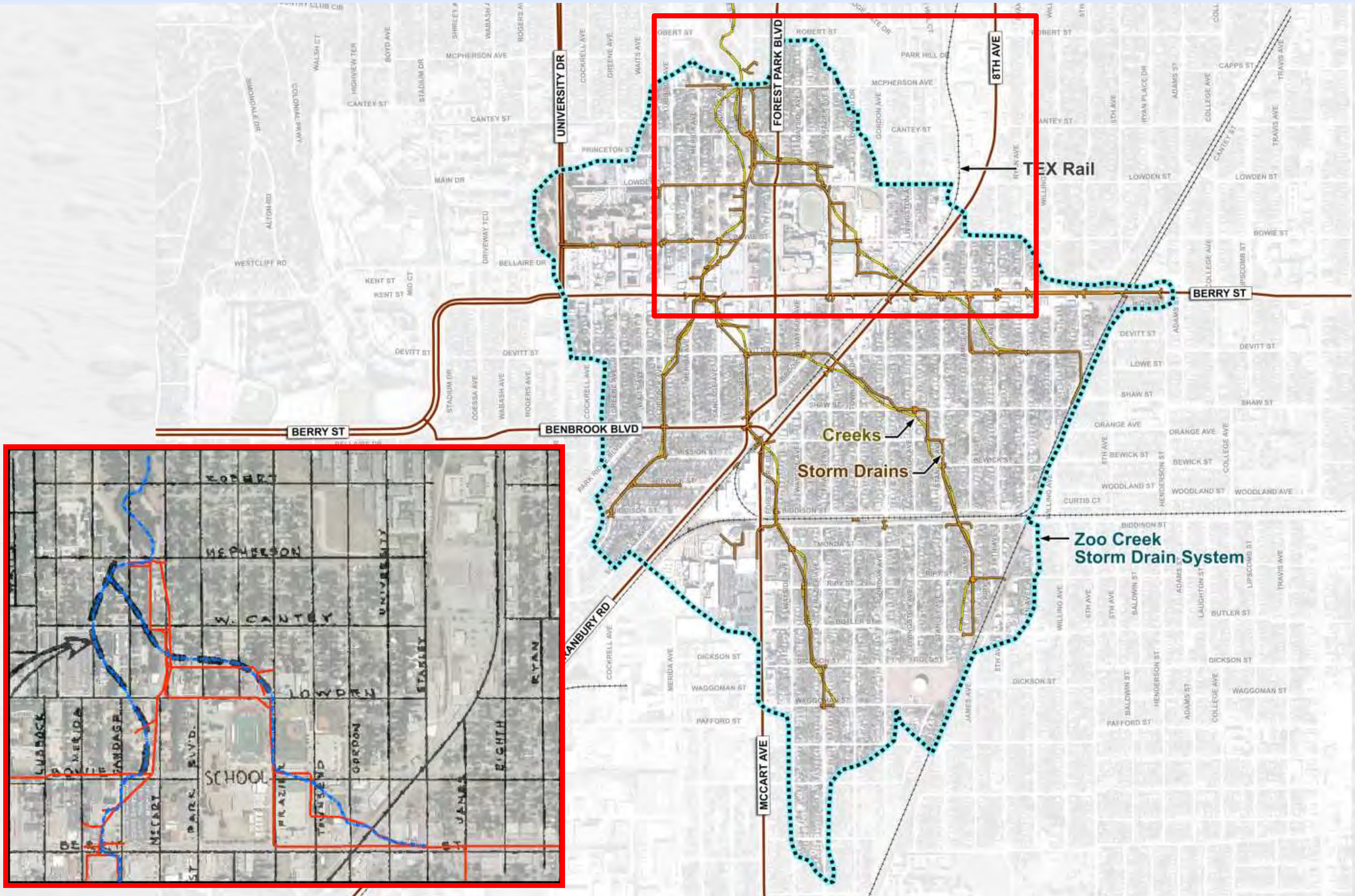

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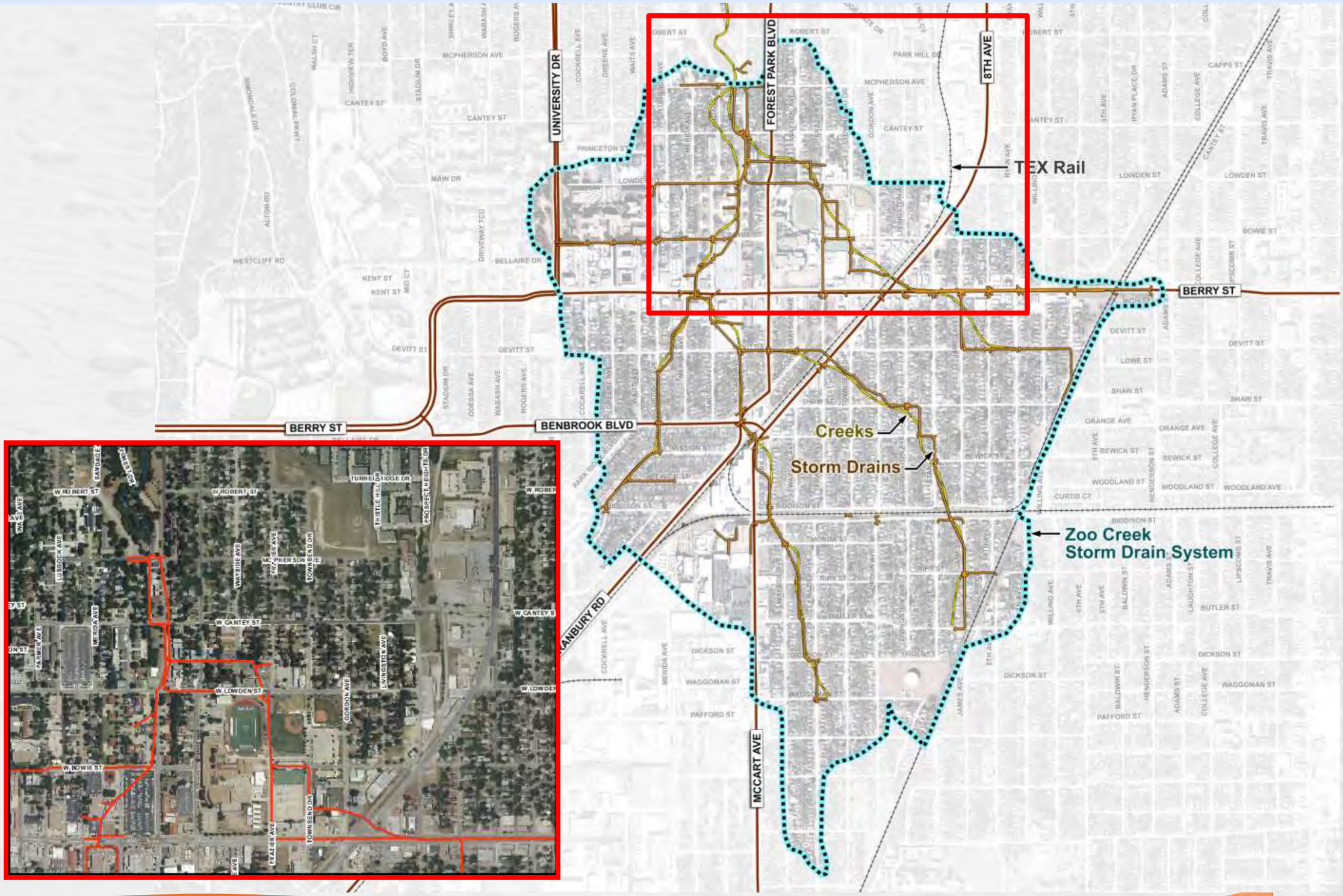
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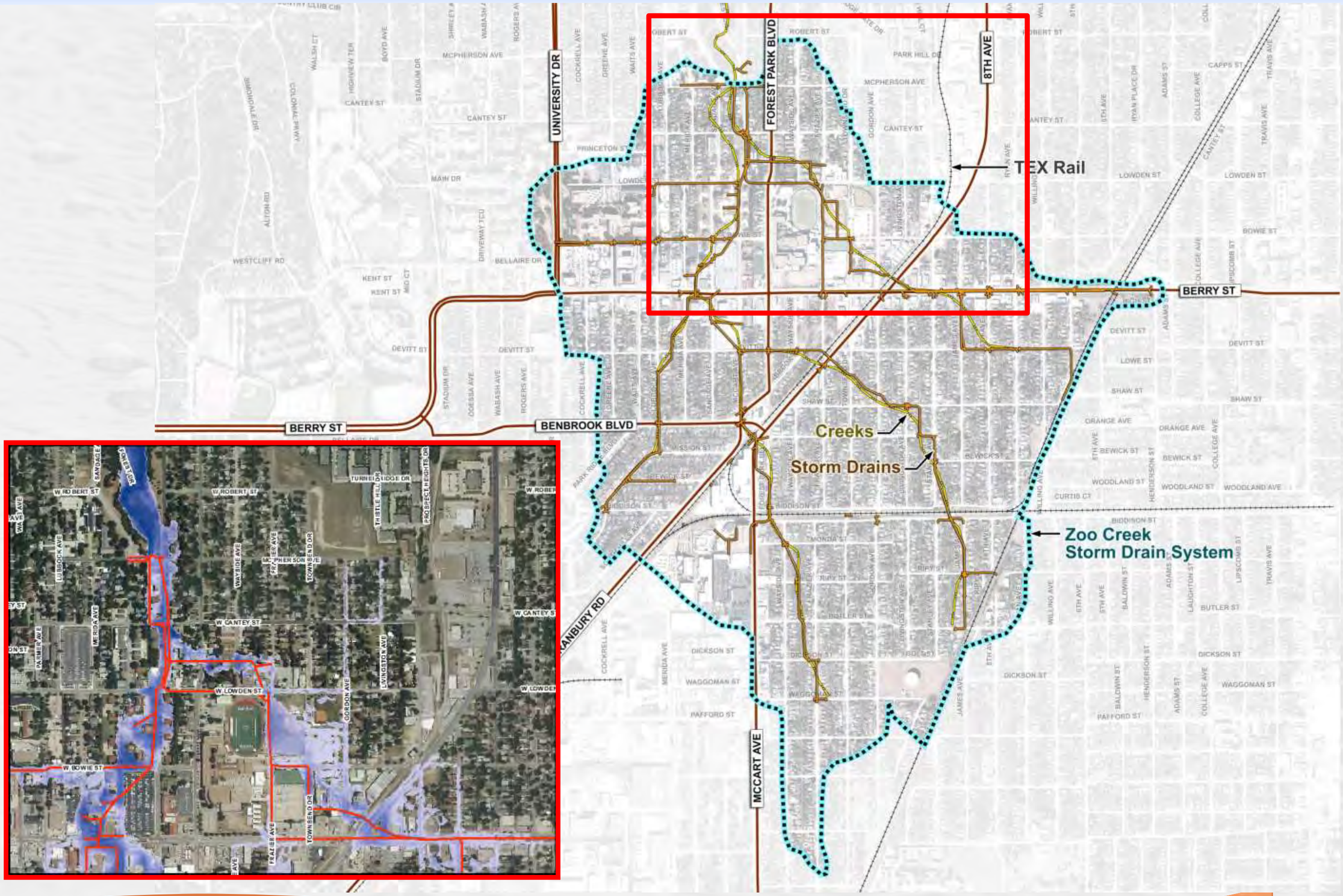
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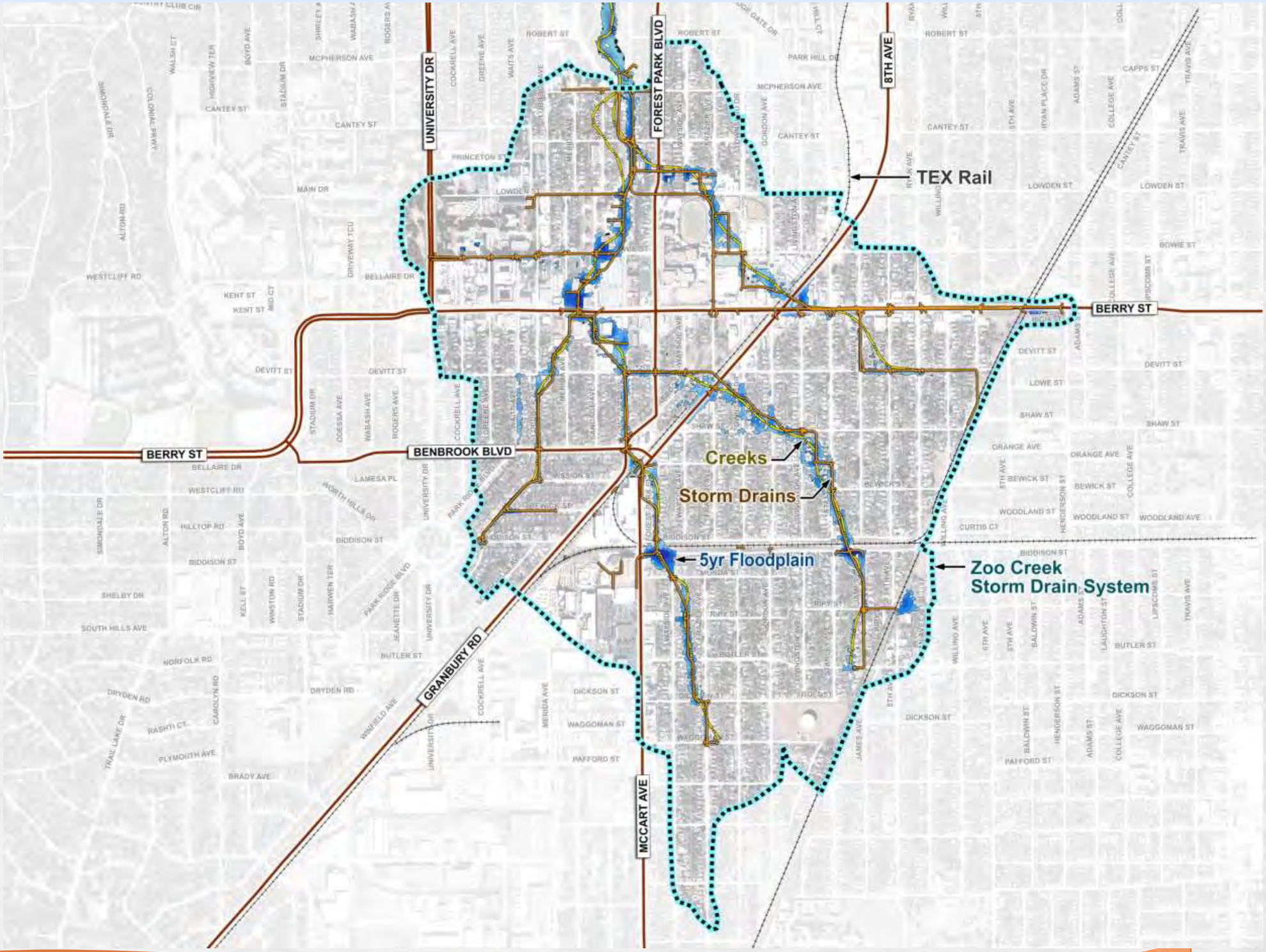
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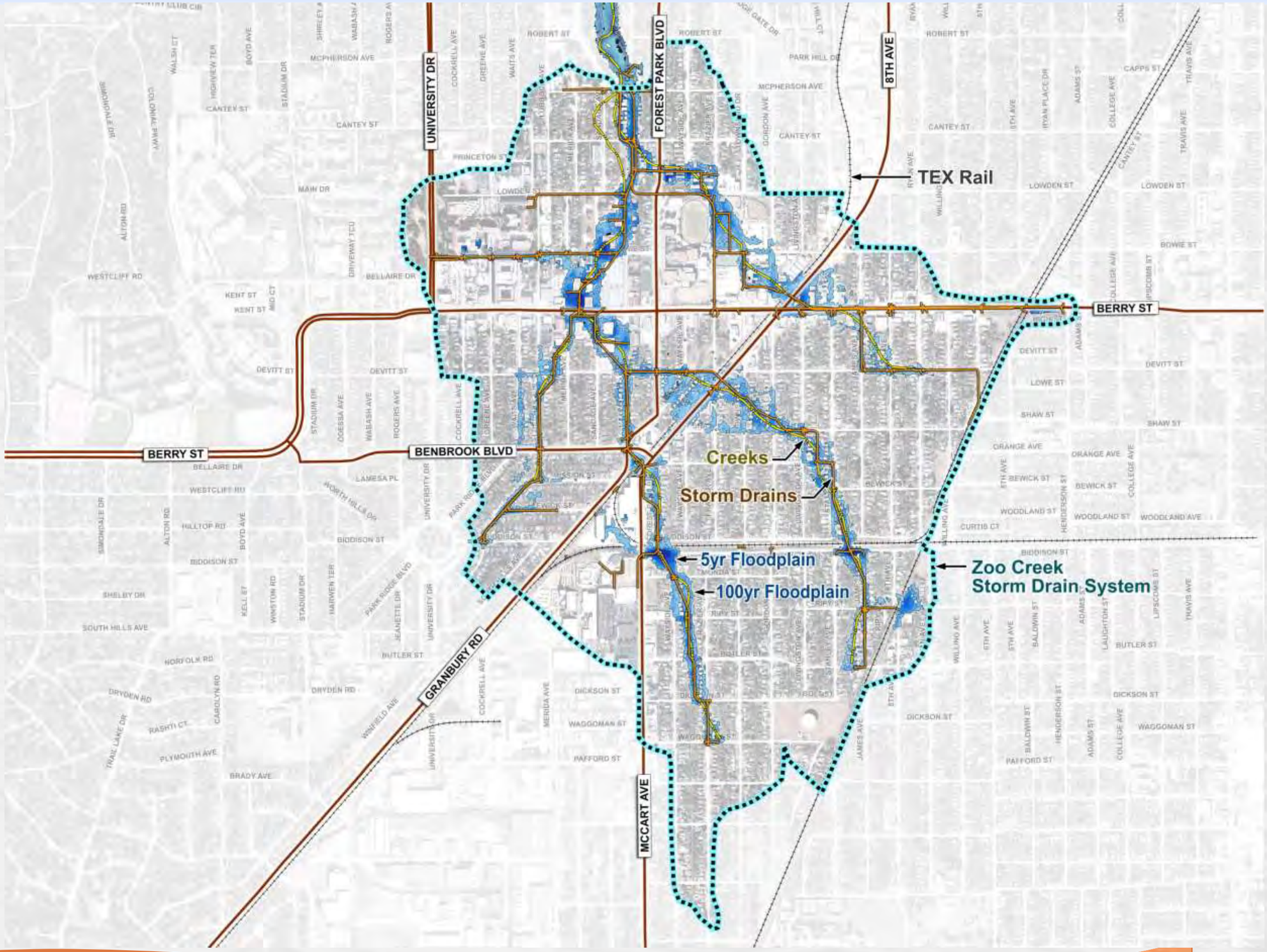
Storm Drain System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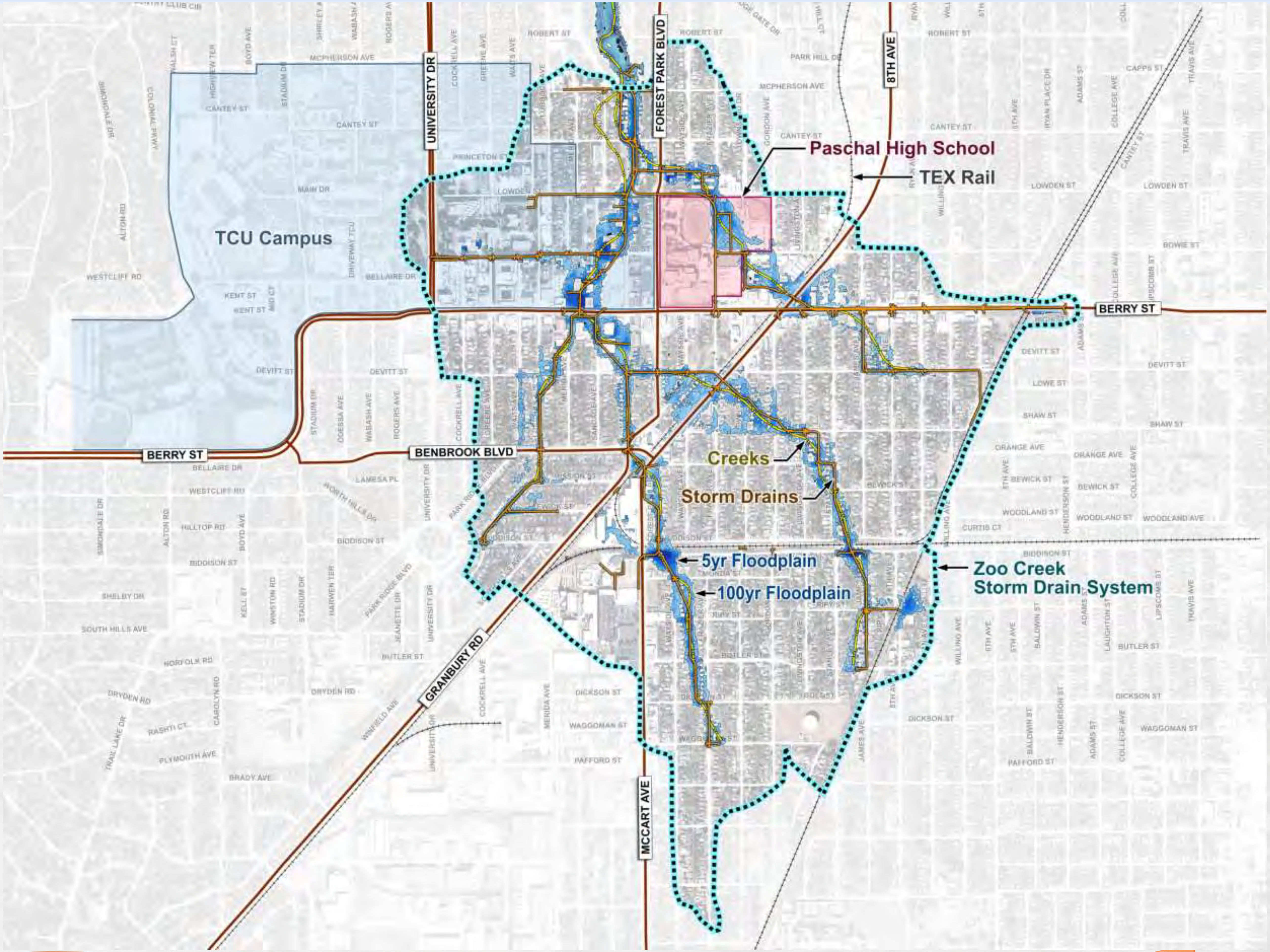

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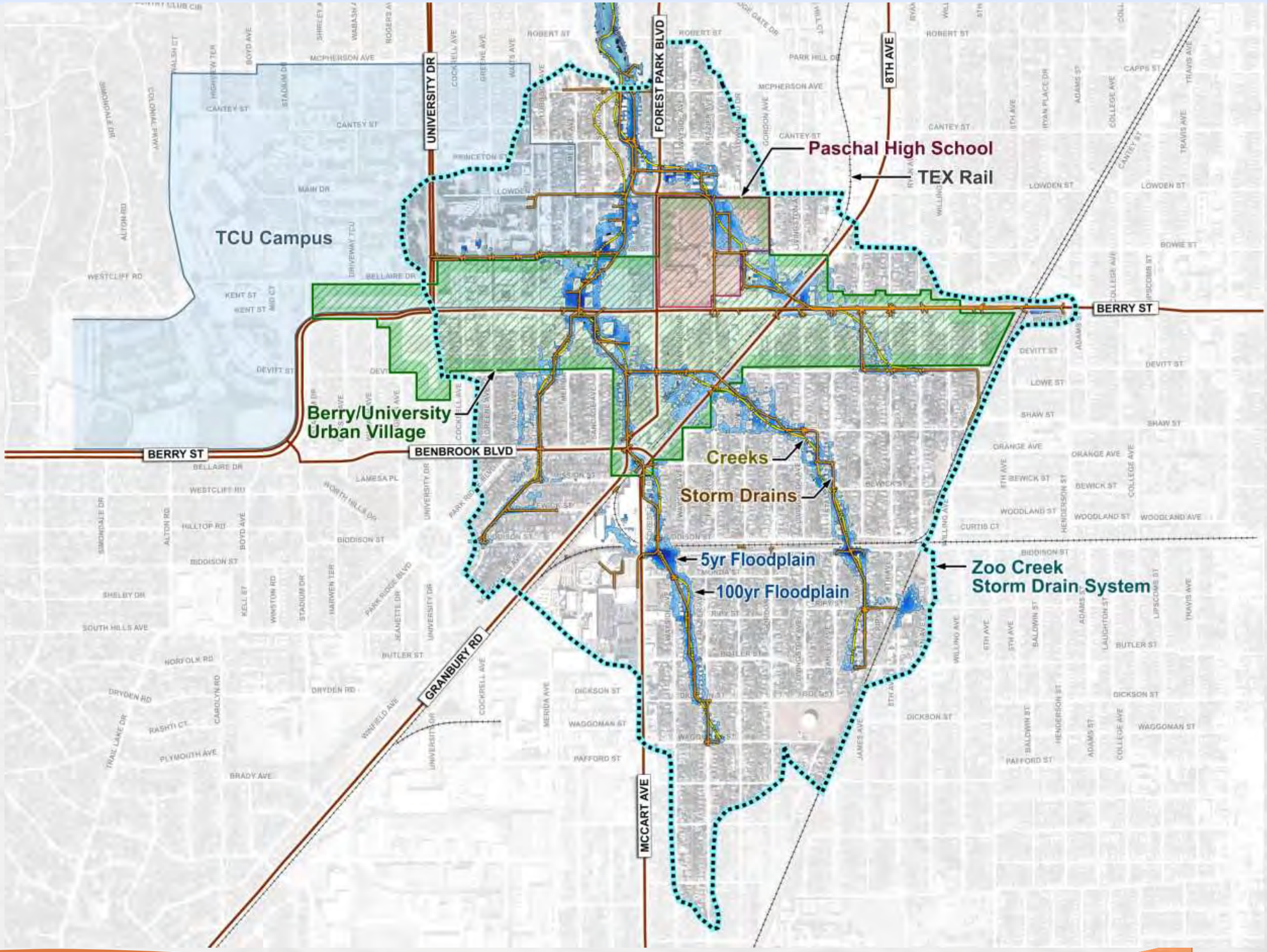
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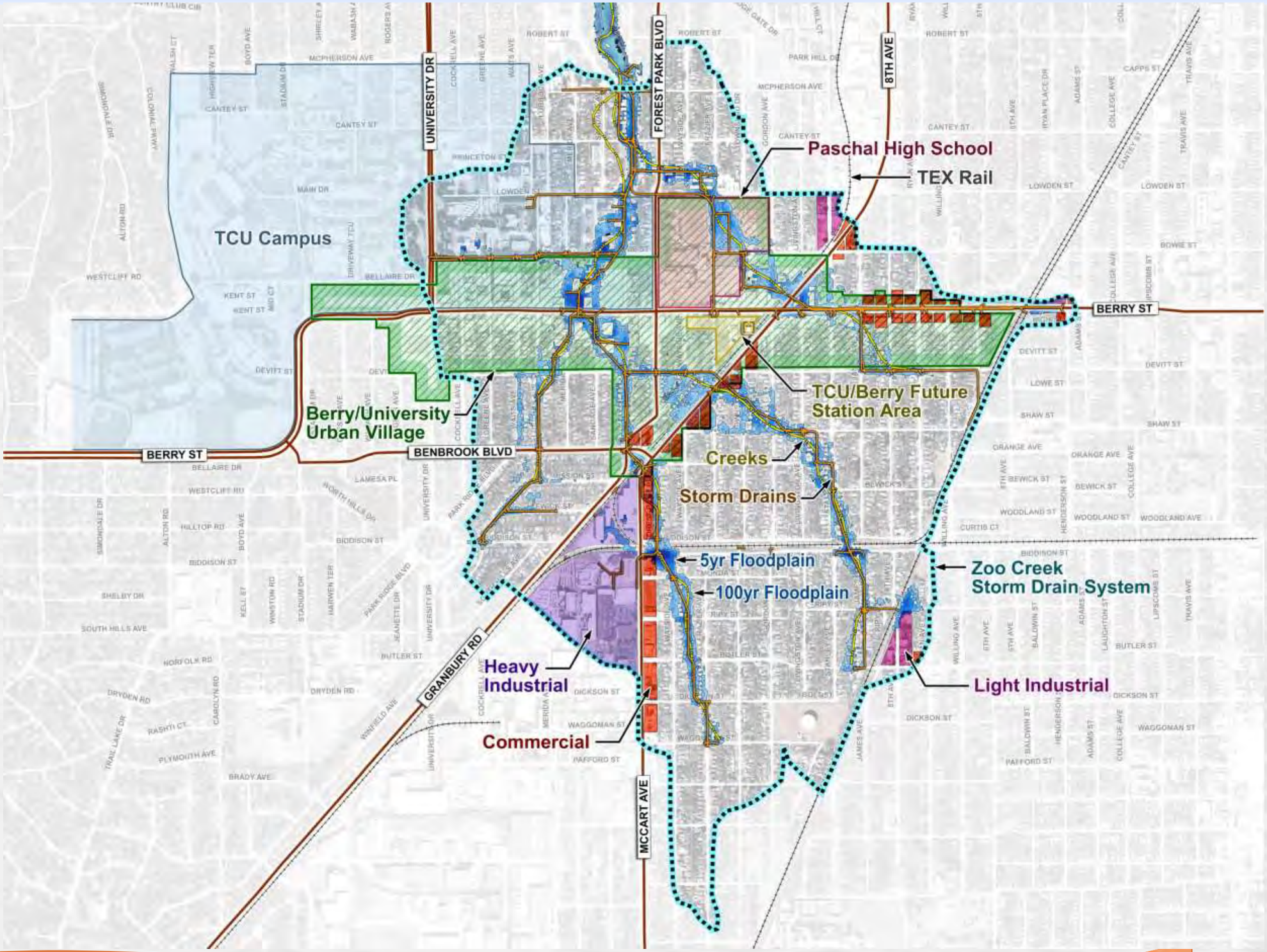
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TCU/Berry Future
Station Area
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Heavy
Industrial
Commercial
Light Industrial
UNIVERSITY DR
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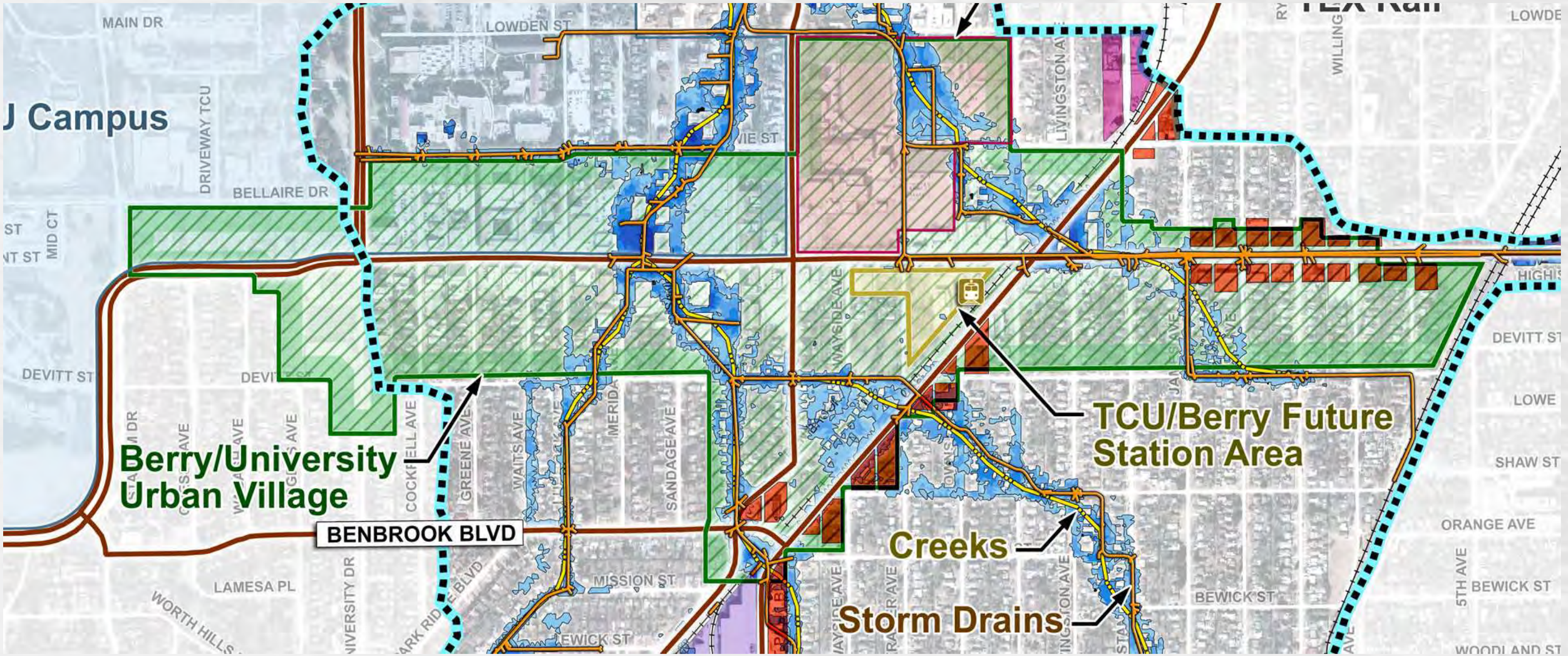
Berry / University Urban Village

Development Plan and Form Based Code



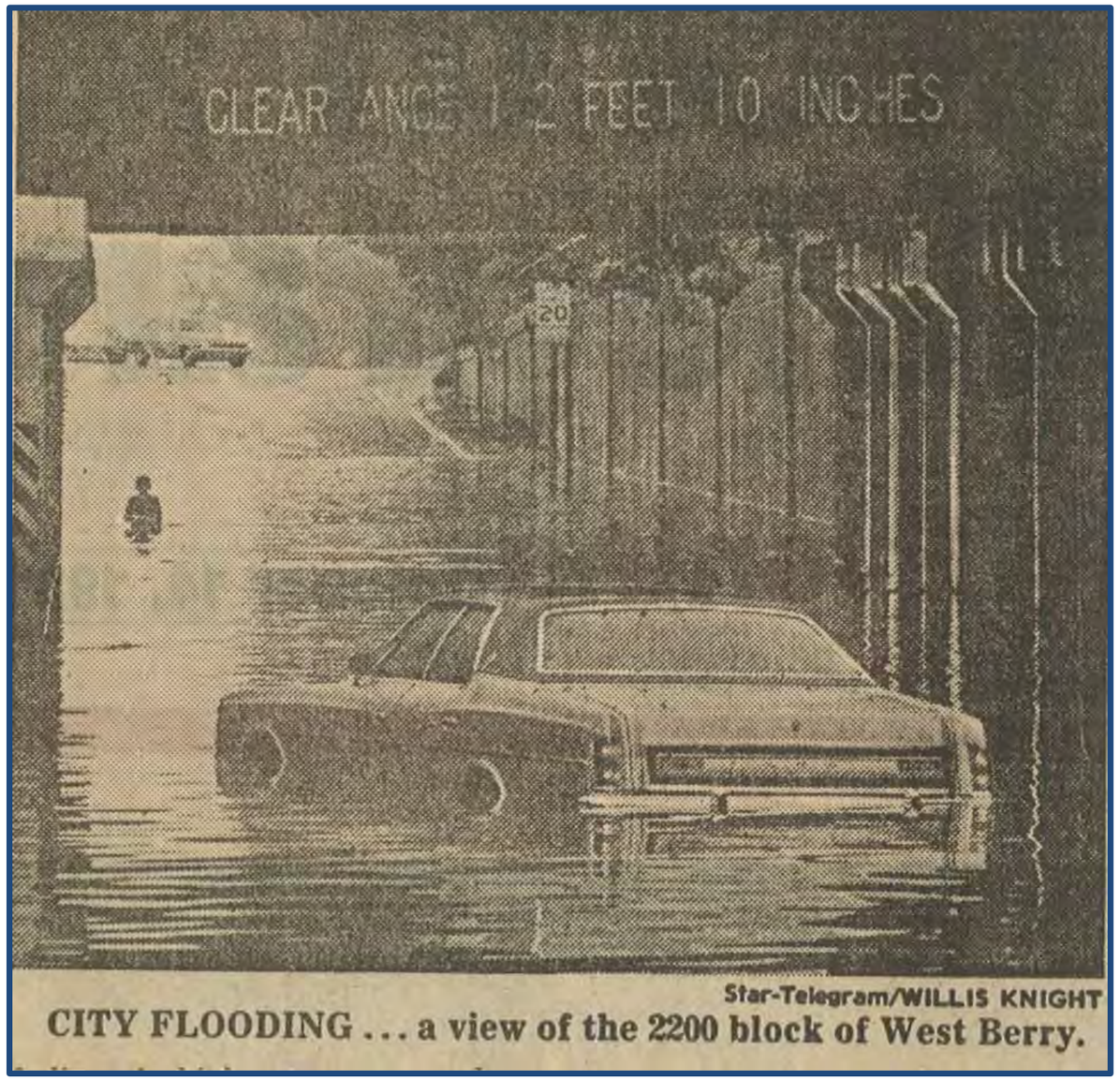
Berry / University Urban Village

Development Plan and Form Based Code

Overall Stormwater Goals

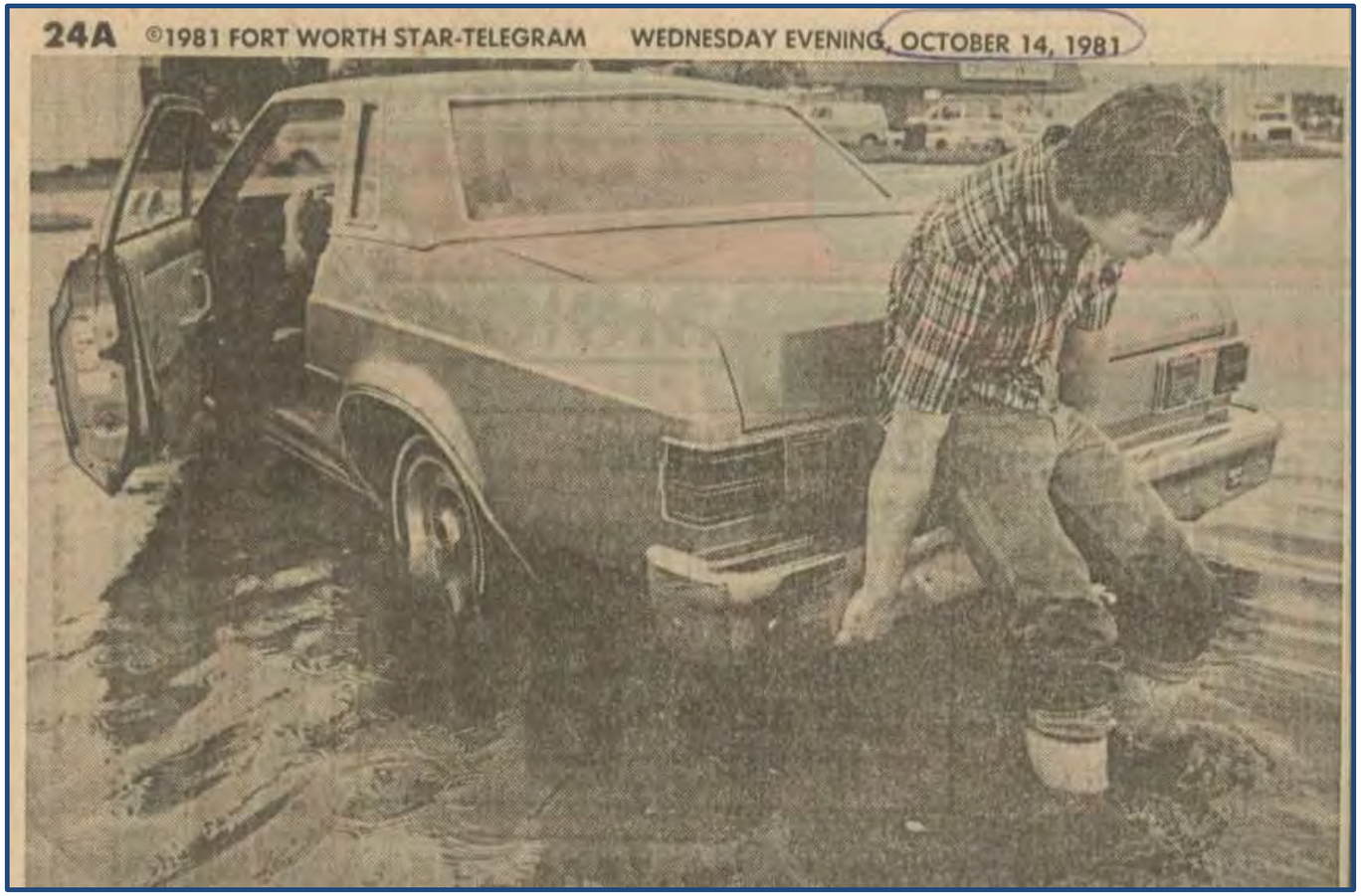
- **Protect People and Property from Stormwater Runoff**
  - Stormwater Runoff is NOT Going Away…Plan Around Flooding
  - Avoid Development in Identified Flooding Areas
  - Reduce Flooding Frequency along Streets
- **Transit-Ready Development**
  - Take Advantage of Open Space Needs to Promote Connectivity
- **Neighborhood Resiliency**
  - Reduce Flooding, Improve Stormwater Quality
  - Preserve Integrity of Adjacent Neighborhood
- **Form-Based Code**
  - Encourage Stormwater Measures that Enhance the Urban Village
  - Set an Example for the Surrounding Area

Existing Stormwater Issues



Star-Telegram/WILLIS KNIGHT

CITY FLOODING . . . a view of the 2200 block of West Berry.

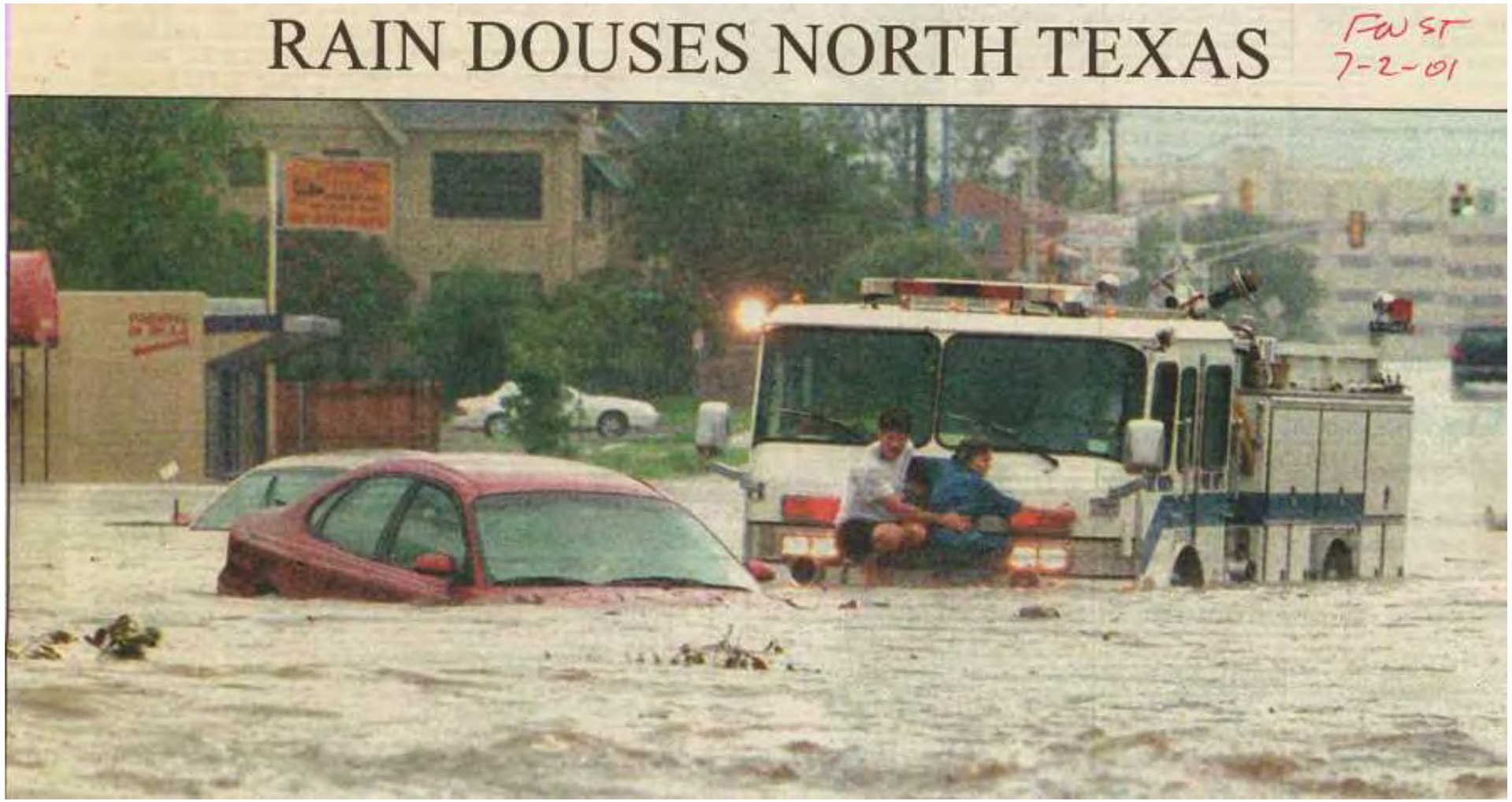


1981

Existing Stormwater Issues

1995

Existing Stormwater Issues


RAIN DOUSES NORTH TEXAS

FW ST
7-2-01

2001

Existing Stormwater Issues

2004

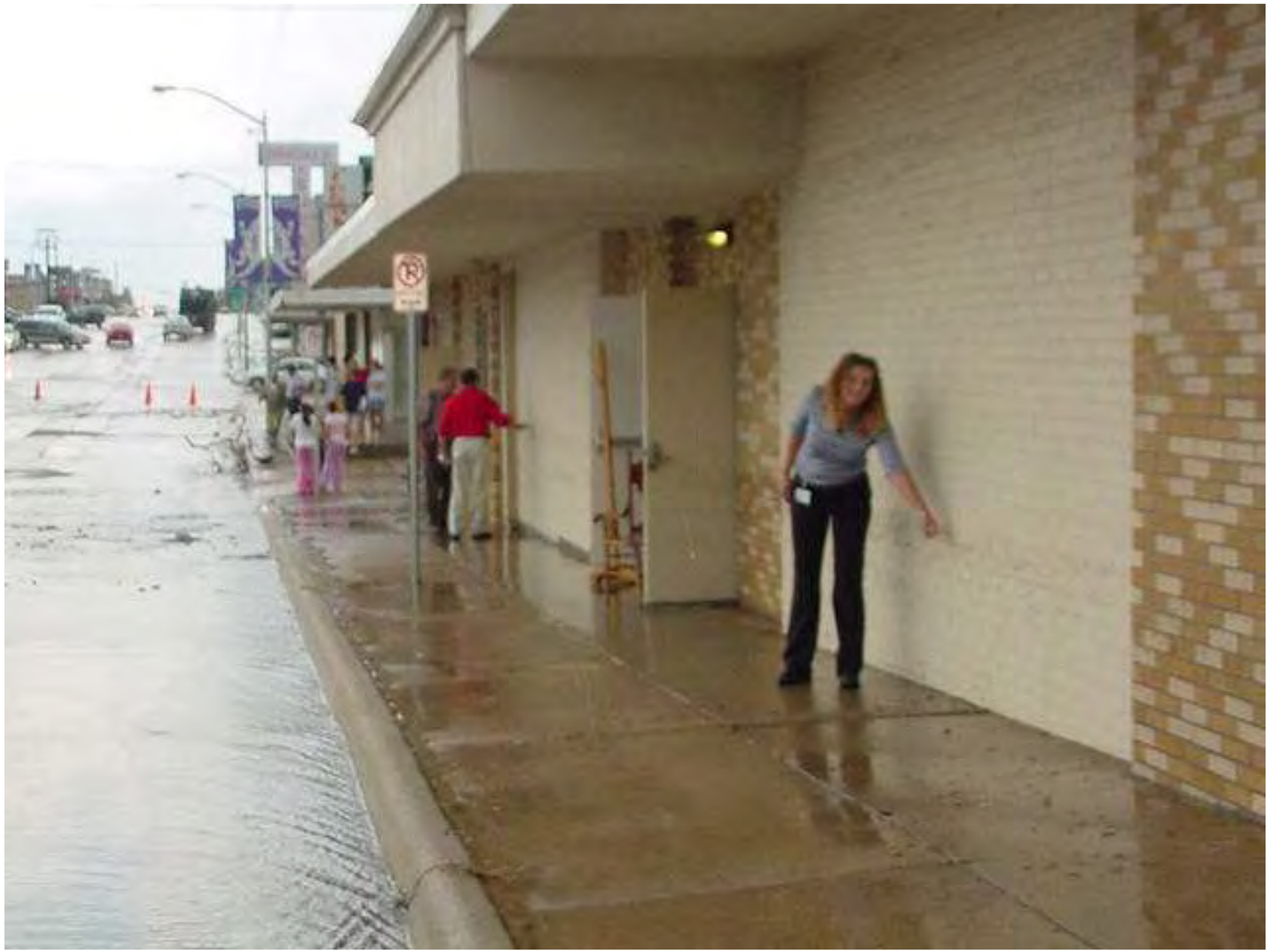
Existing Stormwater Issues

2004

Existing Stormwater Issues

2004

Existing Stormwater Issues



2004

Existing Stormwater Issues

2004

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2014

Existing Stormwater Issues

2004

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2007

Existing Stormwater Issues

2004

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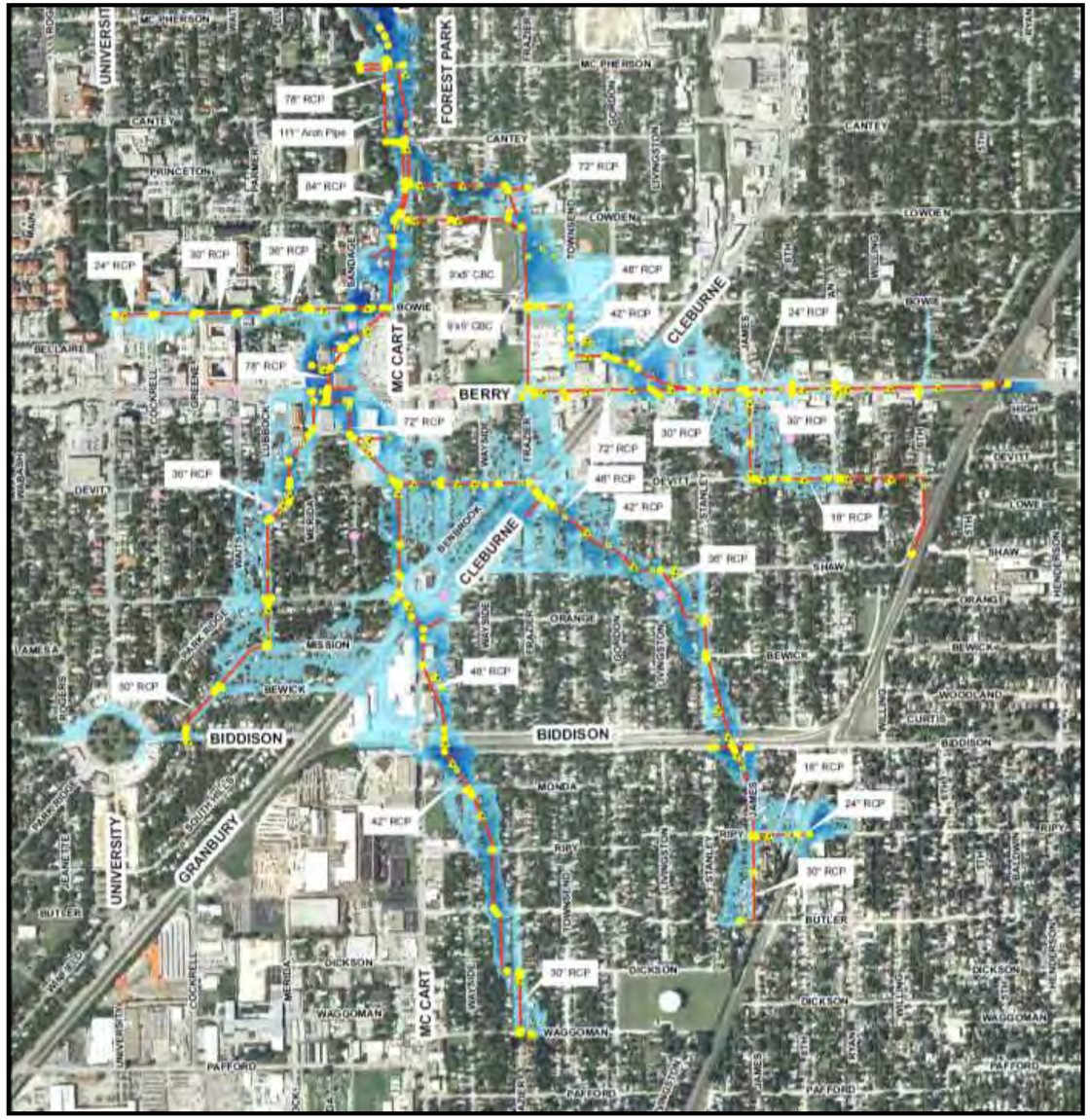
Existing Stormwater Issues

2004

Previous Study Efforts

- **Considered Many Solutions**
  - Large Storm Drains
  - Relief Tunnels
  - Deep Detention (Pumped)
  - Large Regional Detention
  - Green Infrastructure
  - Pocket Detention
- **Initial Focus on 100-year**
- **Costs from $43M to $156M**



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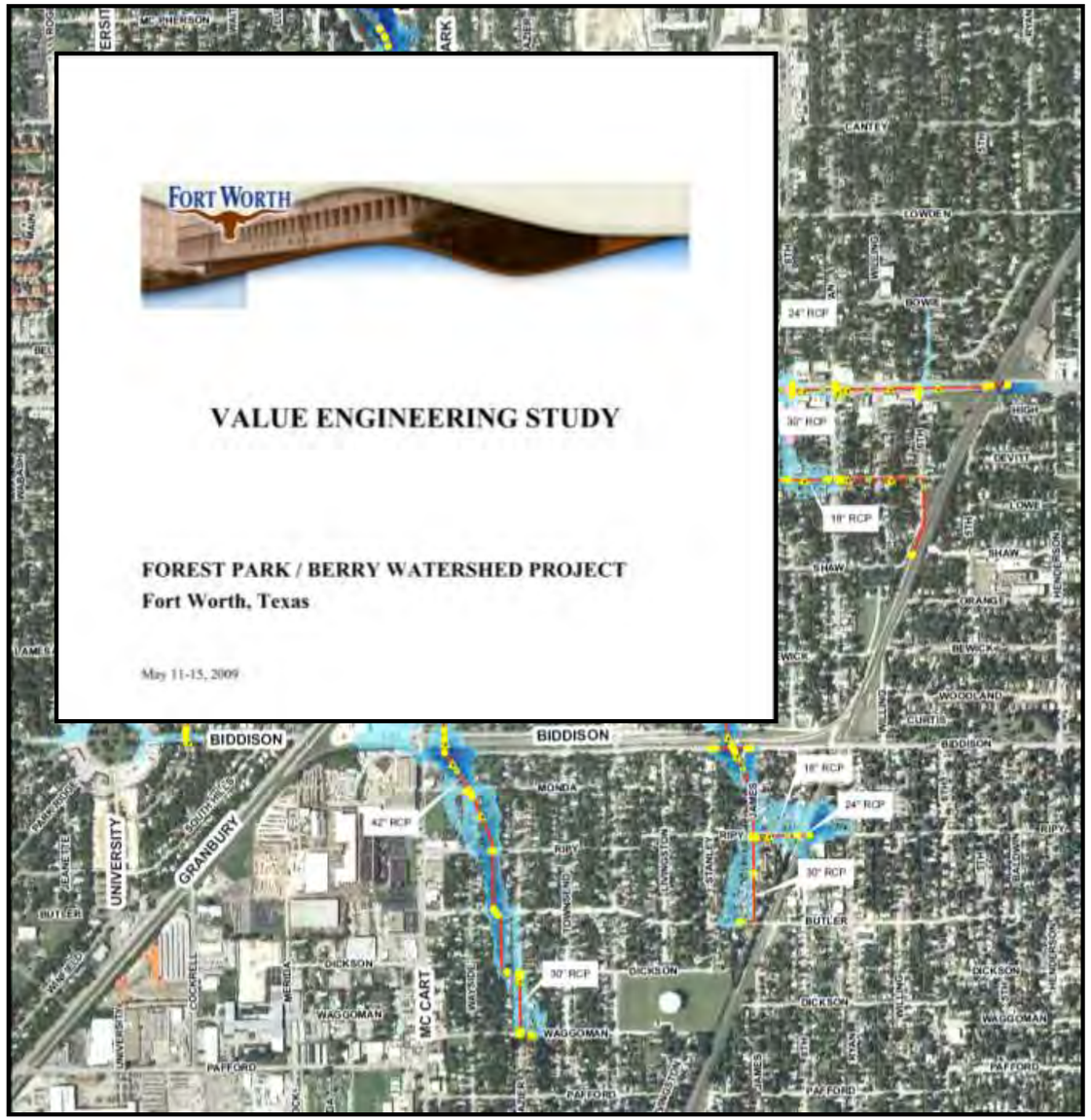

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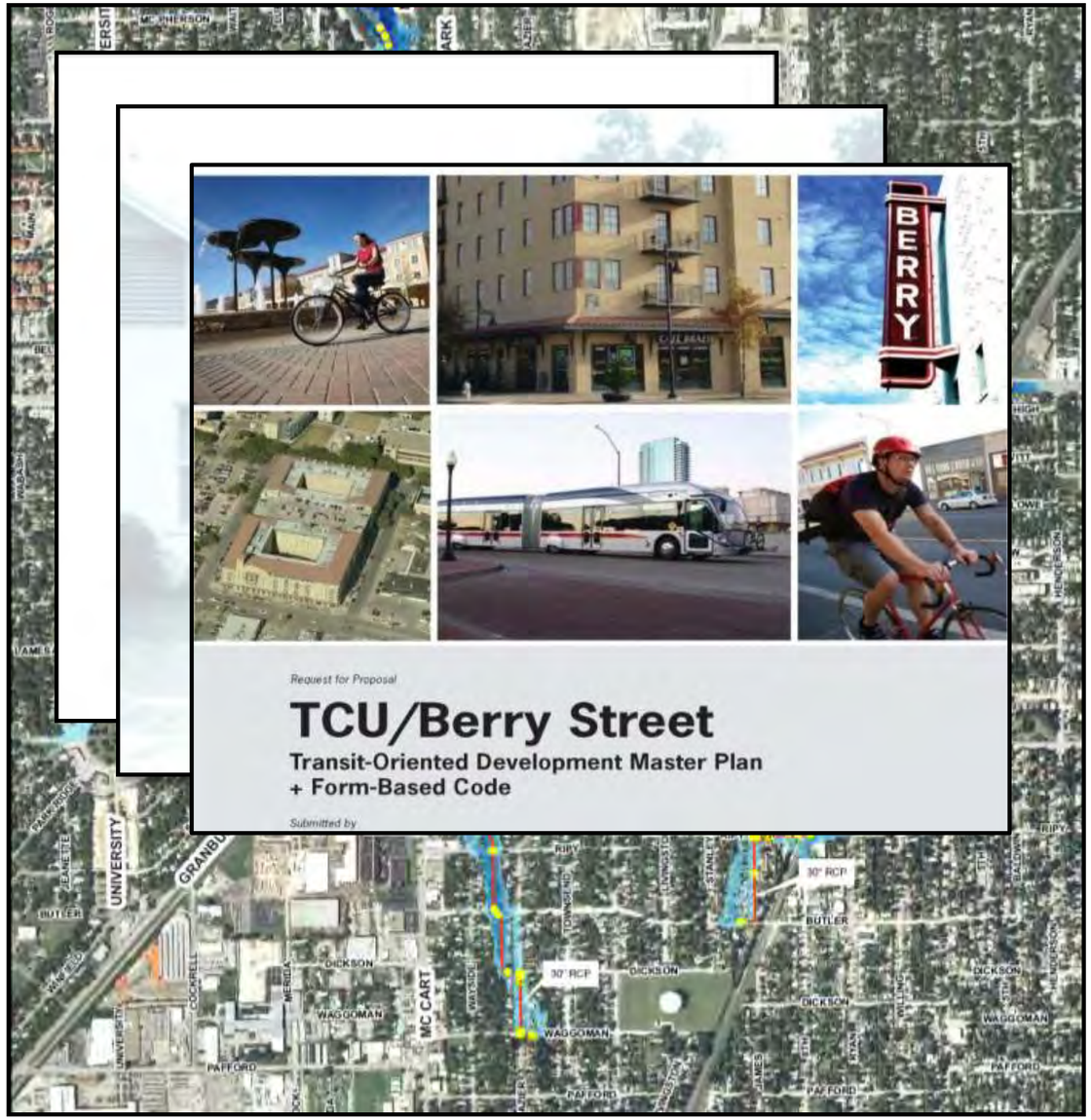
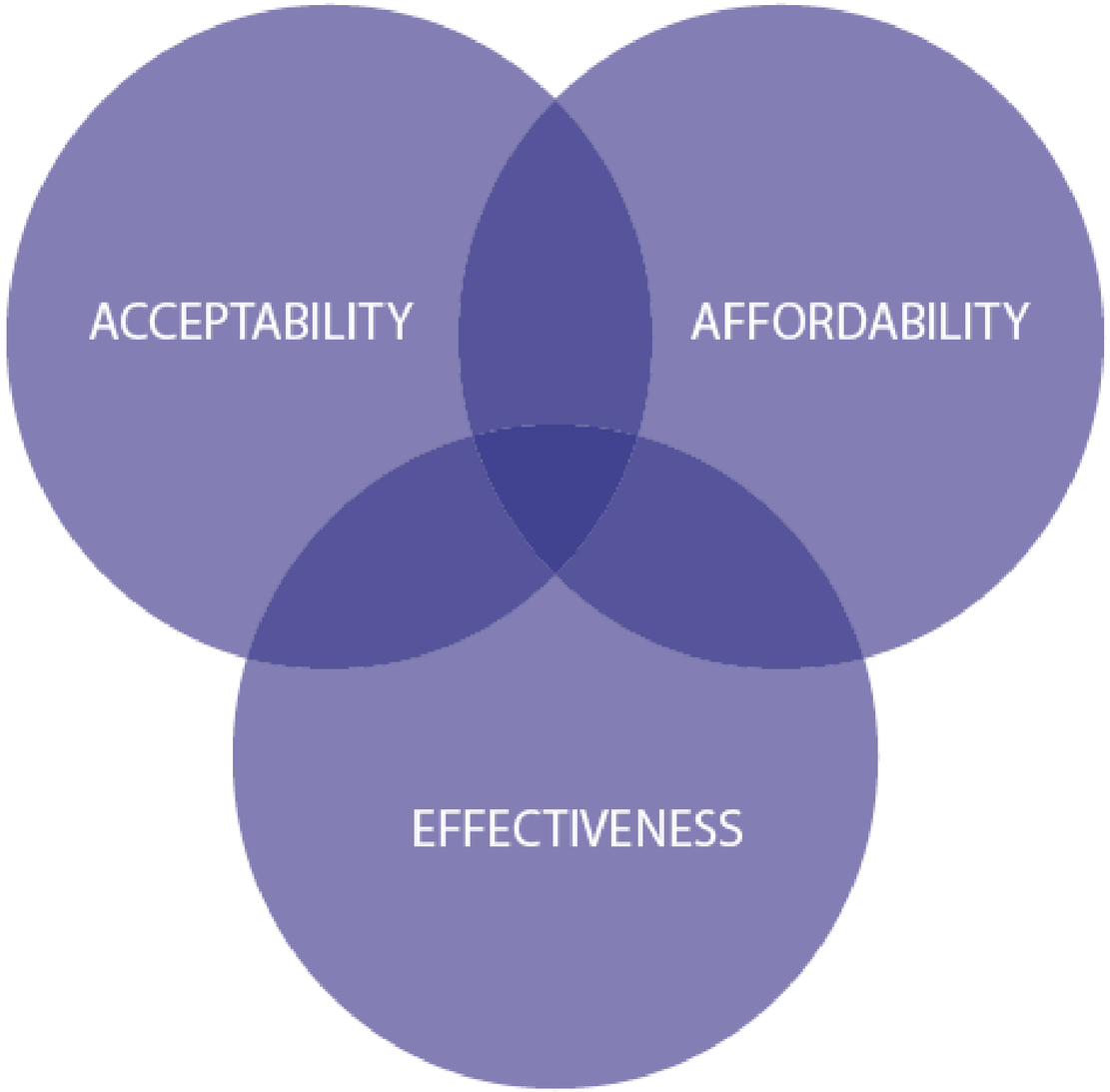


Stormwater Philosophy

- **Find "Feasible" Solutions**
- **Effective to Reduce Flood Risk of Flooding**
- **Affordable and Within Budget**
- **Acceptable in Terms of Quality of Life**



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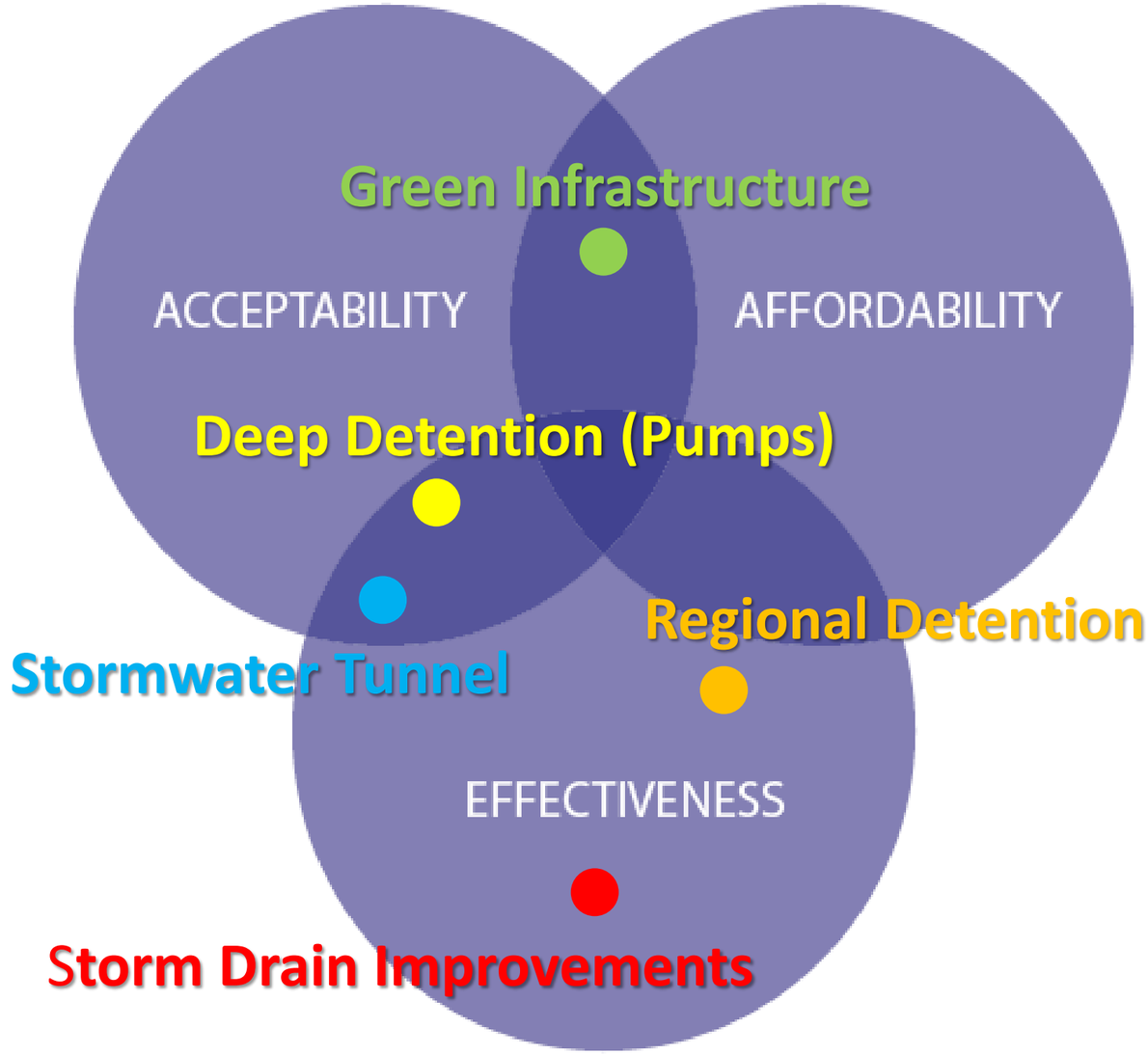

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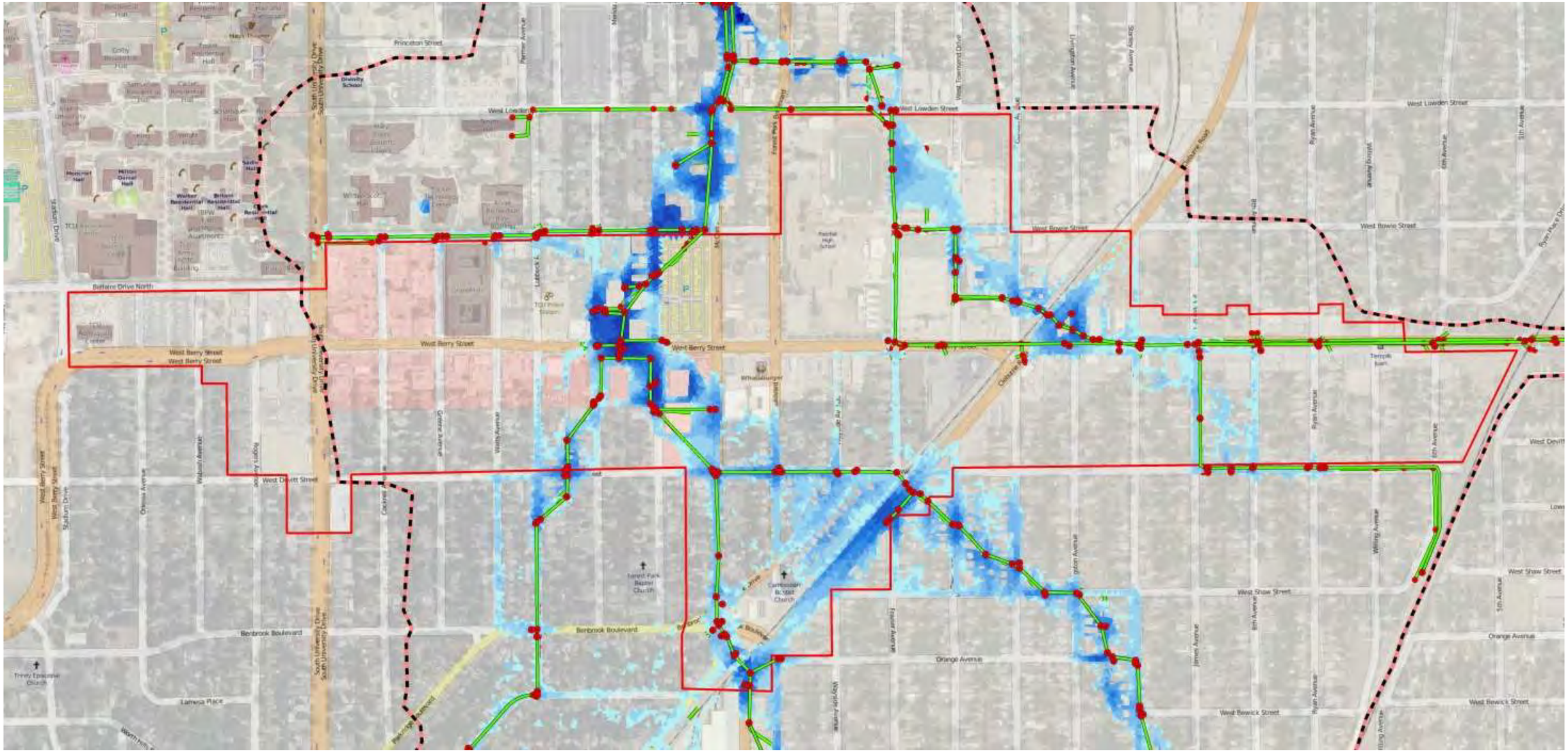
Stormwater Focus

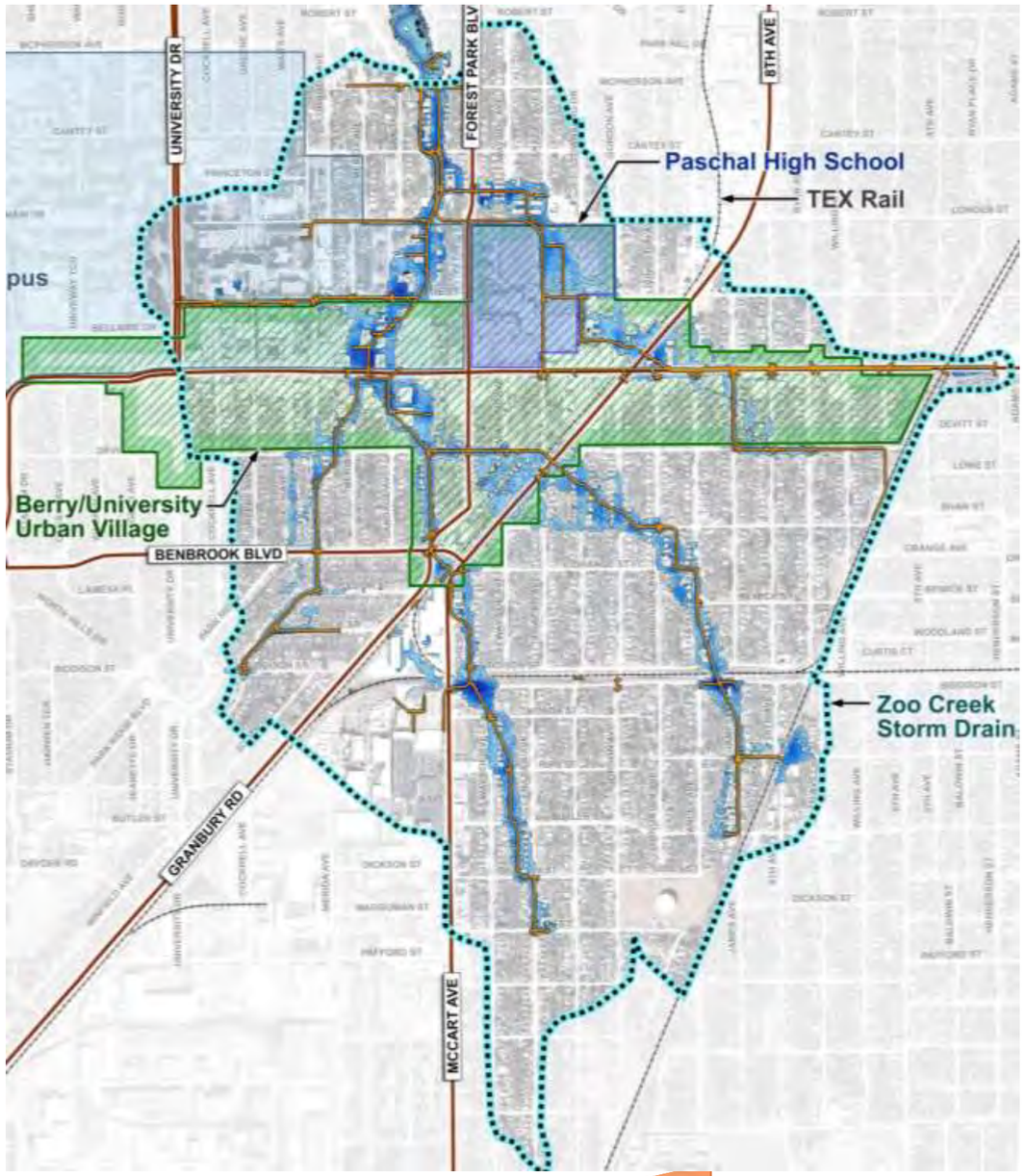


Stormwater Focus

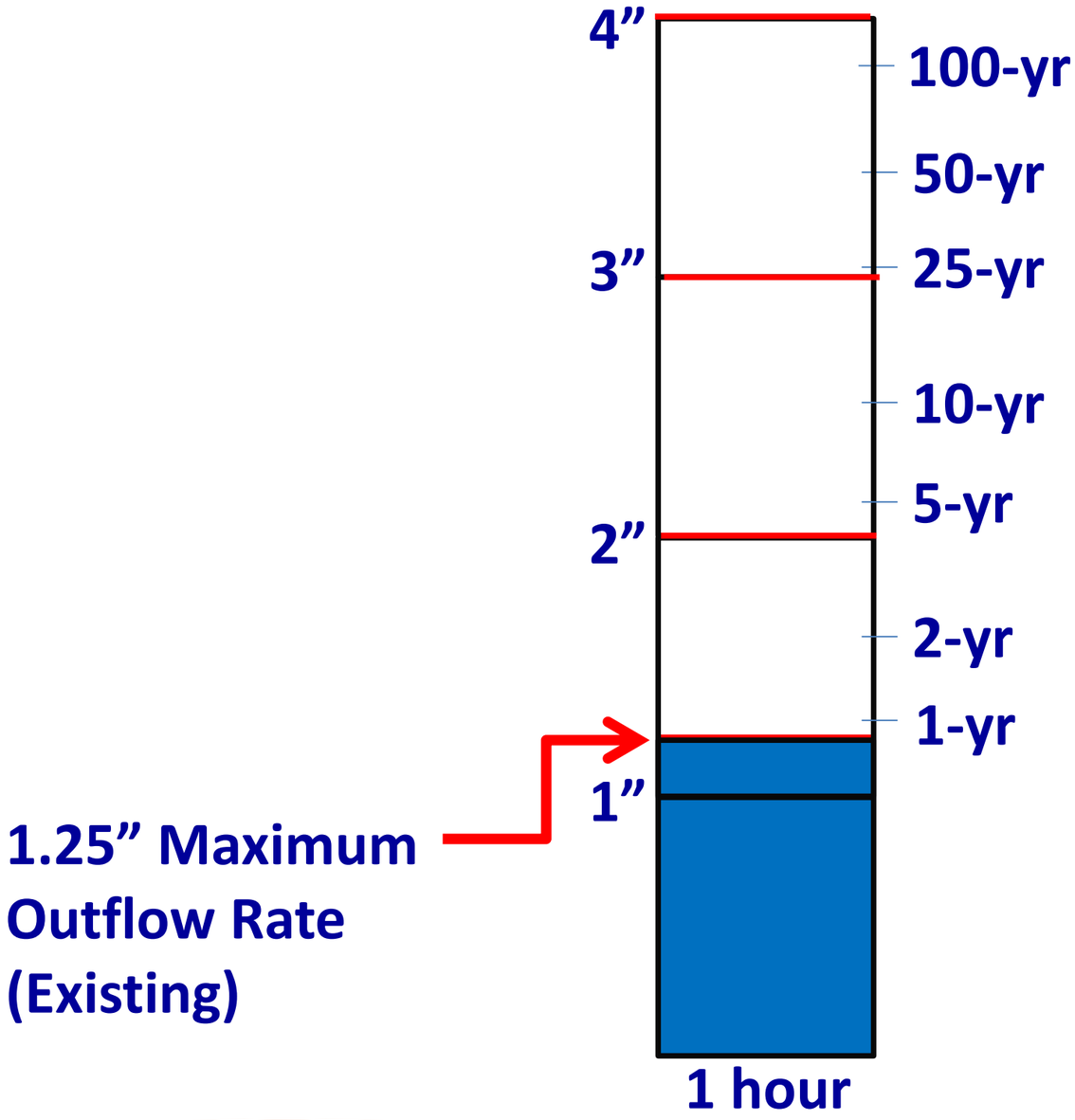
- **Plan Based on a Worst Case Scenario (100-Yr Storm)**
- **Consider more frequent rainfall patterns**
- **Focusing on incremental improvements**
  - How can we handle 2”? What about 3”?
  - Small projects improve flooding bit-by-bit.
- **Changing how we think about solutions**
  - Consider how stormwater projects can improve other aspects of the community (connectivity, health, environment, etc.)
  - Higher standards set an example for other areas

Zoo Creek Storm Drain Study

- **Consider Previous Studies**
- **Evaluate the Extent of the Current Flooding**
- **Identify Opportunities and Challenges**
- **Develop a "Long-Term Vision" for Improving Flooding in Urban Village and Surrounding Area**



Existing System Capacity



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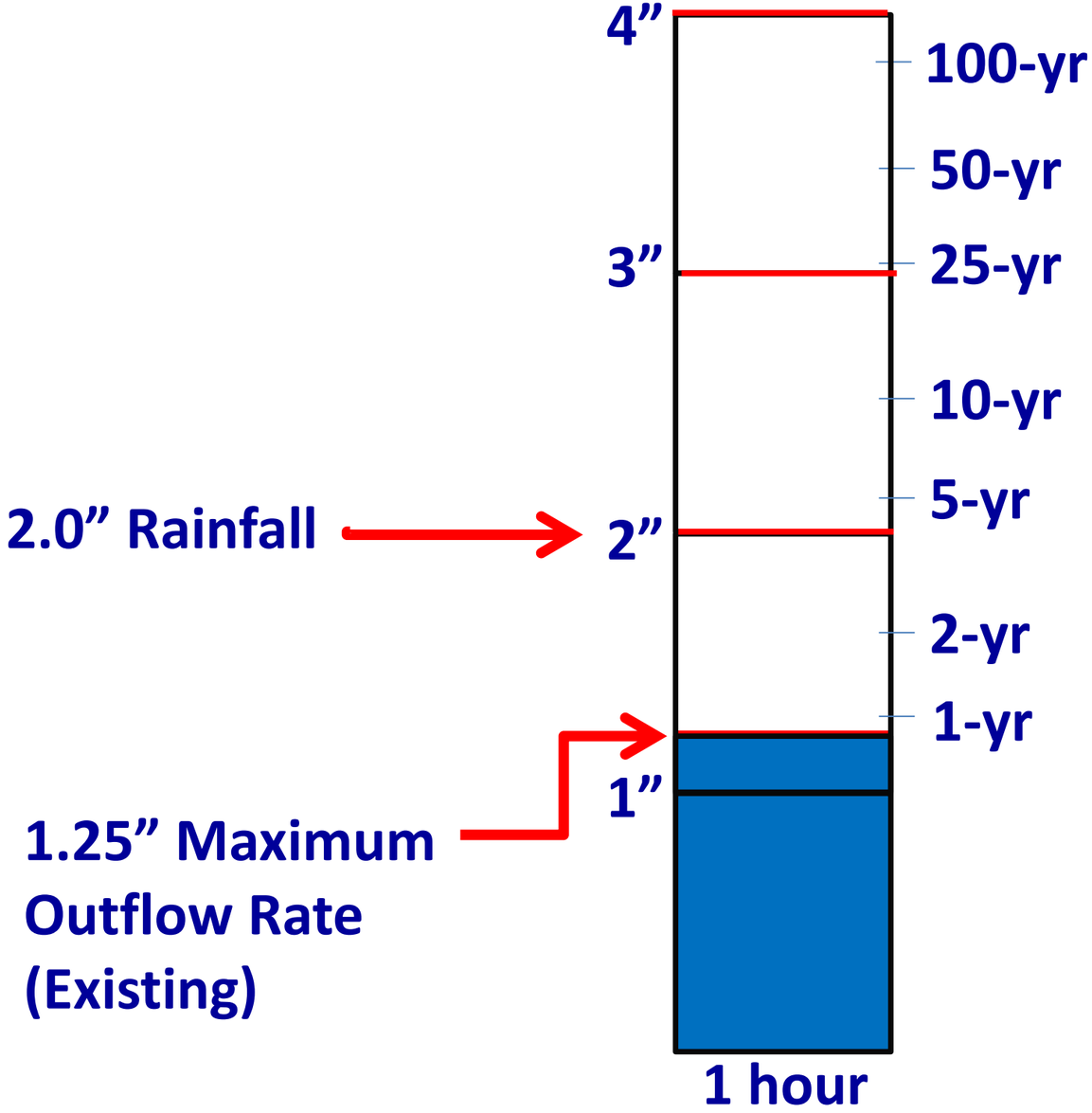

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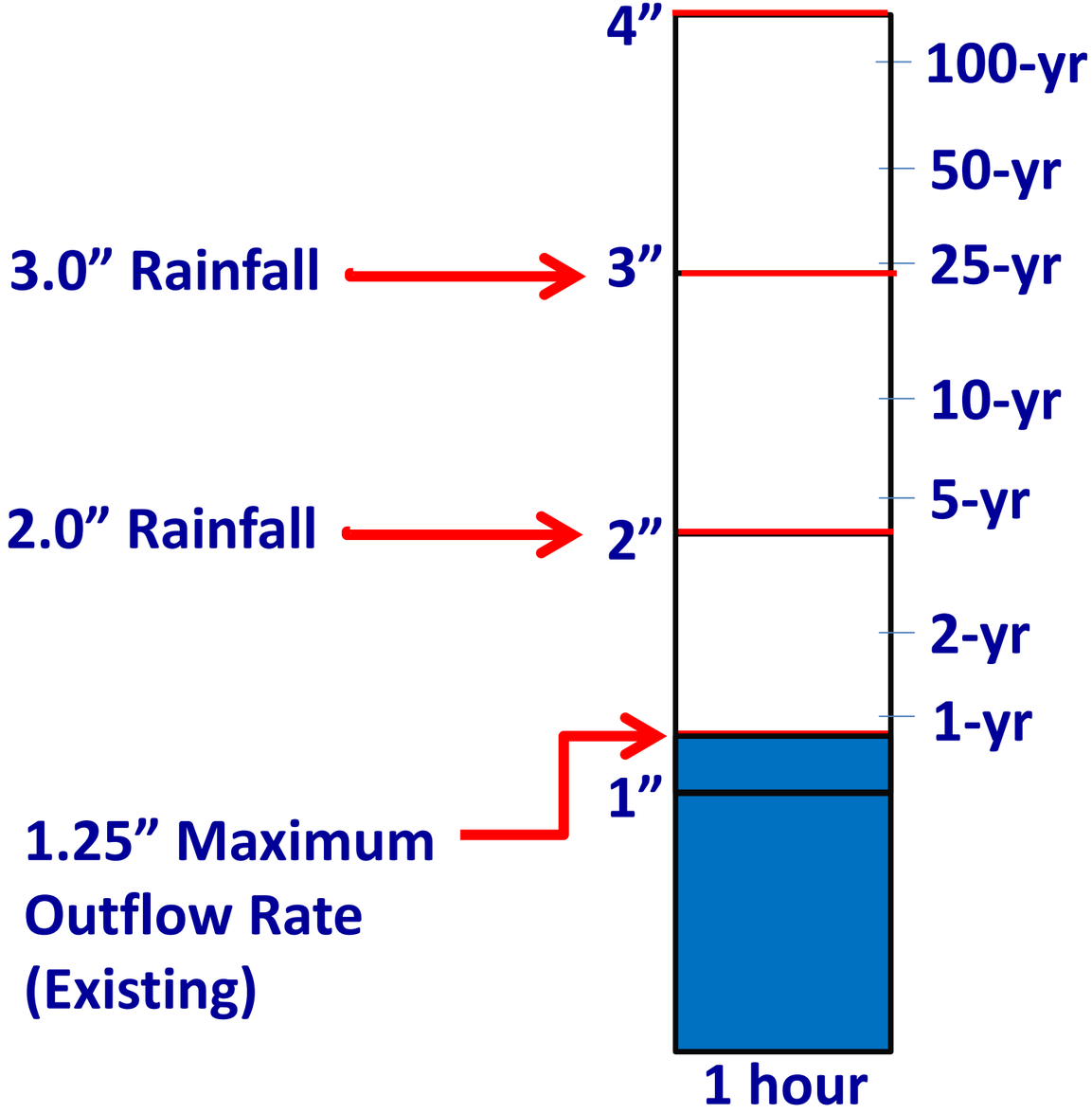

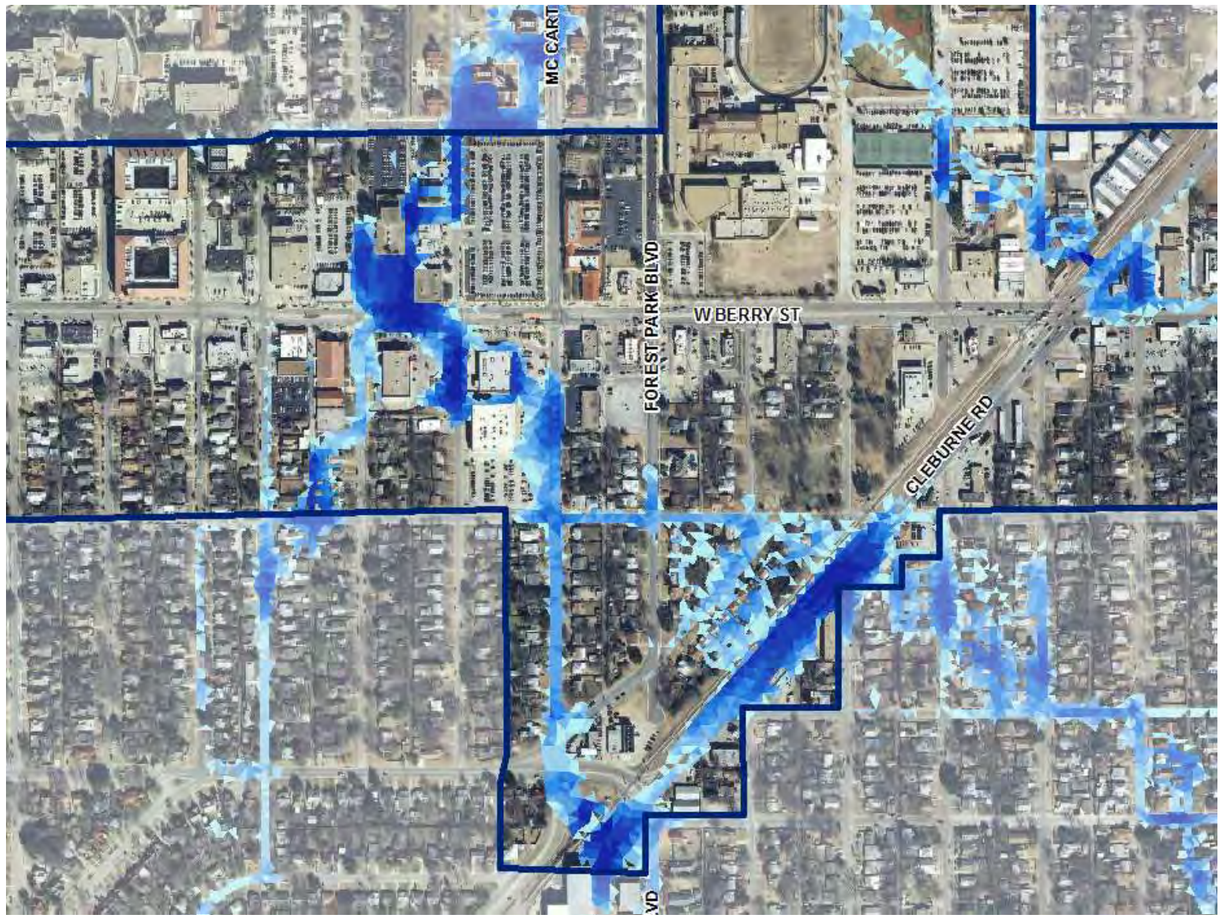

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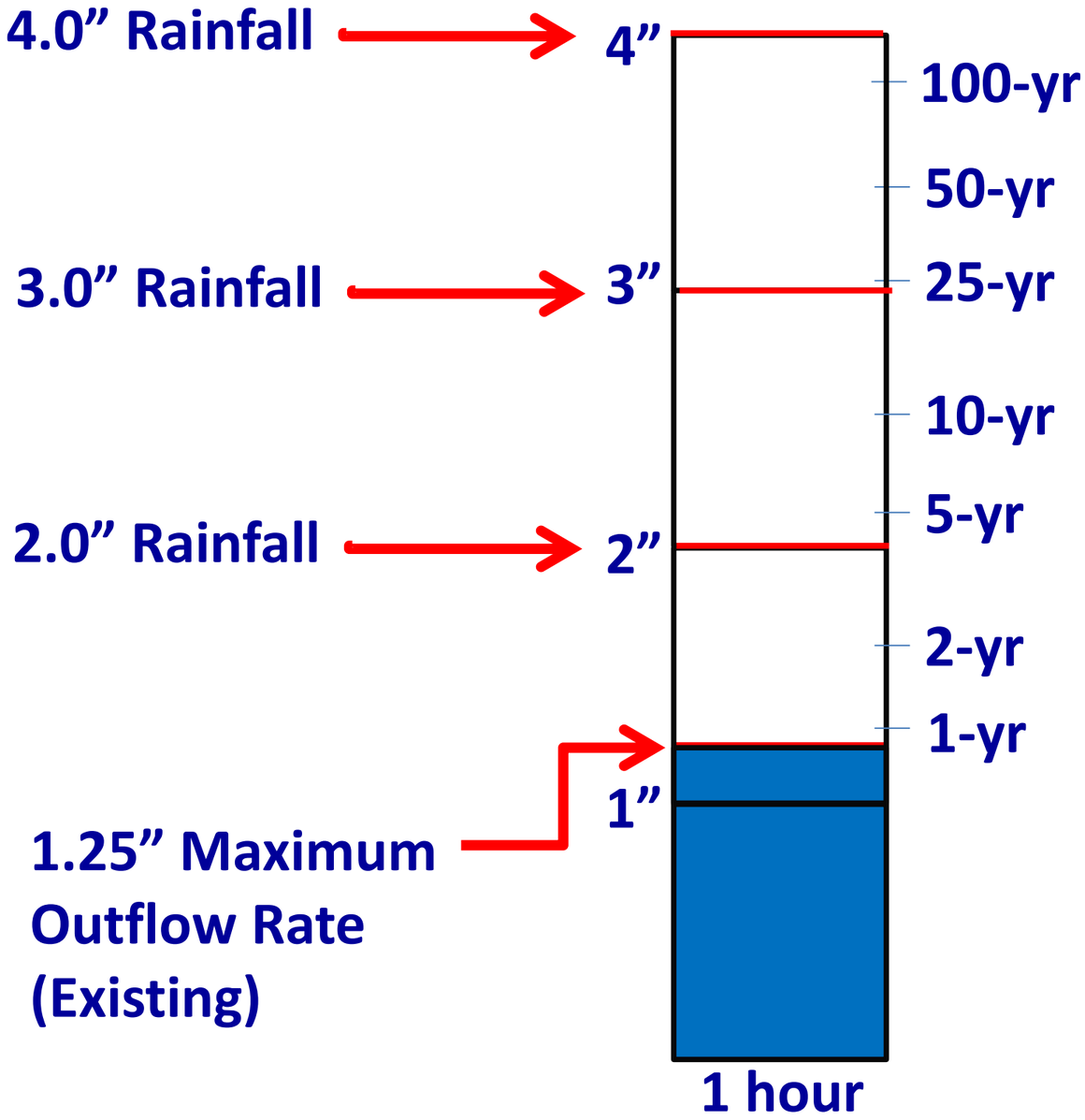

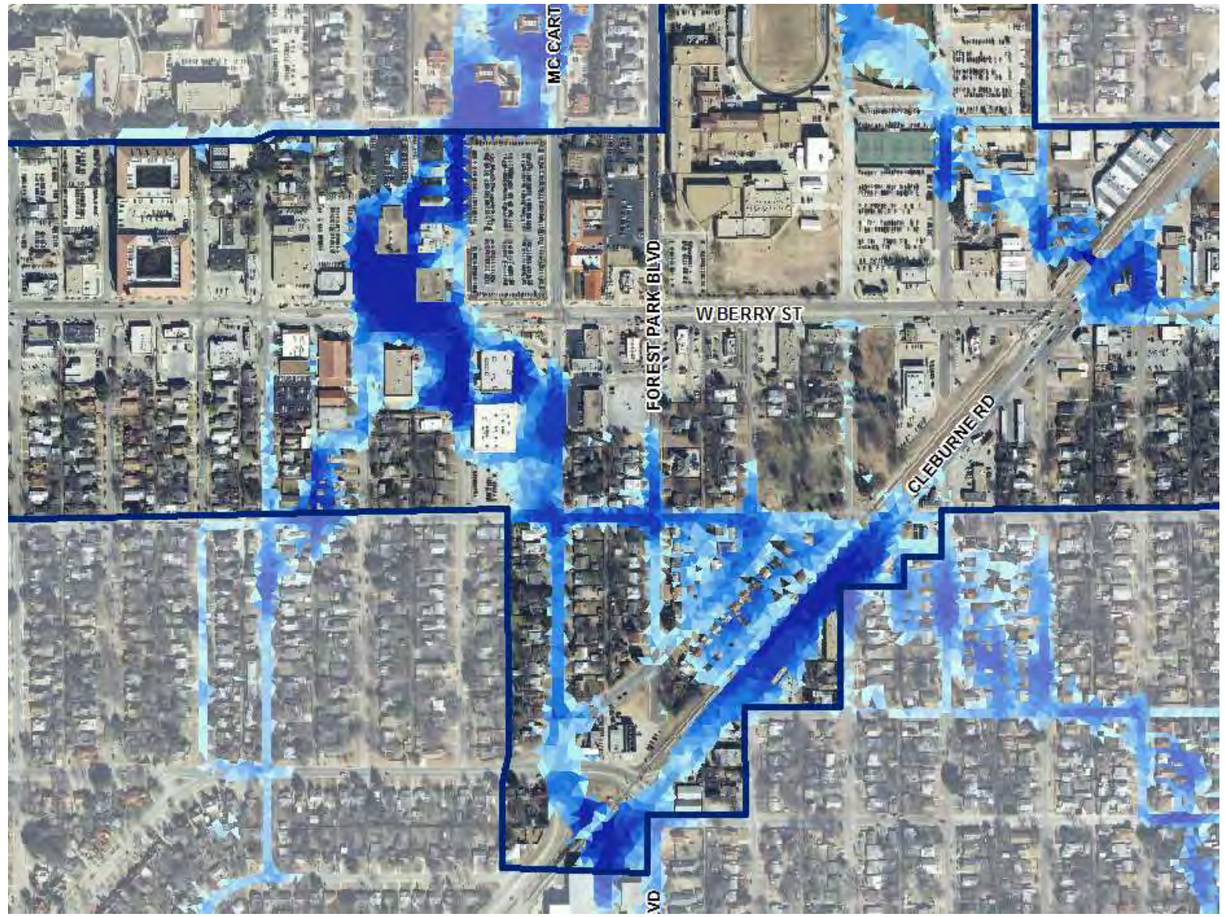

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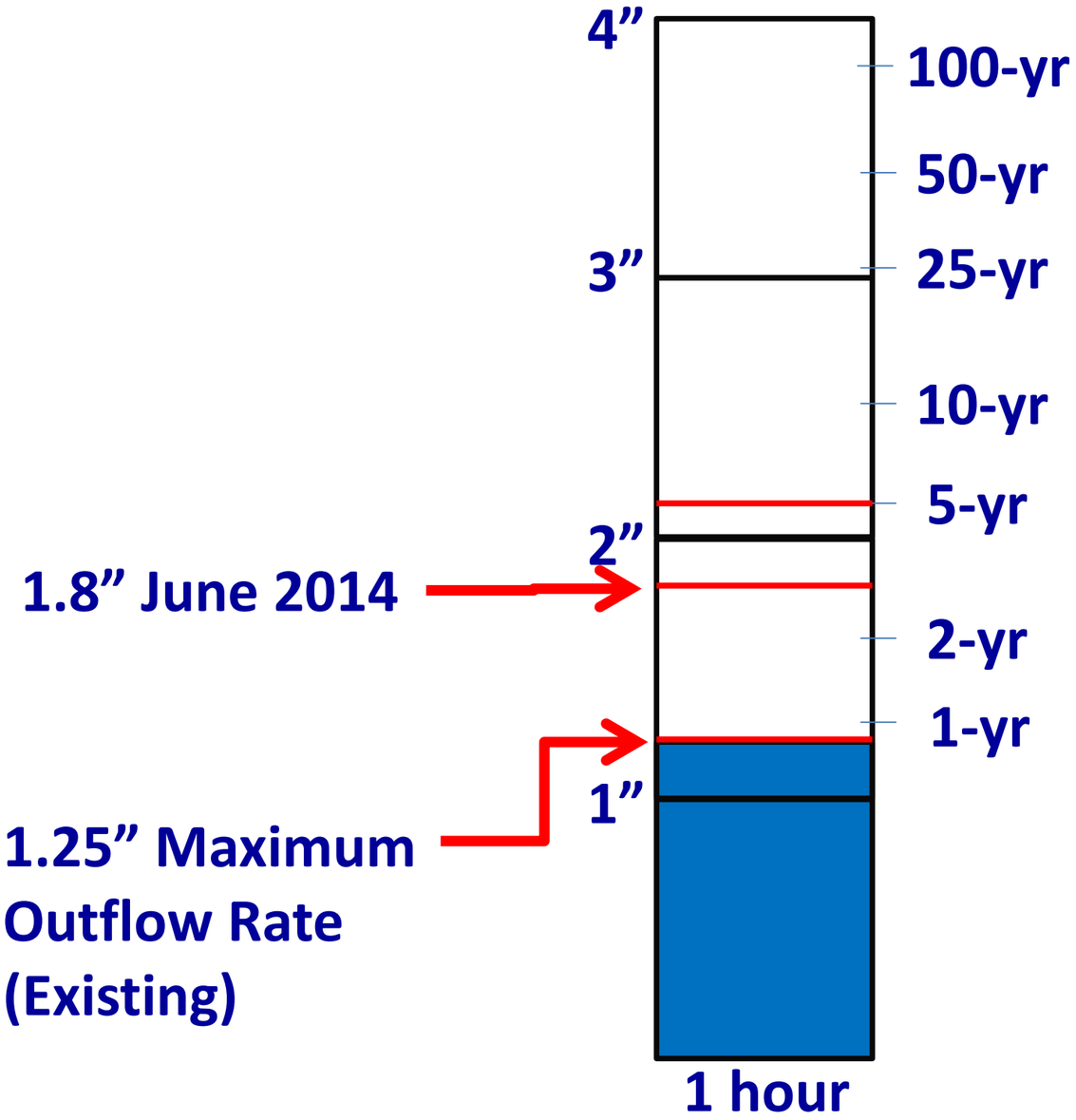
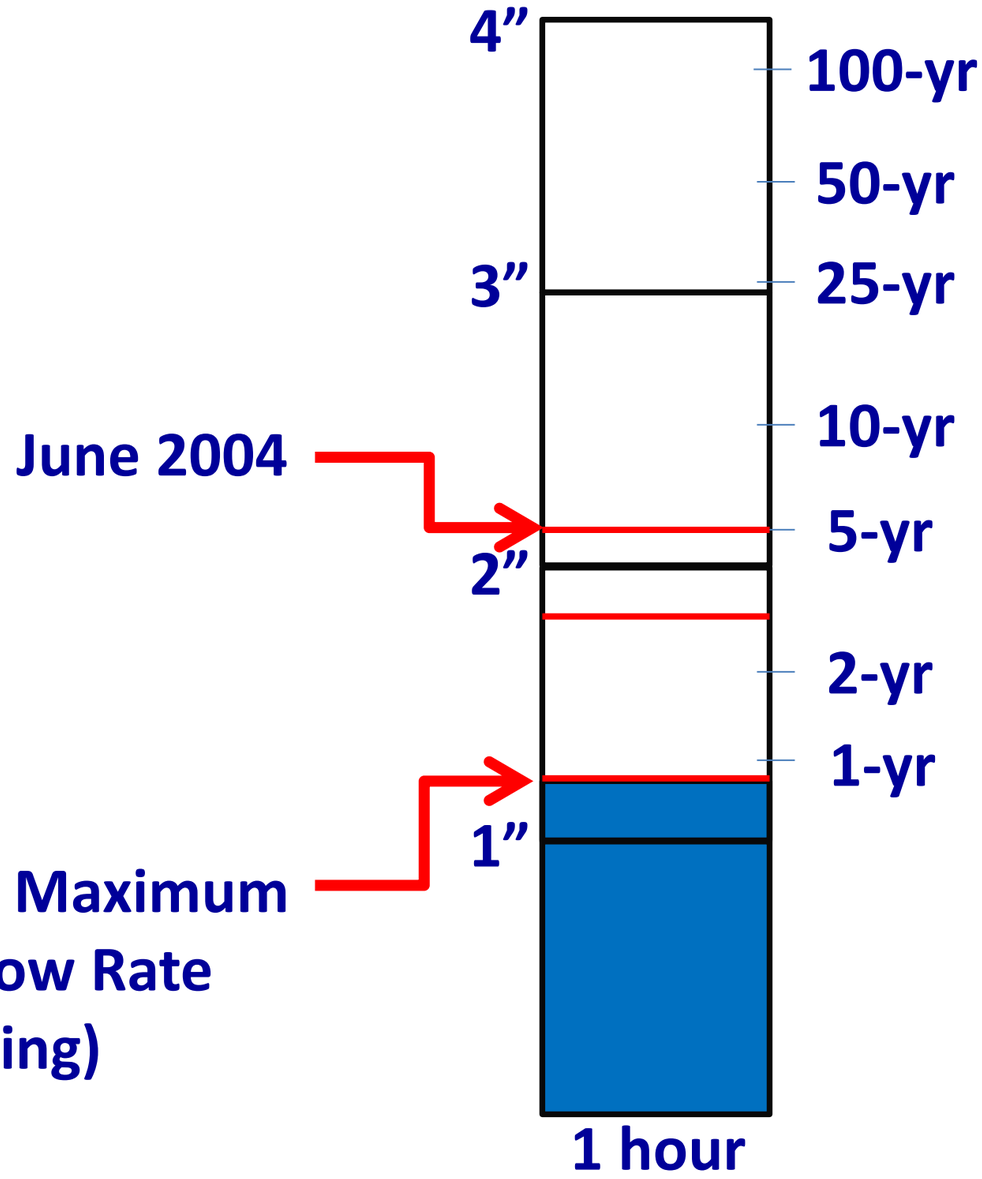
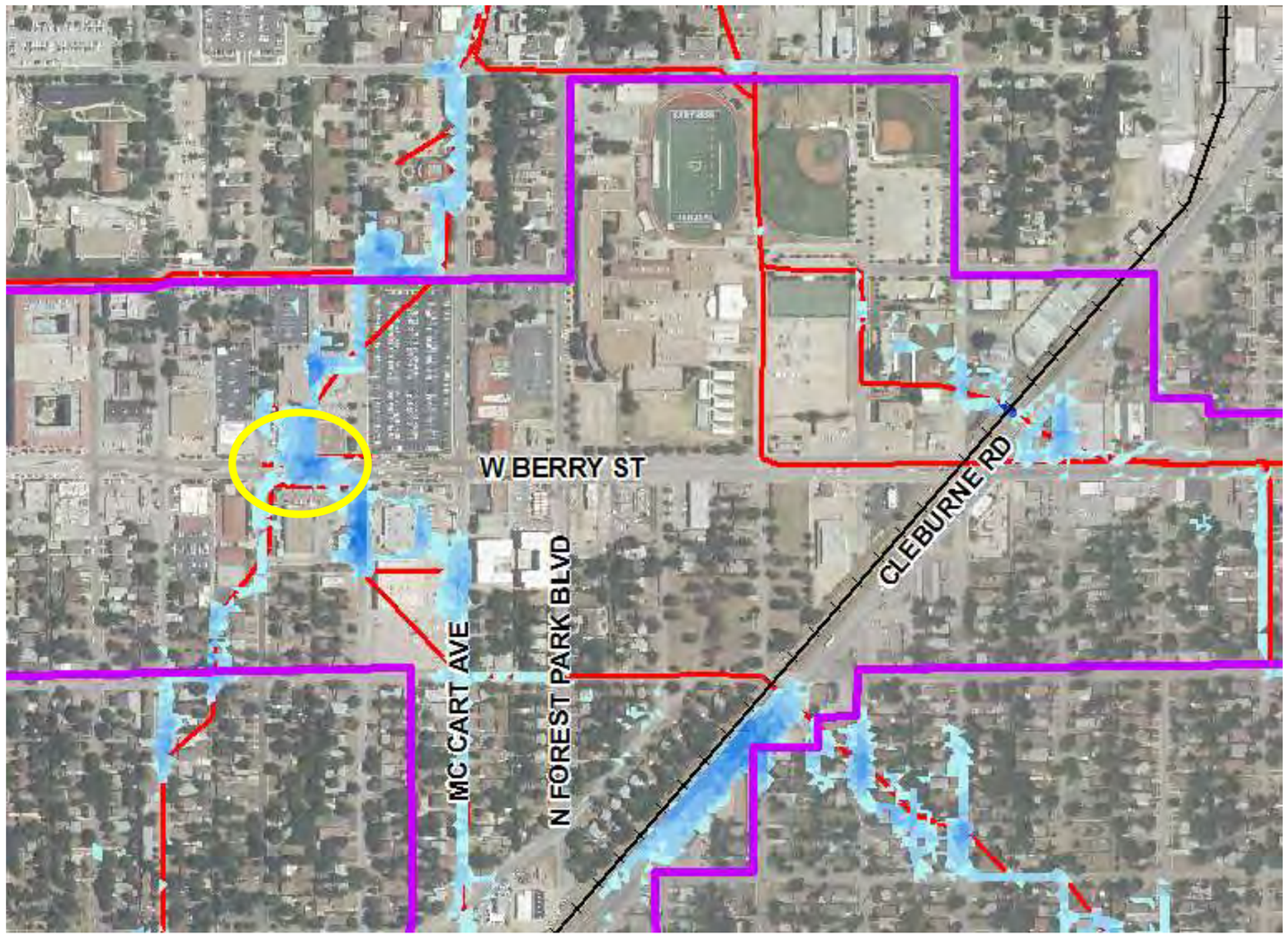


Existing System Capacity

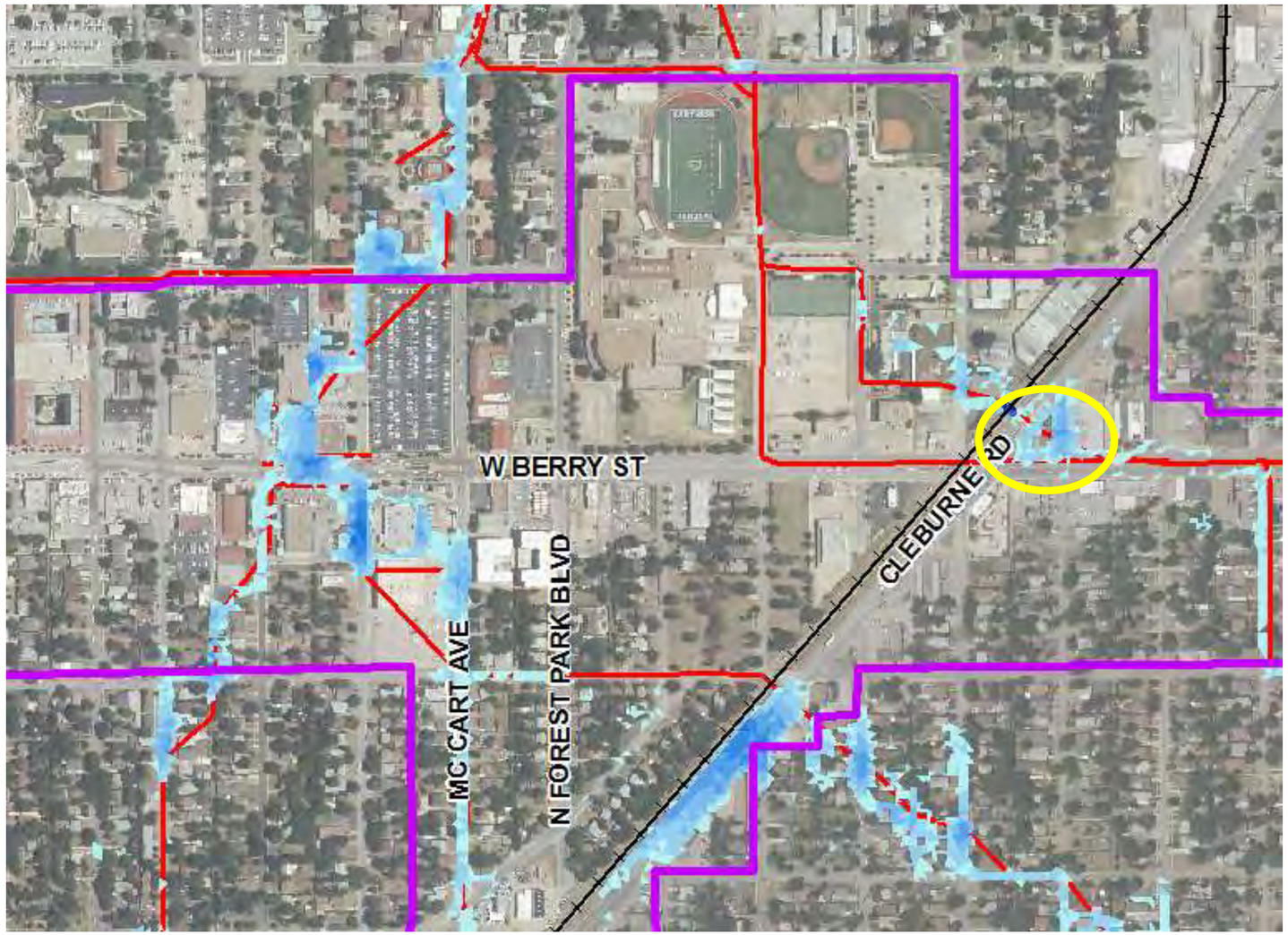


June 2014 Existing Flooding



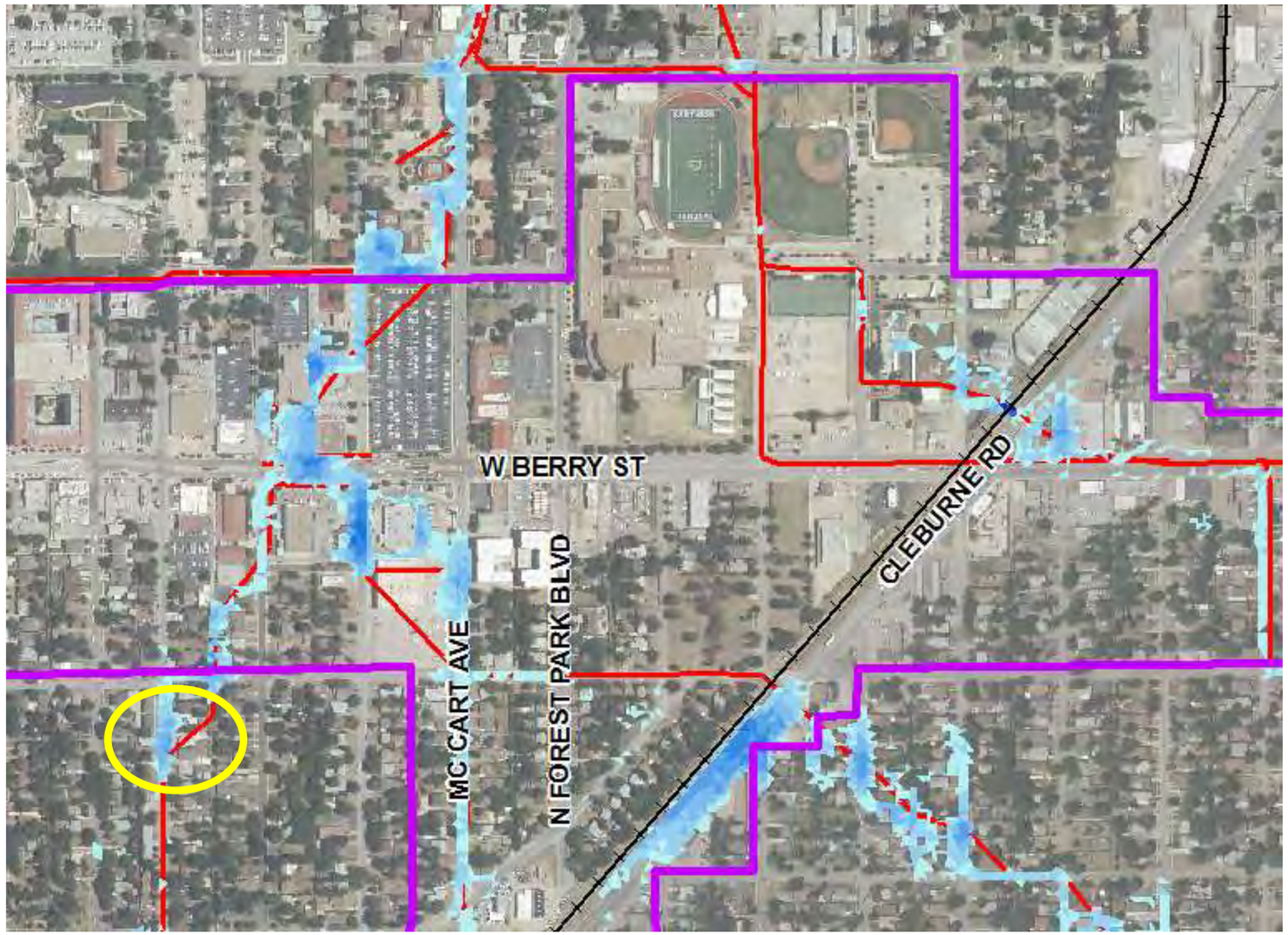
LOCATION	MAX. DEPTH
Berry near Sandage	2.5 ft

June 2014 Existing Flooding



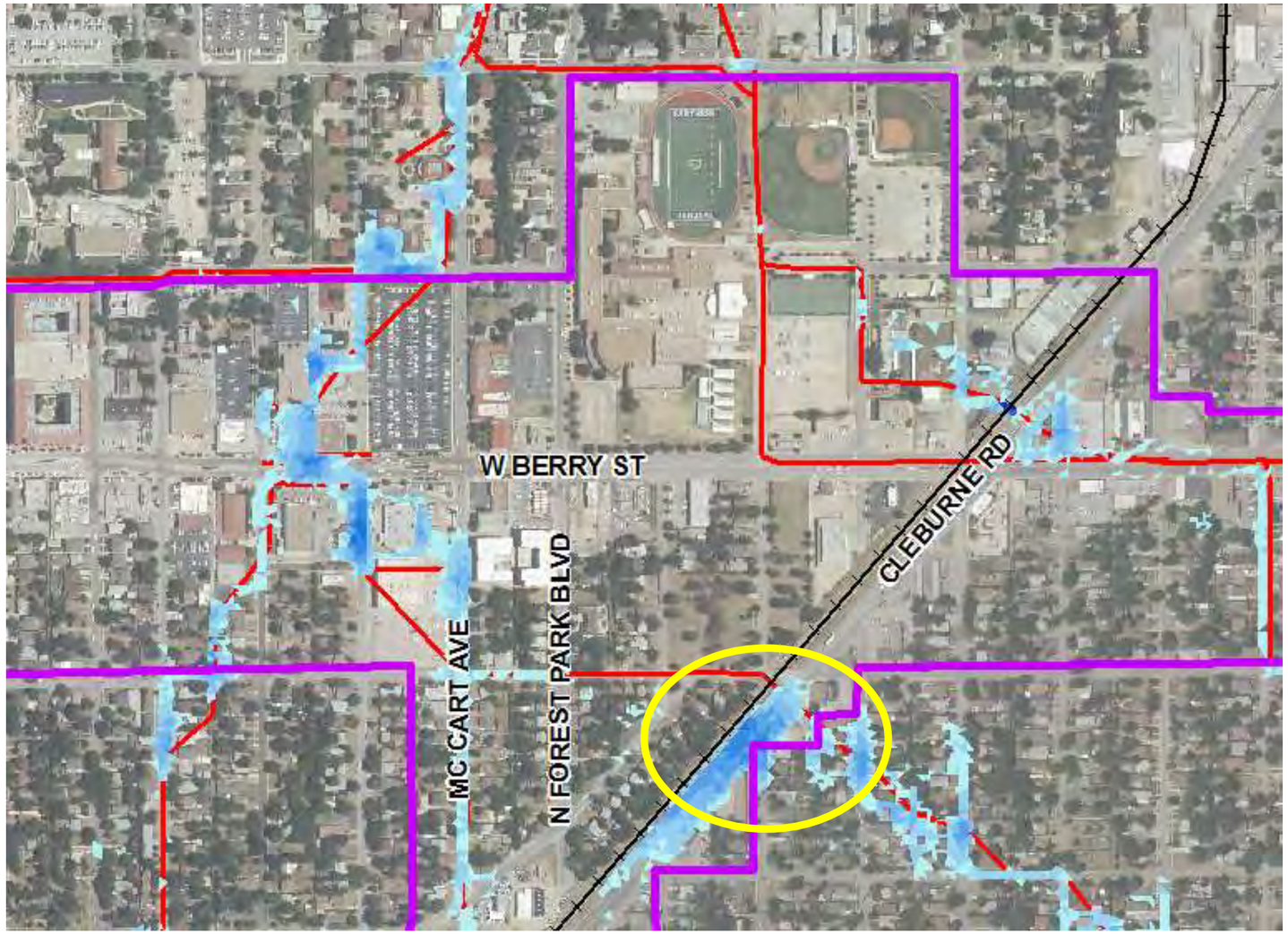
LOCATION	MAX. DEPTH
Berry @ Cleburne	1.1 ft

June 2014 Existing Flooding



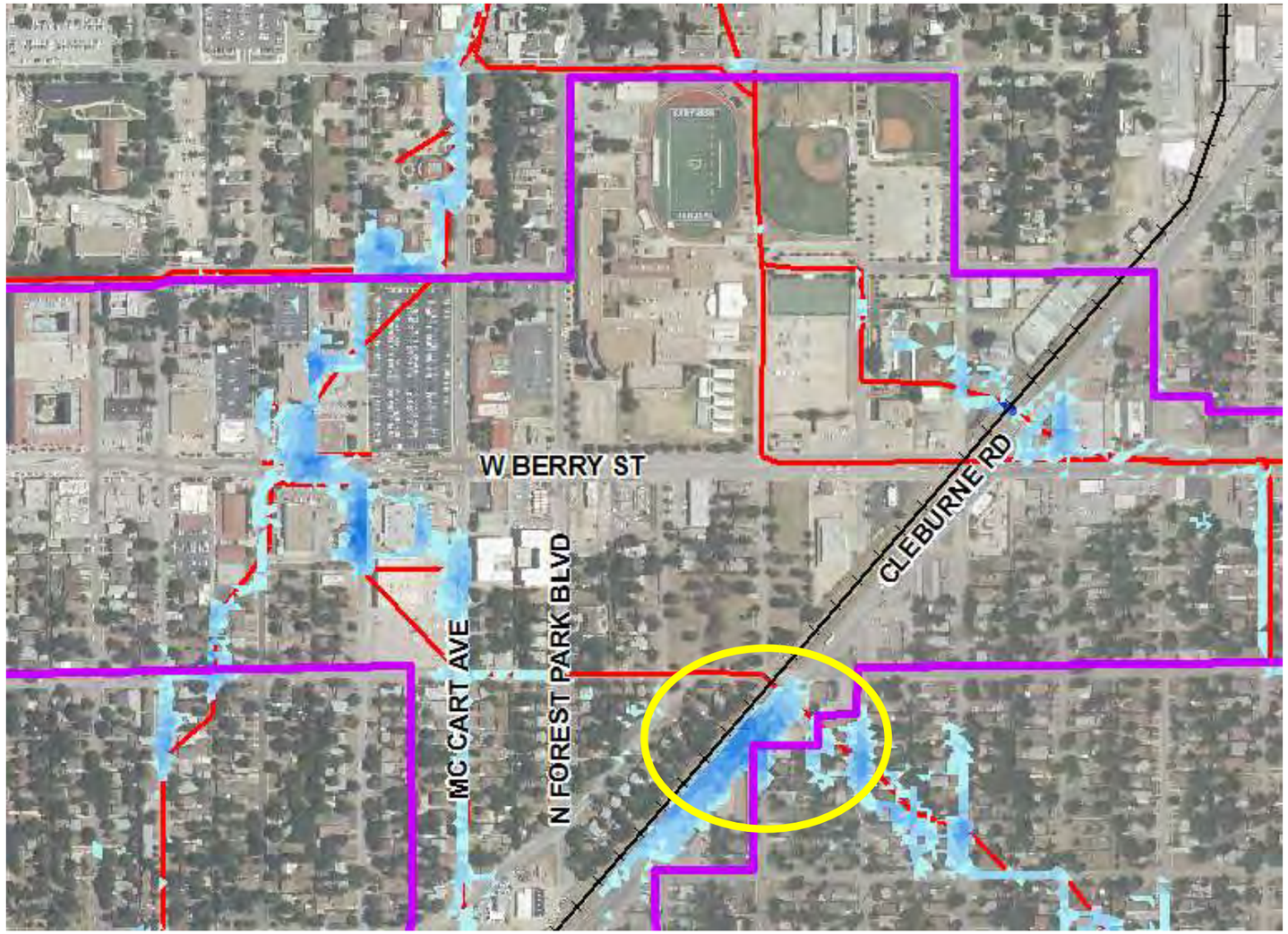
LOCATION	MAX. DEPTH
Lubbock near Devitt	1.7 ft

June 2014 Existing Flooding



LOCATION	MAX. DEPTH
Granbury @ RR	2.7 ft

June 2014 Existing Flooding



LOCATION	MAX. DEPTH
Granbury @ RR	2.7 ft

Potential Solutions

- **Large Regional Detention**
  - Potential Multi-Use or Permanent Pool Facilities
- **“Daylighting” streams**
  - Return streams to natural form, restore natural habitat
- **Open space storage**
  - Amenity and opportunity to connect Urban Village
- **Green Infrastructure**
  - Slow flow, filter pollutants
- **Storm Drain Improvements**

All of these potential solutions are pieces in the overall puzzle.

Volume Required

- **Large Watershed; Significant Volume**
- **Detention Volume needed depends on the goal**
  - Managing a 2” Rainfall ~ 30 ac-ft
  - Managing a 2.5” Rainfall ~ 50 ac-ft
  - Managing a 4” Rainfall ~ 110 ac-ft
- **Placement is Critical to Success**
  - Needs to be spread throughout the watershed
  - Provide more benefit to the watershed as a whole

Paschal High School

TEX Rail

Berry/University Urban Village

Zoo Creek Storm Drain

Managing a 2.5” Storm needs 50 acre-feet = Filling the bowl on Amon Carter Stadium

Managing a 4” Storm needs 110 acre-feet = Filling the bowl more than twice

Multi-use Detention Facilities

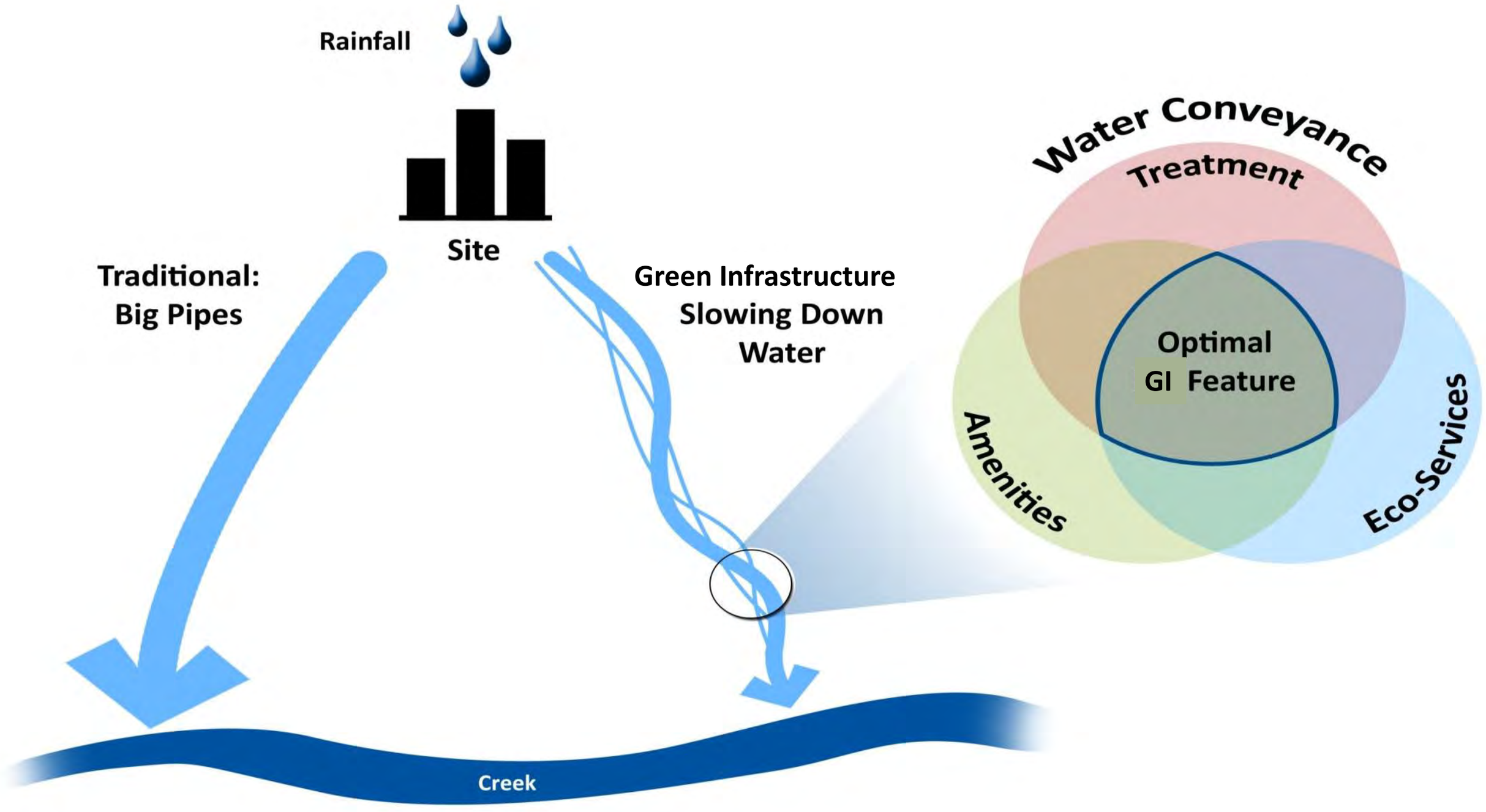
Wet Retention Ponds

Daylighting Streams

Daylighting Streams

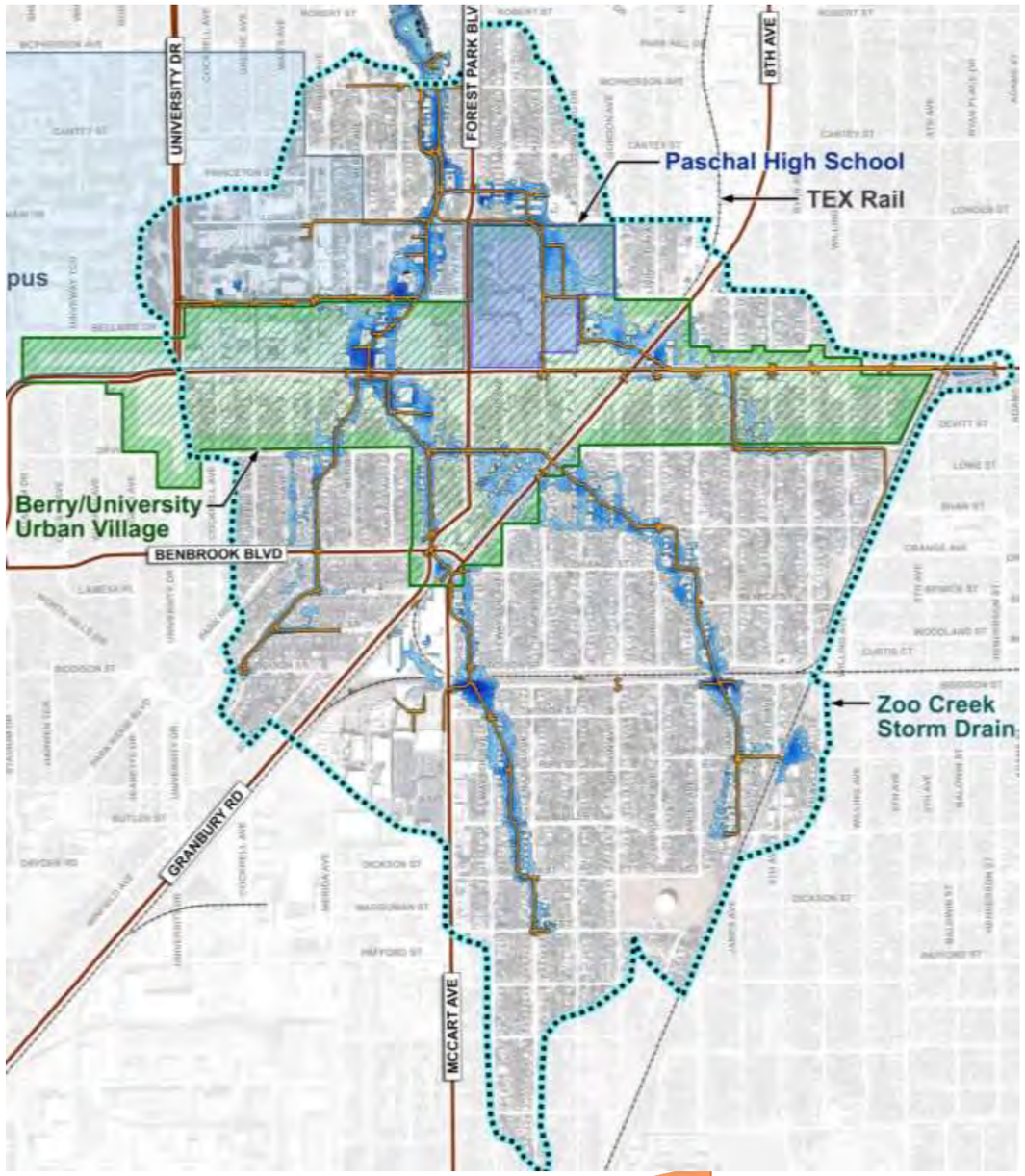
Open Space Storage

Green Infrastructure



Development and Stormwater

- **Flooding is a Barrier to Economic Growth**
- **Watershed is Flood Source**
- **Planned development**
  - Help Reduce flooding
  - Provide amenities
- **Flooding is Significant**
  - Plan to Avoid Development in Flood Prone Areas



Modern Code = Clear, Predictable Results

SHOPFRONT

PLACEMENT

SETBACK AREA
2ft min. (7 ft. if ground floor use is a restaurant with outdoor seating) to 15 ft. behind ROW line.

CONTEXTUAL INFILL
For any infill project along a designated Shopfront Frontage with less than 75 feet of frontage, and upon approval of the Planning Director, structures may be located closer to the ROW line than the minimum setback provided that the structure is located within the range of front setbacks on the street. This range of setbacks is measured on the basis of the four structures surrounding the project site (the two closest lots in either direction along the street).The new structure shall be located within the range of established setbacks (no closer than the narrowest setback, no further than the deepest setback). Where a setback in these four lots is significantly out of the range of setbacks along the street, it may be eliminated from the range.

REQUIRED BUILDING FRONTAGE
1. Primary street (sites 100 ft. or more in width). The building façade must be located within the setback area for a minimum of 80% of the site width.
2. Primary street (sites less than 100 ft. in width). The building façade must be located within the setback area for a minimum of 70% of the site width. For sites under 100 ft. in width, the required building frontage may be reduced to accommodate no more than a single 20-ft. access drive for a rear parking area.
3. Side street. The building façade must be located within the setback area for a minimum of 40% of the site depth.

SIDE/REAR SETBACKS
Abutting single-family: 10 ft min. Abutting multifamily, nonresidential: 0 or 10 ft min. Abutting alley: 5 ft. min. Building separation: 10 ft min.

PARKING SETBACK
1. Primary street setback. Min 30 ft. behind ROW line.
2. Side street setback. Min 8 ft. behind ROW line.
3. Abutting single-family Min 10 ft.
4. Parking shall be located behind the parking setback line. No parking is permitted between the street and the building. This requirement shall not restrict on-street parking.
5. On street parking is required.

ELEMENTS

TRANSPARENCY (WINDOWS & DOORS)
1. Ground floor. Primary Street 50% min, Side Street 30% min. Ground floor transparency is measured between 2 and 12 ft. above the adjacent sidewalk.
2. Upper floor. Min 20% (floor to floor).
3. A minimum of 60% of the window pane surface area shall allow views into the ground floor for a depth of at least 6 ft. Windows shall not be made opaque by window treatments (excepting operable sunscreen devices within the conditioned space).

BUILDING ENTRANCE
1. A functioning entrance, operable during normal business hours, is required facing the primary street. An angled entrance may be provided at either corner of the building along the primary street to meet this requirement.
2. A building located on two primary streets shall have either one entrance per frontage or provide one angled entrance at the corner of the building at the intersection. Buildings located on corner lots shall meet all applicable intersection sight distance requirements. Additional entrances off another street, pedestrian area or internal parking area are permitted.
3. A minimum of 50% of the required entrance shall be transparent.
4. Recessed entrances shall not exceed 3 ft. in depth and one floor in height.

BLANK WALL AREA
Blank lengths of wall exceeding 25 linear ft. are prohibited on all primary and side street building façades.

HEIGHT

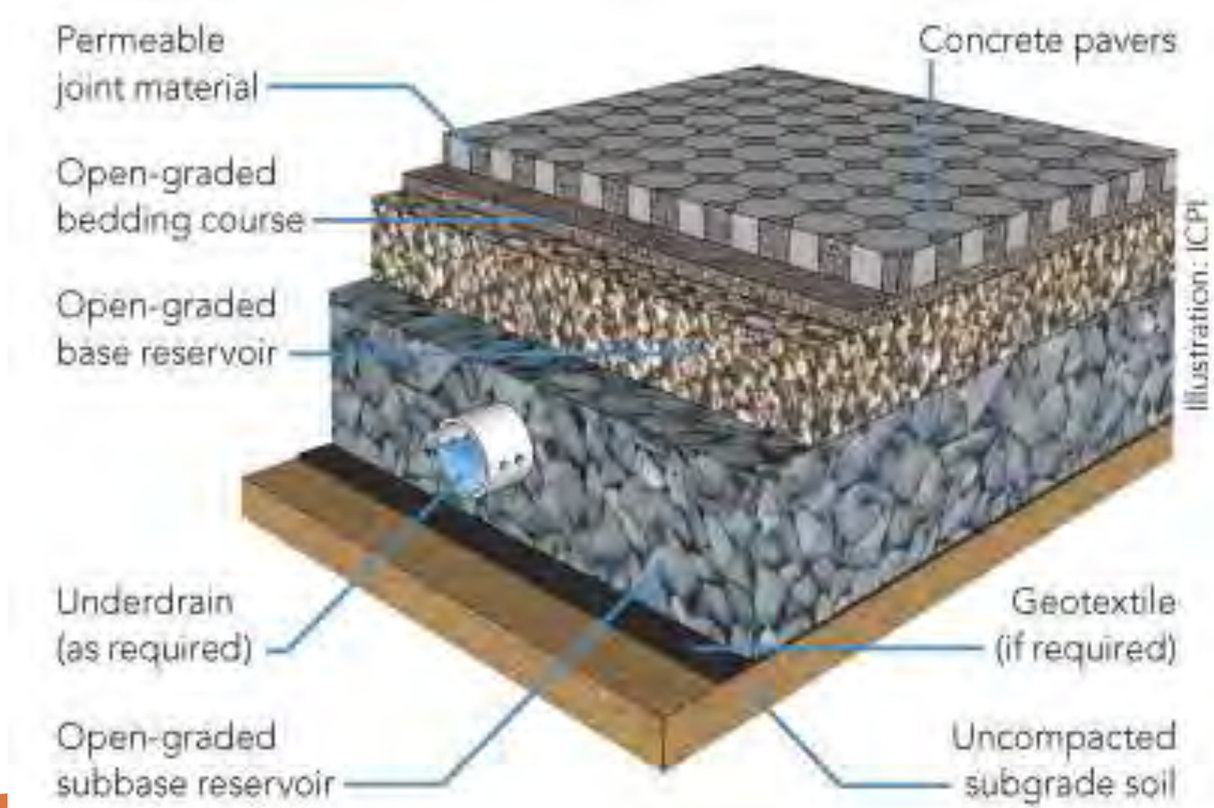
GROUND FLOOR ELEVATION
For ground floor residential uses, the ground floor finished elevation shall be a minimum of 18 inches above the adjacent sidewalk. There is no minimum for ground floor nonresidential uses.

FLOOR HEIGHT
1. Ground floors shall have a floor to floor height of at least 14 ft.
2. Each upper floor shall have a floor to floor height of at least 9 ft.

GI Stormwater Management Techniques

- Resilience and Avoidance
- Permeable paving
- Green roofs
- Rainwater harvesting
- Bioretention (Rain Gardens)
- Underground storage

Permeable Pavement



Green Roofs

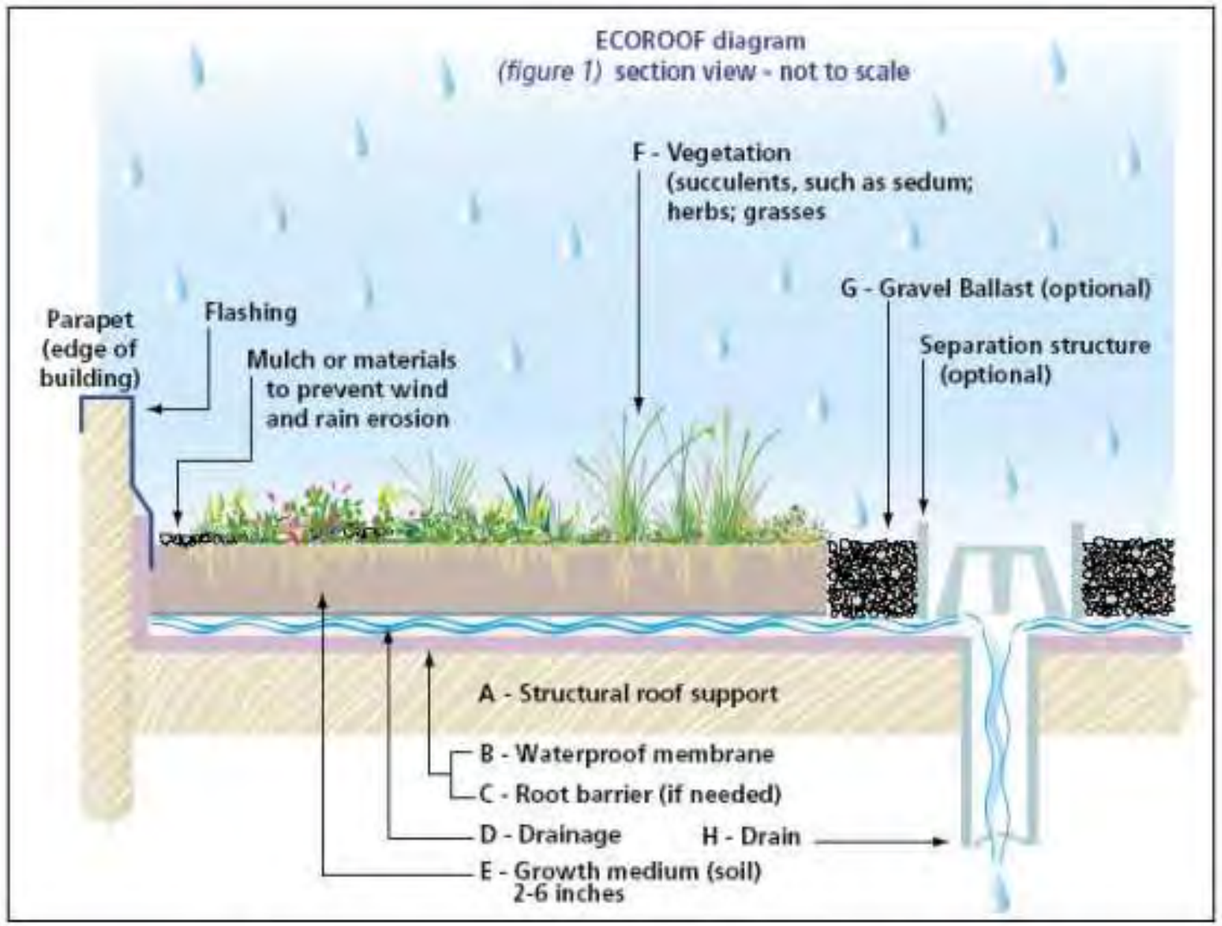
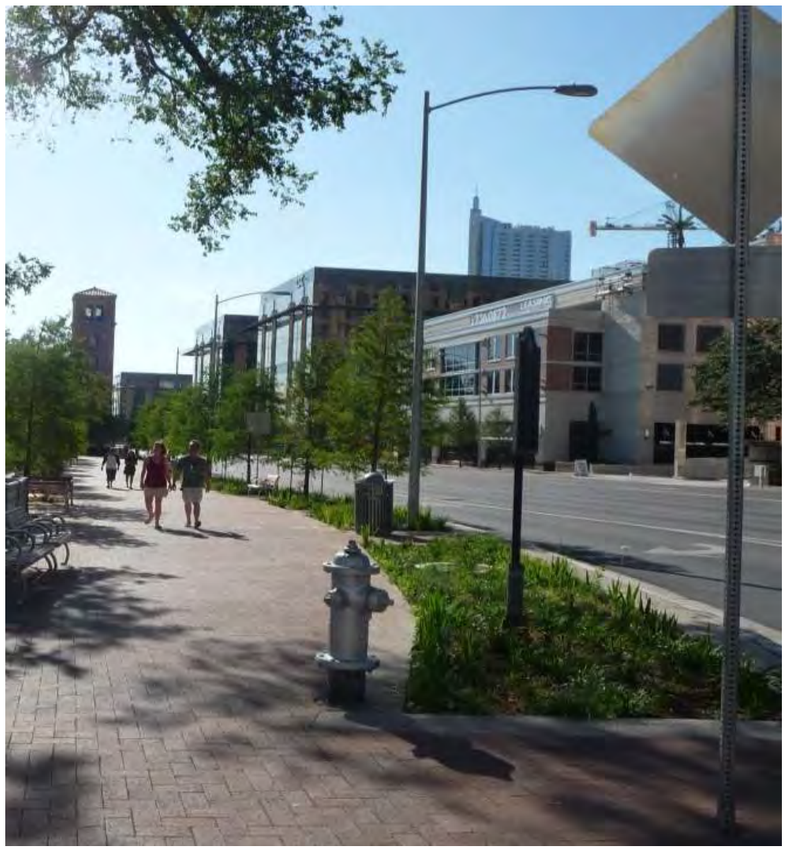
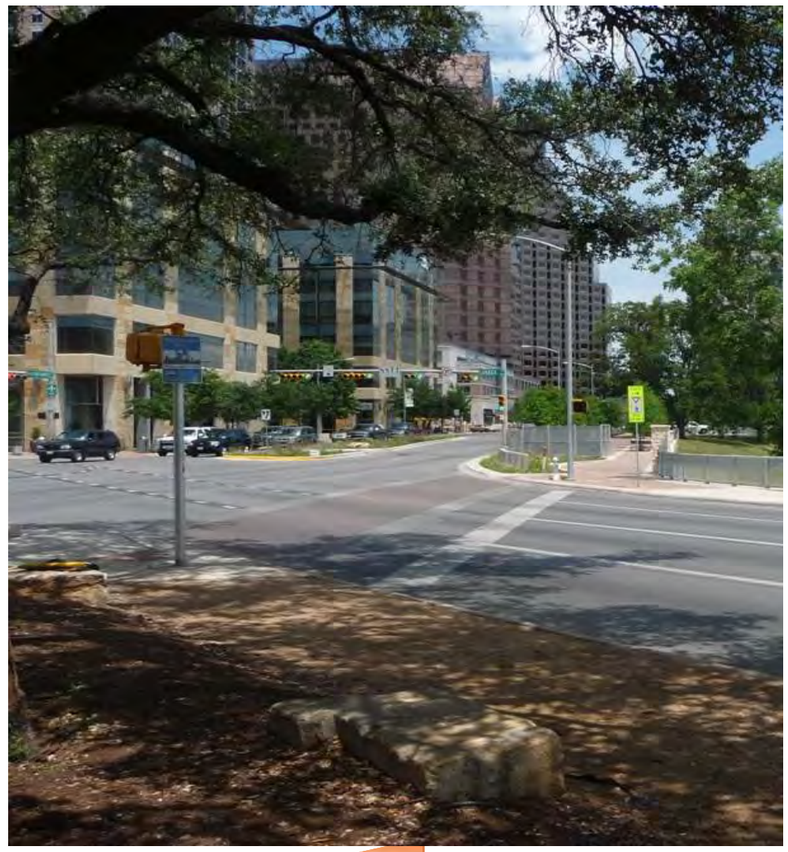


Figure 23.1 Green Roof Cross Section (from City of Portland, Oregon)

Rainwater Harvesting

Bioretention / Raingardens





Underground Detention

Summary

- Form Based Code Stormwater Implementation will be an example for the watershed
- Coordinate with Zoo Creek Storm Drain Flood Mitigation Study
- Facilitate Future Development without negative impacts

We need to hear from you how you want this area to grow!