Presentation Overview

- What and Why of Flooding
- Flood Risk
- Flood Mitigation Strategies
- Flood Prevention Strategies
- Master Planning Process
  - Creek Flood Problem Identification and Prioritization
  - Local Flood Problem Identification and Prioritization

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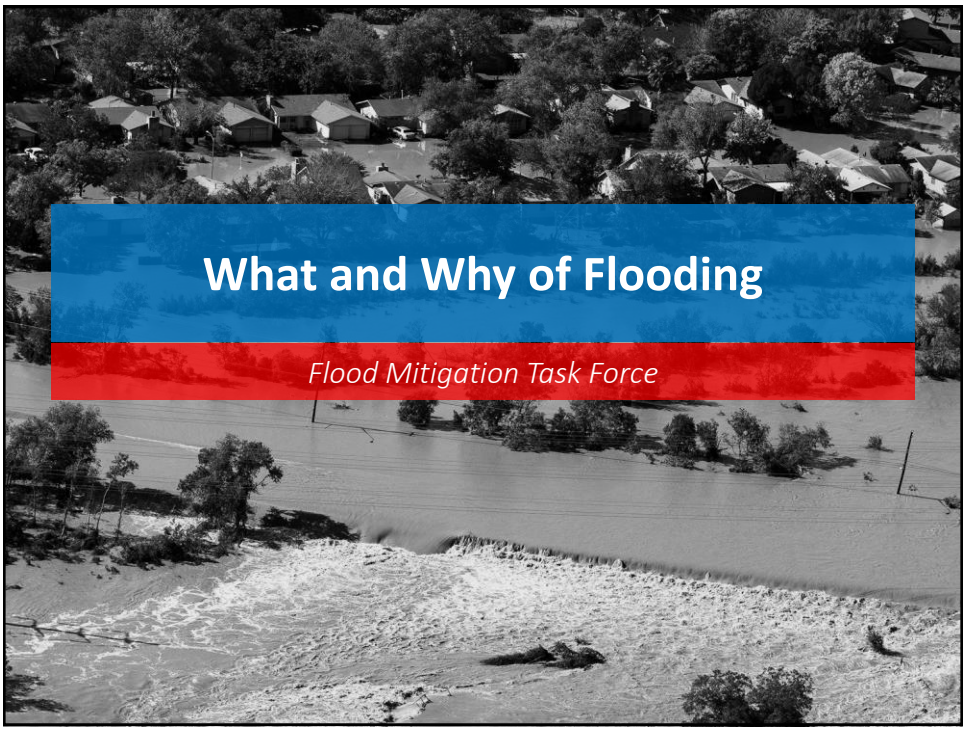
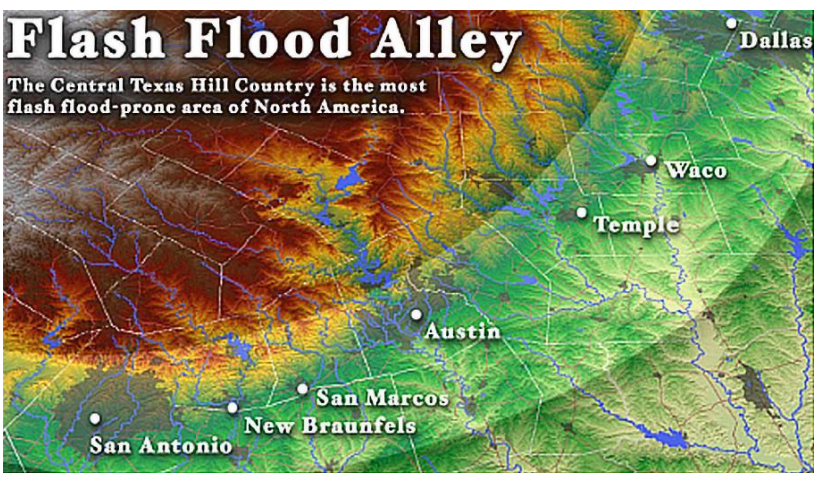


Need for Flood Mitigation Services



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Why Does Flooding Occur?

Flooding occurs as a result of overloads of the primary drainage system, the creeks, "CREEK FLOODING" or the secondary drainage system, the storm drains, "LOCAL FLOODING".

Local Flooding

Creek Flooding

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What is a Floodplain?

The floodplain is the area of land that is likely to be under water when the creek overtops its banks. In a sense, the floodplain is the full extension of the creek.

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Austin's Flood History

Major Austin Floods

1832
1833
1836
1843
1852
1869
1870
1900
1913
1915
1921
1932
1935
1936
1938

1915 - Sabine Street near Waller Creek

1961 1975 1991 2001 2007 2013
1960 1974 1981 1998 2004 2010 2015

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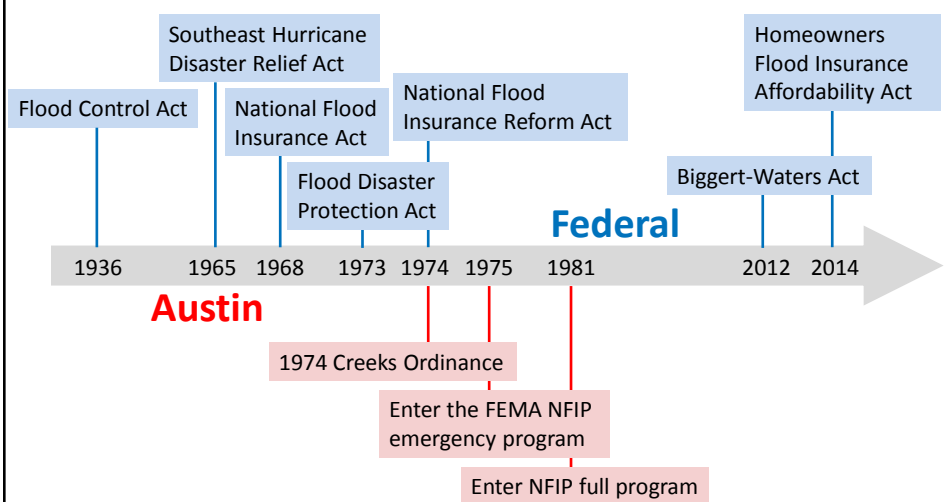
Drainage and Floodplain Regulation History



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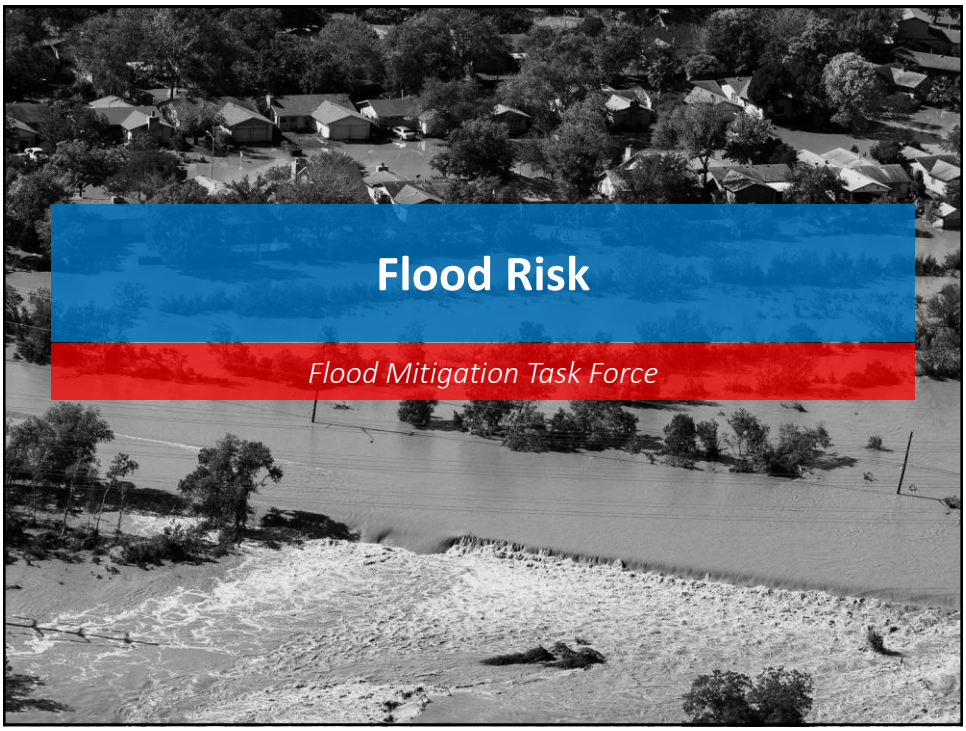

What is a 100-year flood?

- 1% annual chance flood (i.e. it has a 1% chance of happening every year)
- Has a 26% chance of happening over a 30 year mortgage
- Can occur multiple times per year
- Does *not* mean that it will be another 99 years before it happens again
- What are the 2-year (50%), 10-year (10%), 25-year (4%), 500-year (0.2%) floods?

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What level of risk does FEMA require in the NFIP?

- The standard is the 100-year flood
- Currently 22,100 communities in the NFIP nationwide

FEMA

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What level of risk do we currently accept in Austin?

- **Storm drains:** 25-year inside the pipe; 100-year in the roadway right-of-way/drainage easement
- **Ditches/Channels/Creeks/Rivers:** 100-year
- **Roadway crossings:** 100-year; max. 0 – 12 inches over the roadway (depending on road class)
- **Floodplain regulations:** fully developed 100-year, no adverse impact, freeboard, safe access

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Why would a community strive for less risk than other communities?

- Increased protection for lives and property
- Location in Flash Flood Alley
- **Community Rating System** – NFIP program that rewards communities that surpass minimum requirements with flood insurance discounts

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Community Decisions Regarding Flood Risk

What is an acceptable level of risk?

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Flood Mitigation Strategies

- How do we minimize or eliminate existing flood risk for development that occurred **before** the establishment of drainage and floodplain regulations or for newly annexed areas?
  - Flood mitigation projects
  - Regulations for redevelopment projects

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Flood Mitigation Projects: Capital Solutions

- Low-water crossing upgrades
- Detention and retention ponds
- Conveyance improvements
- Diversion
- Barriers
- Structure elevating/floodproofing
- Nonstructural

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Flood Mitigation Projects
Structural

Before

After

David Moore Roadway Improvements

Low-water crossing upgrades:
culverts, bridges

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Flood Mitigation Projects
Structural

Northwest Park detention facility

Detention and retention ponds: *Online, offline*

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Flood Mitigation Projects
Structural

Conveyance:
channel modifications, pipes, inlets, ditches

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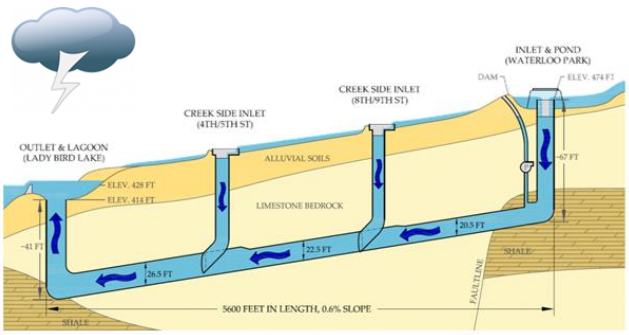
Flood Mitigation Projects
Structural



Waller Creek Tunnel

Diversion: *tunnels*

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Flood Mitigation Projects
Structural

Crystalbrook Floodwall

Barriers: *floodwalls, levees*

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Flood Mitigation Projects
Nonstructural


Bayton Loop Property Buyouts

Nonstructural projects:
buyouts, permanent road closures

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Regulations for Redevelopment Projects

CodeNEXT is considering requirements that redevelopment mitigate its share of downstream flooding.

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Flood Prevention Strategies

- How do we ensure that <u>new</u> development minimizes its flood risk and the risk to others?
  - Drainage criteria and floodplain regulations
  - FEMA floodplain regulations vs. Austin floodplain regulations
  - Austin floodplain regulations

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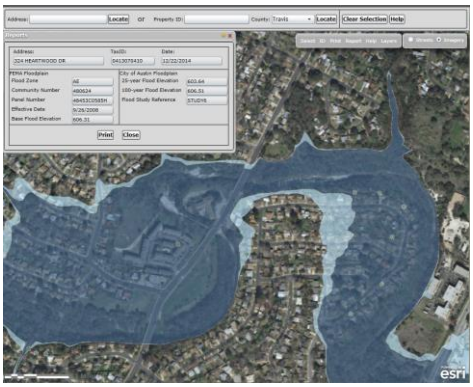
Austin Floodplain Regulations

- Existing conditions vs. fully developed conditions
- No adverse impact
- Freeboard
- Safe access



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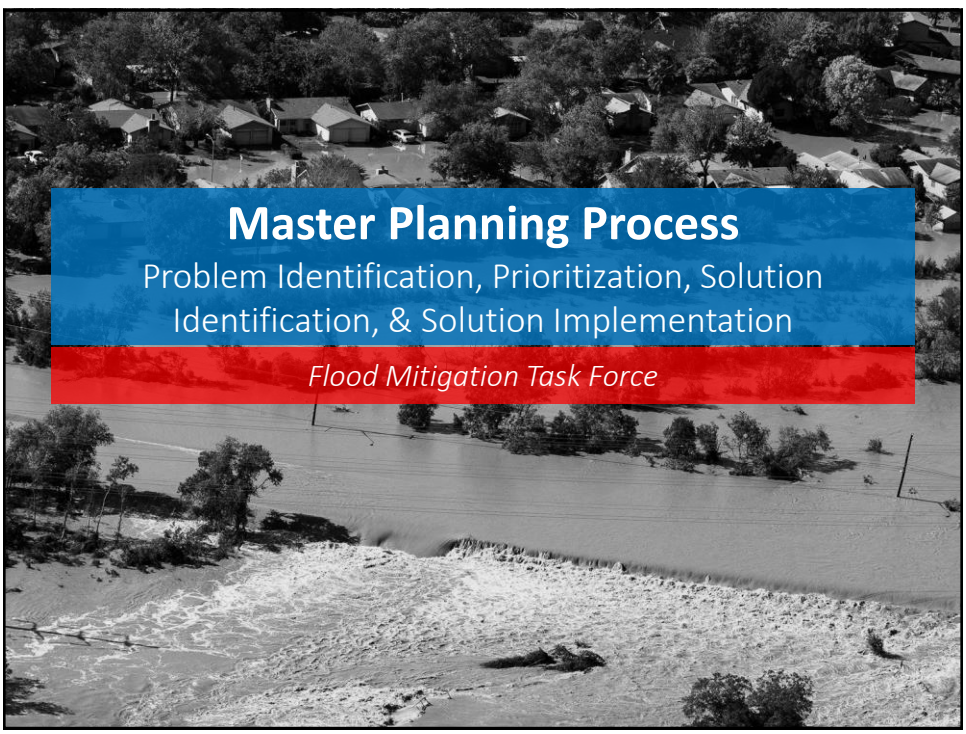
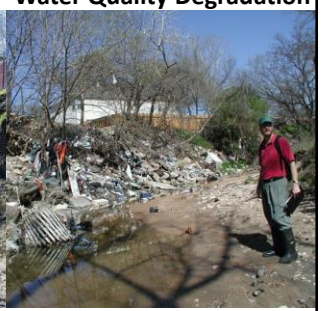


2001 Master Plan and Watershed Protection Department Mission

Flooding	Erosion	Water Quality Degradation
		
Public Safety	Property Protection	Environmental Protection

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Master Plan: Primary Mission Goals

1. Flood Mitigation: Protect lives and property by reducing the impact of flood events.
2. Erosion Control: Protect channel integrity and prevent property damage resulting from erosion.
3. Water Quality Protection: Protect and improve Austin's waterways and aquifers for citizen use and the support of aquatic life.

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Master Plan Common Goals

- **Public Use & Natural Character:** Improve the urban environment by fostering additional beneficial uses of waterways and drainage facilities.
- **Regulatory Compliance:** Meet or exceed all local, state & federal permit and regulatory requirements
- **Assets Maintenance:** Maintain the integrity and function of Utility Assets
- **Optimization/Mission Integration:** Optimize City resources by integrating flood, erosion, and water quality control measures.

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Master Plan
Flood Mitigation Objectives

1. Reduce the depth and frequency of flooding for all 100-year floodplain structures.
2. Reduce the depth and frequency of flooding on all roads in the 100-year floodplain.
3. Reduce the danger at road crossings subject to any flooding by the 100-year flood.
4. Provide mitigation for flood damage.
5. Prevent the creation of future flood hazards to human life and property.

(Continued next slide) 32

Master Plan
Flood Mitigation Objectives

(Continued from previous)

6. Reduce the depth and frequency of local flooding for buildings.
7. Reduce the depth and frequency of local flooding for yards.
8. Reduce the danger of street flooding created by substandard storm drains.
9. Reduce standing water in public rights-of-way and drainage easements outside the 100-year floodplain.

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Master Planning Process

- Identify the problem
- Prioritize the problem
- Identify the solution
- Implement the solution

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Identifying Flood Risk in Austin

- Flood risk identification through known flood damages vs. theoretical determination
- Flooding knowledge
- Engineering models
- Citizen complaints
- Creek Flood vs. Local Flood

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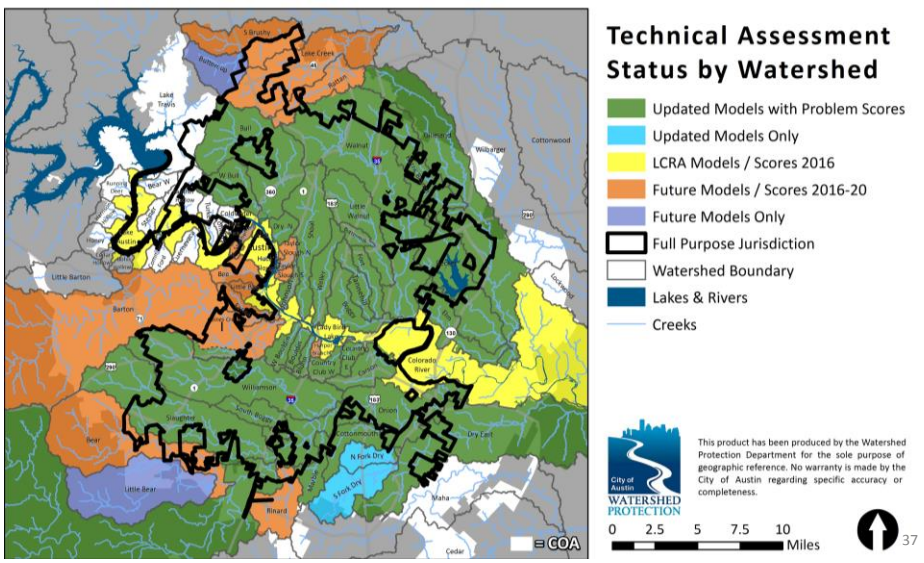
Watersheds with Engineering Models



Determining the Level of Risk

- Storm events (2-, 10-, 25-, 100-year)
- Building flood depths
- Roadway flood depths & velocity
- Resource values

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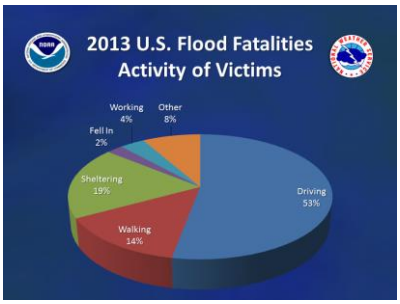
Creek Flood Risk

- Building Flooding Risk
  - ~ 5,100 buildings in COA full purpose jurisdiction
- Roadway Crossing Flooding Risk
  - Greatest threat to public safety
  - ~400 roadway crossings in COA full purpose jurisdiction



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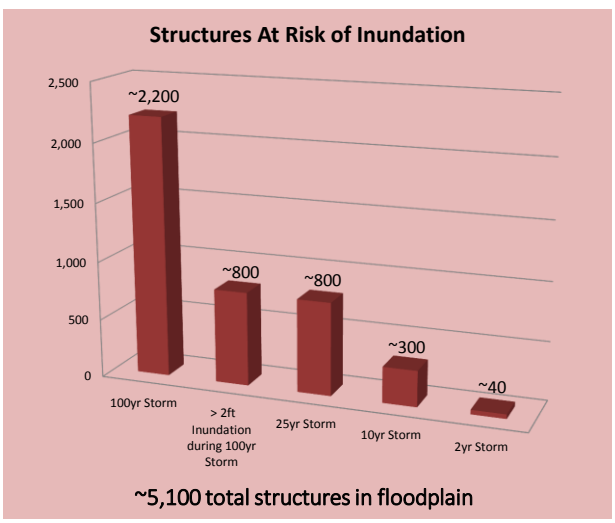
Creek Flood Risk



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Local Flood Risk

Local Flood Complaints

- ~2,100 building complaints
- ~2,600 yard complaints
- ~1,450 street complaints
- ~6,150 TOTAL

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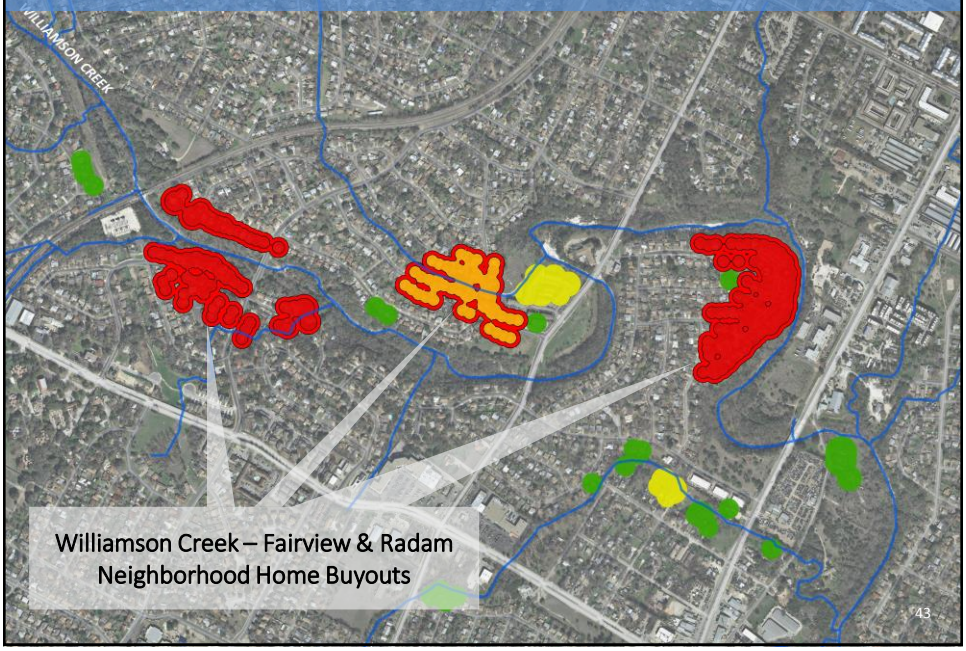
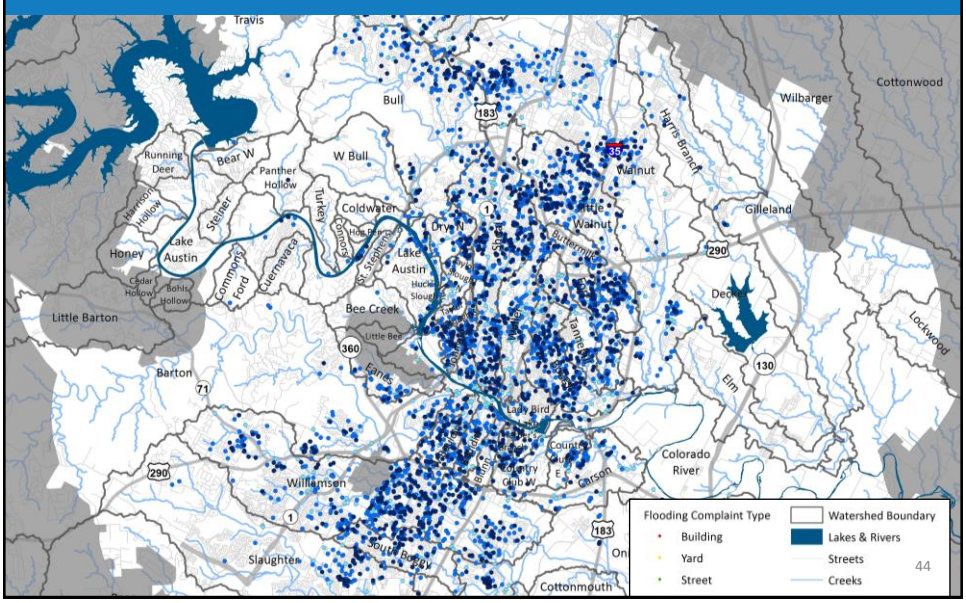
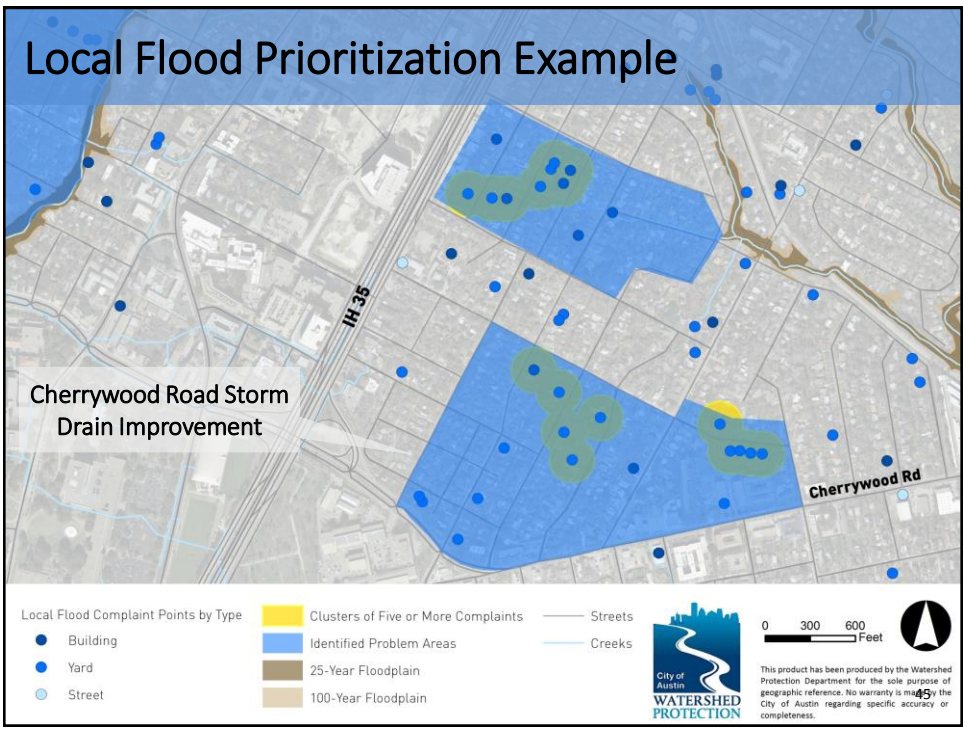
Creek Flood Prioritization Example



Citizen Complaints (3-1-1)




Local Flood Prioritization Example
Cherrywood Road Storm Drain Improvement
IH 35
Cherrywood Rd
Local Flood Complaint Points by Type
Building
Yard
Street
Clusters of Five or More Complaints
Identified Problem Areas
25-Year Floodplain
100-Year Floodplain
Streets
Creeks
City of Austin
WATERSHED PROTECTION
0 300 600 Feet
This product has been produced by the Watershed Protection Department for the sole purpose of geographic reference. No warranty is made by the City of Austin regarding specific accuracy or completeness.
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Master Planning Process
Solution Identification
Flood Mitigation Task Force

Flood Solution Identification

- Feasibility studies
  - Site visits
  - Detailed evaluation of the elevation and expected inundation depths
  - Evaluations of potential solutions (structural, buyout, elevation, etc.),
  - Identification of project constraints
  - Preliminary cost estimates
  - Partnership/integration opportunities
  - Funding plan/schedule

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Capital Improvement Flood Solutions

- Roadway Improvements
- Storm drain Improvements
- Regional Ponds
- Channel conveyance modifications
- Channel diversions
- Floodwalls/Levees
- Structure Raising
- Property Buyouts

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Contact Information

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Flood Mitigation Task Force:
https://www.austintexas.gov/fmtf Main Webpage
https://floodmitigationtaskforce.bloomfire.com/ Additional Resources Webpage

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