



Using HMGP to Mitigate Flooding: A Growing Story of Success

W. Byron Hinchey, PE, CFM

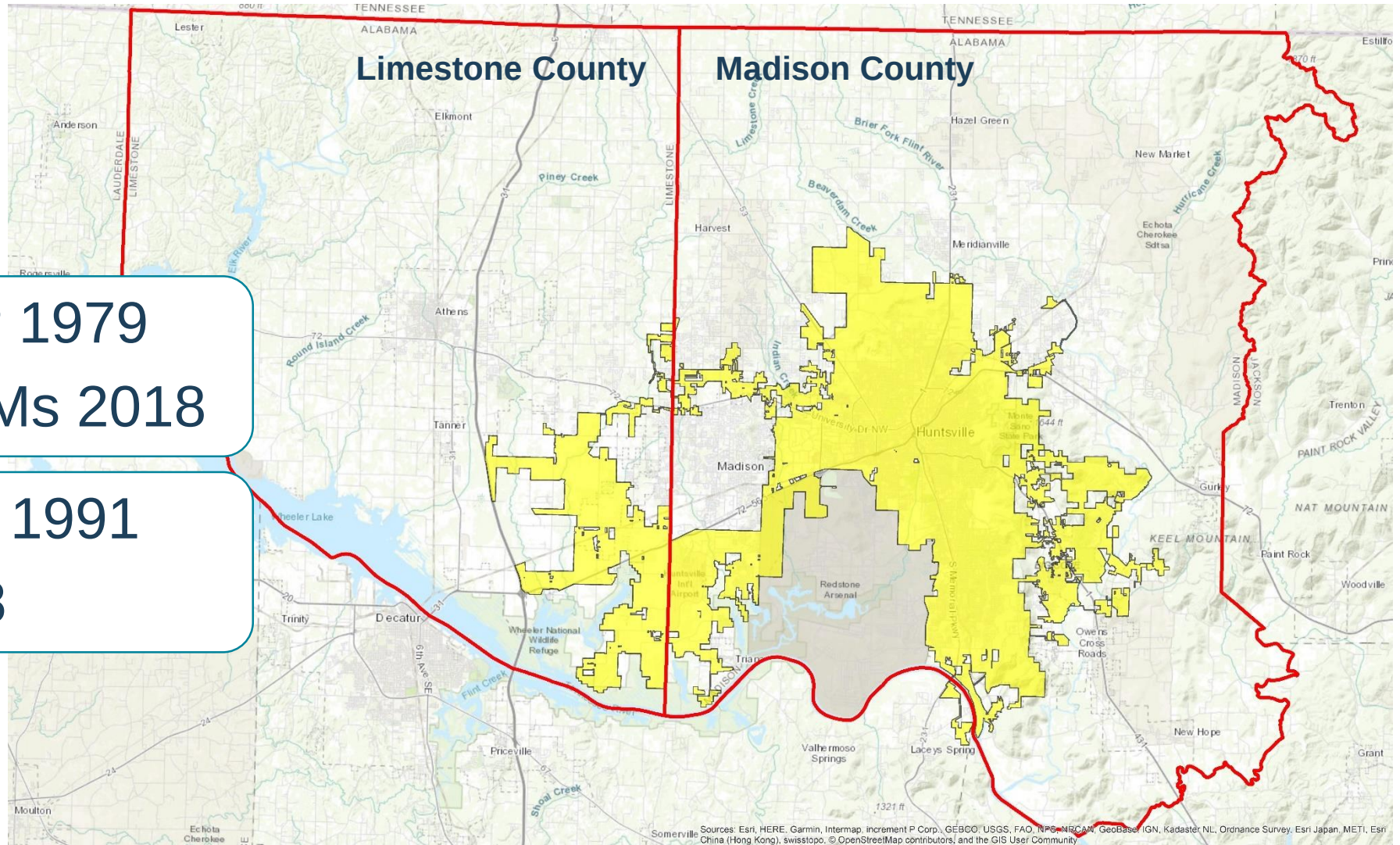
Huntsville, AL

- ❖ US Army's Redstone Arsenal
 - Home to:
 - U.S. Space & Rocket Center
 - NASA Marshall Space Flight Center
 - Army Aviation and Missile Command
 - Missile Defense Agency
 - Federal Bureau of Investigation
 - 62 mi²
 - 900 Active Military
 - 80 Organizations Employing 40,000
- ❖ #1 in Engineers per Capita in U.S.
- ❖ #2 Largest Research Park in U.S.



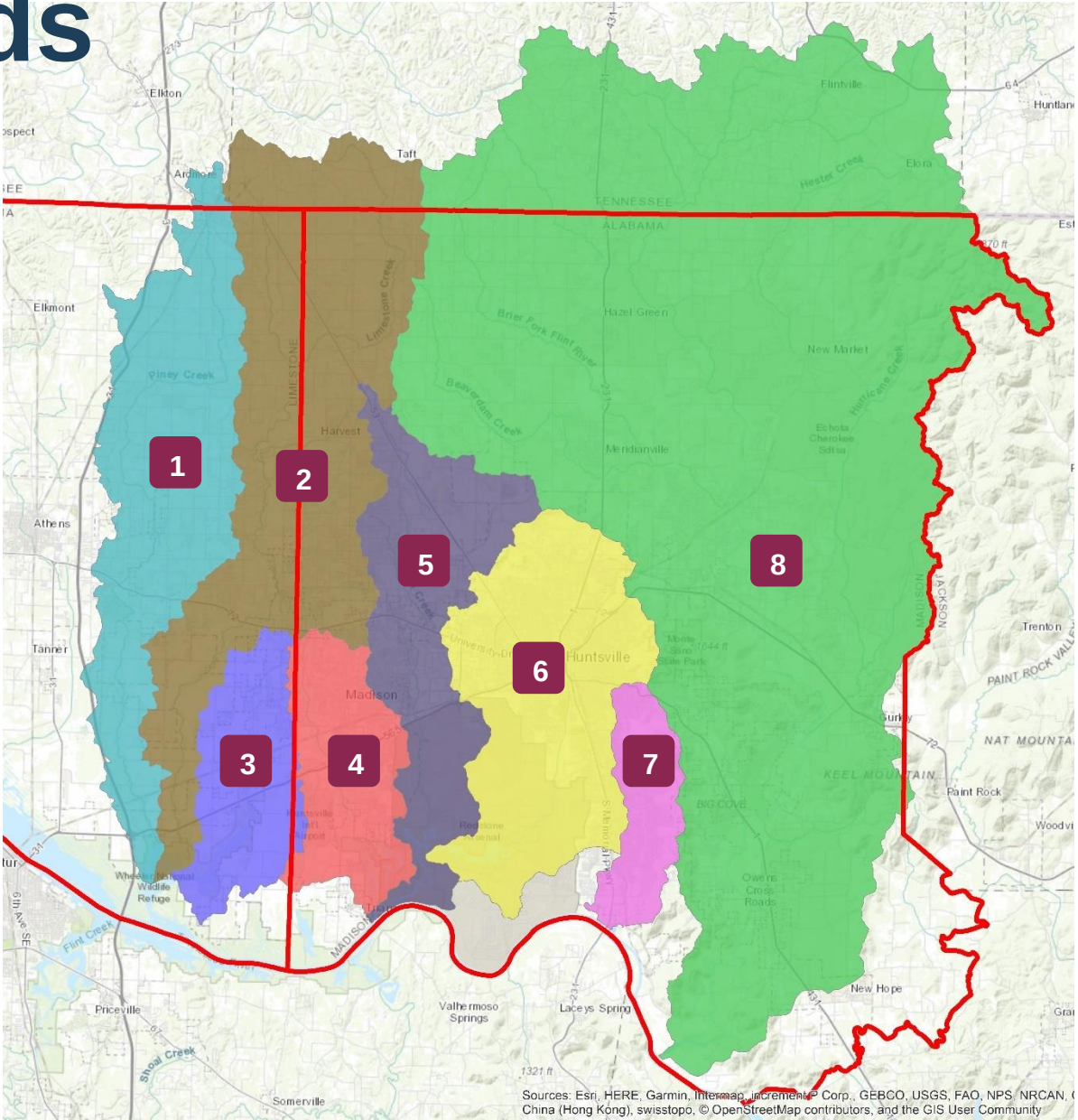
City of Huntsville

- ❖ Entered NFIP 1979
- ❖ Effective FIRMs 2018
- ❖ Entered CRS 1991
- ❖ CRS Rating 8



Huntsville Watersheds

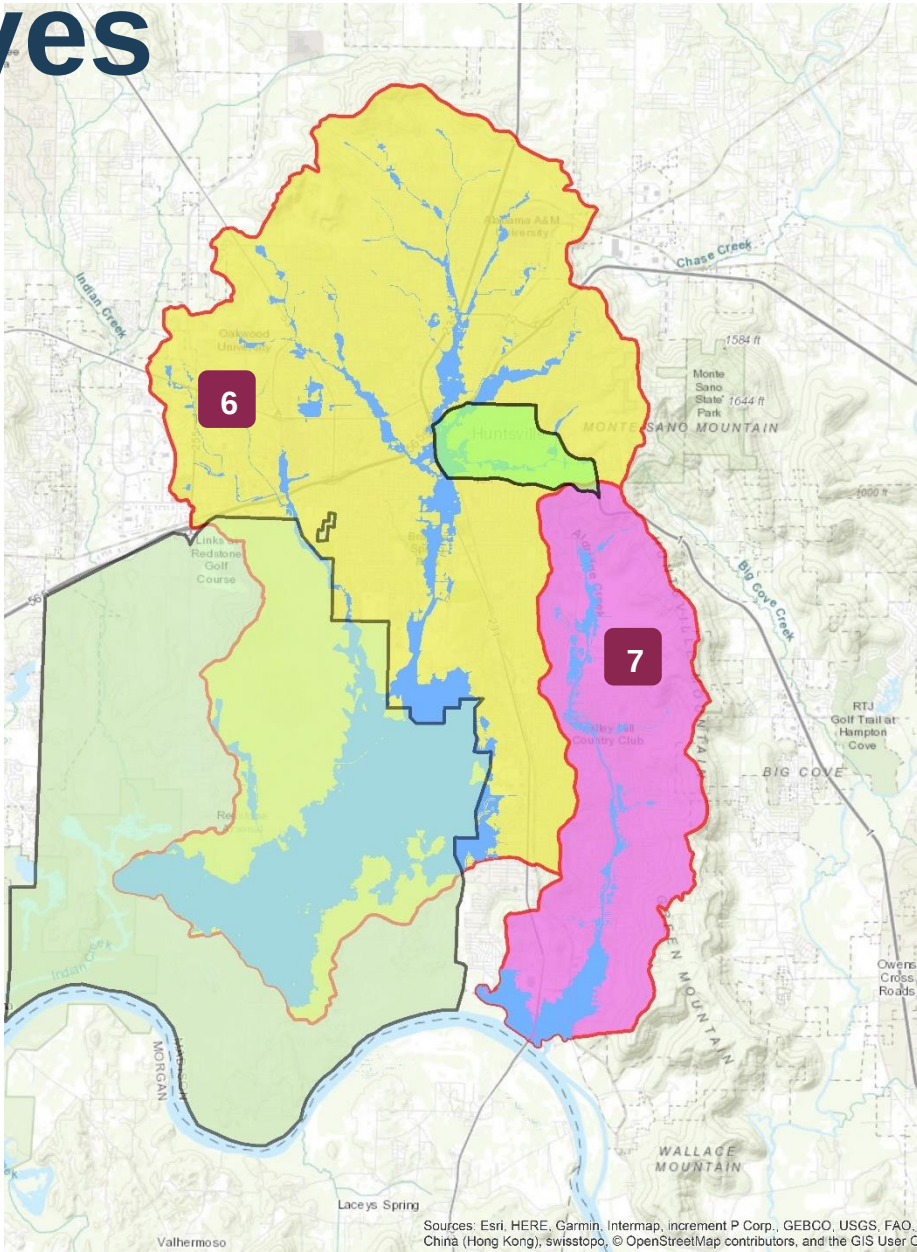
#	Watershed	Area (mi ²)
1	Piney Creek	96
2	Limestone Creek	146
3	Beaverdam Creek 2	39
4	Barren Fork Creek	40
5	Indian Creek	69
6	Huntsville Spring Branch	90
7	Aldridge Creek	23
8	Flint River	568



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

Flood Mitigation Initiatives

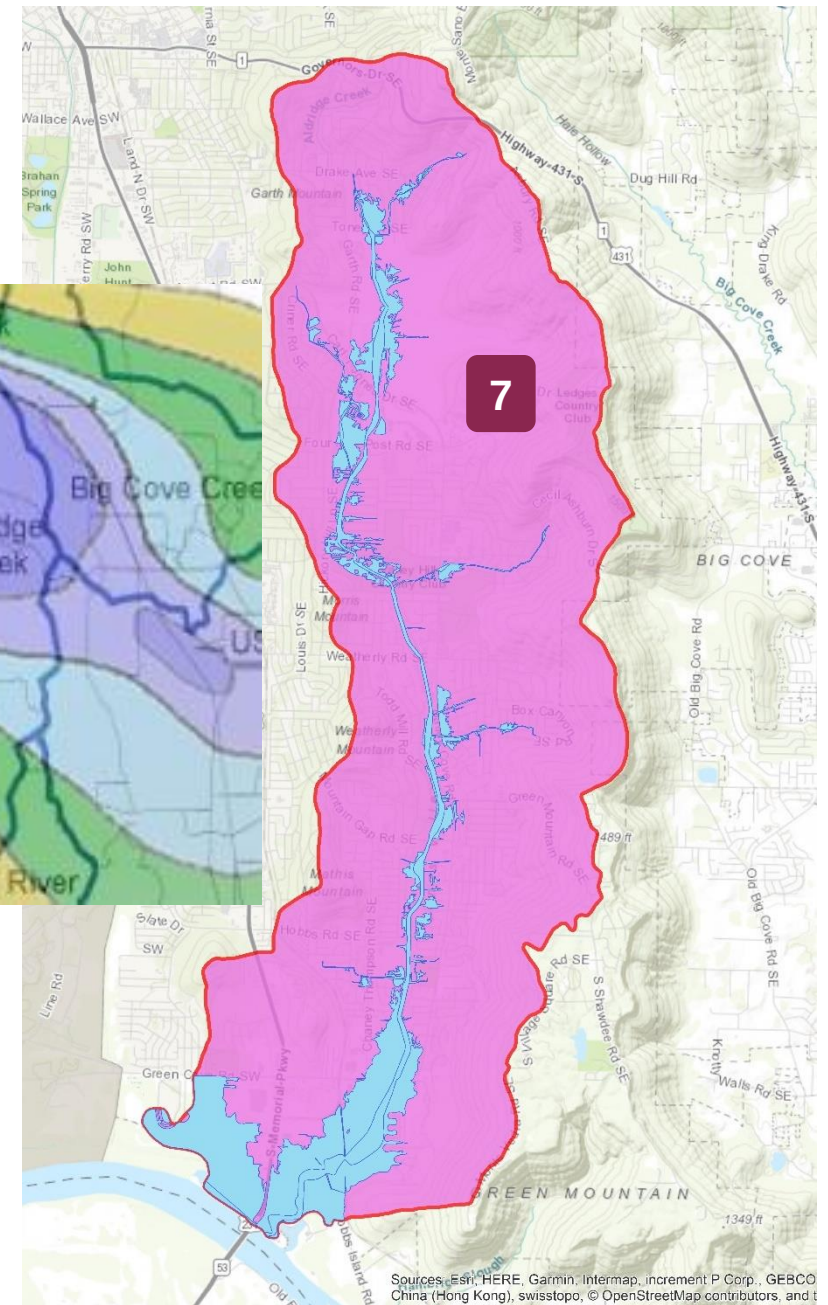
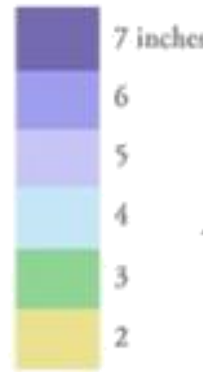
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Aldridge Creek Flooding

- ❖ 23 mi²
- ❖ June 28, 1999
- ❖ 7 inch rainfall
- ❖ 2 hours (12 am – 2 am)
- ❖ Rainfall Frequency ~ 500 yr
- ❖ Flood Frequency > 100 yr



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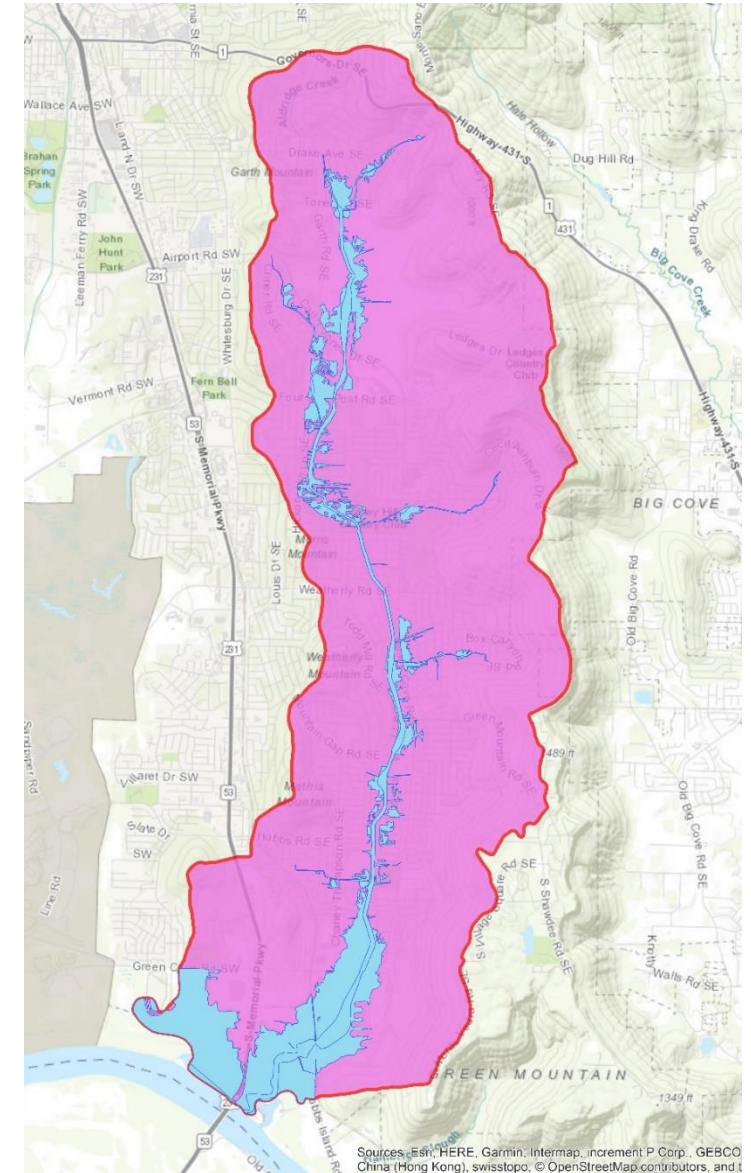
Aldridge Creek Flooding

- ❖ Roughly 300 Pre-FIRM homes flooded
- ❖ Public Outcry
- ❖ Stakeholder Meetings
- ❖ Public Meetings
- ❖ 3 Lawsuits



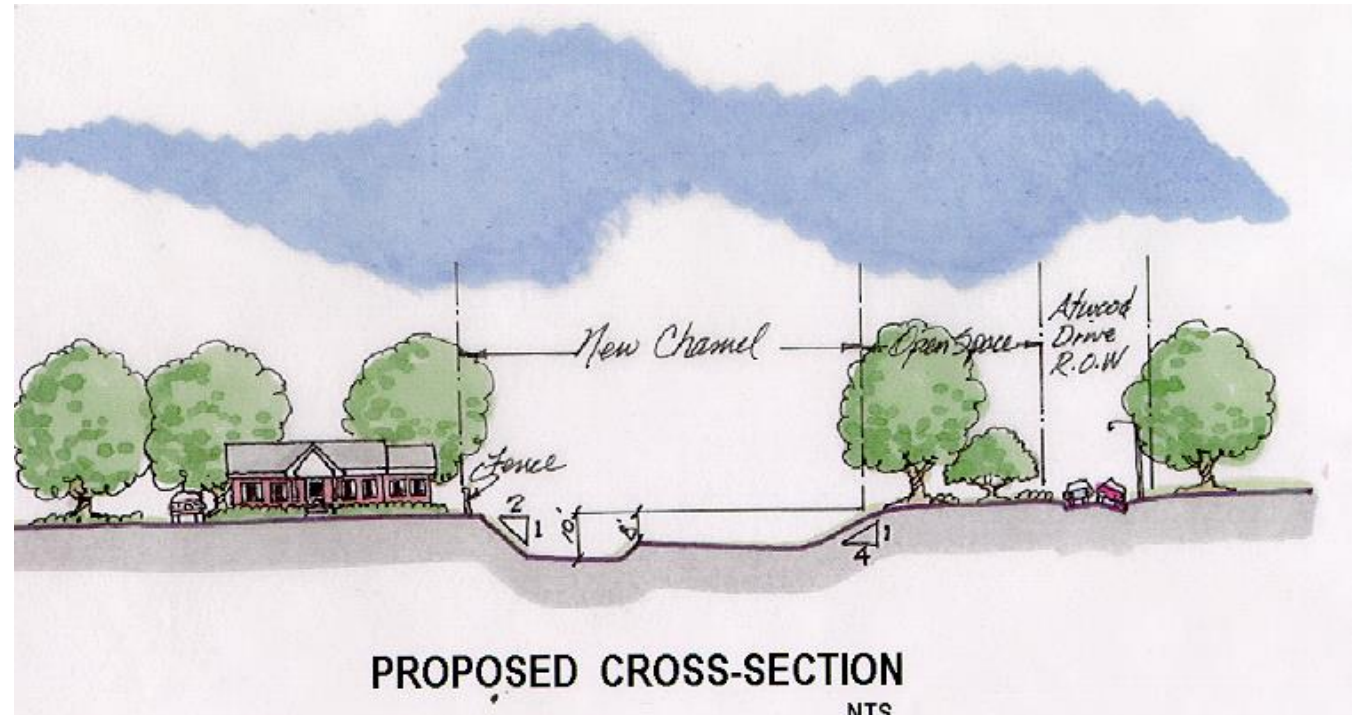
Flood Mitigation Alternatives

- ❖ Mainstem Regional Detention (150 acres)
- ❖ Tributary Regional Detention Basins
- ❖ Stream Channel Modifications
- ❖ Bridge Modifications
- ❖ Property Acquisitions
- ❖ Stream Diversion
- ❖ Combinations

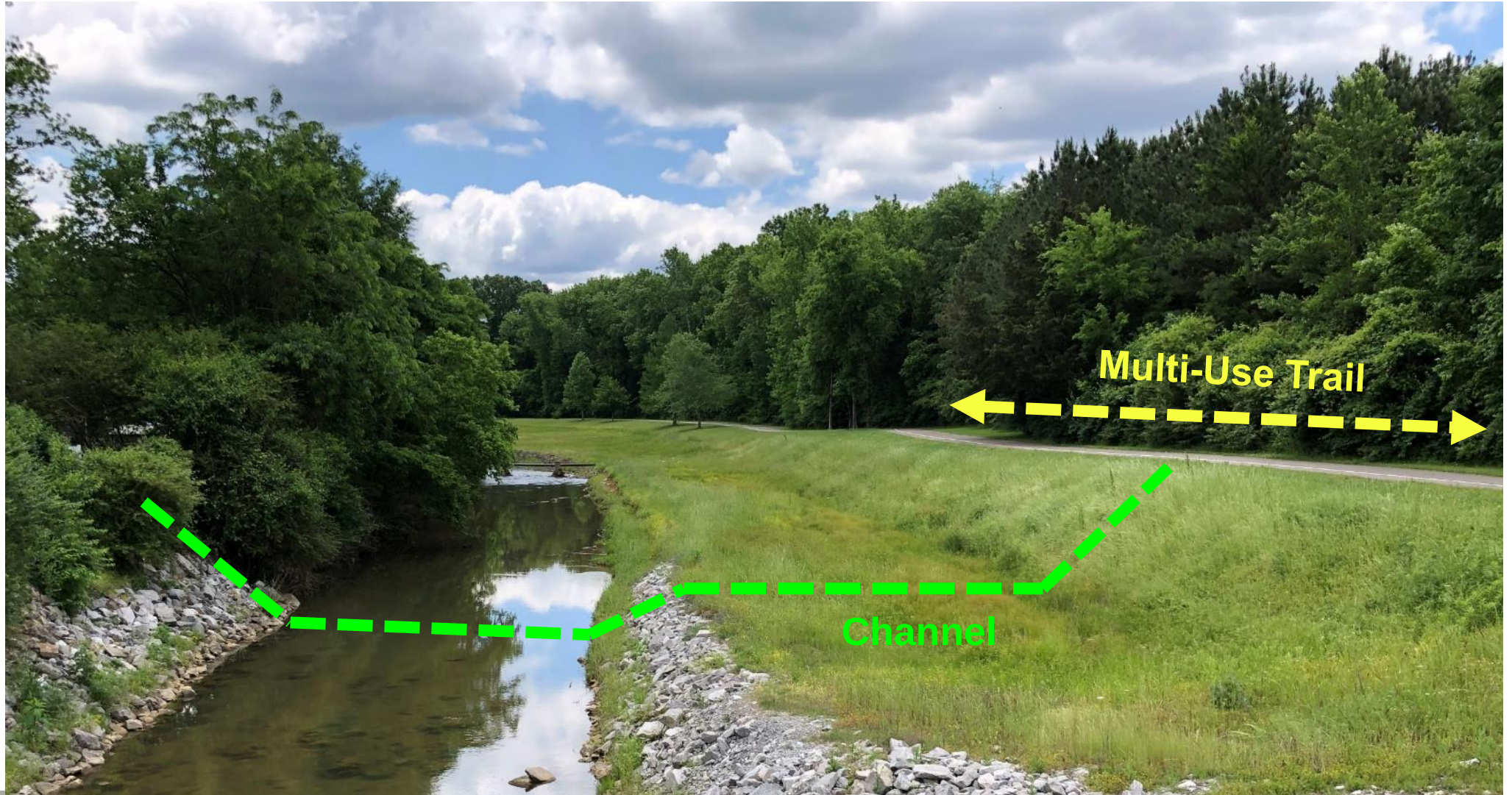


Selected Mitigation Strategy

- ❖ Excavate High-Flow Bench (4 ½ miles)
- ❖ Acquire 34 Homes in Floodway
HMGP Unmet Needs 1261
- ❖ Expand 3 Bridges
- ❖ Project Financing
 - \$4.5M HMGP funds
 - \$4.8M local funds



Mitigation Implementation

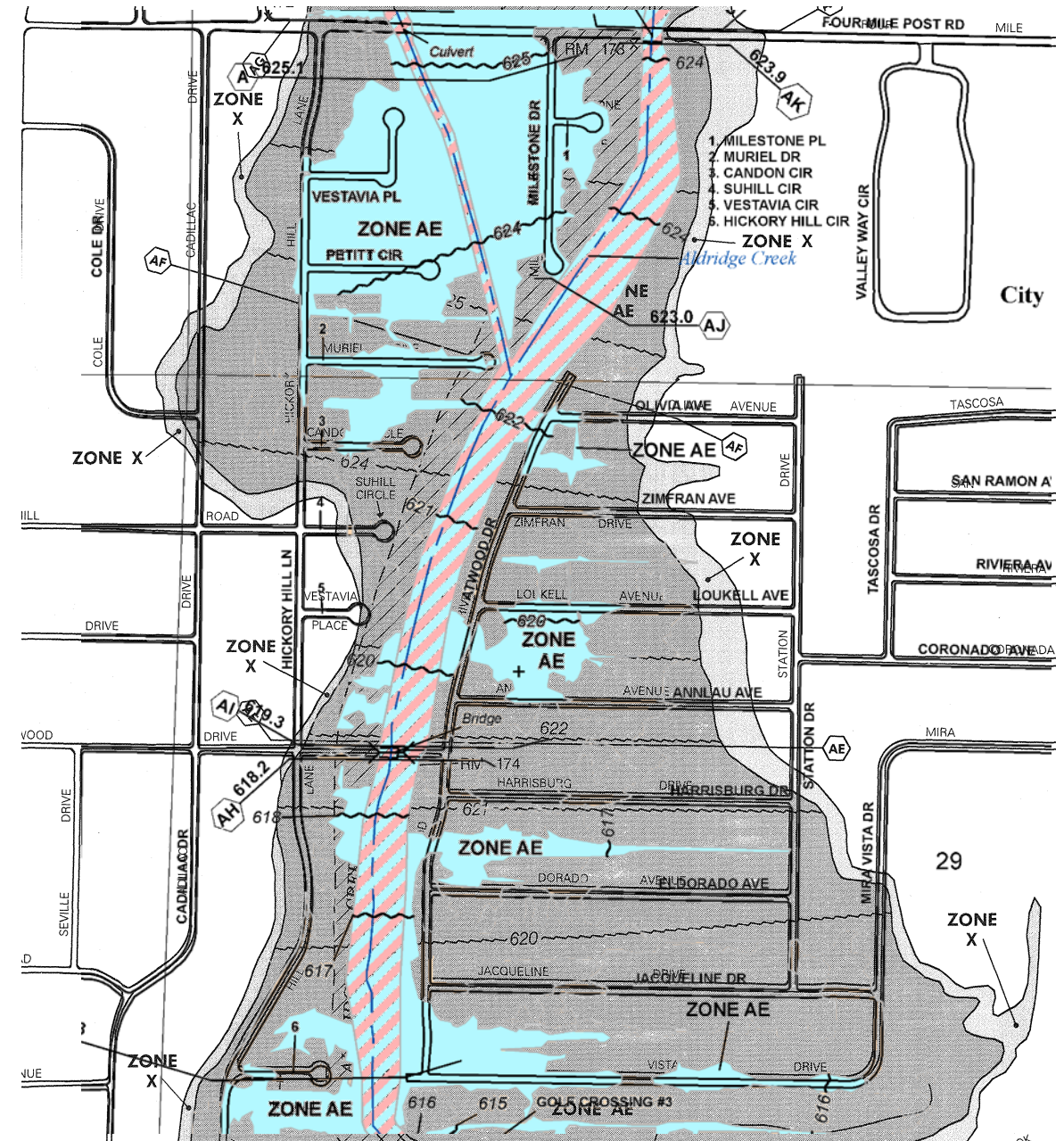


Mitigation Implementation



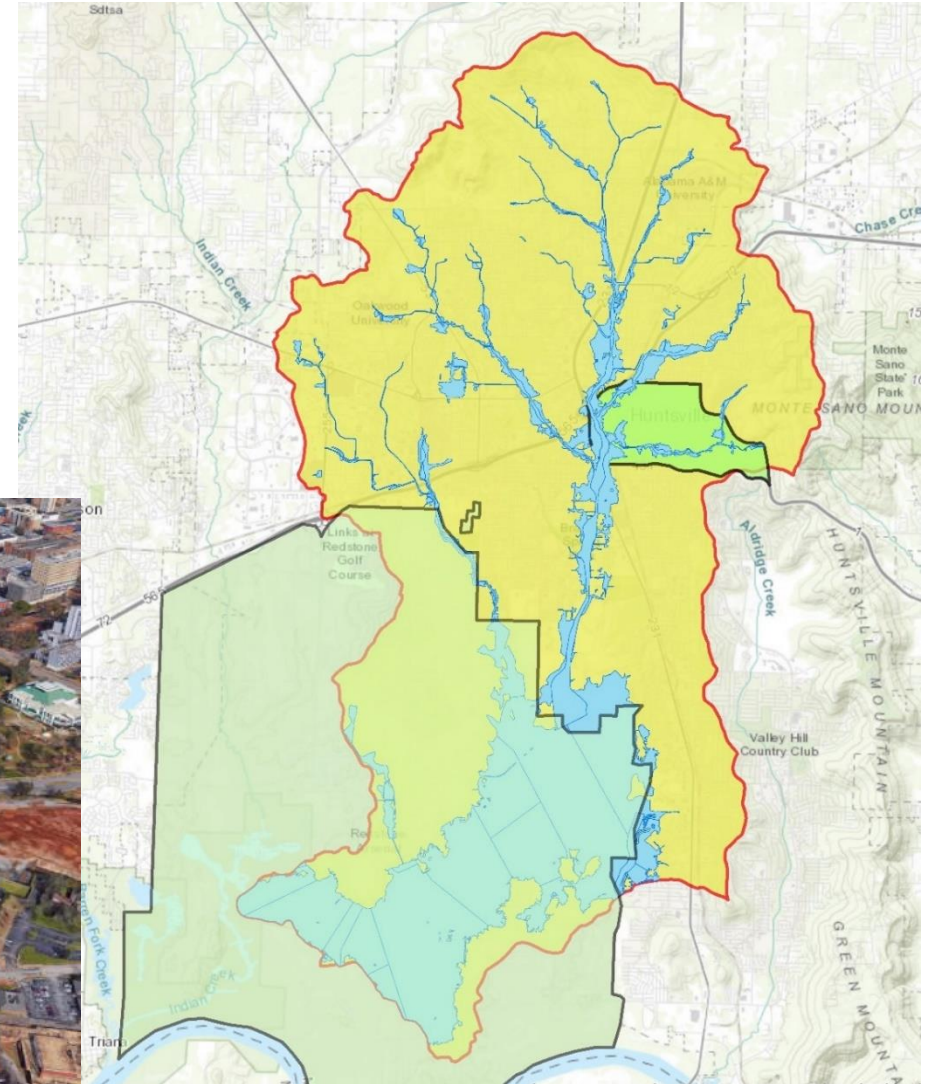
Mitigation Results

- ❖ WSEL Decrease
 - 3 ft. in Critical Areas
- ❖ Project Removed
 - 300 homes from FP
 - 99 homes from FW
- ❖ Later PMR
 - Removed >700 homes watershed-wide from FP



Huntsville Spring Branch Watershed

- ❖ Watershed Area 90 mi²
- ❖ Lots of Zone AE Streams
- ❖ Heart of the City
- ❖ Largely Urbanized



Huntsville Spring Branch Watershed



Beautiful Unaltered Streams



Huntsville Spring Branch Watershed



Natural Channel Sinuosity

Huntsville Spring Branch Watershed

Abundant Tree Canopy



History of Flooding

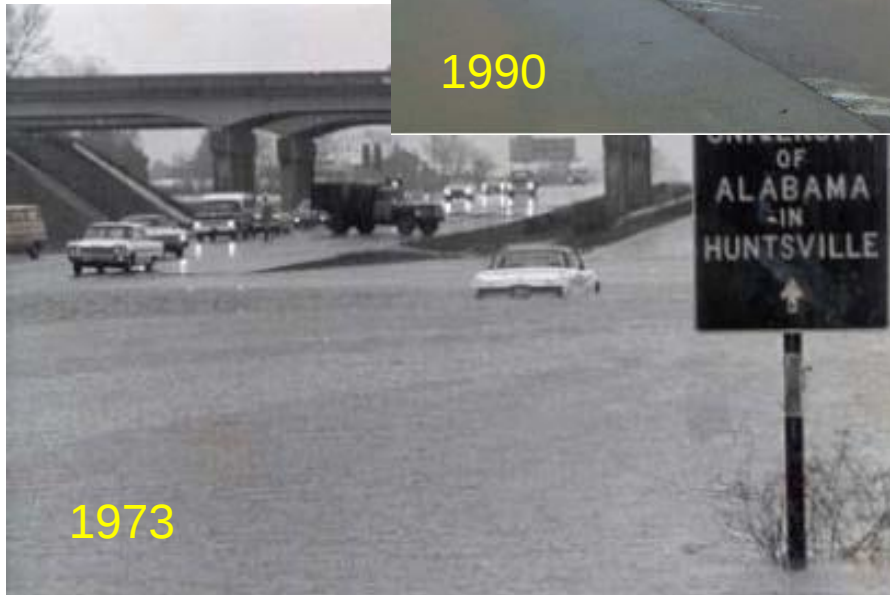
- ❖ 1912
- ❖ 1963
- ❖ 1973
- ❖ 1990
- ❖ 2003
- ❖ 2005



1990



2005

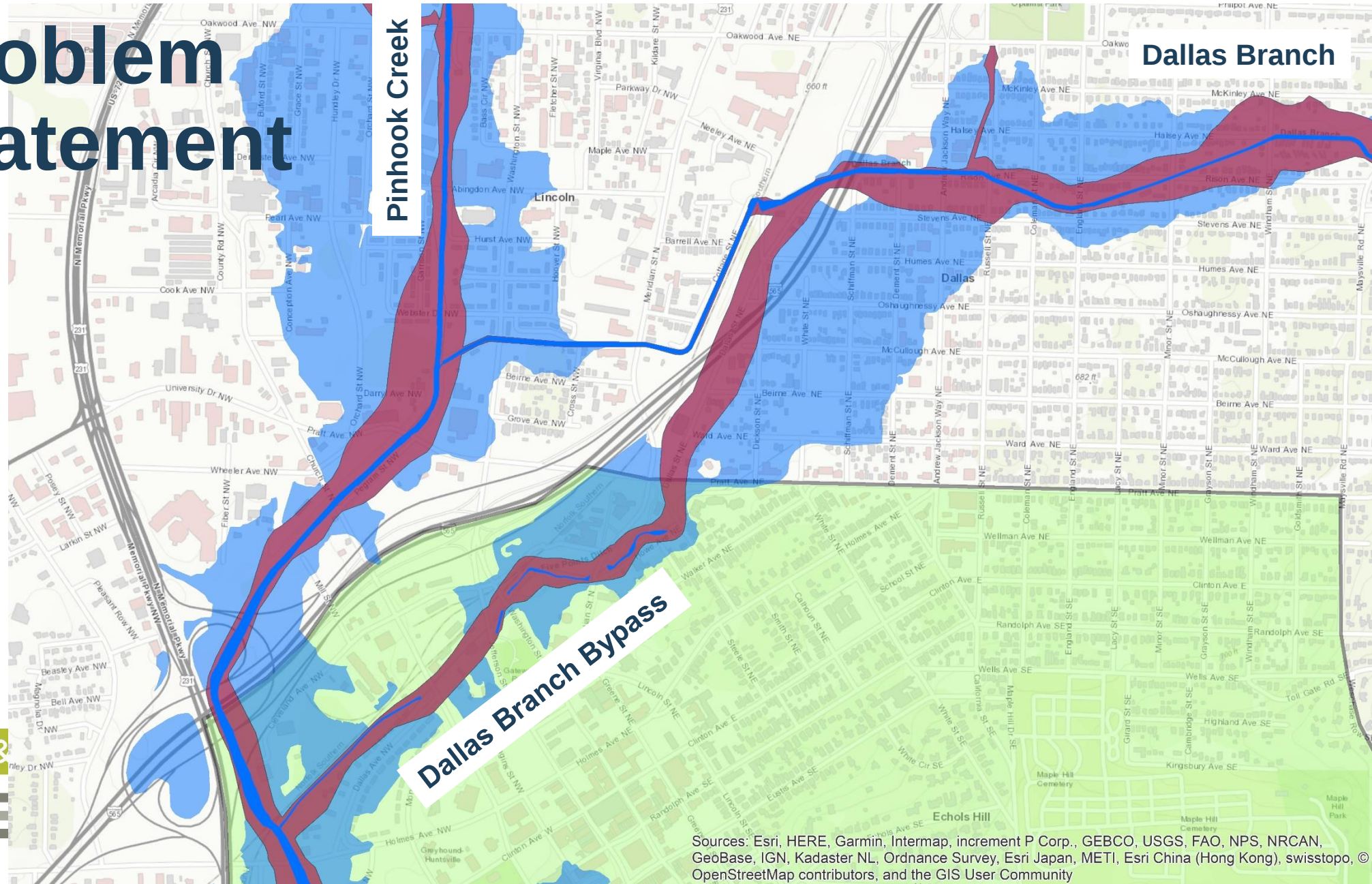


1973



2003

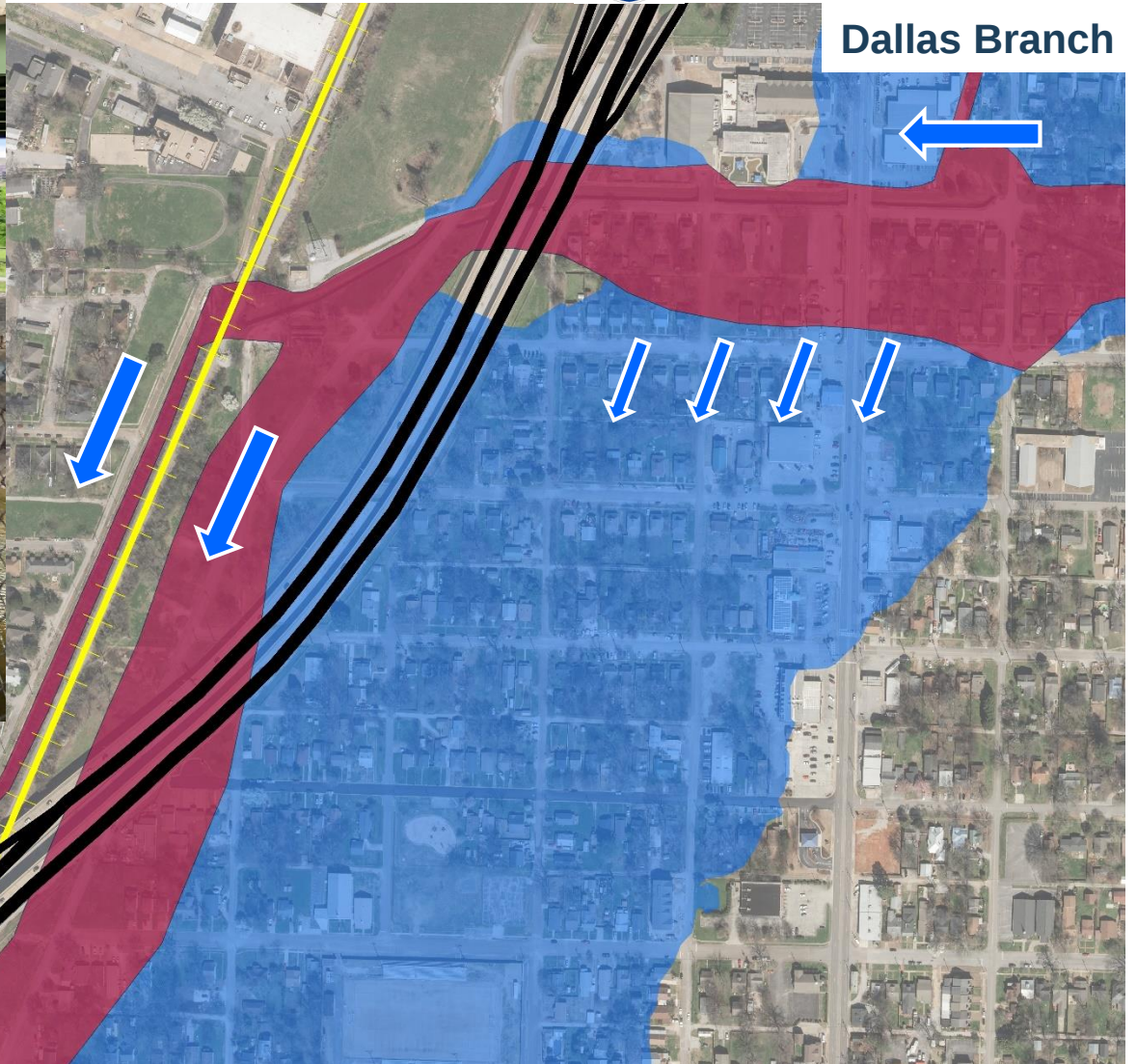
Problem Statement



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

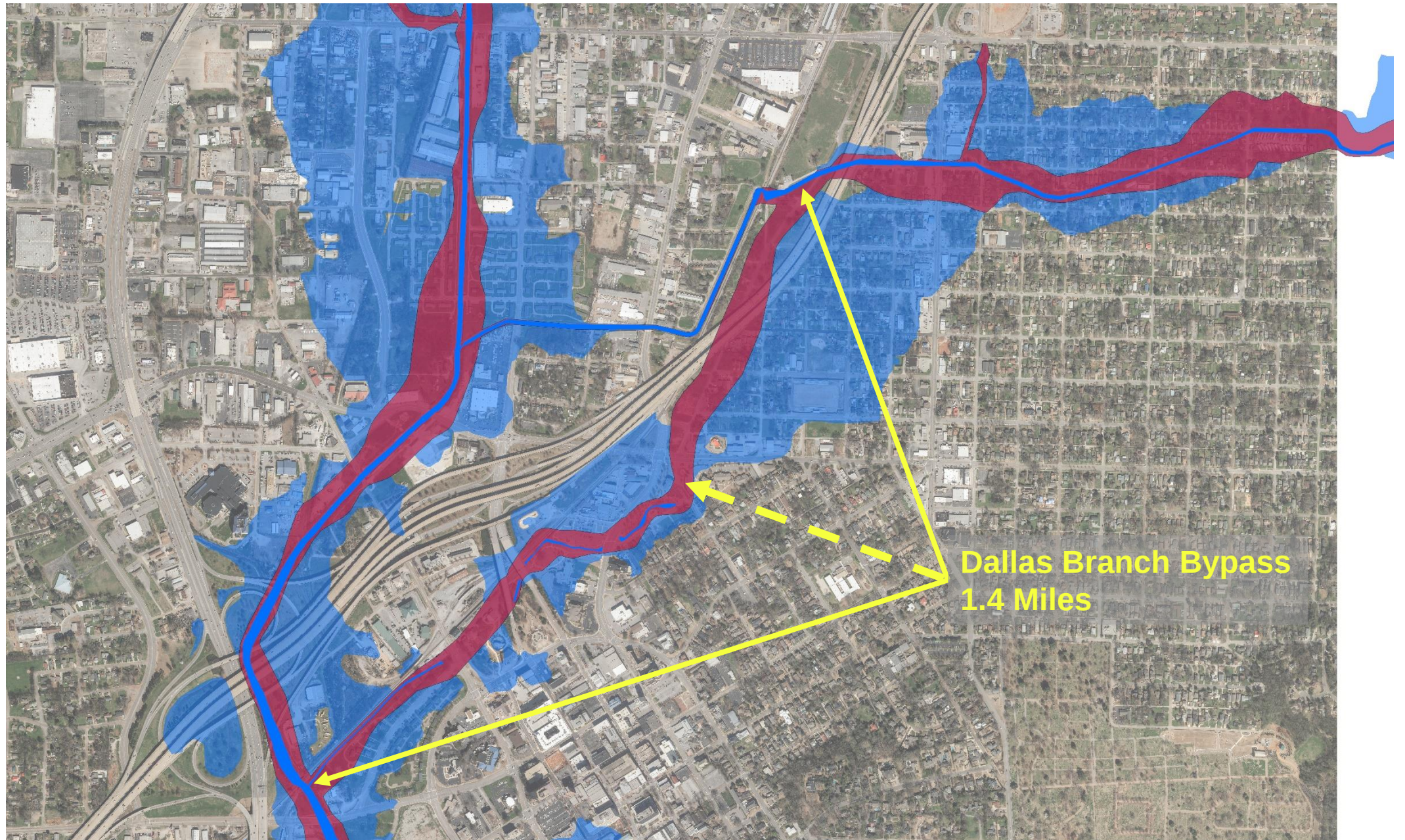


Dallas Branch



Dallas Branch Bypass Floodway

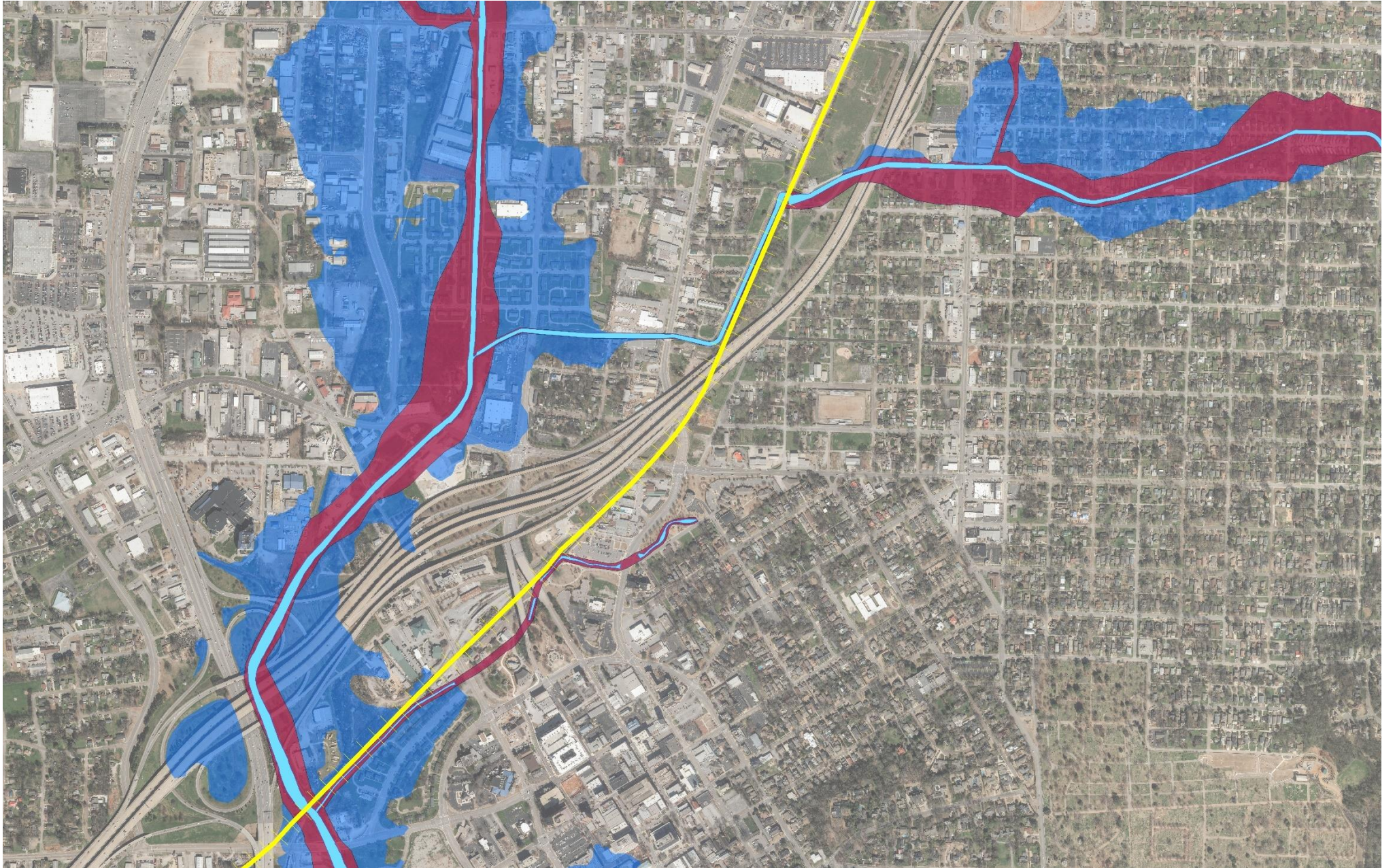




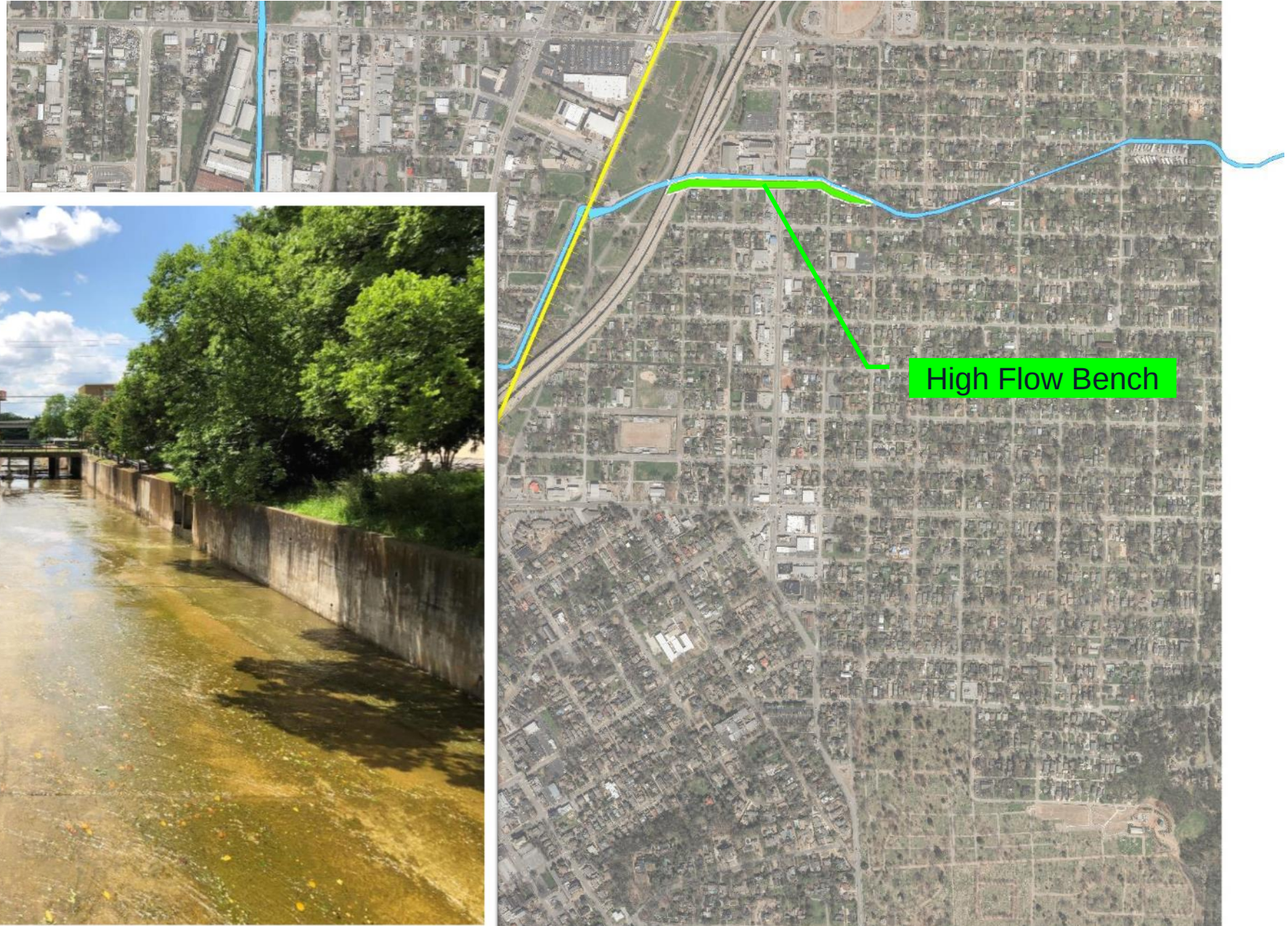
Dallas Branch Bypass
1.4 Miles



The Goal



Selected Alternative



Selected Alternative



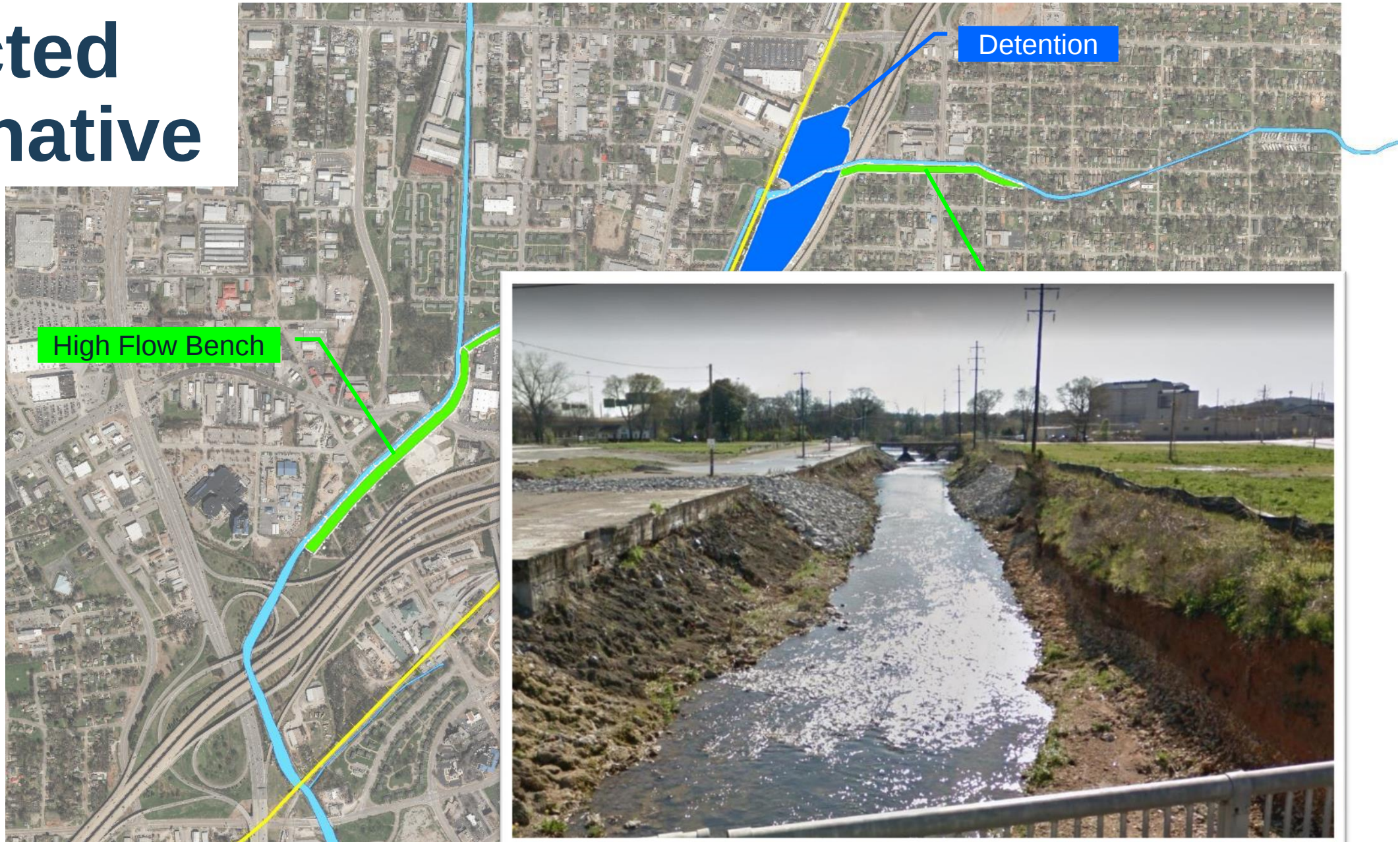
Selected Alternative



Selected Alternative



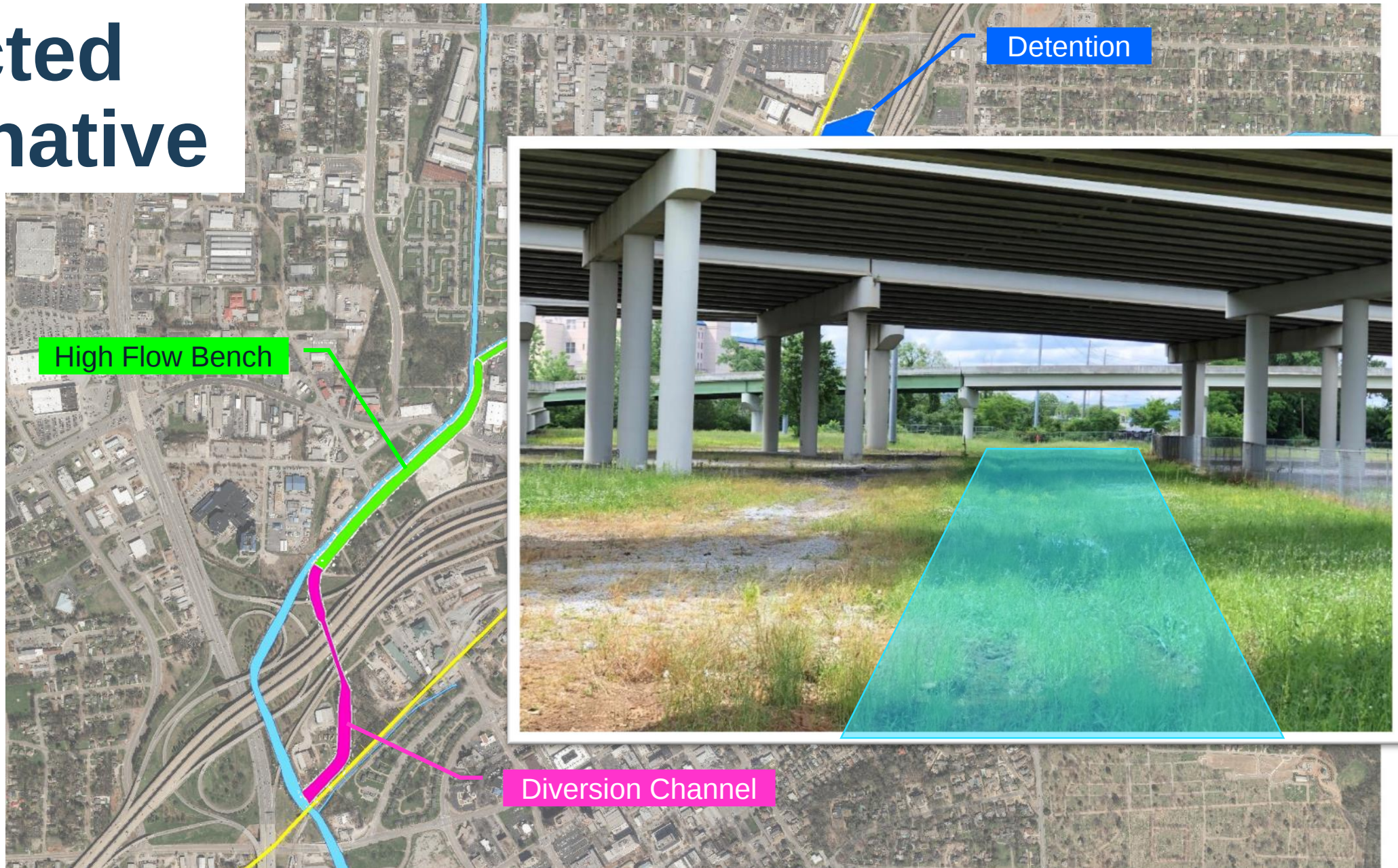
Selected Alternative



Selected Alternative



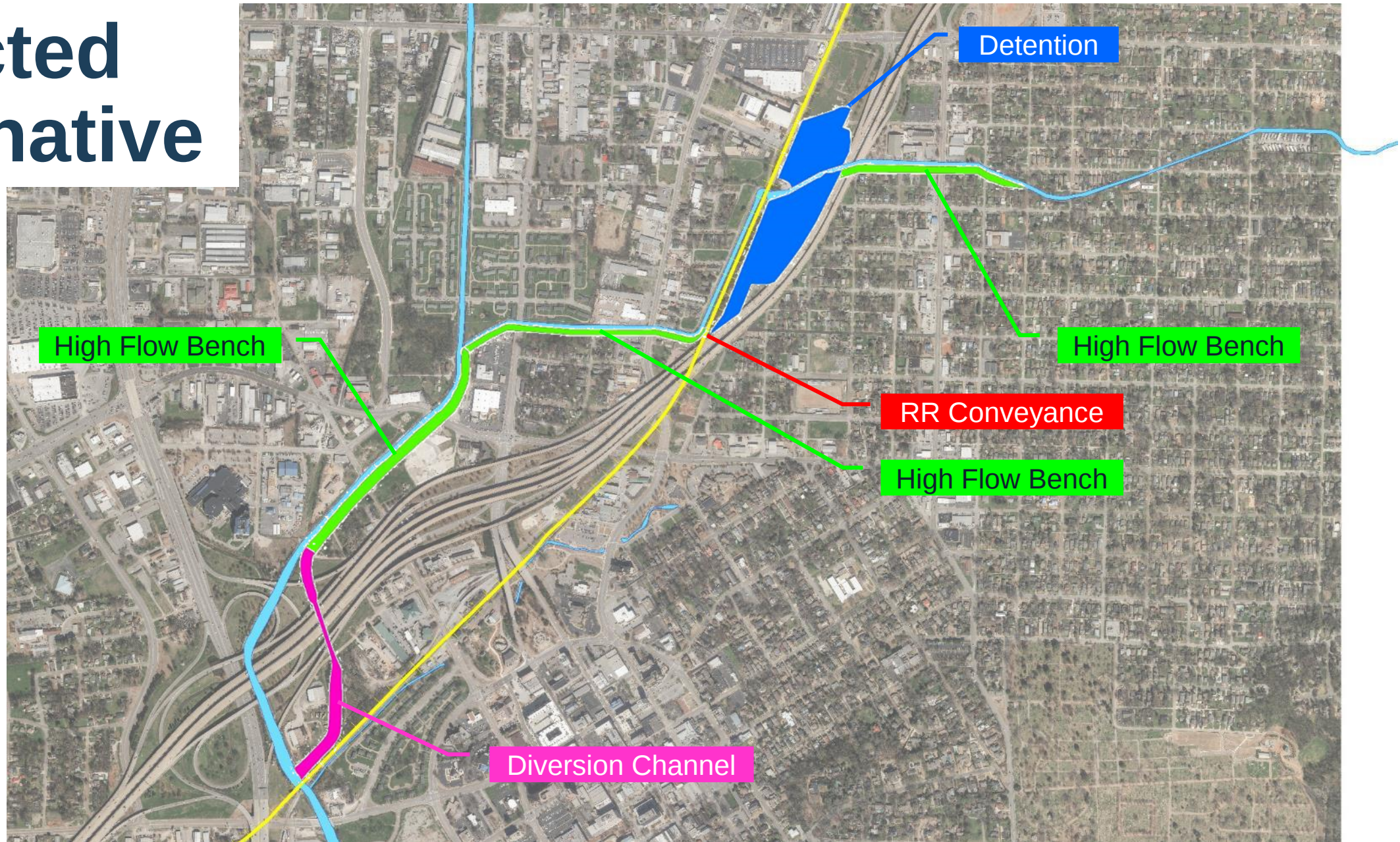
Selected Alternative



Project Benefits

- ❖ Lower BFE up to 3 feet on Dallas Branch
- ❖ Eliminate Dallas Branch Overflow to the Bypass
 - Eliminates Inadvertent Floodway & Floodplain
- ❖ Reduce flow in Bypass by 78%
 - 4500 cfs to 1000 cfs
 - Reduces Residual Floodway & Floodplain
- ❖ Reduce Flood Risk for 600 Structures
- ❖ Reduce Average Annual Damages
 - \$7 million to \$4 million

Selected Alternative



Project Timeline



- ❖ 2005 - Hurricane Katrina (DR-AL-1605-0217)
- ❖ 2006 - Phased HMGP Application
 - Phase 1 (Planning & 90% Design)
 - Phase 2 (100% Design & Construction)
- ❖ 2008 - Phase 1 Funding Approved
- ❖ 2010 - Phase 2 Funding Denied (appeal filed)
- ❖ 2011 - Phase 2 Funding Denied (final appeal filed)
- ❖ 2013 - Complete 100% Design (local funds)
- ❖ 2016...Election
- ❖ 2017...Hurricanes Harvey & Irma
- ❖ 2018 - Phase 2 Funding Awarded (\$15.9 million)
- ❖ 2019 - Updated BCA...Construction Start TBA



FEMA Hazard Mitigation Assistance (HMGP)

Category 400 - Stormwater Management

❖ Stormwater Management

- Culverts
- Detention/Retention
- Storage & Diversions
- Flapgates / Floodgates
- Other Minor Flood Control

❖ Infrastructure Protection

- Roads & Bridges
- Electric, Gas, etc.
- Water & Wastewater Systems



State	Project	HMGP Funding
Alabama	PC/DB Flood Mitigation (Huntsville)	\$15.9M
Florida	Studies, W/WW System Protection, Culverts (Hallandale Beach)	\$15.6M
Kentucky	Culverts, Diversions, Detention/Retention (UK)	\$7.7M
South Carolina	Flood Control Dam (Aiken Co.)	\$6.0M
Mississippi	Detention/Retention (Waveland)	\$6.0M
Georgia	Diversion Canal Improvements (Columbia Co.)	\$3.4M
Tennessee	Regional Detention (Bradley Co.)	\$1.6M
North Carolina	Culvert Upsize Project (Highlands)	\$468K



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