

Memorandum



CITY OF DALLAS

DATE August 5, 2016

TO The Honorable Members of the Transportation and Trinity River Project Committee:
Lee M. Kleinman (Chair), Deputy Mayor Pro Tem Erik Wilson (Vice-Chair), Sandy Greyson,
Mayor Pro Tem Monica R. Alonzo, Adam Medrano, and Casey Thomas II

SUBJECT integrated Stormwater Management (iSWM)

On Monday, August 8, 2016, you will be briefed on integrated Stormwater Management (iSWM). Attached are the materials for the briefing. Thank you

Please let me know if you have any questions or concerns.

A handwritten signature in black ink, appearing to read 'Mark McDaniel'.

Mark McDaniel
Assistant City Manager

C: Honorable Mayor and Members of the City Council
A.C. Gonzalez, City Manager
Christopher D. Bowers, Interim City Attorney
Craig D. Kinton, City Auditor
Rosa A. Rios, City Secretary
Daniel F. Solis, Administrative Judge
Ryan S. Evans, First Assistant City Manager

Eric D. Campbell, Assistant City Manager
Jill A. Jordan, P.E., Assistant City Manager
Joey Zapata, Assistant City Manager
Jeanne Chipperfield, Chief Financial Officer
Sana Syed, Public Information Officer
Elsa Cantu, Assistant to the City Manager – Mayor & Council

integrated Stormwater Management (iSWM)



Transportation and Trinity River Project Committee

August 8, 2016



Purpose

- Provide an update on regional and Dallas sustainable drainage design efforts
 - NCTCOG Regional Programs
 - iSWM™
 - Sustainable Design Initiative
 - Stormwater Fee

What is NCTCOG?

Voluntary association of, by, and for local governments, to help them:

- Plan for common needs
- Strengthen their individual and collective power
- Recognize regional opportunities
- Resolve regional problems
- Make joint decisions/cooperate for mutual benefit

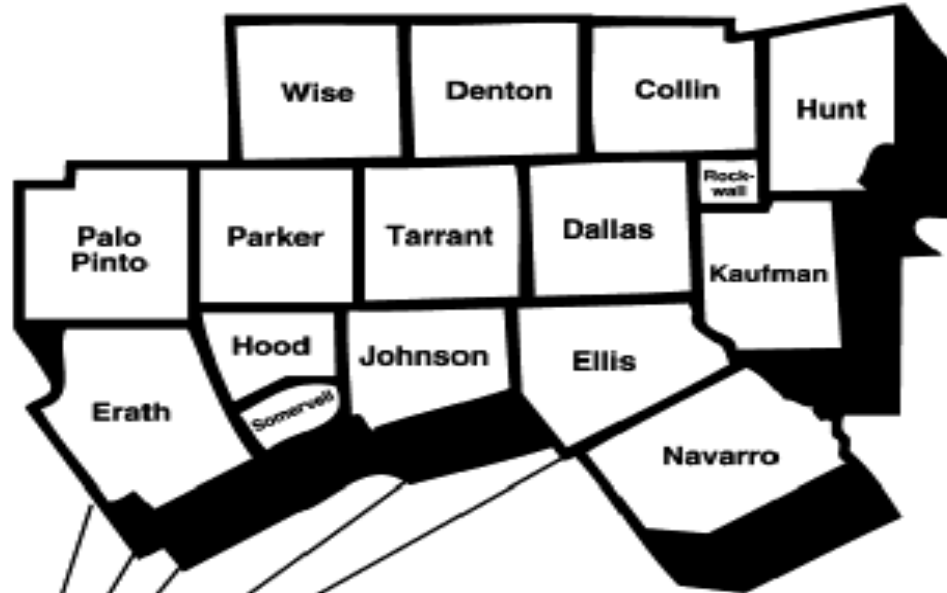
What Area of the State Does NCTCOG Cover?

16 Counties

169 Cities

**53 School &
Special
Districts**

**North Central
Texas**



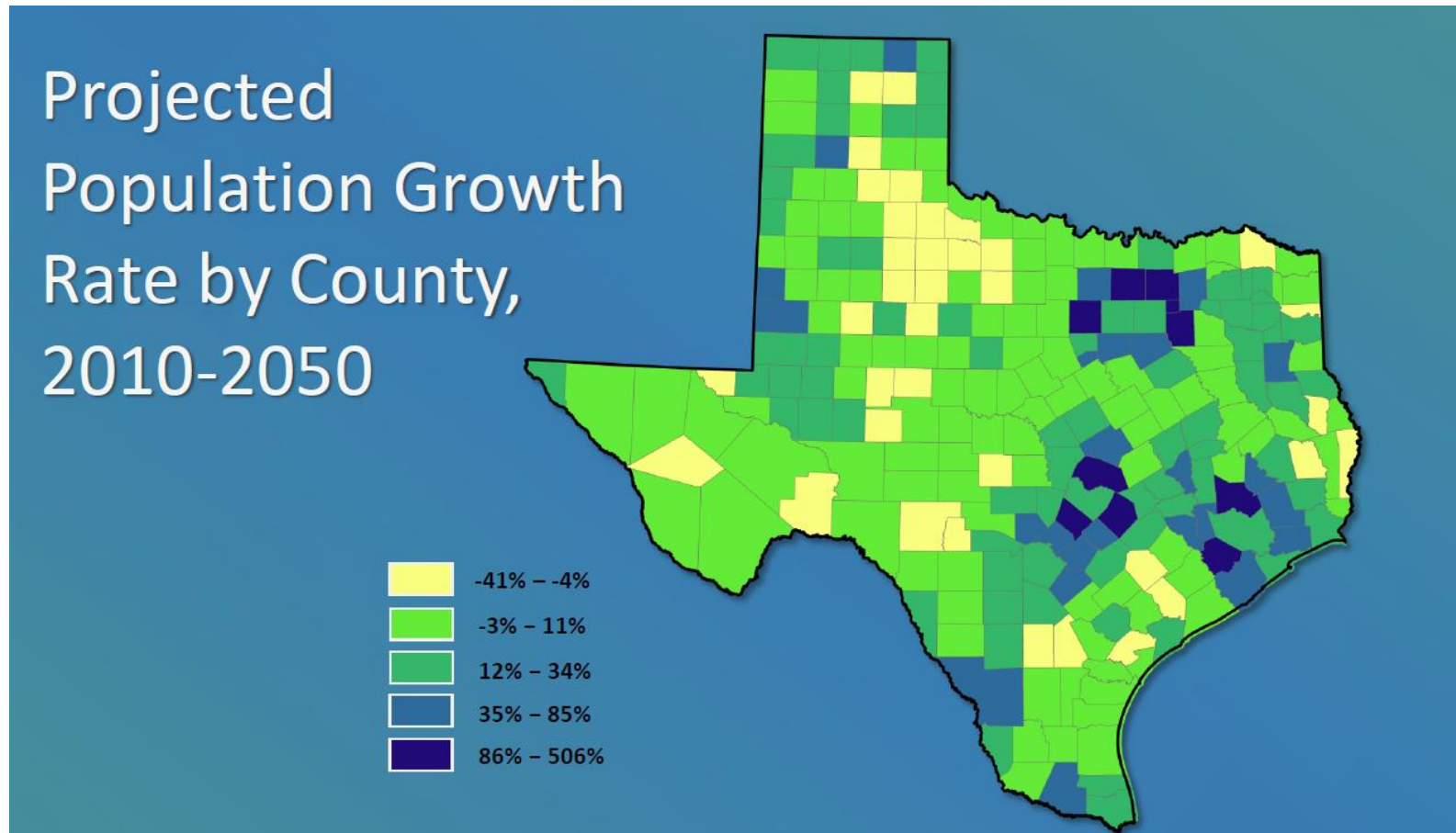
7 Million People

North Central Texas Region

Texas Population Projections by County (2010-2050)

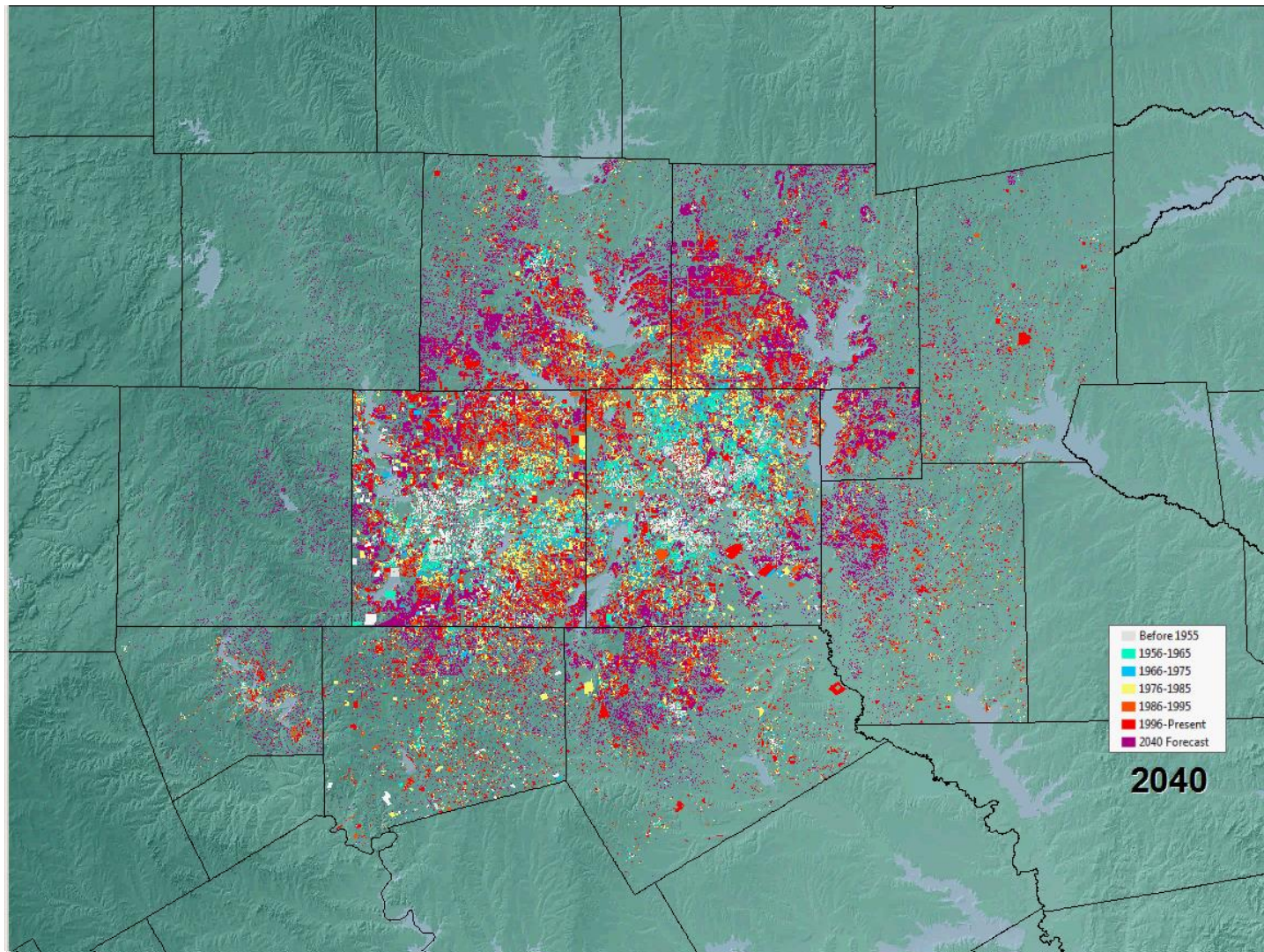


North Central Texas Council of Governments



Source : Dr. Lloyd Potter, Texas State Demographer

1950-2040 Growth Animation



Drainage Related Initiatives

- Trinity River Common Vision
- Regional Stormwater Management Coordinating Council
- Regional Ecosystem Framework
- *integrated* Stormwater Management (iSWM™)

REGIONAL WATERSHED CLUSTERS OF 12 -DIGIT HUC'S



- Legend**
- Proposed MPA Boundary
 - Primary Highway
 - Secondary Highway
 - Counties
 - Trinity River
 - Major Lakes
 - Streams
 - Drains to Water Supply Reservoirs
 - Drains to Trinity River
 - Access Ramp
 - Major Arterial
 - Watersheds
 - Subwatersheds
 - Subbasins
 - Cluster/Drainage



North Central Texas
Council of Governments
Environment & Development



Data Source : Watershed Boundary Dataset (WBD) by
USDA - Natural Resources Conservation Service

Stream Data by National Hydrography Dataset (NHD)

This map/data was created by the North Central Texas Council of Governments (NCTCOG) for use "as is" and as an aid in geographic representation only. This data is not certified by a Registered Land Surveyor for the State of Texas and is not intended to be used as such. NCTCOG, its officials, and its employees do not accept liability for any discrepancies, errors, or omissions that may exist.

North Central Texas Impaired Waters Draft 2014 Texas Integrated Report

DRAFT

2014 Impaired Segments

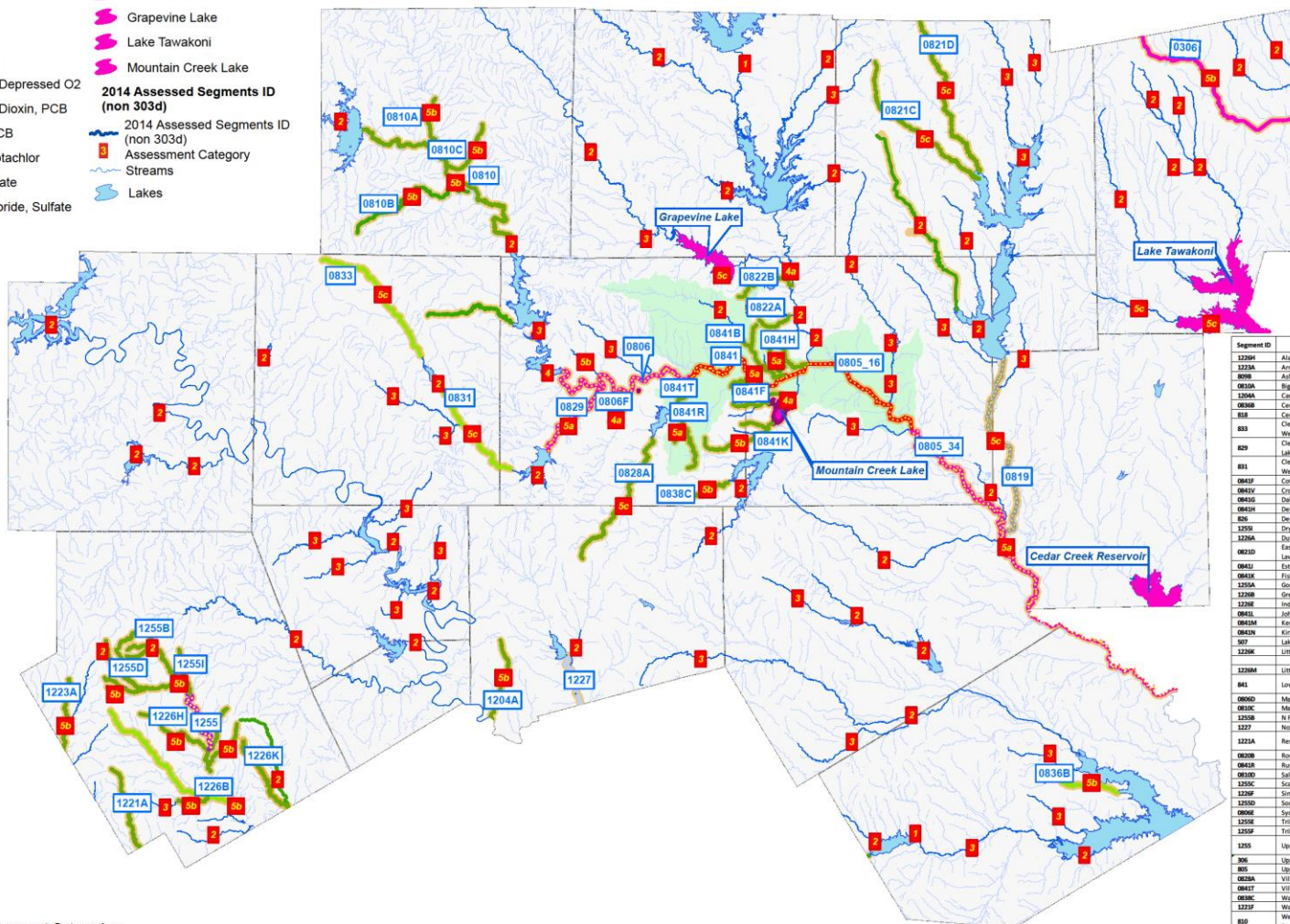
- Depressed O2
- PCB
- pH
- Bacteria
- Bacteria, Depressed O2
- Bacteria, Dioxin, PCB
- Dioxin, PCB
- PCB, Heptachlor
- TDS, Sulfate
- TDS, Chloride, Sulfate

Impaired Lakes

- Cedar Creek Reservoir
- Grapevine Lake
- Lake Tawakoni
- Mountain Creek Lake

2014 Assessed Segments ID (non 303d)

- 2014 Assessed Segments ID (non 303d)
- Assessment Category
- Streams
- Lakes



Segment ID	Segment Name	Segment Category	Impairment Parameter
1229H	Alarm Creek	Sb	Bacteria
1229A	Armonock Creek	Sb	Bacteria
0809	Ash Creek	Sc	Bacteria
0809A	Big Sandy Creek	Sb	Bacteria
1209A	Cana Creek	Sb	Bacteria
0808	Cedar Creek	Sb	Depressed O2
818	Cedar Creek Reservoir	Sc	pH
833	Clear Fork Trinity above Lake Weatherford	Sc	Depressed O2
829	Clear Fork Trinity below Brook Lake	Sa	Dioxin / PCB
831	Clear Fork Trinity below Lake Weatherford	Sc	Depressed O2
0841F	Collinwood Creek	Sc	Bacteria
0841V	Cocklett Branch	Sc	Bacteria
0841G	Dalworth Creek	Sa	Bacteria
0841H	Delaware Creek	Sa	Bacteria
826	Denton Creek	Sc	pH
1209B	Dry Branch	Sb	Bacteria
1209A	Duffau Creek	Sc	Bacteria
0821D	East Fork Trinity River above Lake Lanier	Sc	Bacteria
0841J	Estelle Creek	Sa	Bacteria
0841K	Fish Creek	Sb	Bacteria
1209A	Goose Branch	Sb	Bacteria
1209B	Green Creek	Sb	Depressed O2
1209E	Indian Creek	S	Depressed O2
0841L	Johnson Creek	Sa	Bacteria
0841M	Kea Branch	Sa	Bacteria
0841N	Kitty Creek	Sb	Bacteria
907	Lake Tawakoni	Sc	pH
1209K	Little Duffau Creek	Sb	Bacteria
1209M	Little Green Creek	Sb	Bacteria
841	Lower West Fork Trinity River	Sa	Bacteria, Dioxin, PCB
0808D	Marine Creek	Sb	Bacteria
0808C	Marlin Branch	Sb	Bacteria
1209B	N Fork Upper N Bosque	Sb	Bacteria
1227	Nolan River	Sb	Sulfate, TDS
1221A	Realey Creek	Sb	Bacteria, Depressed O2
0808B	Roslett Creek	Sc	Bacteria
0841R	Rush Creek	Sa	Bacteria
0841D	Salt Creek	Sb	Bacteria
1209C	Scarborough Creek	Sb	Bacteria
1209F	Sims Creek	Sb	Bacteria
1209D	South Fork N Bosque	Sb	Bacteria
0808E	Sycamore Creek	Sb	Bacteria
1209E	Tri of Gona Branch	Sb	Bacteria
1209F	Tri of Scarborough Cr	Sb	Bacteria
1209	Upper N. Bosque River	Sb	Bacteria, Depressed O2
306	Upper South Sulphur River	Sb	pH
807	Upper Trinity River	Sa	Dioxin / PCB
0808A	Village Creek	Sc	Bacteria
0841T	Village Creek	Sa	Bacteria
0808C	Walnut Creek	Sb	Bacteria
1209F	Walnut Creek	Sb	Bacteria
810	West Fork Trinity below Bridgeport Rv.	Sb	Bacteria
806	West Fork Trinity below Eagle ML Rv.	Sa	PCB
806	West Fork Trinity below Lake Worth	Sa	Dioxin / PCB
0808U	West Irving Creek	Sc	Bacteria
0808E	Willow Creek	Sa	Bacteria
815	East Fork Trinity River	Sc	Sulfate, TDS
1209G	Woodhollow Branch	Sb	Bacteria

TCEQ Stream Segment Categories

- Category 1. Attaining all water quality standards and no use is threatened.
- Category 2. Attaining some water quality standards and no use is threatened; and insufficient data and information are available to determine if the remaining uses are attained or threatened.
- Category 3. Insufficient data and information are available to determine if any water quality standard is attained.
- Category 4. Water quality standard is not supported or is threatened for one or more designated uses but does not require the development of a TMDL.
- Category 4a. TMDL has been completed and approved by EPA.
- Category 4b. Other pollution control requirements are reasonably expected to result in the attainment of the water quality standard in the near future.
- Category 4c. Nonsupport of the water quality standard is not caused by a pollutant.
- Category 5. The water body does not meet applicable water quality standards or is threatened for one or more designated uses by one or more pollutants.
- Category 5a. A TMDL is underway, scheduled, or will be scheduled.
- Category 5b. A review of the water quality standards for the water body will be conducted before a management strategy is selected.
- Category 5c. Additional data and information will be collected or evaluated before a management strategy is selected.



**North Central Texas
Council of Governments**

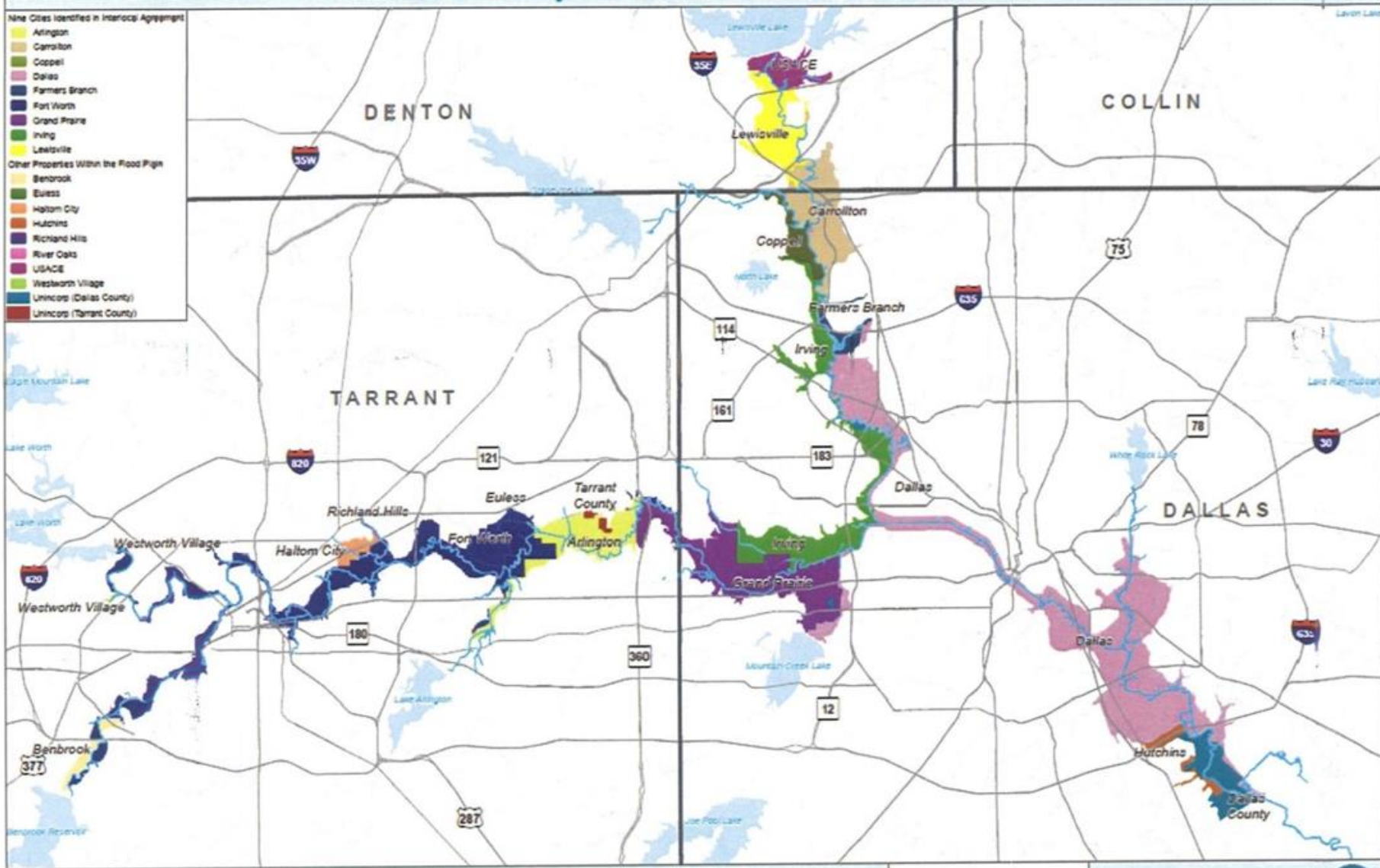
Data Source: TCEQ 2014 Texas Integrated Report for Clean Water Act Sections 305(b) and 303(d) and the NCTCOG Regional Data Center (2015).

This map/data was created by the North Central Texas Council of Governments (NCTCOG) for use "as-is" and as an aid in graphic representation only. The data is not verified by a Registered Professional Land Surveyor for the State of Texas and is not intended to be used as such. NCTCOG, its officials, and its employees do not accept liability for any discrepancies, errors, or variances that may exist.

DEA 06/15/15
G:\EP_05\Water\water_quality\2014 Impaired Waters

Trinity River Corridor

- Nine Cities Identified in Interlocal Agreement**
- Arlington
 - Carrollton
 - Coppell
 - Dallas
 - Farmers Branch
 - Fort Worth
 - Grand Prairie
 - Irving
 - Lewisville
- Other Properties Within the Flood Plain**
- Benbrook
 - Euless
 - Haltom City
 - Hutchins
 - Richland Hills
 - River Oaks
 - USACE
 - Westworth Village
 - Unincorp (Dallas County)
 - Unincorp (Tarrant County)



North Central Texas
Council of Governments
Environment & Development

Trinity River Corridor
 CDC Zone



0 0.5 1 2 Miles
 1 inch equals 1 mile

This report was created by the North Central Texas Council of Governments (NCTCOG) for use "as is" and is not intended to be used as a legal document. The use of this report by a Registered Land Surveyor for the State of Texas and is not intended to be used as a legal document. NCTCOG, its officials, and its employees do not accept liability for any consequences, actions, or omissions that may result.

Trinity River *COMMON VISION*

- A *SAFE* Trinity
- A *CLEAN* Trinity
- An *ENJOYABLE* Trinity
- A *NATURAL* Trinity
- A *DIVERSE* Trinity



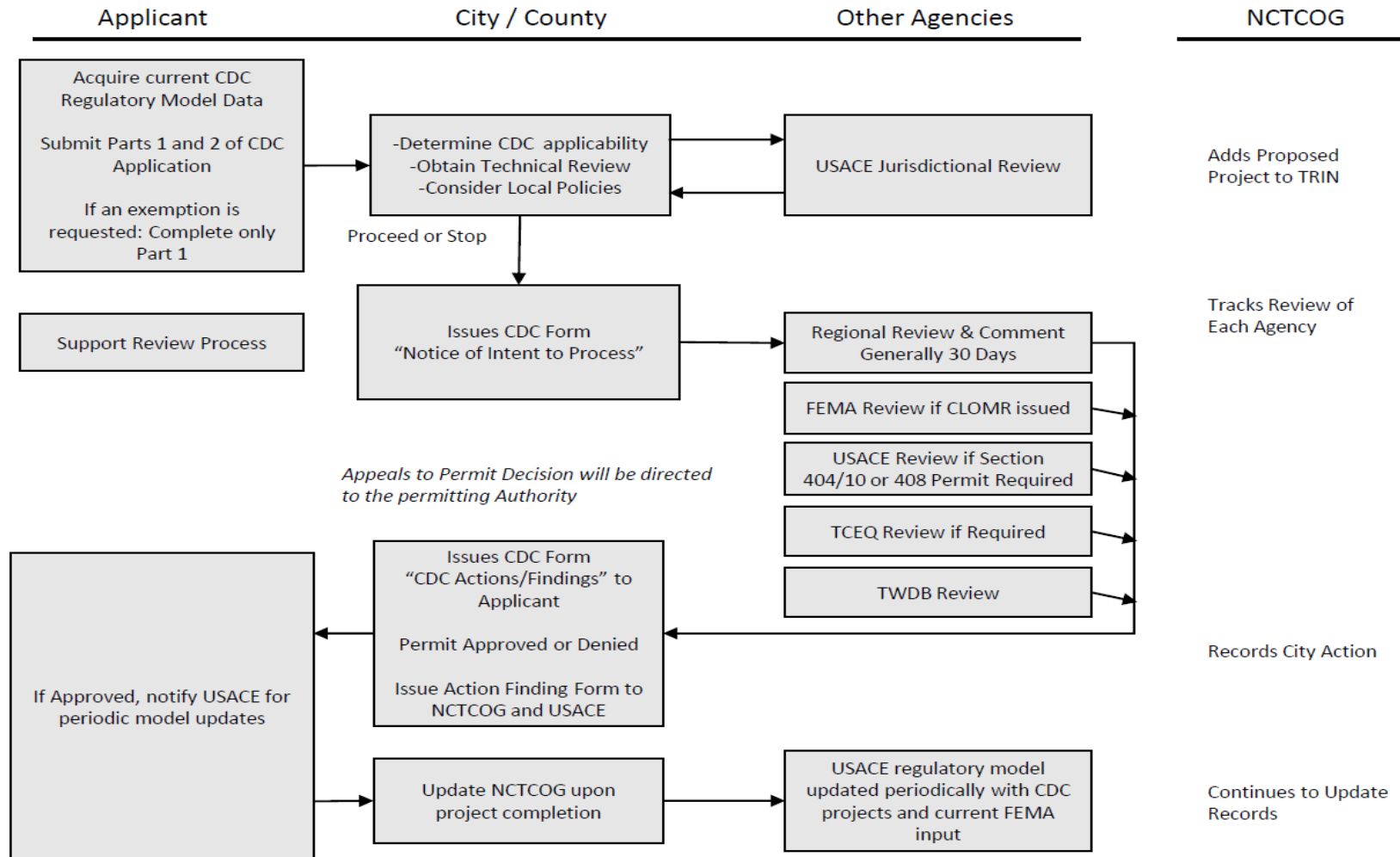
COMMON VISION -CDC Manual

- Arlington
- Carrollton
- Coppell
- Dallas
- Farmers Branch
- Fort Worth
- Grand Prairie
- Irving
- Lewisville
- Dallas County
- Denton County
- Tarrant County
- Tarrant County Water Control and Improvement District Number One
- Trinity River Authority of Texas
- United States Army Corps of Engineers, Fort Worth District
- Federal Emergency Management Agency
- North Central Texas Council of Governments

Common Vision Permit Criteria

- All floodplain projects permitted (*not just for USACE permits*)
- City's retain development authority
- Consistent design level of protection
- Adopted by every member
- Any public or private development must obtain a CDC (*unless specifically exempted*)

Corridor Development Certificate Process



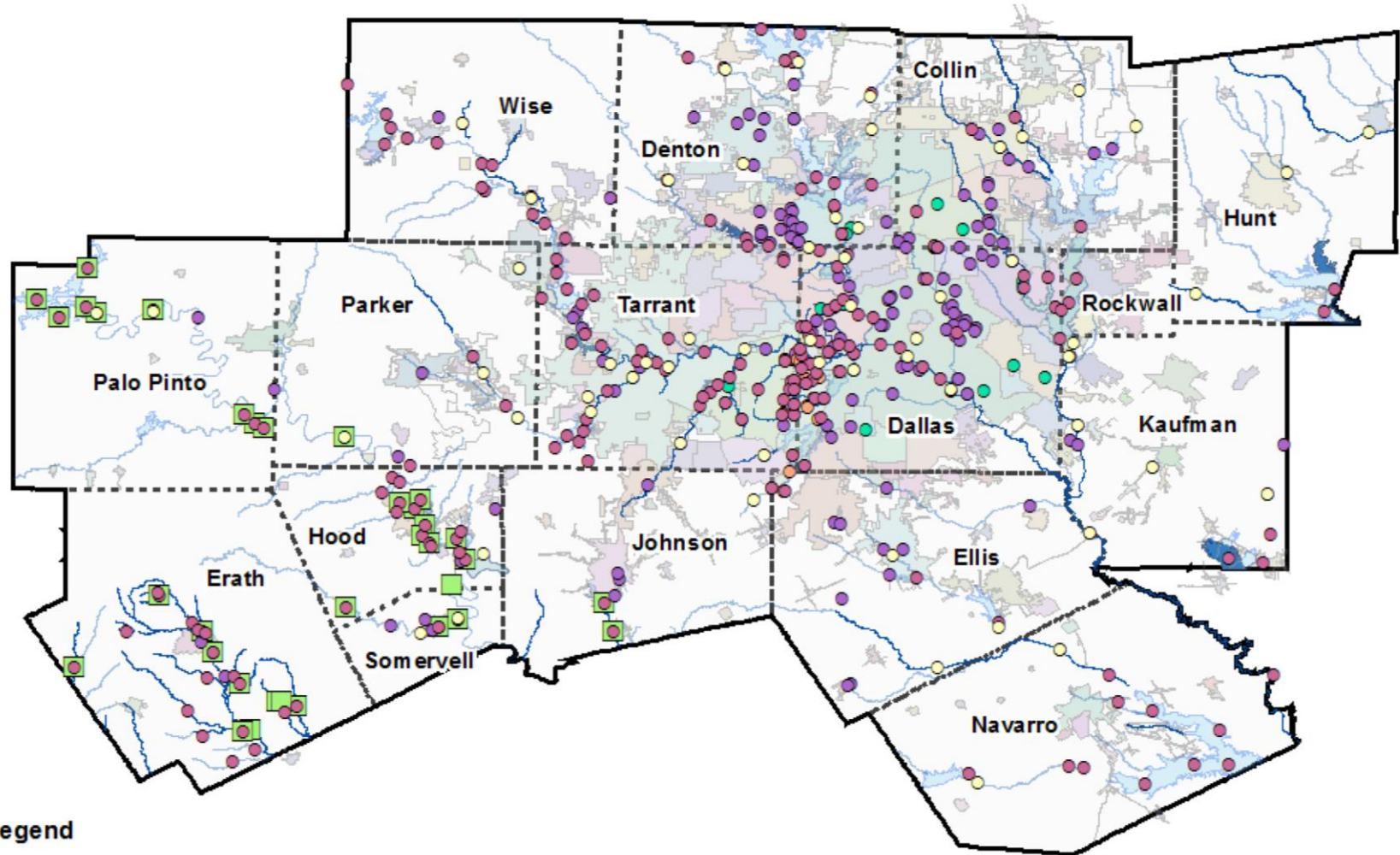
Regional Stormwater Management Coordinating Council

- Comprehensive program to coordinate regional stormwater quality issues
- Engages a unified approach to state and federal stormwater quality regulations
- Provides local stormwater training
- Encourages better science from shared data
- Encourages four related regional task forces
- Coordinates TMDL planning & implementation

Regional Stormwater Task Forces

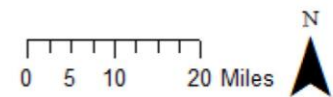
- **Public Education** –educational materials cooperative purchases, Texas SmartScape®
- **Municipal Pollution Prevention** –education and training for City programs
- **Illicit Discharge Detection and Elimination** - investigation and inspection methods to find water pollution
- **Regional Cooperative Monitoring** - TCEQ-approved regional water quality monitoring program. [www.dfwstormwater.com].

Figure 10. NCTCOG Regional Planning Area Water Quality Monitoring Network



Legend

- USGS Surface Water Quality Monitoring Site
- Clean Rivers Program Monitoring Sites
- Grand Prairie monitoring sites
- Texas Stream Team Monitoring Sites
- 2015 NCTCOG Atkins Monitoring Sites
- Brazos Basin Monitoring in NCTCOG Region Boundary
- Lakes
- NCTCOG Boundary
- Impaired Waters Cat. 4 & 5
- Impaired Lakes Cat. 4 & 5



Source: US Geological Survey (USGS), NCTCOG, Texas Stream Team, TCEQ: Clean Rivers Program (TRA), Brazos River Basin; 2015

North Central Texas Cities within the Greater Trinity River Bacterial TMDL Study Area

Arlington

Bedford

Cockrell Hill

Colleyville

Coppell

Dallas

Dalworthington Gardens

Eules

Fort Worth

Grand Prairie

Grapevine

Haslet*

Highland Park

Hurst

Irving

Keller

Kennedale*

Mansfield*

Mesquite*

North Richland Hills

Pantego

Rendon*

Richland Hills*

University Park

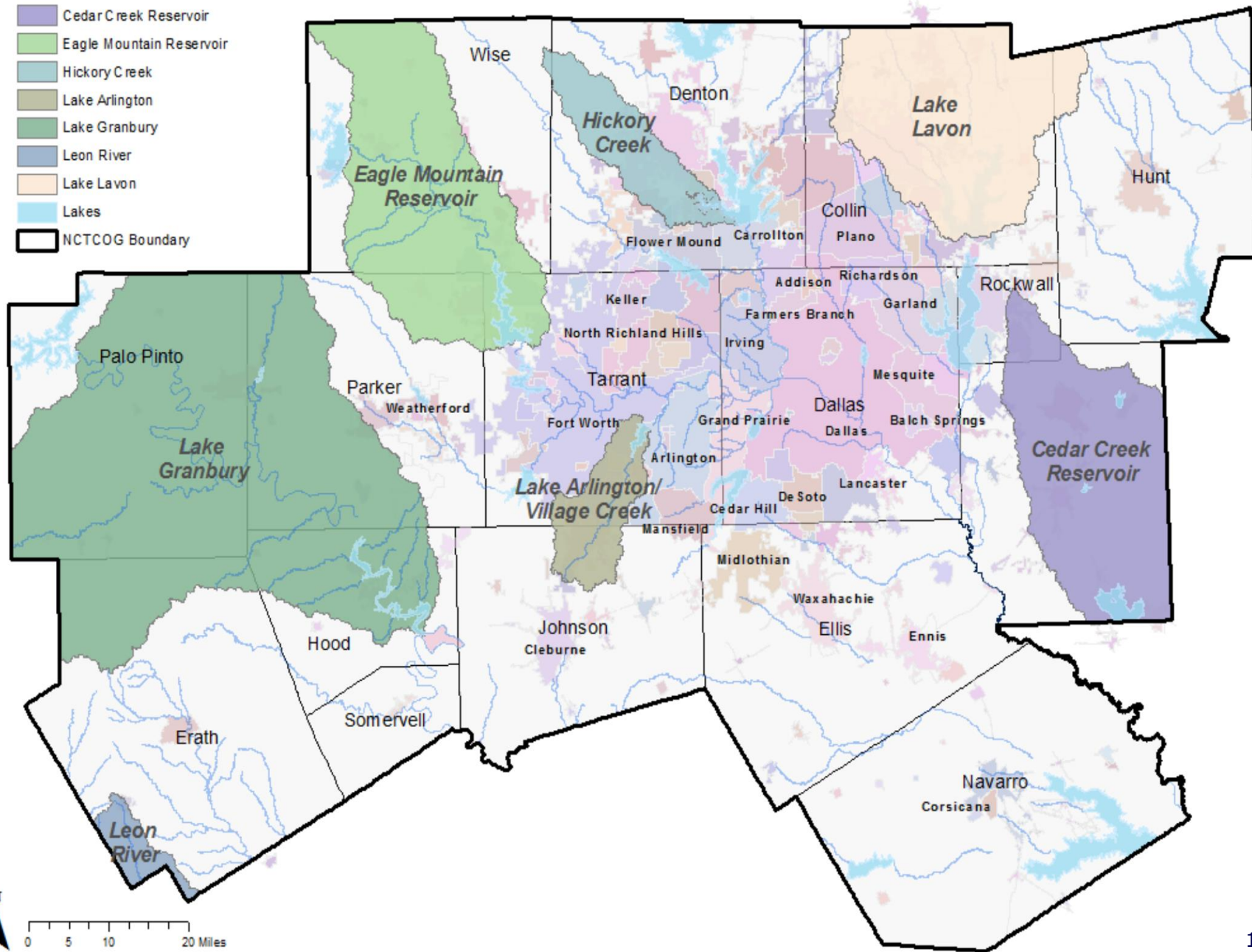
* Indicates only small portions of the city limits are within the TMDL Study Area

Source: NCTCOG, 2016

Watershed Protection Plans

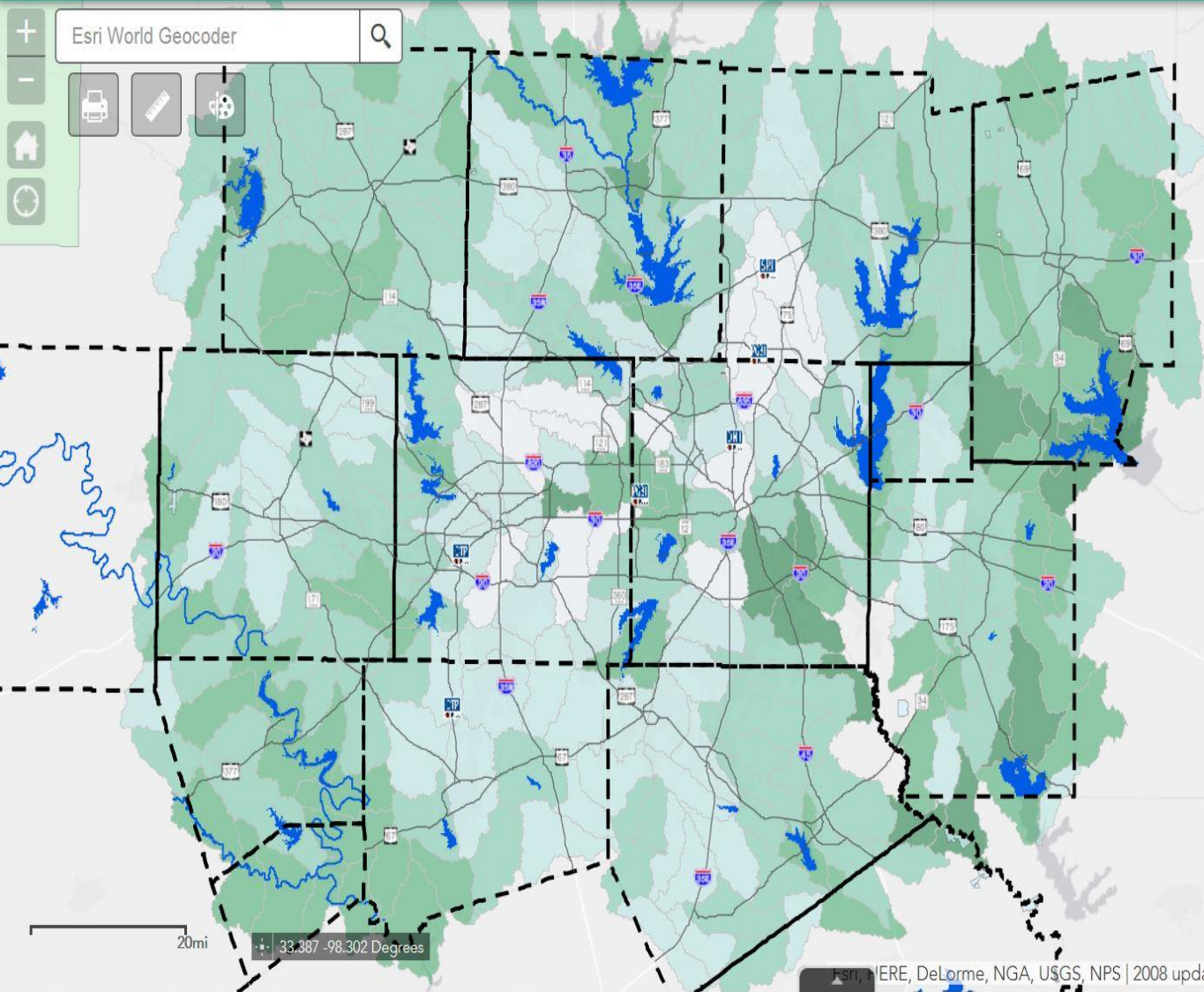
Watersheds

- Cedar Creek Reservoir
- Eagle Mountain Reservoir
- Hickory Creek
- Lake Arlington
- Lake Granbury
- Leon River
- Lake Lavon
- Lakes
- NCTCOG Boundary





Esri World Geocoder



Legend

- NCTCOG Counties
- Conservation Easements
- Major Lakes
- Ecologically Significant Streams
- REF Composite
 - Total REF Score
 - 30-40 (Greater Resources of Concern)
 - 25-30
 - 20-25
 - 15-20
 - <15 (Lesser Resources of Concern)

20mi 33.387 -98.302 Degrees

Esri, HERE, DeLorme, NGA, USGS, NPS | 2008 update

iSWM™ = Integrated Stormwater Management

- *Integrated* system of development, design and construction strategies to address:
 - Water Quality
 - Streambank Protection
 - Flood Mitigation and Conveyence



- *"Voluntary" for non-City Projects*
- *Required for 2012/2017 Bond Program Projects*

iSWM History

- Comprehensive stormwater management design manual developed by NCTCOG and more than 60 participating public entities, including the City of Dallas
- Twenty two (22) local entities now REQUIRE iSWM for design
- Some form of low impact design, post-construction controls, and/or iSWM is now required in all 50 states*

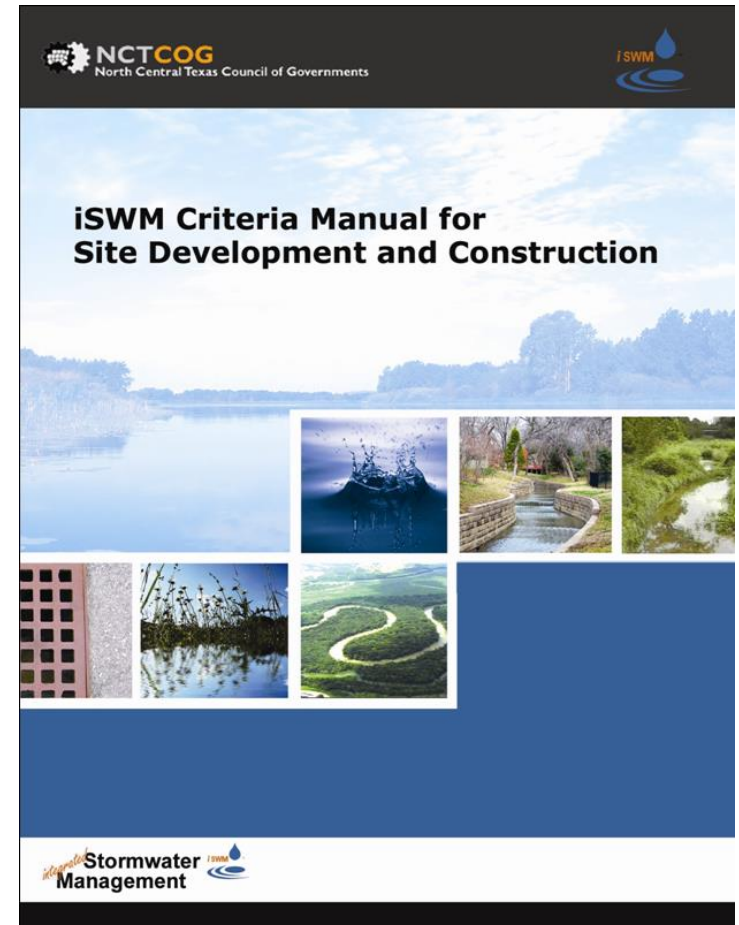
* <http://www.epa.gov>

Timeline of Activities to Date

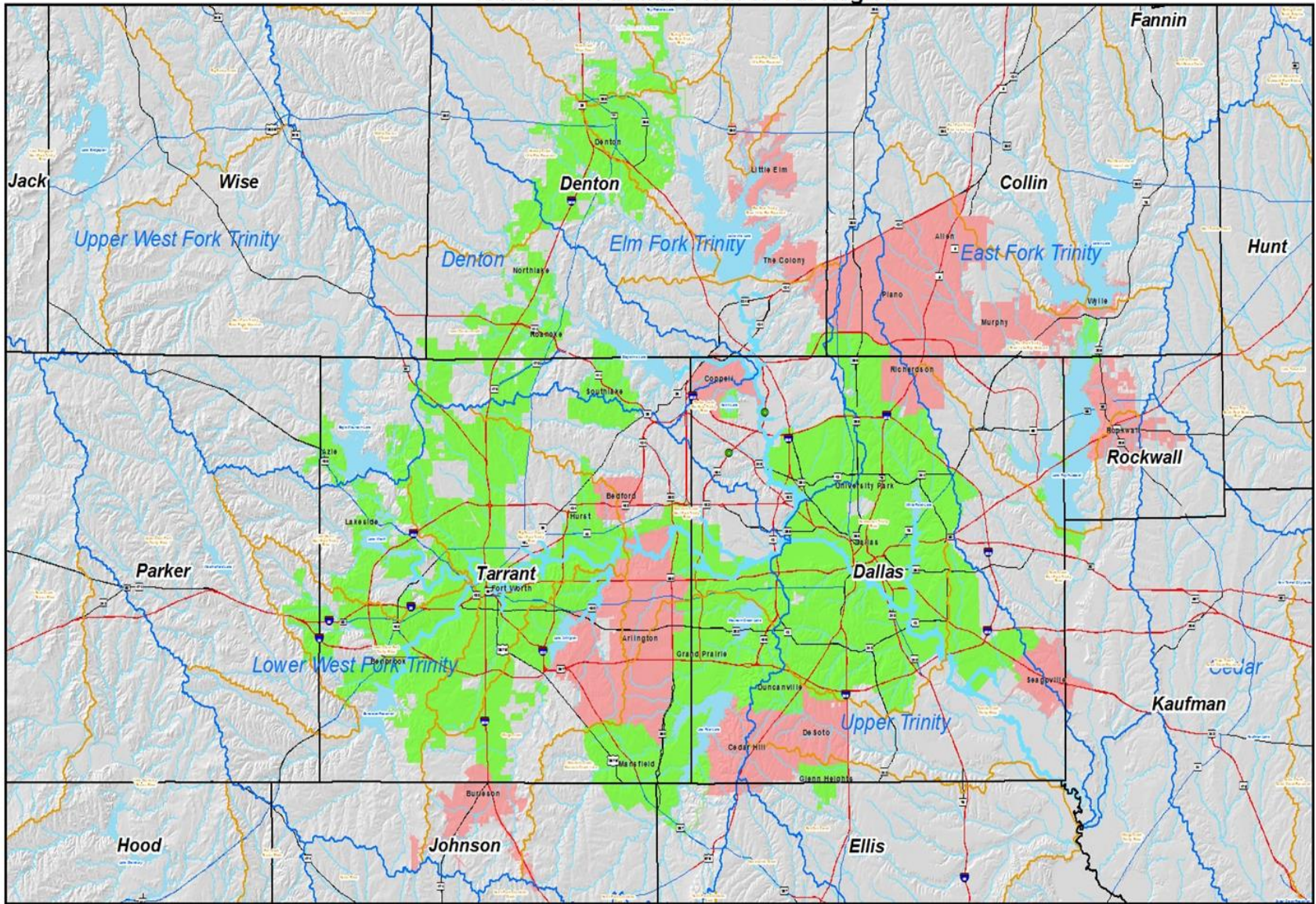
- **1993:** *Last update* of City of Dallas drainage manual
- **1997:** *EPA approves Dallas' city-wide storm water permit (Phase I MS4)* regulating water quality in storm water runoff
- **2003-2006:** City of Dallas participates with more than 60 entities in *NCTCOG initiative to develop iSWM*
- **December 2007:** Dallas *City Council requests* staff to engage consultant *to adopt iSWM*
- **Jan 2008 – Feb 2009:** Dallas works with community to incorporate iSWM into City drainage criteria
 - *Draft criteria developed* from existing criteria and iSWM standards
 - *Monthly Green Task Force* meetings
 - *3 community meetings* with invitations sent to hundreds of Dallas developers
 - *Direct outreach meetings* with development community
 - HBA
 - TREC
 - *Public web site* for information and input
 - *One-on-one meetings* with stakeholders

iSWM Benefits Across North Texas

- Reduces costs, safety issues and liability concerns
- Provides a “greener” community
- Shared experience
- Provides a consistent framework
- Provides NCTCOG training opportunities



iSWM In the Dallas Forth Worth Region



- Legend**
- Primary Highway
 - Secondary Highway
 - Access Ramp
 - Major Arterial
 - Lakes
 - Streams
 - WBD HUS Subbasins
 - WBD HUS Watersheds
 - NCTCOG Cities/Towns
 - Implemented iSWM
 - Considering iSWM Strategies



North Central Texas
Council of Governments
Environment & Developm



Data Source : Watershed Boundary Daset (WBD) by
USDA - Natural Resources Conservation Service
Stream Data : National Hydrography Daset (NHD)

The information presented by the North Central Texas Council of Governments (NCTCOG) for use herein was derived from publicly available information. This data is not intended to be a guarantee, warranty, or representation of any kind. NCTCOG, its officers, employees, agents, and contractors, make no liability for any consequences, errors, or omissions that may arise.

iSWM Philosophy

- iSWM's focus: *"fit the project to the natural stormwater system, not the stormwater system to the project"*
- iSWM focusses on water quality and flow reduction through:
 - On-site storm water controls
 - Off-site regional initiatives, as available
 - Use of site design practices (preserve natural areas, floodplain, riparian buffers, etc.)



A bioswale and permeable concrete are used for stormwater management and to enhance neighborhood aesthetics (Source: Abby Hall, US EPA)

Design Aspects of iSWM

- Current design requires assessment of existing drainage system up/downstream of project
- *Relevant for private and public development sites as well as public rights of way*
- City's Complete Streets initiative provides the opportunity to incorporate design concepts into the standard street profiles.



The old way of thinking – deliver water to storm inlet as quickly as possible and do not nourish nearby trees



Why iSWM in Dallas?

- Permit Compliance
- Addresses Regulatory Program feedback
- Undersized existing drainage system
- Water quality improvement
- May help reduce maintenance
- Part of larger Urban Design Initiative

Permit and Regulatory Compliance

EPA expanding federal stormwater regulations:

- Energy Independence and Security Act
- Executive Order 11990 (higher standards for floodplain delineation)
- National Construction General Permit



State & Federal Permit Compliance

Stormwater Discharge Permit requires:

- Projects to address water quality impacts
- Comprehensive program to address development and redevelopment



Cedar Crest Bridge Project

Regulatory Program Feedback

- EPA Community Partnership Technical Assistance Grant
- Identified barriers to implementing Green Infrastructure in Dallas
- Reviewed Dallas codes and design manuals with a charrette with City design staff
- Used EPA Green Infrastructure Checklist to facilitate review
- Provided 27 pages of comments and suggestions

EPA Recommendations

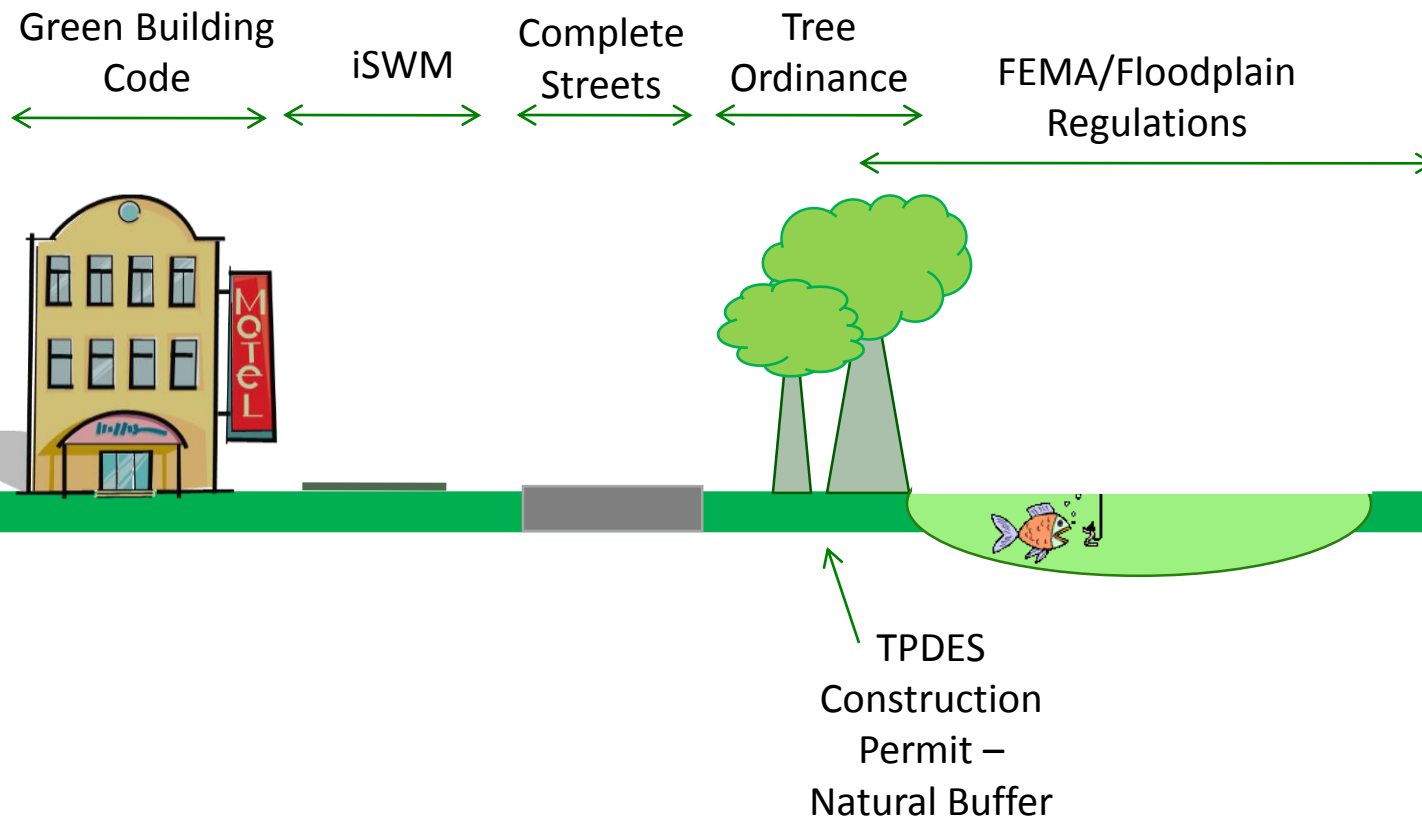
Recommendations focused on:

- Further integrating and implementing the City's existing programs to form a more comprehensive approach to sustainable design
- Using Green Infrastructure/ iSWM on City projects to serve as an example to private development

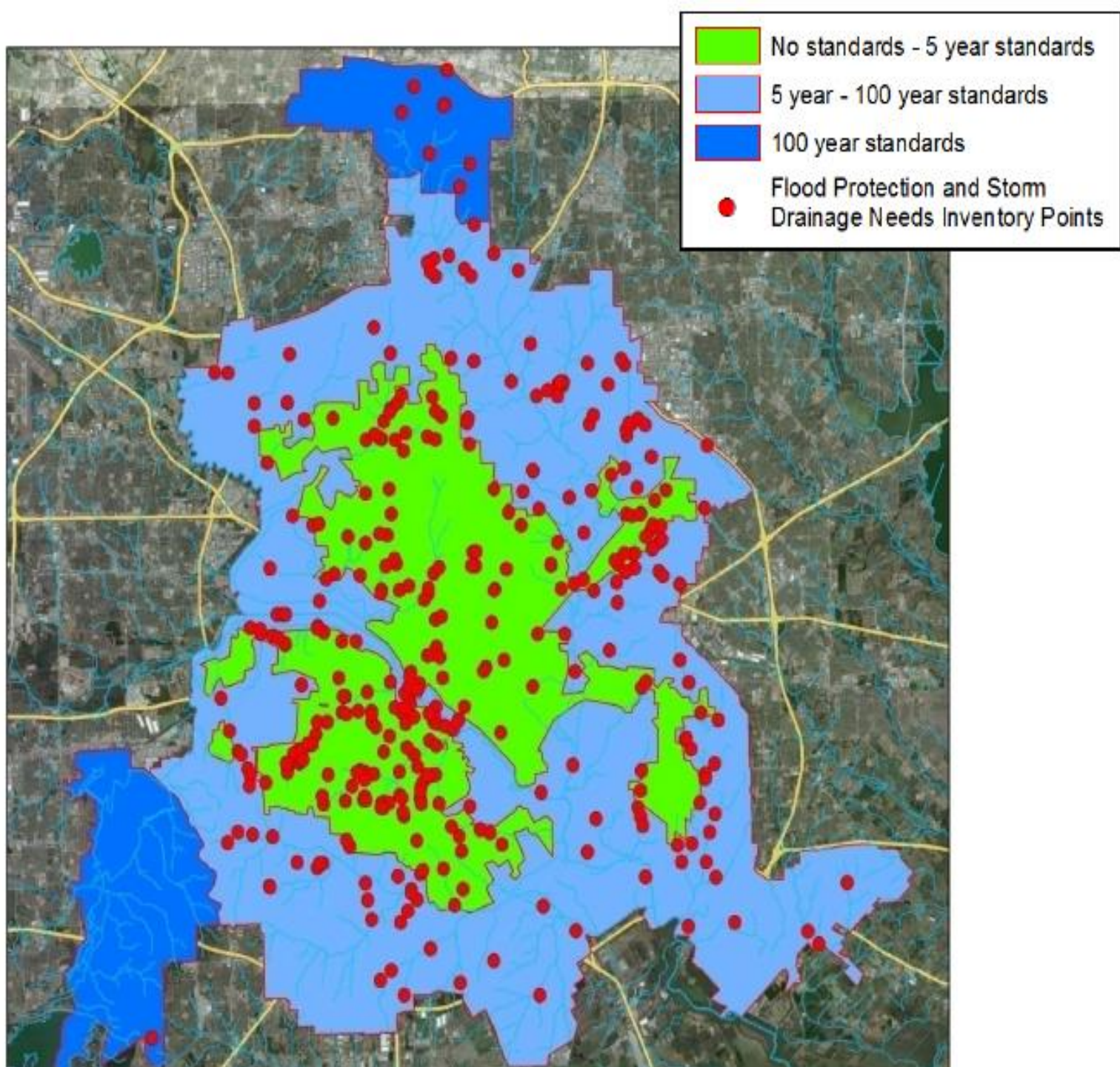
Urban Design Initiative: Street & Drainage Standard Update

- Traditional Design Manuals in use from 1993/1998
- iSWM and urban design methods being used
- Designers struggling with two manuals
- Additional Tree Ordinance, Development Ordinance and Floodplain Ordinance Updates
- Multi-Department Team Effort under the Urban Design Initiative

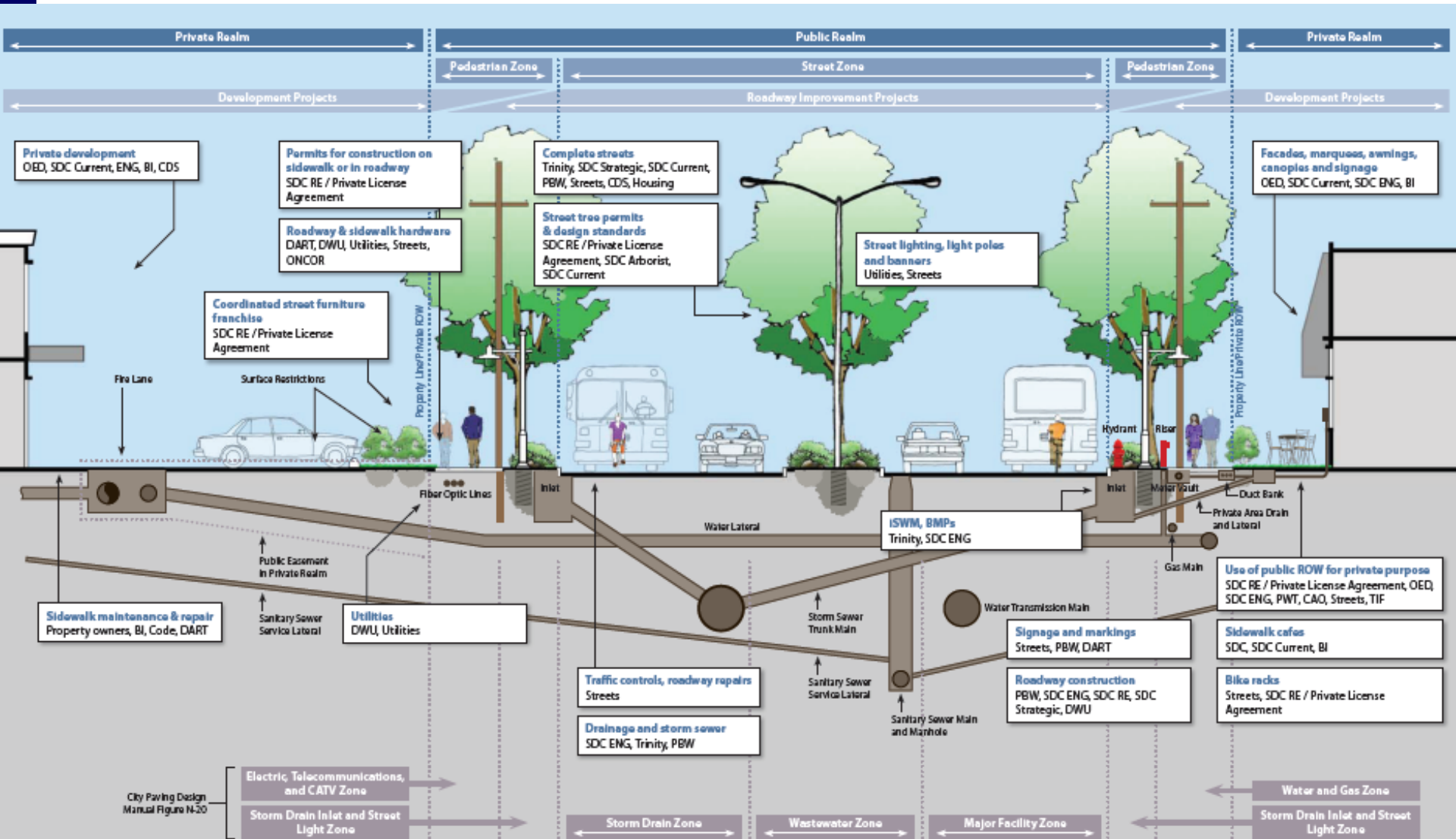
Sustainable Design Opportunities



The majority of the needs in the City are associated with areas developed with inadequate standards

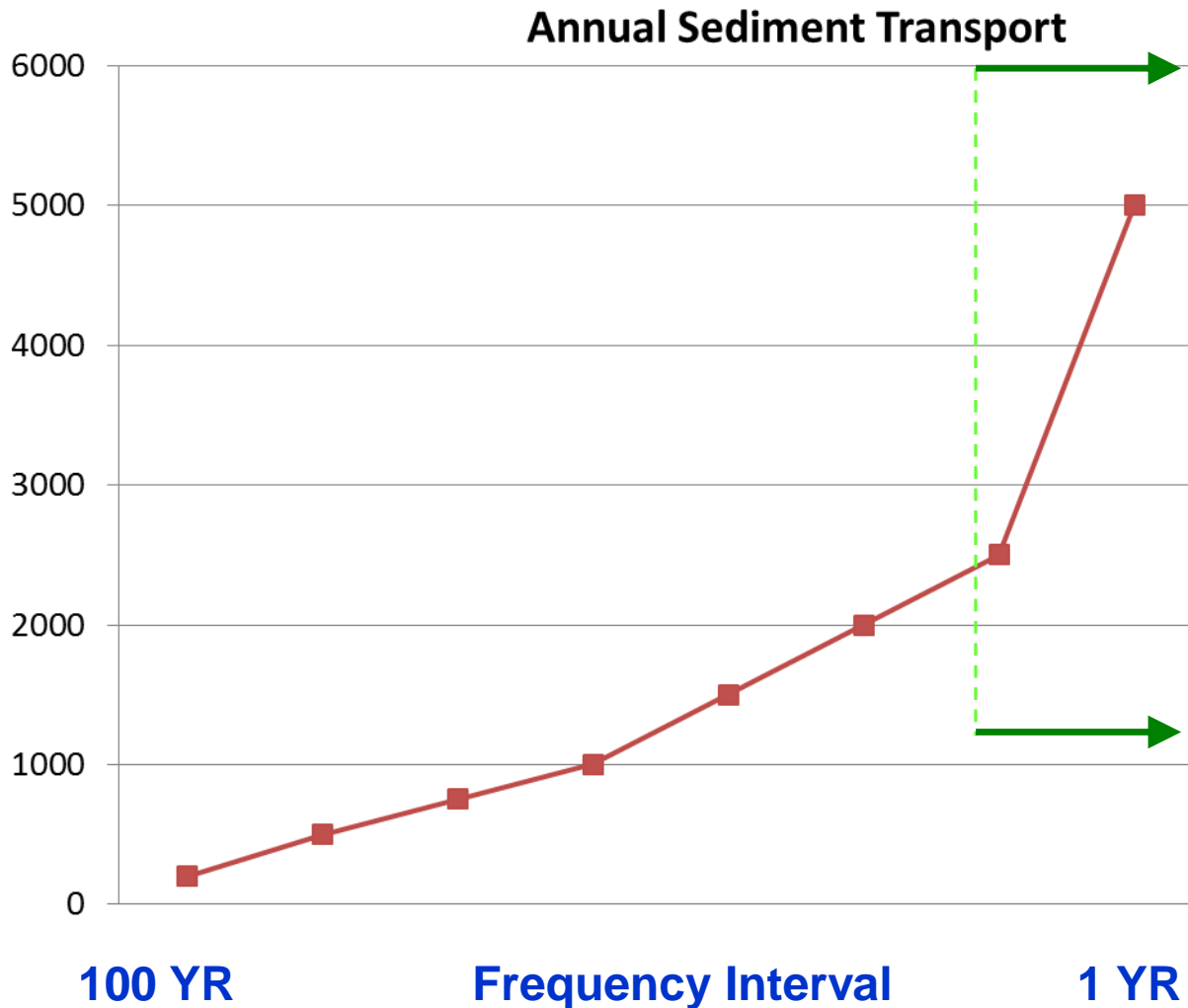


Complex Agency Roles on City ROW



City Paving Design Manual Figure N-20

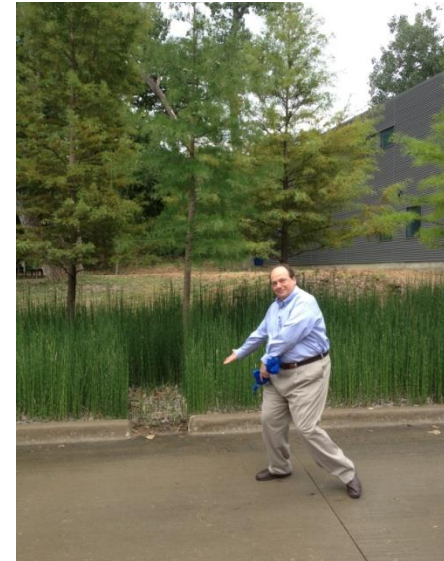
Maintenance Concerns



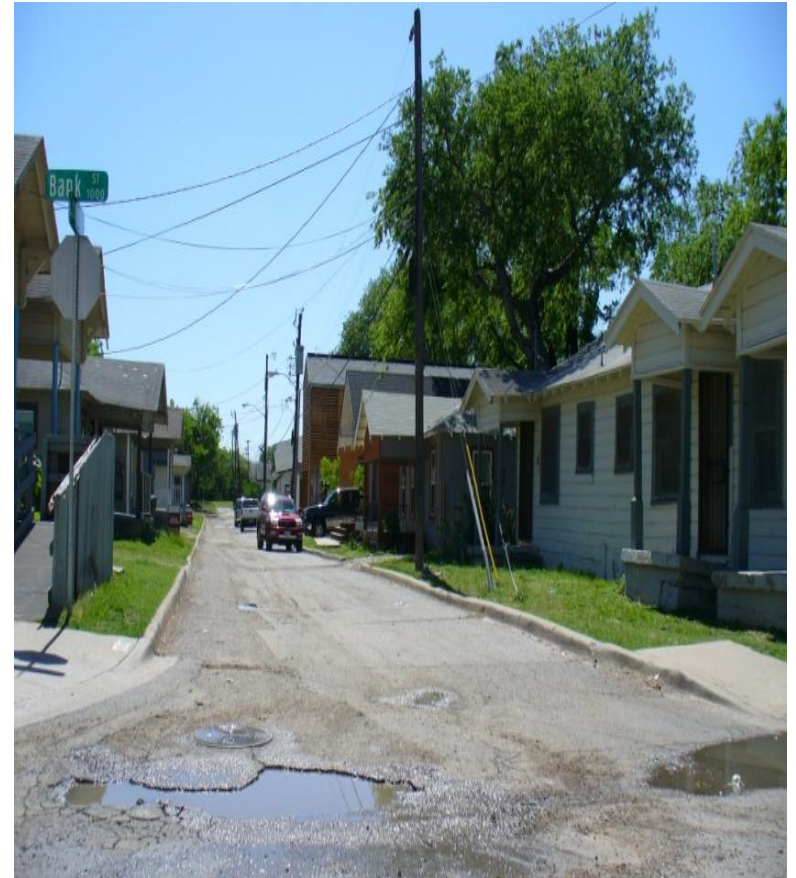
Implementing iSWM/ Green Infrastructure can help reduce erosion and sediment transport occurring during the smaller, but more frequent storm events

iSWM Use in Dallas

- iSWM examples:
 - Urban Reserve
 - Cedar Creek Bridge Park
 - Omni Hotel
 - Perot Museum
 - Bush Library
 - Sylvan 30
 - And several roadway projects...



Complete Street - Congo Street Project Pre-construction



Complete Street – Congo Street Project: Post-construction



Bioswale and landscaping



Permeable pavement in recessed parking areas

Financial Incentive: Stormwater Fee Update

- Current stormwater fee structure based on available data when utility created in 1991
- Implemented in accordance with Texas Municipal Code
- Proposed rate structure uses measured impervious area to more accurately assess each property's impact on drainage
- Briefed to Council on June 8, 2016
- Stormwater fee finder:
<http://gis.dallascityhall.com/swfeefinder>

Rationale for Fee Change

- More equitable
- Better defines properties' stormwater run-off impacts
- **Promotes environmental quality**
- Current industry standard
- Coincides with need to manage impervious area
- Consistent with current EPA guidance
- Stormwater fee finder:
<http://gis.dallascityhall.com/swfeefinder>

Questions?



APPENDIX



FY 2016-17 Budget

Workshop #5:

Budget Overview & Update



PUBLIC SAFETY



ECONOMIC VIBRANCY



CLEAN, HEALTHY ENVIRONMENT



CULTURE, ARTS, RECREATION & EDUCATION



E-GOV

City Council Briefing – June 8, 2016

Storm Water Drainage

(\$ in millions)

FY16 Revenues
\$50.5m



\$51.4m
FY16 Expenses



FY17 Revenues
\$50.5m



\$52.0m
FY17 Expenses



Storm Water Fee Update

- Current storm water fee structure was based on available data at time of utility creation in 1991
 - Data assumed impervious area based on premise type (minimum charge of \$5/parcel)
- Consultant hired to assess/revise rate structure
- Proposed rate structure utilizes measured impervious area to more accurately assess each property's impact on drainage system
- Per Council direction, proposed revisions are revenue neutral

Storm Water Fee Update

Current Residential Property Area Rates

Lot Size	Monthly Rate
Up to 6,000 Sq Ft	\$3.65
6,001-8,000 Sq Ft	\$5.77
8,001-17,000 Sq Ft	\$7.77
17,001-215,000 Sq Ft	\$13.87
More than 215,000 Sq Ft	\$43.87

Unimproved and Commercial Property – Fee is calculated based on square footage and a runoff coefficient (\$0.1589 per Sq Ft of impervious area).

Unimproved and commercial properties have a minimum monthly charge of \$5.00; vacant properties have a maximum charge of \$57.10, but commercial properties are not capped

Proposed Residential Property Area Rates

Impervious Area	Monthly Rate
Up to 2,000 Sq Ft	\$3.25
2,000-3,500 Sq Ft	\$5.17
3,500-5,500 Sq Ft	\$7.77
More than 5,500 Sq Ft	\$12.67

Unimproved and Commercial Property- Fee is calculated based on \$1.75 per 1,000 Sq Ft of impervious area.

Unimproved and commercial properties have a minimum monthly charge of \$5.00