

TECHNOLOGY APPLICATIONS FOR PROJECT MANAGEMENT

“GIS APPLICATION AND TOOLS”

2011 S.A.M.E. INFRASTRUCTURE FORUM

DALLAS, TEXAS

DECEMBER 1, 2011

Speaker:

Marc Cottingame, PE

Dallas Water Utilities

Biography

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Marc Cottingame, PE

Born and raised in Richardson, Texas

Graduated with Bachelor of Science in Engineering from Texas Tech University 1992

Marc Cottingame worked from 1992 until 2003 as a consultant for different firms performing Master Planning, I/I Studies, and water and wastewater pipeline design and construction services for municipalities nationwide including the City of Dallas and other cities within the DFW Metroplex. Marc Cottingame joined Dallas Water Utilities in April 2003 as a Project Manager in the Capital Improvement Pipeline Project Management Division. In 2008, Marc Cottingame promoted to the Program Manager of the Utility Automation and Integration Division of DWU.

As the Program Manager of the Utility Automation and Integration Division of Dallas Water Utilities, Marc Cottingame manages the Water Departments Technical Services Groups including GIS Services Team who develops and maintains the GIS database and is responsible for the growth of the asset management program.

Outline

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- Dallas Water Utility Interesting Facts
- Horizontal Project Outlook
- DWU Engagement/Organization
- Project Coordination
- GIS Project Management/Coordination Tools
- GIS Asset Documentation

Challenge: Putting

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- The benefits of GIS-based project coordination practices are well established.
- However, putting theory into practice can be challenging!

Pipeline, Growth – Southwest Pipeline

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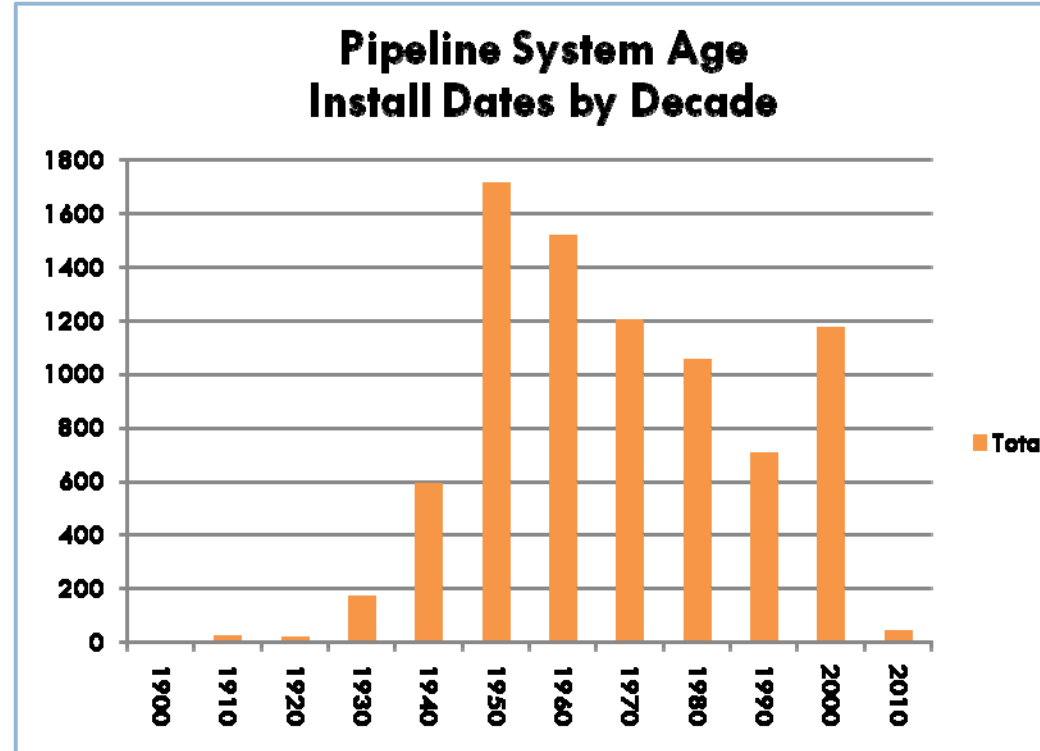
- 32.5 Miles
 - ▣ Treated Water
 - ▣ 96" thru 120"
- Location
 - ▣ Dallas County
 - ▣ 214 Parcels
 - ▣ 10 Cities
 - Cedar Hill, DeSoto, Duncanville, Lancaster, Hutchins, Balch Springs, Mesquite, Sunnyvale and Dallas
- Complete 2017
- Massive Coordination Effort



Pipeline Renewal/Replacement Forecast

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- Average age is 38.3 years
- Mean is not the message
- 40% built 1950-1960's
- **~50% of system is > 50 years old**
- 14.6% built in 1970's
- **1.5% per year Renewal and Replacement Program**



DWU Horizontal Project Summary

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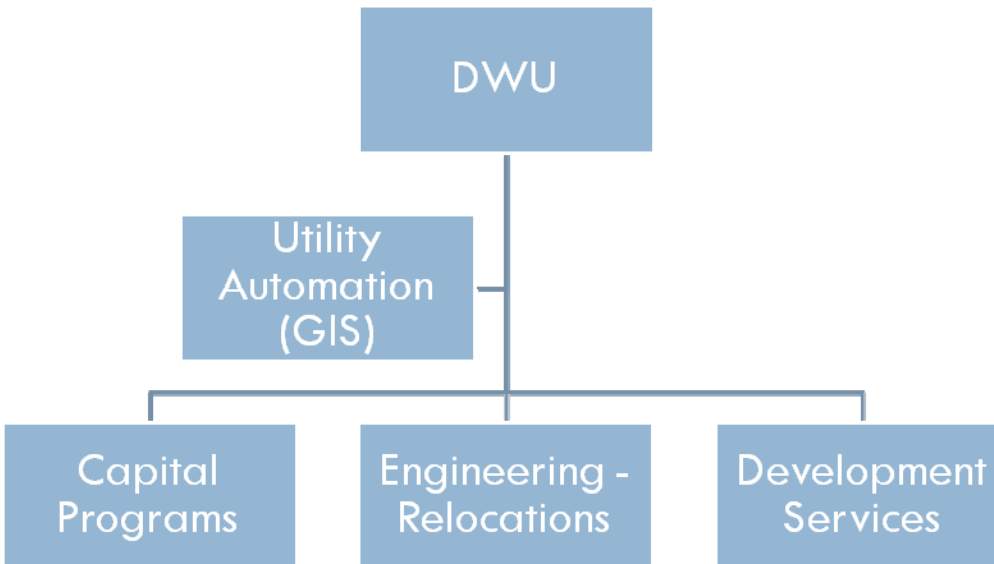
FY11 Construction Contract Type	% Contracts	Segments	Design Sheets	Miles of Main
Capital Improvement	63%	510	1598	105.9
Private Development	24%	194	486	32.2
Relocations	13%	101	323	21.4
Total	100%	805	2407	159.5

Forecasted, Segments	Needs/Pending	Design	Construction	Total Segments
Capital Improvement	1,186	665	755	2,606

Coordination required for all project e.g. G,R&R projects cross or are adjacent to other agencies' infrastructure or projects.

DWU Engagement\Organization

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- Capital Programs
 - ▣ Regulatory and Growth Needs
 - ▣ O&M Renewals and Replacements
- Relocations
 - ▣ Coordinate Work by Other Agencies
- Development Services
 - ▣ Development and Redevelopment
- Utility Automation
 - ▣ Document DWU Assets via GIS
 - ▣ Provide Analysis and Tools to Help Make Decisions

http://www.dallascityhall.com/dwu/water_utilities.html

Project Management and Coordination

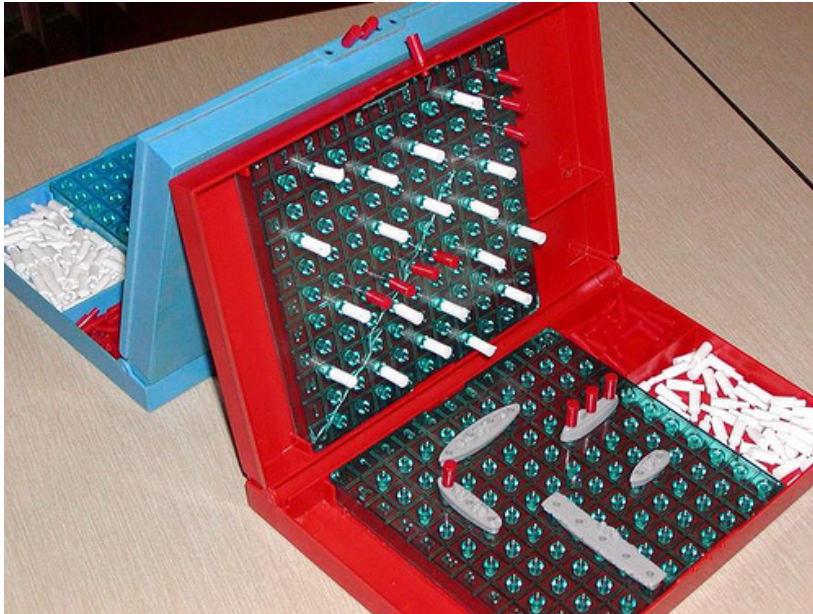
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- Fundamental Elements
 - ▣ Optimize participation and performance
 - ▣ Scope of Work
 - ▣ Schedule
 - ▣ Budget
 - ▣ **Location**



Traditional Project Coordination Tools

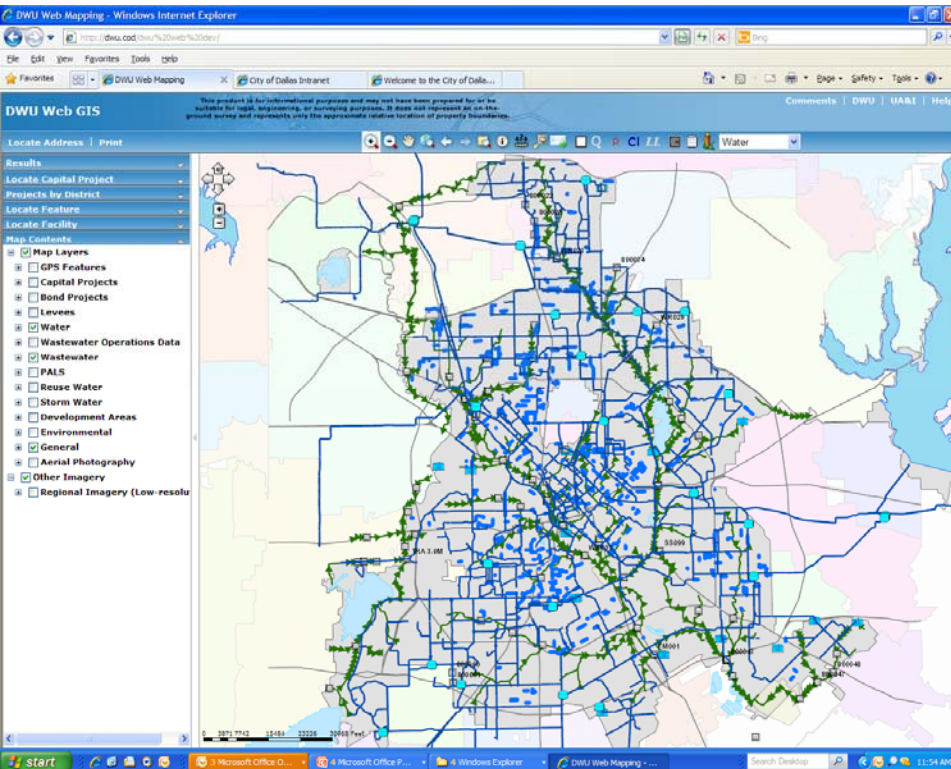
11



- Lists
- Reports
- Maps
- Mapsco with Sticker-Dots

Modern Project Coordination Tools

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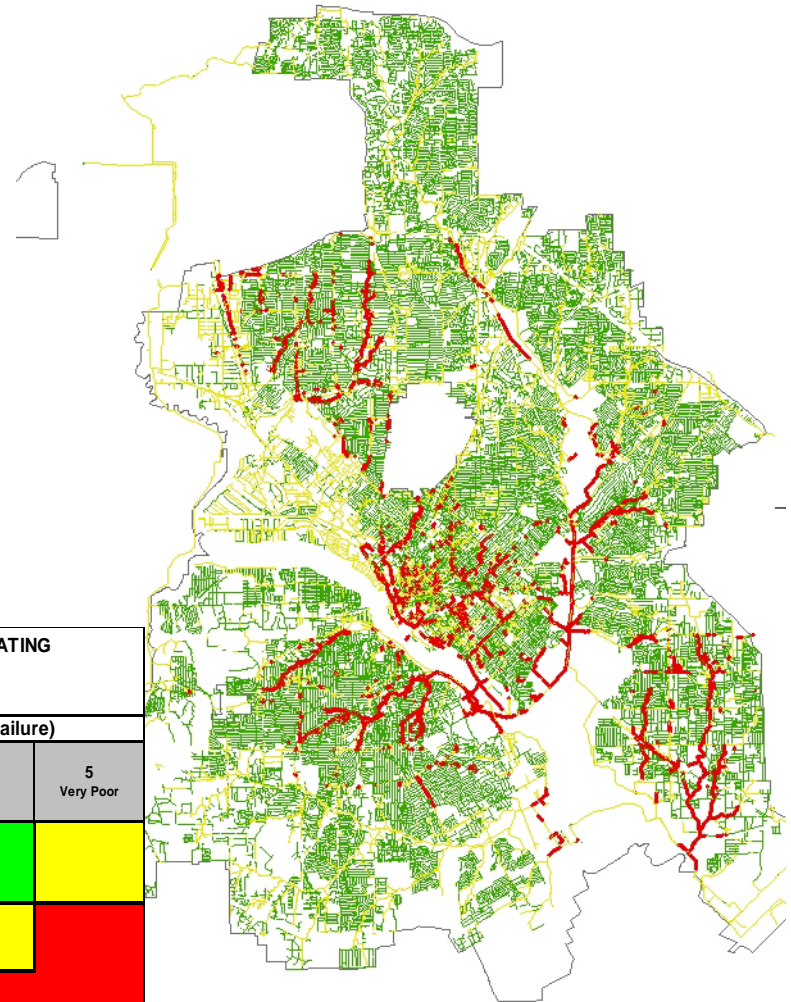
- Single View
 - ▣ Utility Infrastructure
 - ▣ Projects
- Centralized Databases
 - Capital
 - Relocations
 - Development

GIS Coordination Tools – Risk-based Approach for Renewal/Replacement

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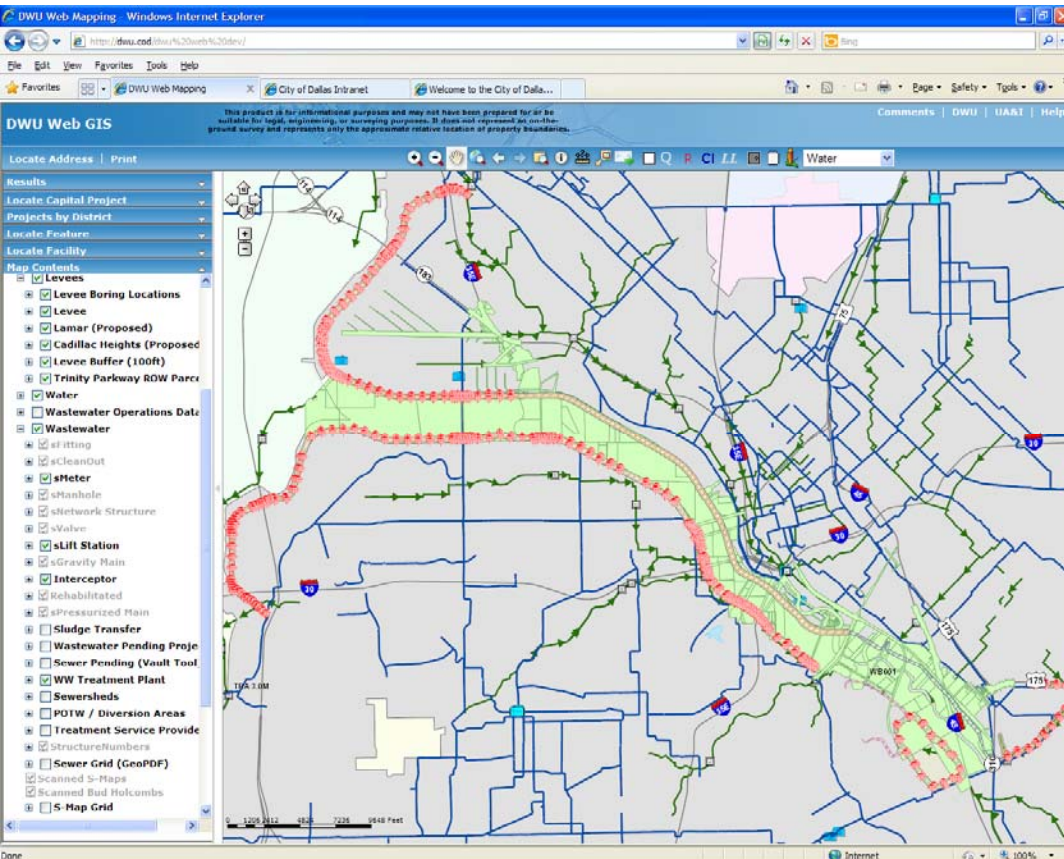
- Critical Infrastructure
 - ▣ Consequence of Failure
- Condition Assessment
 - ▣ Likelihood of Failure
- Understanding of Risk
- Optimize
Renewal/Replacement
Program

WASTEWATER COLLECTION SYSTEM PIPE RISK RATING RESULTS MATRIX					
Risk Score = Condition x Consequence		Condition Score (Probability of Failure)			
		1 Very Good	2 Good	3 Fair	4 Poor
Consequence of Failure	C = 1 Low Impact	72% (2,850 miles)			
	B = 2 Medium Impact	24% (959 miles)			
	A = 3 High Impact			4% (161 miles)	



GIS Coordination Tool – Trinity River Levee

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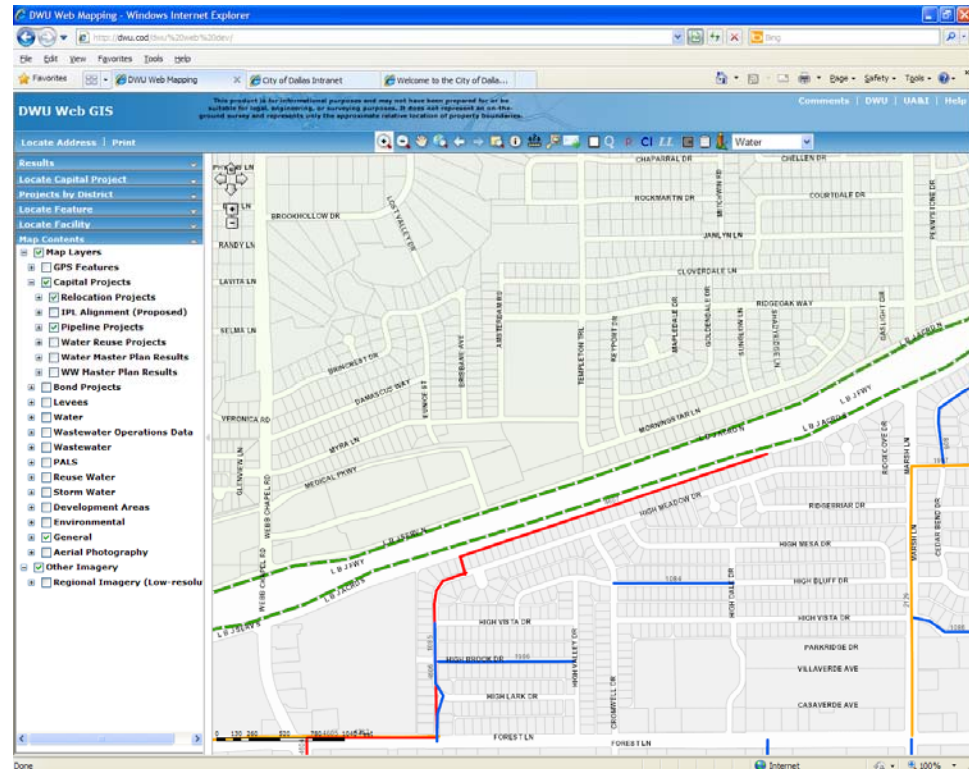


- ☐ Levee Boundary
- ☐ Soil Boring Locations
- ☐ Infrastructure Penetrations
- ☐ Adjacent Construction
- ☐ Assist City Efforts for Levee Certification

GIS Coordination Tools – Horizontal Projects

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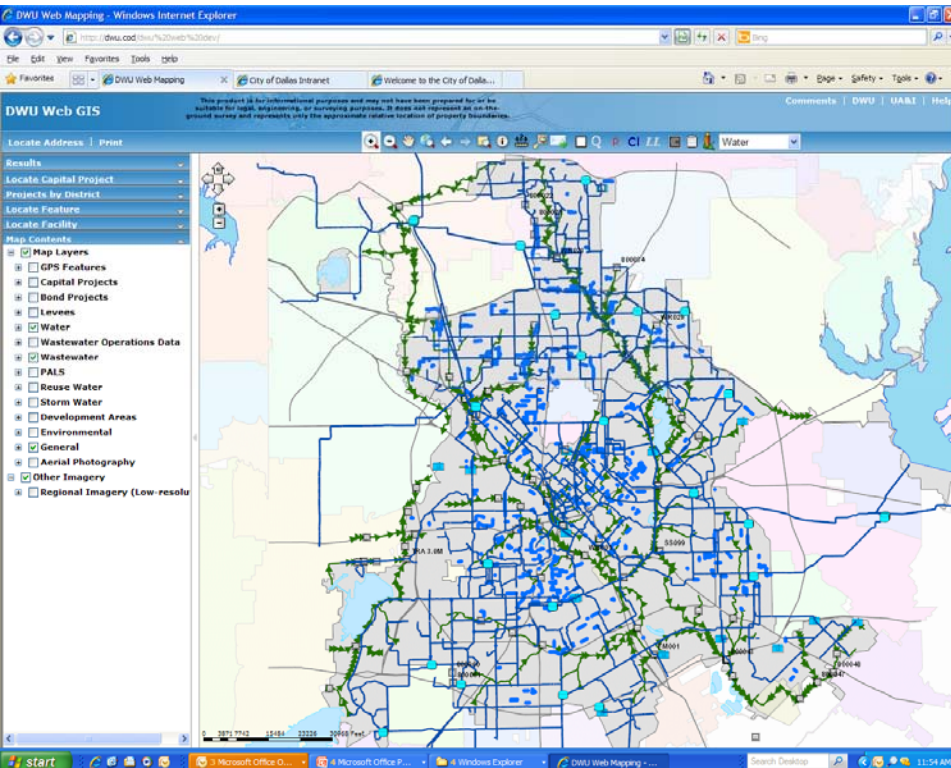
- Identify Conflicts
- Coordinate with Effected Parties
- Optimize participation and performance
 - ▣ Scope of Work
 - ▣ Schedule
 - ▣ Budget



Project Coordination Example Workflow – Project Research

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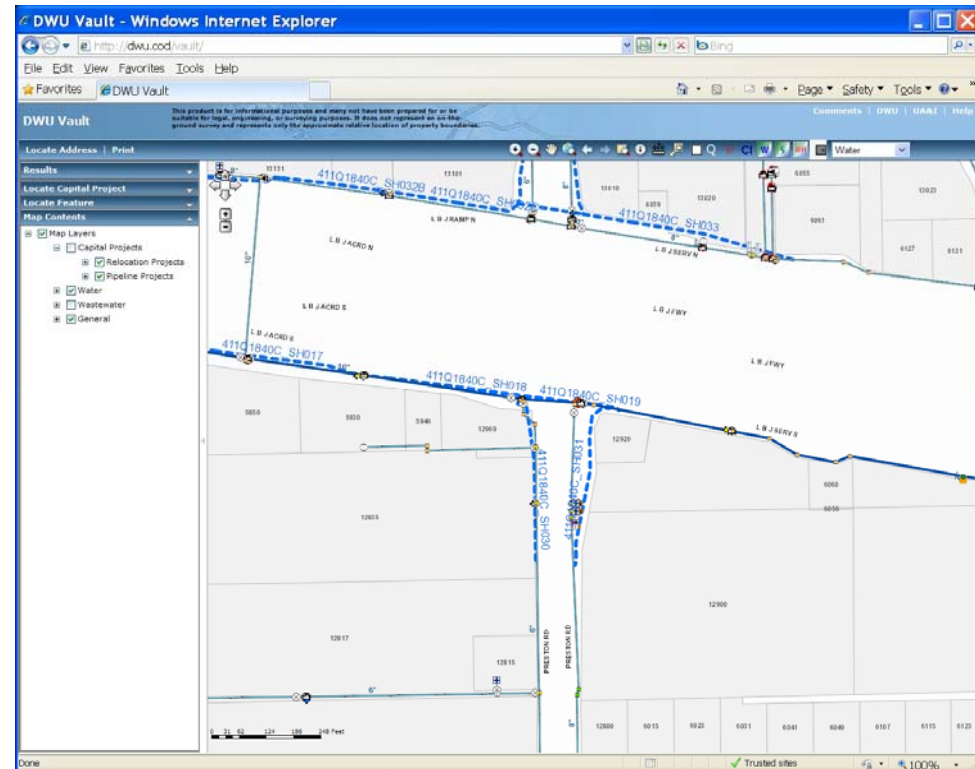
- Single View
 - ▣ Web-based GIS
- Key Project Data
 - ▣ Research
 - ▣ Reference Files



GIS Coordination Tools – Project Research

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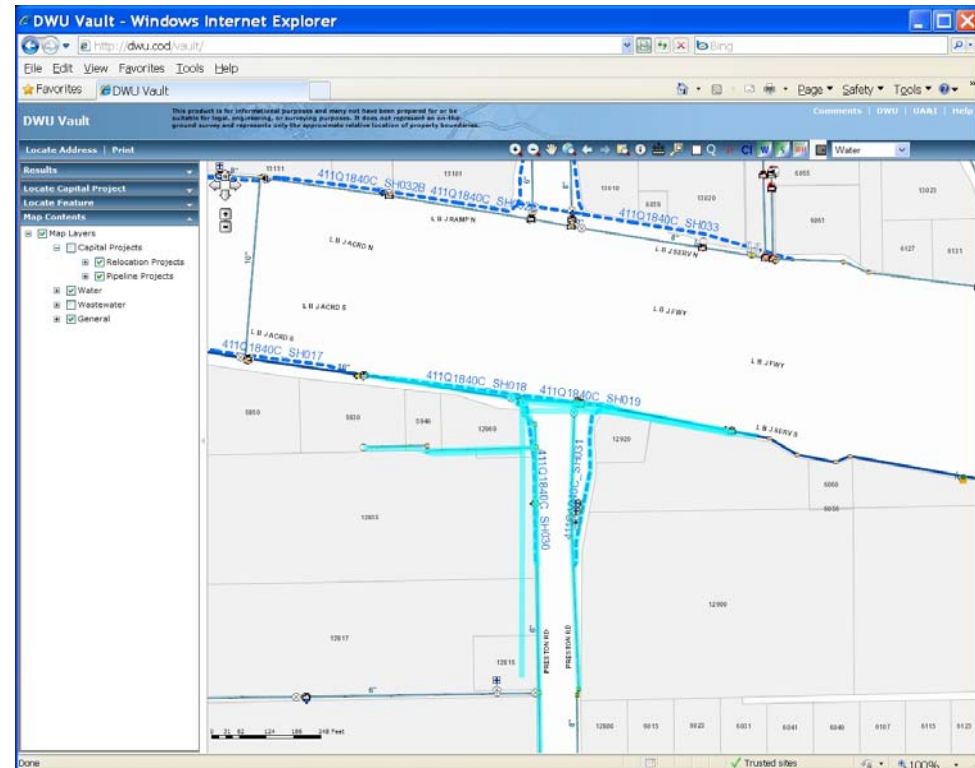
- **Zoom to Area of Interest**
- **Tool – Select Area**
- **Tabular List of Plans**
- **Hyperlink to Files**



GIS Coordination Tools – Project Research

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- Zoom to Area of Interest
- **Tool – Select Area**
- Tabular List of Plans
- Hyperlink to Files



GIS Coordination Tools – Project Research

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- Zoom to Area of Interest
- Tool – Select Area
- **Tabular List of Plans**
- Hyperlink to Files

http://apdwu00/Vault/VaultForm.aspx?A=131682,121208,1367115,131913,...

http://apdwu00/Vault/VaultForm.aspx?A=131682,121208,1367115,131913,11703288-647417,80968,837934,652993,650633,64

Water Projects				
Design Sheets	Construction Inspections	Contract Number	Cross Reference	W-Map
411Q1840_SH047 411Q1841_SH036 411Q1841_SH051 685W0479_SH001 CBB0190_SH004			FB334-28 FB334-51 FB394-7 FB202-74 FB61-3 FB334-27	12-24 12-25

Wastewater Projects				
Design Sheets (Planview)	Design Sheets (Profileview)	Construction Inspections	Contract Number	S-Map
411Q1840_SH047 411Q1840_SH048 411Q1841_SH018 411Q1841_SH019 411Q1841_SH051	411Q1841_SH020 411Q1840_SH065		68-171-P 64-191-R 61-207	12-24

Pending Water Projects	
Design Sheets	Contract No.
411Q1840C_SH010 411Q1840C_SH011 411Q1840C_SH012 411Q1840C_SH013 411Q1840C_SH014 411Q1840C_SH015 411Q1840C_SH016 411Q1840C_SH017 411Q1840C_SH018 411Q1840C_SH019 411Q1840C_SH030 411Q1840C_SH031	11-033-F

Pending Wastewater Projects	
Design Sheets	Contract No.
411Q1840C_SH093 411Q1840C_SH094 411Q1840C_SH095 411Q1840C_SH096 411Q1840C_SH097 411Q1840C_SH098 411Q1840C_SH099 411Q1840C_SH100 411Q1840C_SH101	11-034-F

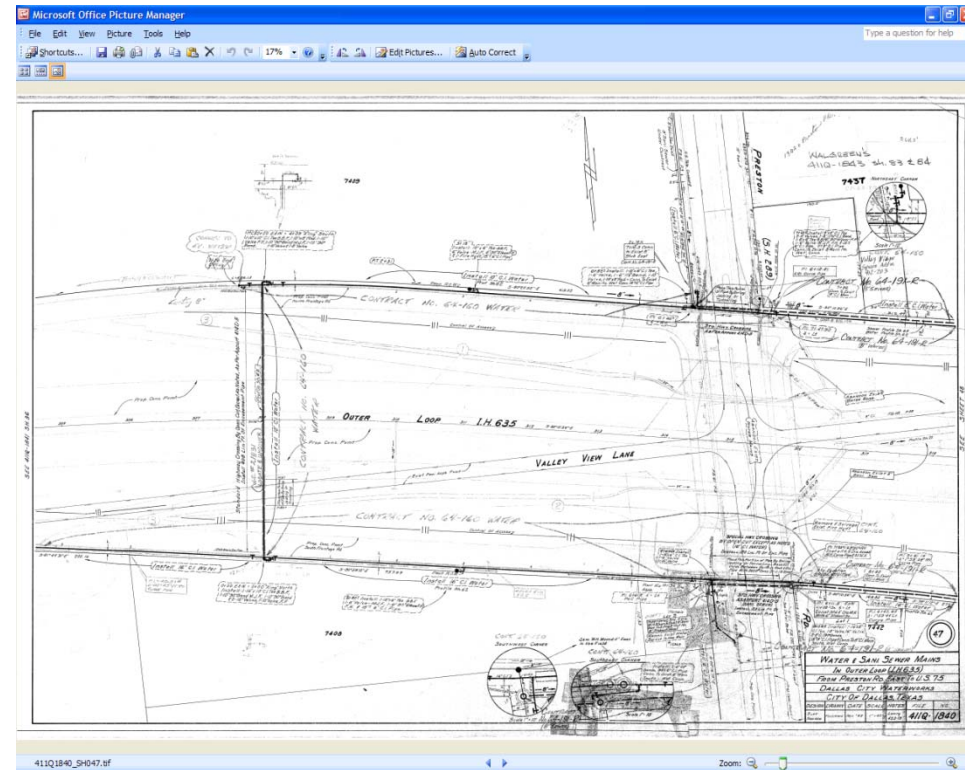
Print Copy

Done Local intranet 100%

GIS Coordination Tools – Project Research

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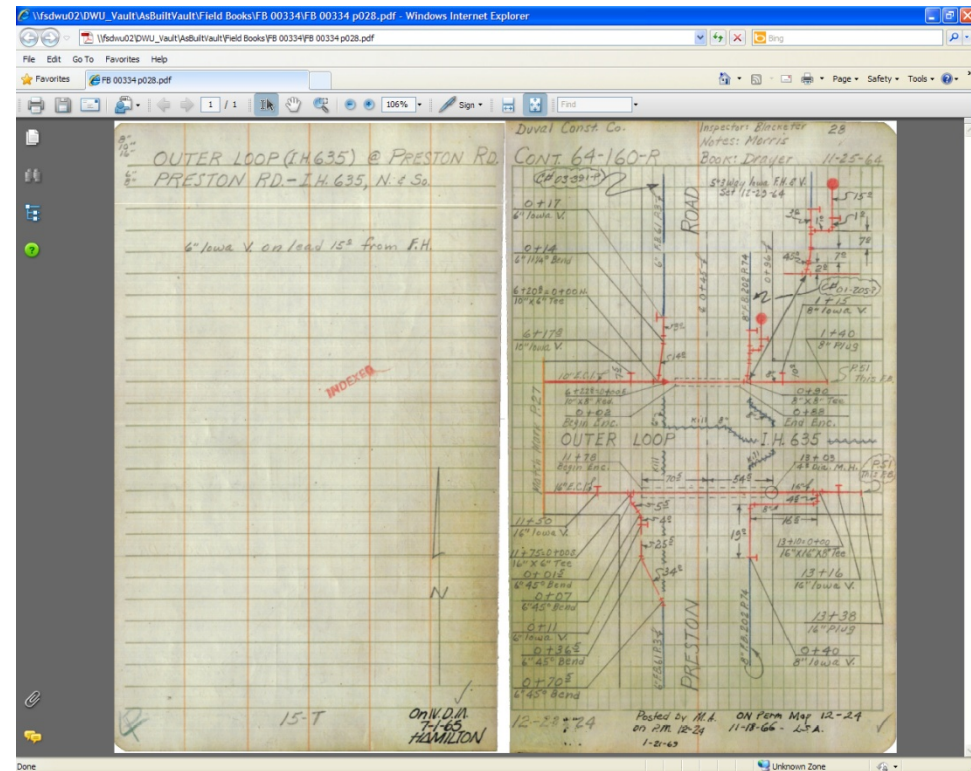
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GIS Coordination Tools – Project Research

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- Zoom to Area of Interest
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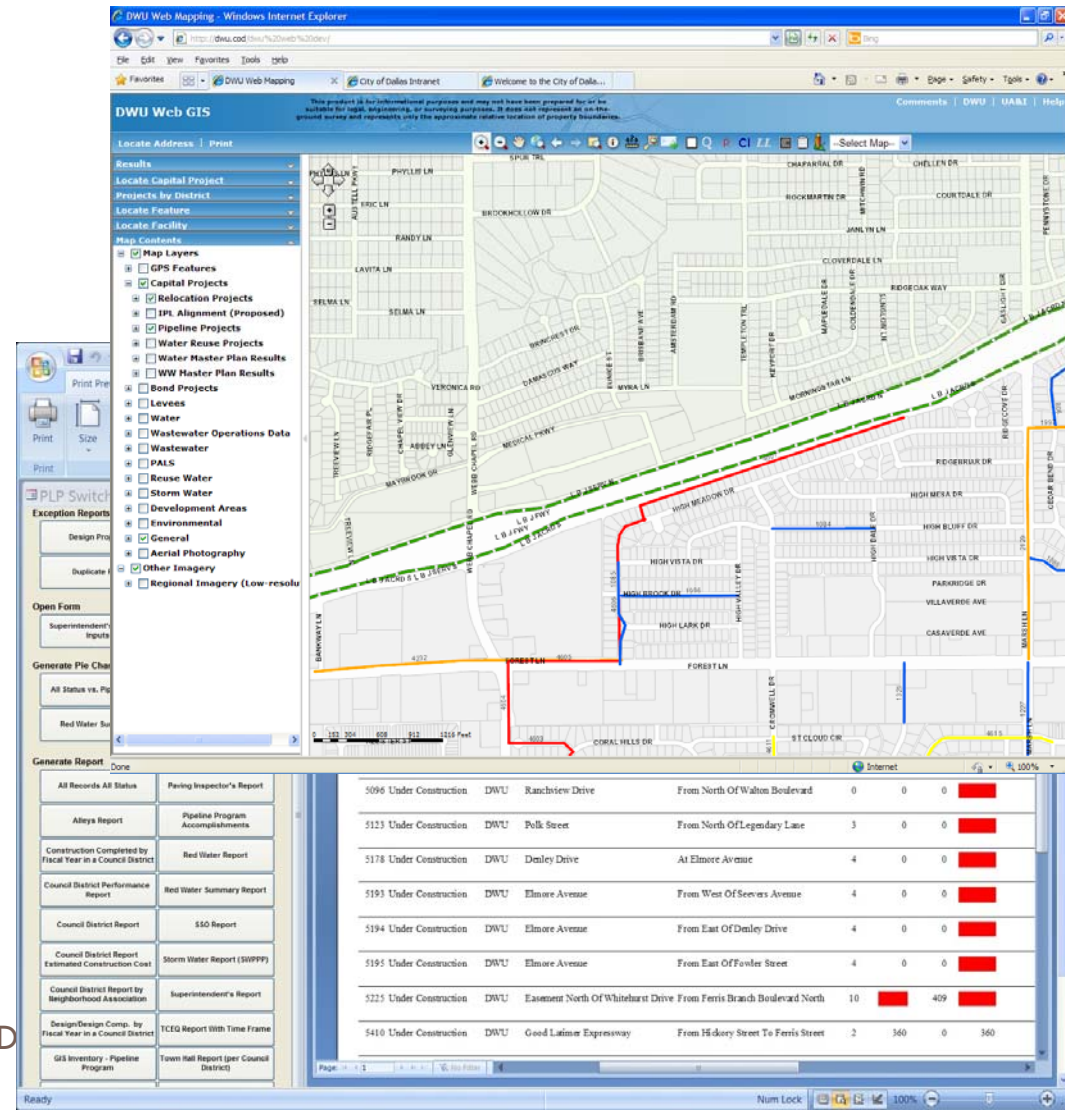
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Modern Project Coordination Tools

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- Geographic Information Systems
 - ▣ Web
 - ▣ GeoPDF
 - ▣ Mobility
- Automated Analysis\Reporting

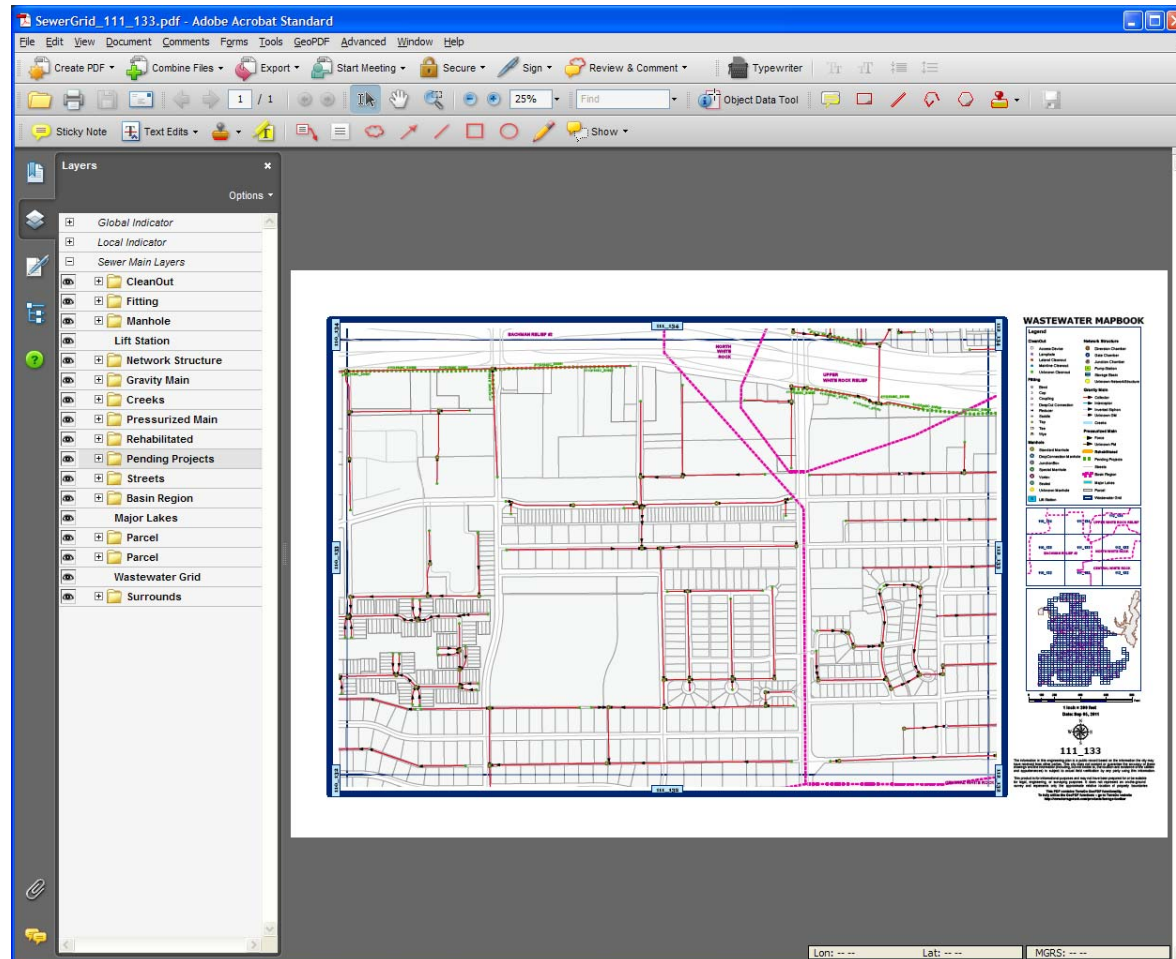


12/1/2011

Mobility – Geo-Enabled PDF

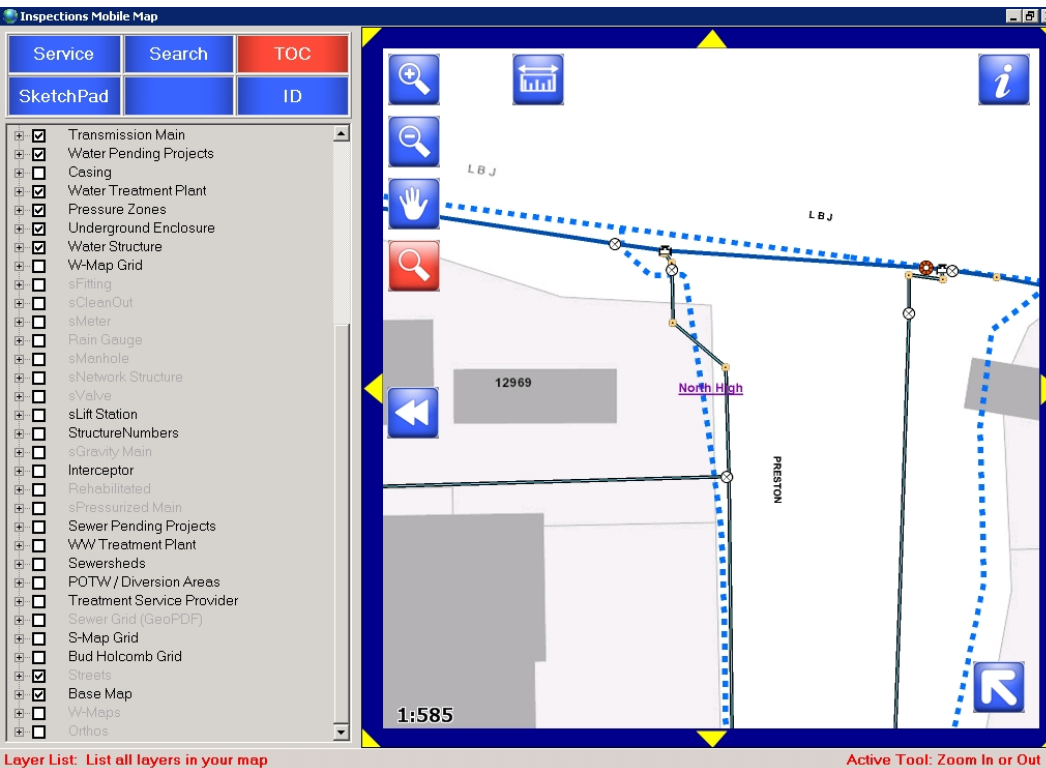
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- Office Data in the Field
 - ▣ Infrastructure e.g. Pipelines
 - ▣ Project Representations
- Both Electronic and Hard-copy
- Collaboration Tools
 - ▣ Requires a Laptop



Mobility – GIS in the Field

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- Office Data in the Field
 - Infrastructure e.g. Pipelines
 - Aerial/Parcels
 - Project Representations
- On-the-fly query data
- Red-up Corrections
- Disconnected – No Wireless Required

Database Coordination Tools - Automated Analysis\Reporting

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Microsoft Access

PLP Switchboard

Exception Reports

Design Projects Under Construction Projects

Duplicate PIDs Under Construction Projects with End Date Before Today

Open Form

Superintendent's Monthly Inputs Record Drawing

Generate Pie Chart

All Status vs. Pipe Length \$50 Chart

Red Water Summary

Generate Report

All Records All Status Paving Inspector's Report

Alleys Report Pipeline Program Accomplishments

Construction Completed by Fiscal Year in a Council District Red Water Report

Council District Performance Report Red Water Summary Report

Council District Report \$50 Report

Council District Report Estimated Construction Cost Storm Water Report (\$00000)

Council District Report by Neighborhood Association Superintendent's Report

Design/Design Comp. by Fiscal Year in a Council District TCEQ Report With Time Frame

GIS Inventory - Pipeline Program Town Hall Report (per Council District)

Exception Report (Under Construction)

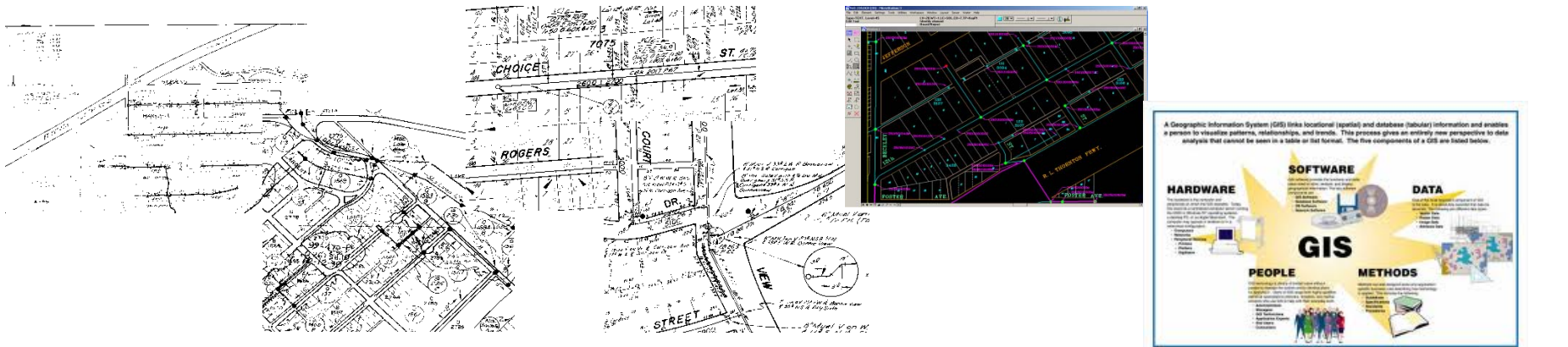
Exception Report for Under Construction projects

PID	Status	Department	Project Location	Project Limits	Council District	LF of W	LF of WW	Total Pipe Length
2207	Under Construction	DWU	Singing Hills Drive	From Minnet Lane Northwest	5	0	0	
3588	Under Construction	DWU	Cypress Avenue	From Scyma Road To Briggs Street	5	1450	1425	2875
3894	Under Construction	DWU	Alley Between Ann Avenue And Peak Street	From Terry Street To Santa Fe Avenue	2	0	285	285
5086	Under Construction	DWU	Abbot Avenue	At Mockingbird Lane	0	0	0	
5096	Under Construction	DWU	Ranchview Drive	From North Of Walnut Boulevard	0	0	0	
5123	Under Construction	DWU	Polk Street	From North Of Legendary Lane	3	0	0	
5178	Under Construction	DWU	Dmley Drive	At Elmore Avenue	4	0	0	
5193	Under Construction	DWU	Elmore Avenue	From West Of Seewers Avenue	4	0	0	
5194	Under Construction	DWU	Elmore Avenue	From East Of Dmley Drive	4	0	0	
5195	Under Construction	DWU	Elmore Avenue	From East Of Fowler Street	4	0	0	
5225	Under Construction	DWU	Eastmont North Of Whitehurst Drive	From Ferris Branch Boulevard North	10		409	
5410	Under Construction	DWU	Good Latimer Expressway	From Hickory Street To Ferris Street	2	360	0	360

- Centralized Databases
- Spatial Analysis
- Write Conflicts to Table/Report
 - Spatial Conflicts
 - Status of Projects
 - Owner/Contact

DWU – We've Come A Long Way!

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1930's

- Wastewater
- Original Dallas
- Limited Info

1960's

- Bud Holcomb
- Wastewater
- Outgrew 1st Maps
- More Info

1980's

- Block Maps
- Water and Wastewater
- Very Detailed
- Massive Effort
 - 100% Water
 - 55% Wastewater

1990's

- Digital
- Water and Wastewater
- Partially Integrated with WOMMS

2000's

- Digital
- Water and Wastewater
- No Facilities
- Maintained Separately from Digital Maps

100% GIS Automated – October 1, 2011

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Modern Methods – Summary

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Challenges

- ❑ Multiple Data Sources
- ❑ Effective Processes to Keep Information Updated
- ❑ Information Overload with Unnecessary data
- ❑ Collaboration
- ❑ Confidentiality

Benefits

- ❑ Optimize Performance and Participation
- ❑ Identify overlap and/or adjacency issues early
- ❑ Make Better Decisions
- ❑ Readily answer Key Questions
- ❑ Avoid delays and minimize changes to Scope

Conclusion

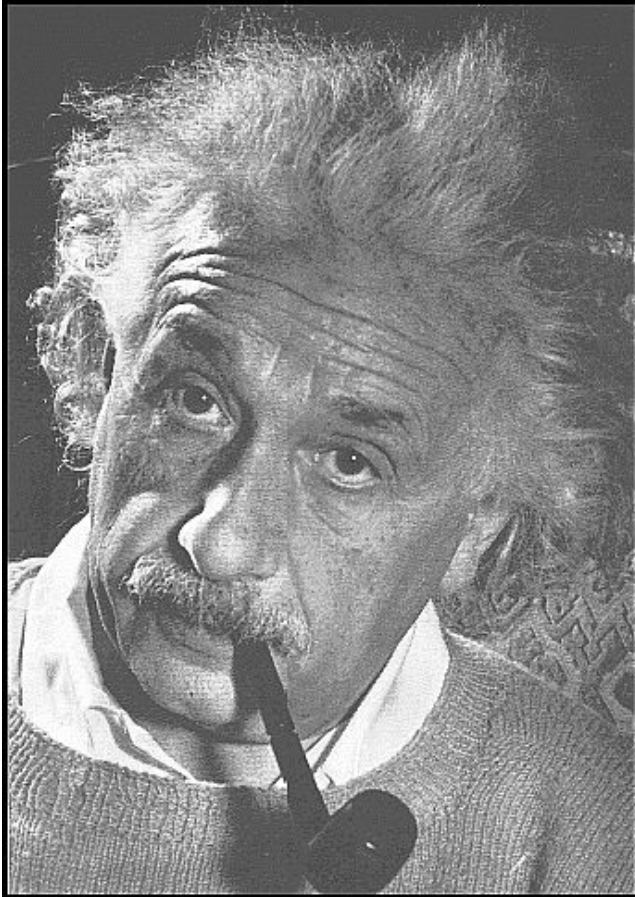
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- DWU is Constantly Doing More with GIS
- Continuous Process Improvements
- GIS Field Technology
- Documenting Assets in GIS
- GIS Project Research and Coordination



Questions & Comments?

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In life, questions are guaranteed;
answers are not!

Contact Information:

Marc Cottingame, PE

Dallas Water Utilities

Marc.Cottingame@dallascityhall.com

Phone: 214.671.9170