

# Applications of GIS for Stormwater Management in the City of Dallas

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# Notice

- This presentation is for informational purposes
- It mainly focuses on how GIS is helping the Stormwater division of the City of Dallas to comply with the Texas Pollutant Discharge Elimination System [*TPDES*] permit

## References:

- [http://dallascityhall.com/departments/trinitywatershedmanagement/wheredoesitgo/DCH%20Documents//FinalDraft\\_SWMP\\_Plan\\_040612.pdf](http://dallascityhall.com/departments/trinitywatershedmanagement/wheredoesitgo/DCH%20Documents//FinalDraft_SWMP_Plan_040612.pdf)
- Photos were taken by SWM staff during inspections
- Some of the maps and reports were compiled by the staff at different periods.

# Background

- History
- Environmental Consent Decree includes:
  - Penalty, Notice and General Requirements
  - StormWater Management Requirements
  - Environmental Management System
  - Supplemental Environmental Projects
  - Reporting Requirements

# Stormwater Management Requirements

- Inspections
  - Construction sites
  - Industrial facilities
  - SARA 313 (Superfund Amendments and Reauthorization Act, Title III, Section 313)
  - Outfall screening and illicit discharge detection
- Staffing levels to be maintained
  - Overall staffing
  - Specific positions with specific assignments
- Audit of the program

# Implementations of SWM Requirements

- The City is required under Texas Pollutant Discharge Elimination System (TPDES) permit to develop and implement a comprehensive Stormwater Management Program (SWMP).
- The Trinity Watershed Management Department is assigned to lead the SWMP
  - It has authority to enforce the permit requirements.
- Stormwater Management, a division in the department, manages:
  - the SWMP,
  - performs compliance and enforcement inspections,
  - water quality monitoring,
  - stormwater-specific outreach and citizen response,
  - develops annual reports.

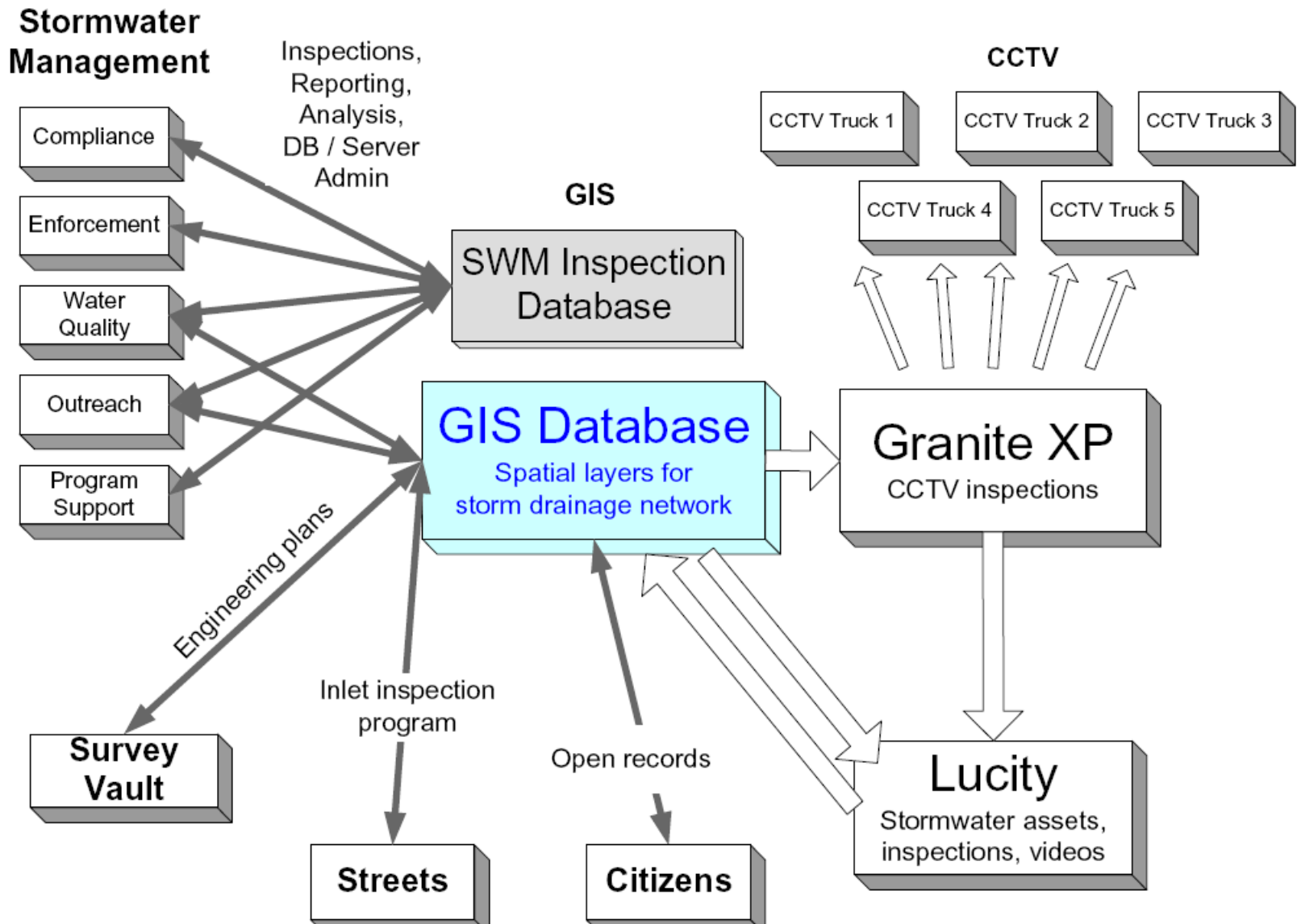
# Stormwater Management Program Elements

- Municipal Separate Storm Sewer System (MS4) Maintenance Activities
- Construction Site Stormwater Runoff
- Post Construction Stormwater Control Measures
- Illicit Discharge Detection and Elimination
- Pollution Prevention and Good Housekeeping
- Industrial and High Risk Runoff
- Public Education, Outreach, Involvement and Participation
  - *Impervious Area*
- Monitoring, Evaluation and Reporting

# Why do we manage MS4 Assets ?

- When we pollute our stormwater, we increase the time and cost of cleaning a water before it is sent to our homes.
- Preventing stormwater pollution not only save the environment, it also saves you money.
- Regular inspections, maintenance and repair for these pump stations, pipes, and culverts can prevent:
  - blockages,
  - reduce flooding ,and
  - reduce pollution to the MS4.
- The cost to clean all 70,000 storm drain inlets only one time is about \$3.3 million.

# SWM-GIS Interaction





# GIS and MS4 Inventory

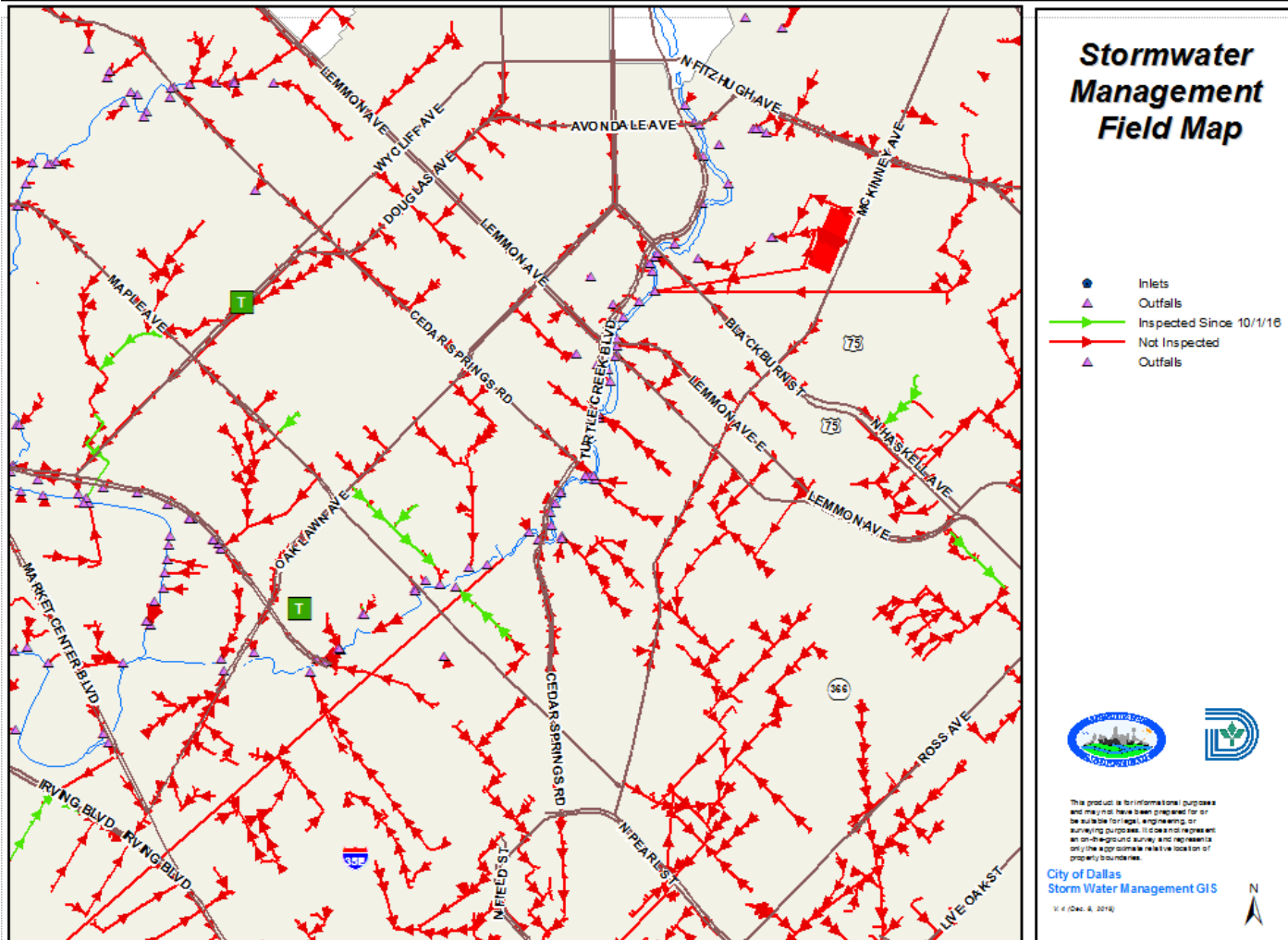
- Location, type, attributes and distribution of the assets are managed by GIS
- The MS4 infrastructure includes at least:
  - Over 67,000 Inlets
  - 1,800 miles Storm Sewers
  - 11,000 Drainage outfalls
  - 180 miles Creeks and Channels
- The City operates at least:
  - 1,800 miles of gravity storm sewer, 7 different pressure sewer systems and 9 street pump stations.

# GIS and MS4 Assets Collection

- Collect GPS Data: Trimble GeoXT & TerraSync Software
- Transfer GPS Data to Office
- Post Process
- QA/QC check
  - Improve a data dictionary used in GPS devices
- Assigns a unique GBAID and add it to a database
- Make it ready for SWM division [inspections, repair, cleaning ...]

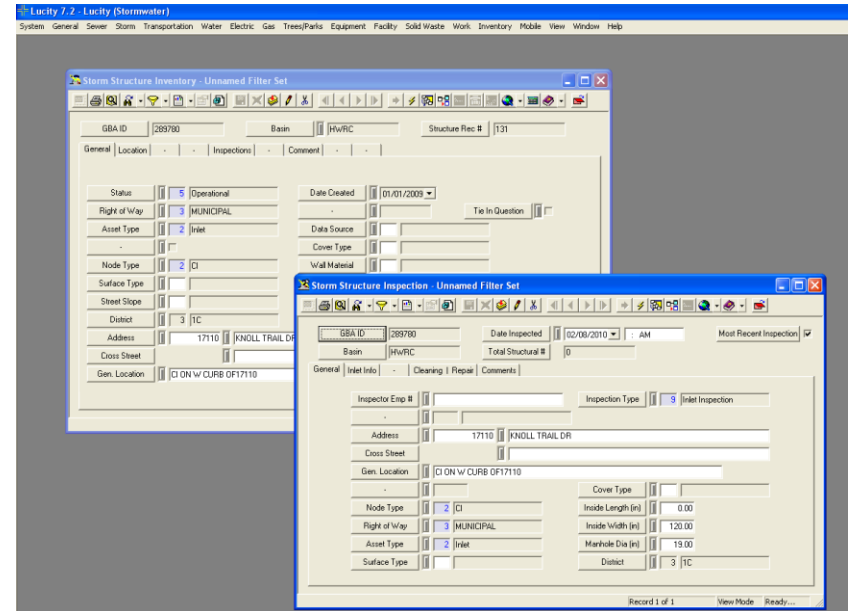
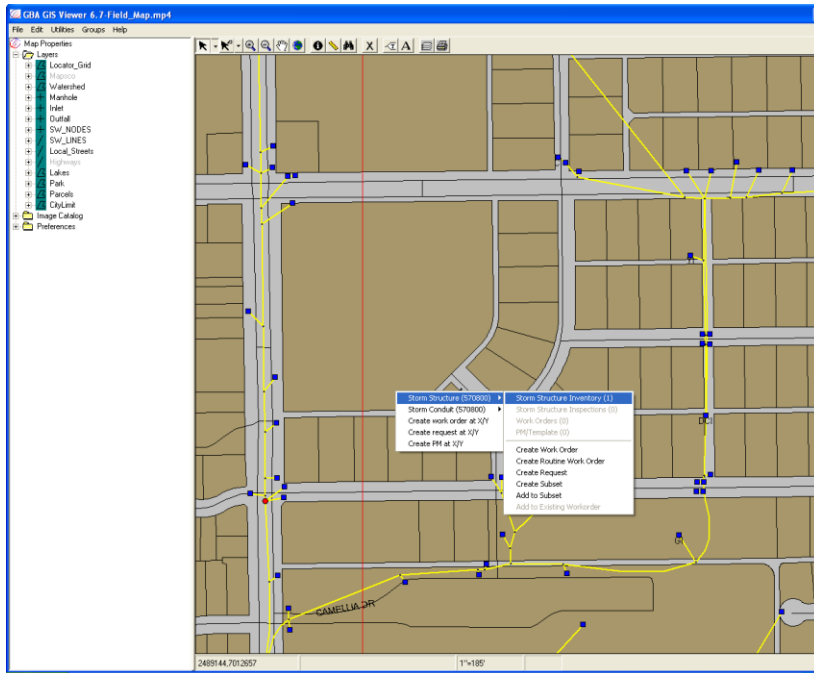
# GIS and MS4 Inspections

- Inspections are conducted through Closed Circuit Televiewing (CCTV)
  - Cleaning and repair follow based on the report.

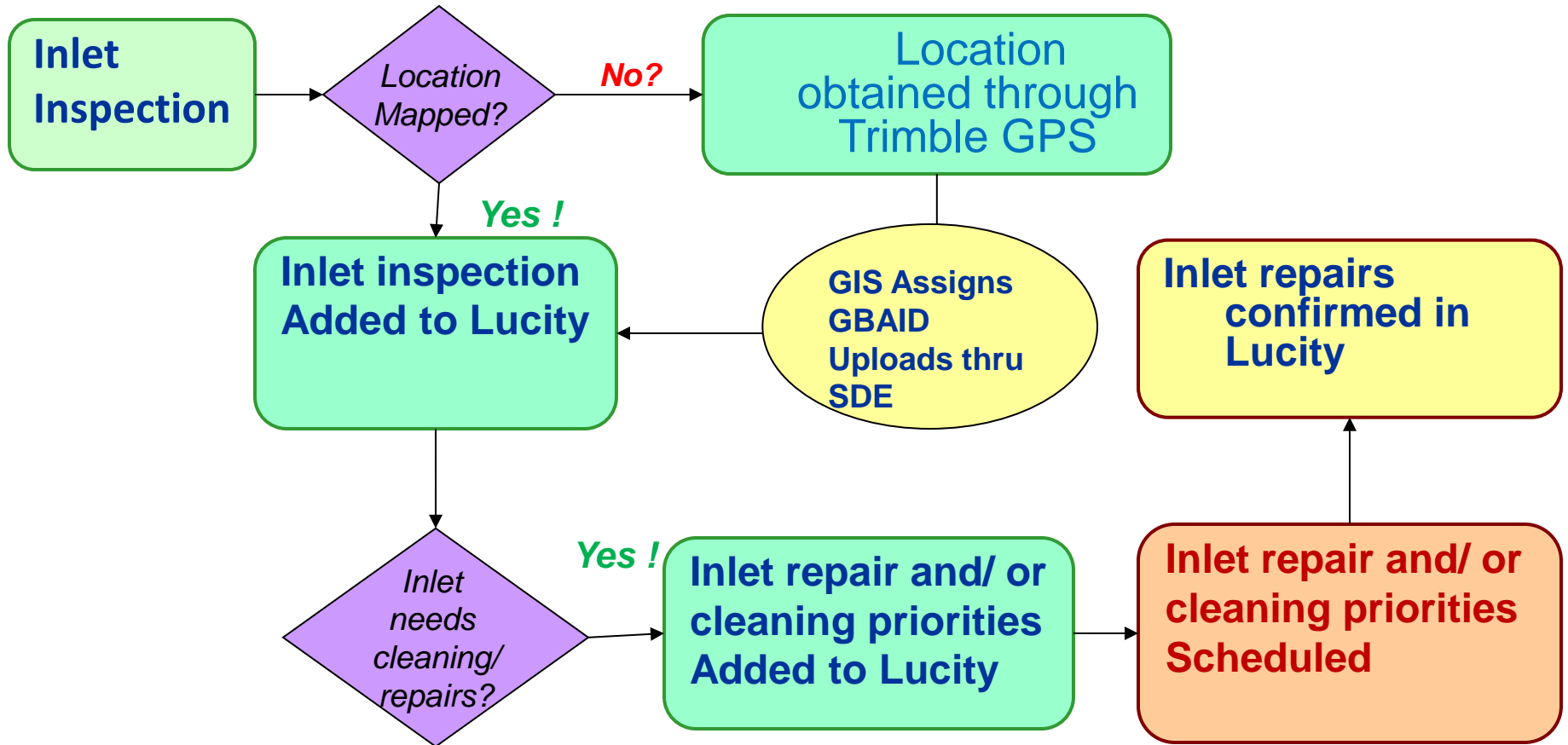


# Inlet and Outfall Inspections

- Lucity software is being used
  - Enterprise asset management software
    - Central storage of stormwater inspections, images and videos

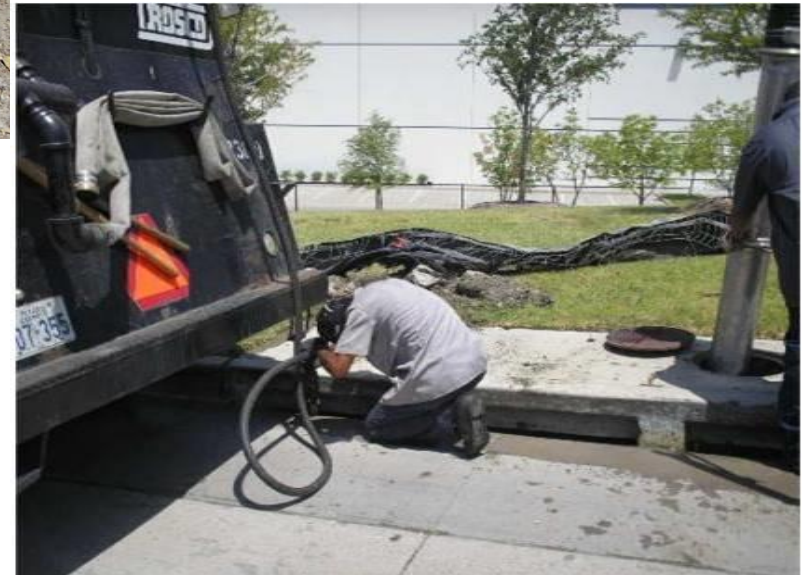


# Inlet Inspection Work Flow





# Inlet Inspection and Cleaning





# Inspection of Construction Sites



Poorly protected inlet



Well protected inlet

# Construction Site

- The City is required to enforce compliance for construction sites that disturb more than one acre of land.
- Stormwater runoff from construction sites is addressed by:
  - implementing effective controls per site-specific Stormwater Pollution Prevention Plans (SWPPPs),
  - construction site inspections, and
  - notifying building applicants of the applicable requirements that affect projects under the TPDES permit regulations.





# Post-construction Controls

- Stormwater control measures addressing post-construction discharges incorporate several different approaches to maintain and/or improve water quality.



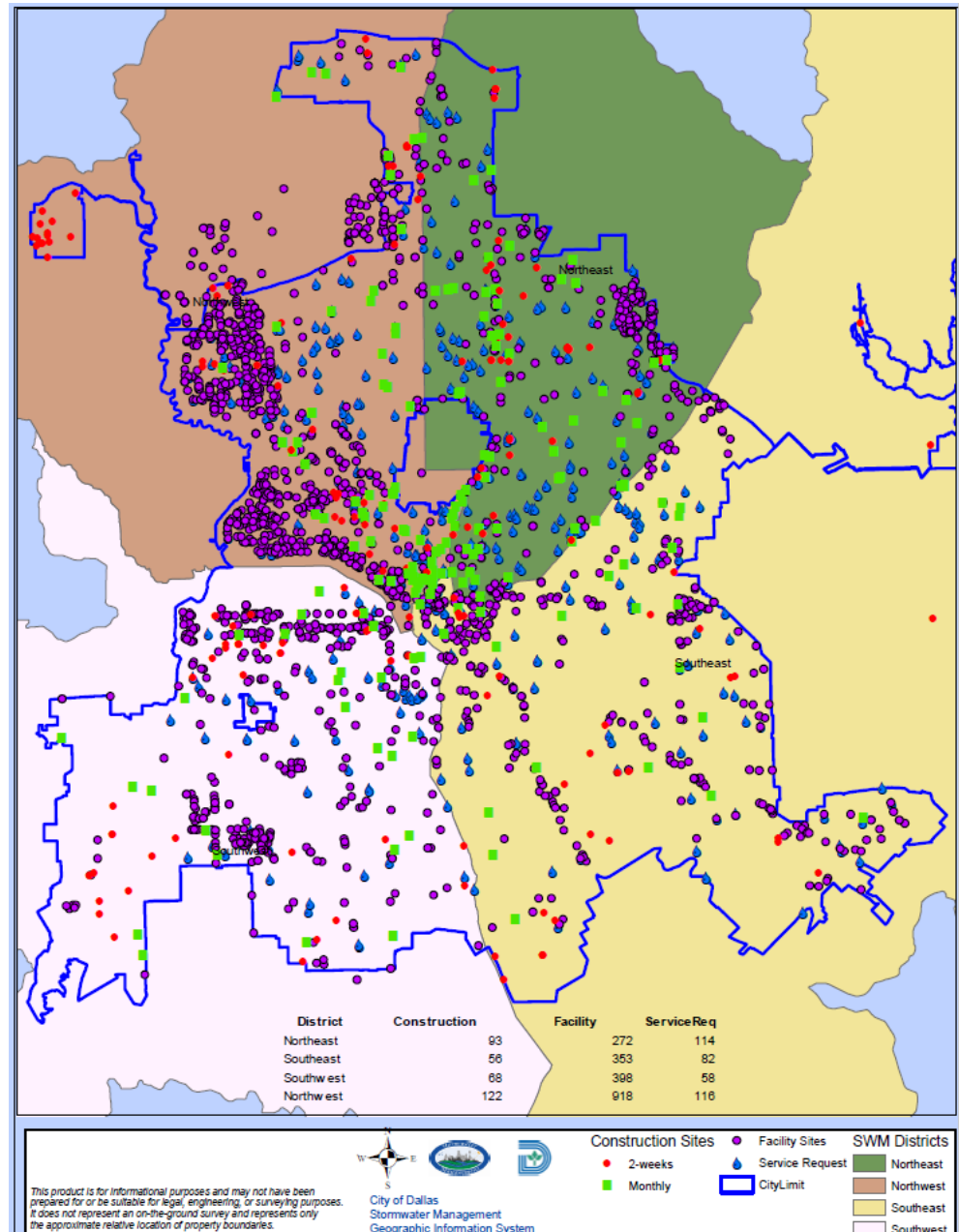
# Industrial And High Risk Runoff

- The City addresses industrial facility stormwater discharges to the MS4 that may pose a threat to water quality through a comprehensive industrial program that includes regular screening, monitoring and inspections.



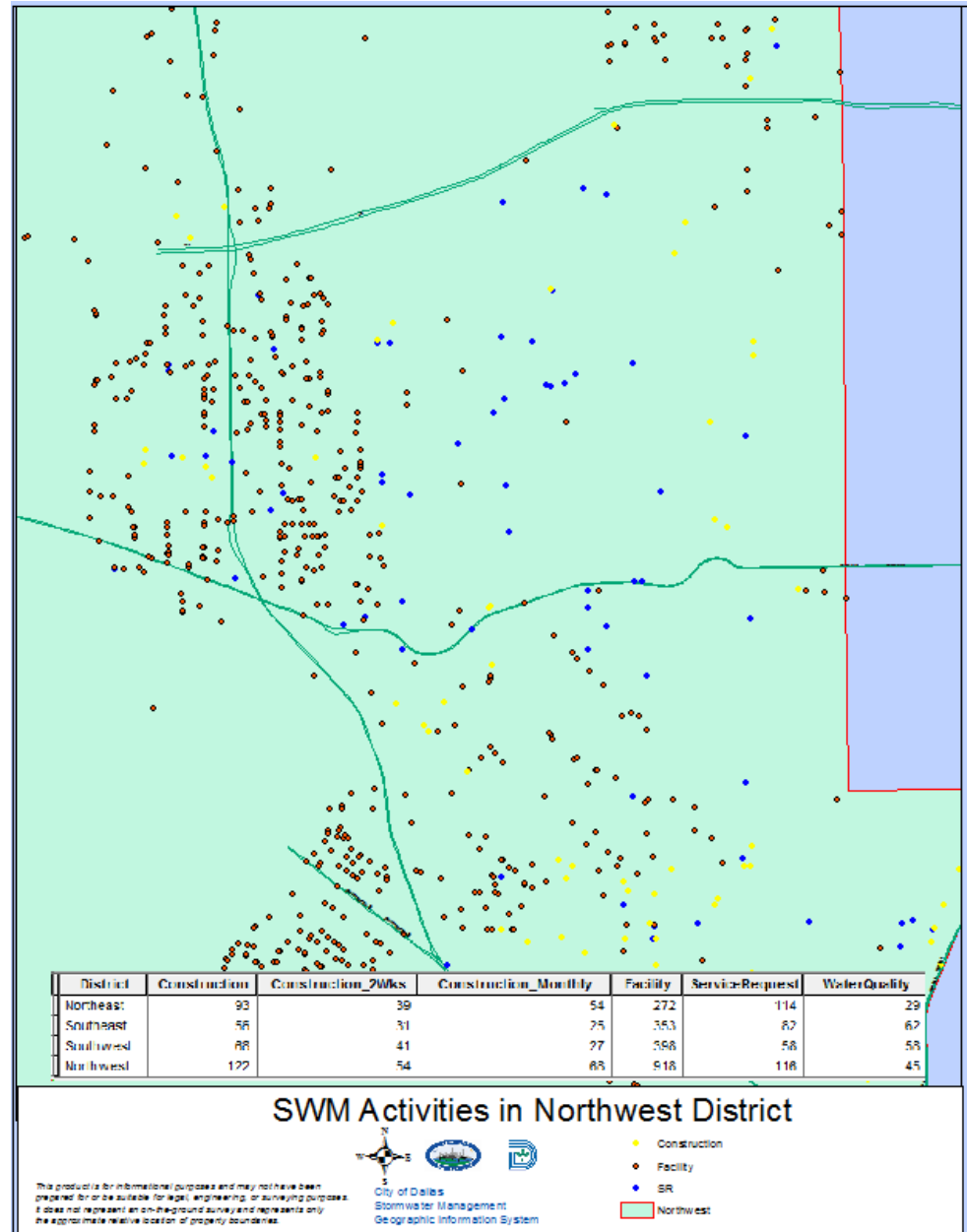
# GIS helps in Analysis

- GIS queries data for compliance /asset management performance data
- MS4 assets inspected vs not inspected; repaired, cleaned, ..
- Frequent location where there is issues with MS4 assets



# GIS helps in Analysis

- Distribution of Construction sites and Industrial facilities in four Stormwater districts



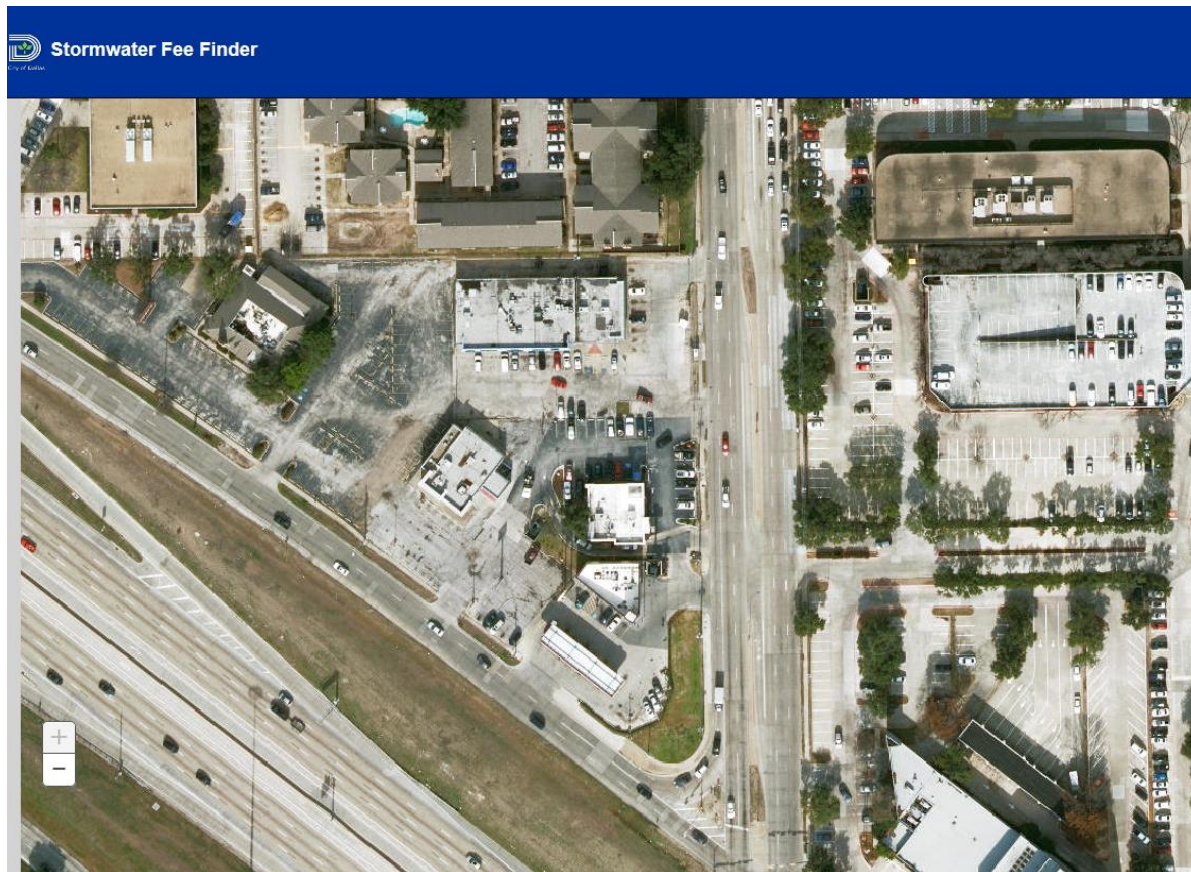
# Impervious Project

- Area that is covered with material that prevents water from soaking into the ground.
- Includes buildings, houses, driveways, roads, parking lots, and other surfaces that repel water and increase the quantity of stormwater runoff when it rains



# Impervious Project

- A stormwater fee website is available at (<http://gis.dallascityhall.com/swfeefinder/> ) where customers can look up their new monthly bills
- GIS helps in responding to citizens request to review the size of their area delineated as impervious



# Conclusions

- GIS is NOT just creating maps
- GIS helps SWM division in the city by:
  - Scheduling inspections
  - Conducting analysis and generating reports
  - Managing a spatial data

# Conclusions

- GIS helps SWM division in the city by:
  - Integrating various inspection types and software





Questions ?