The New Age for GIS Sewer Planning at the City of Los Angeles

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Parties Involved

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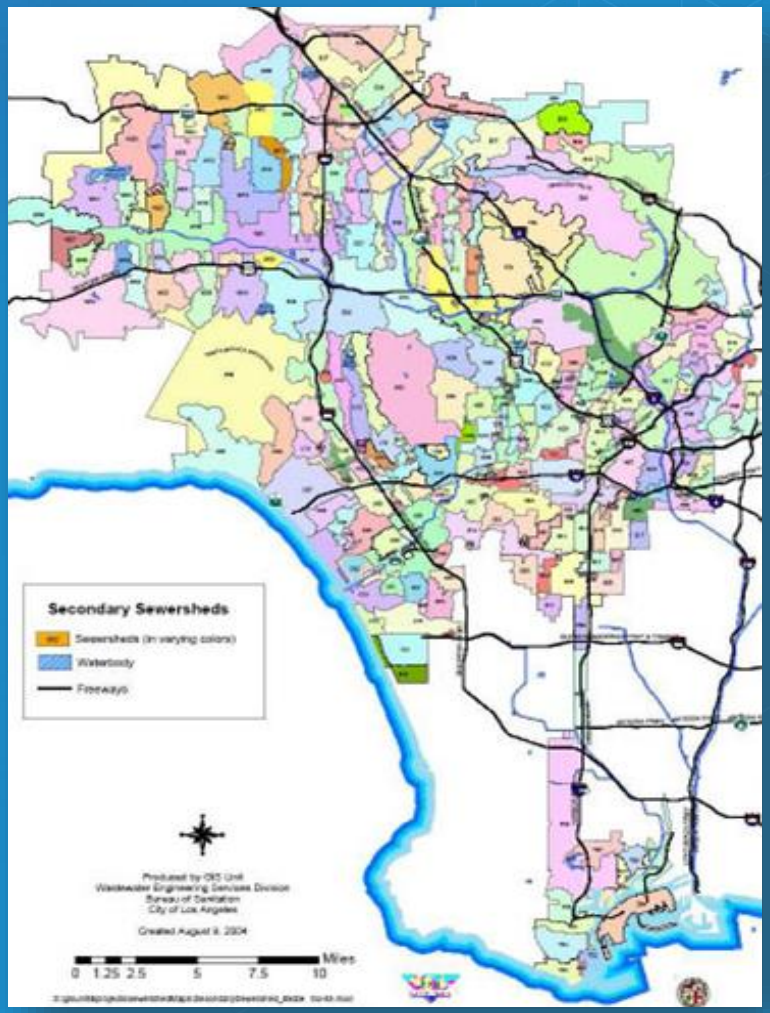
Outline

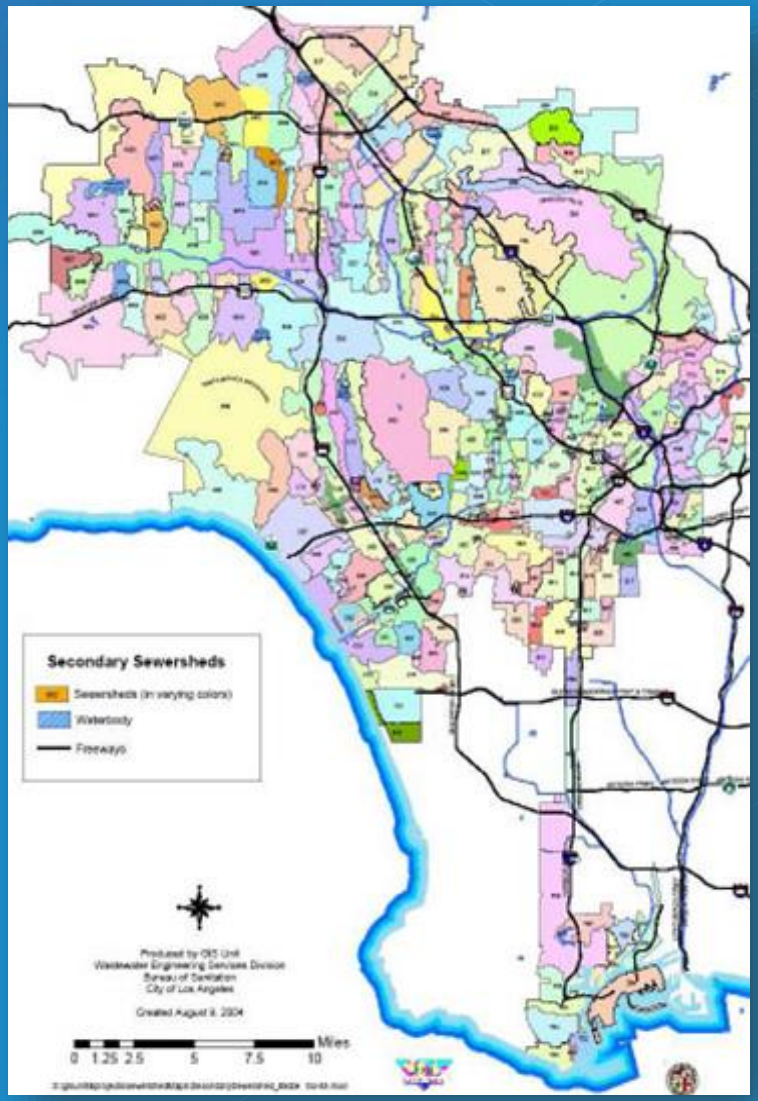
1. Background
2. Data Sources and Collection
3. Selection of InfoMaster
4. Software Utilization
5. Moving Forward



Background

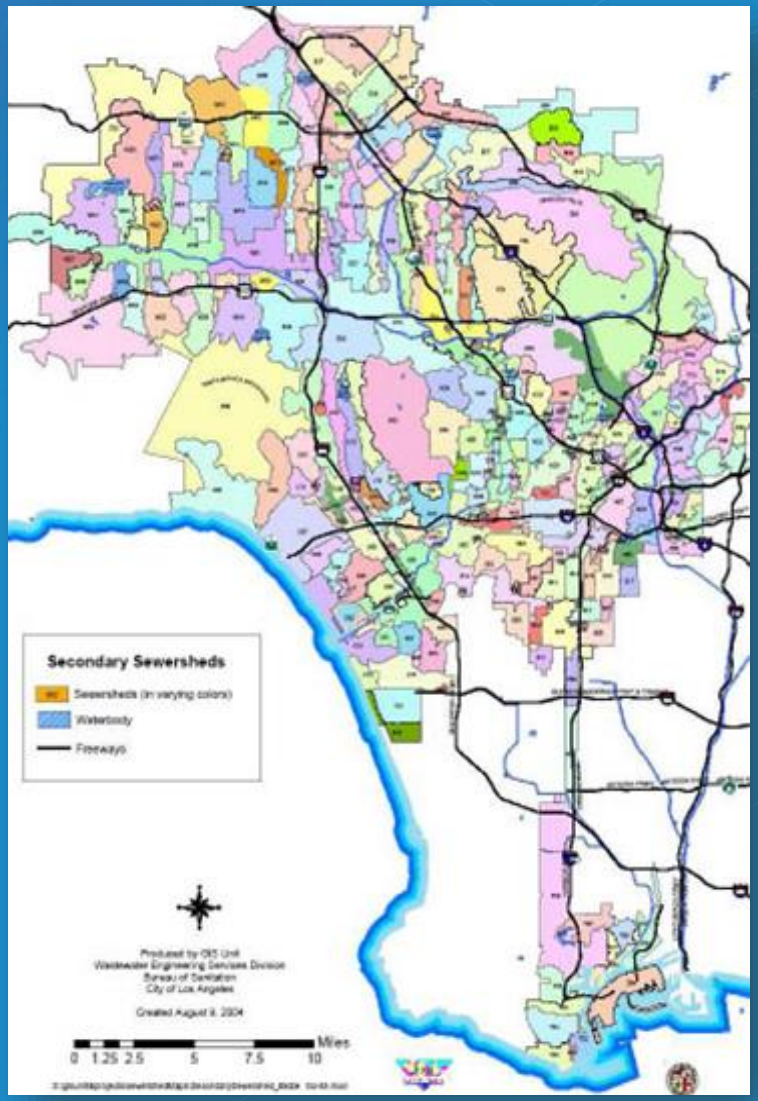
City of LA Wastewater System

- Huge and complex
- Serves over 4M people
- Service area > 600 sq mi
- 29 satellite communities
- 6,700 miles of pipe
- 6-in to 150-in diameter



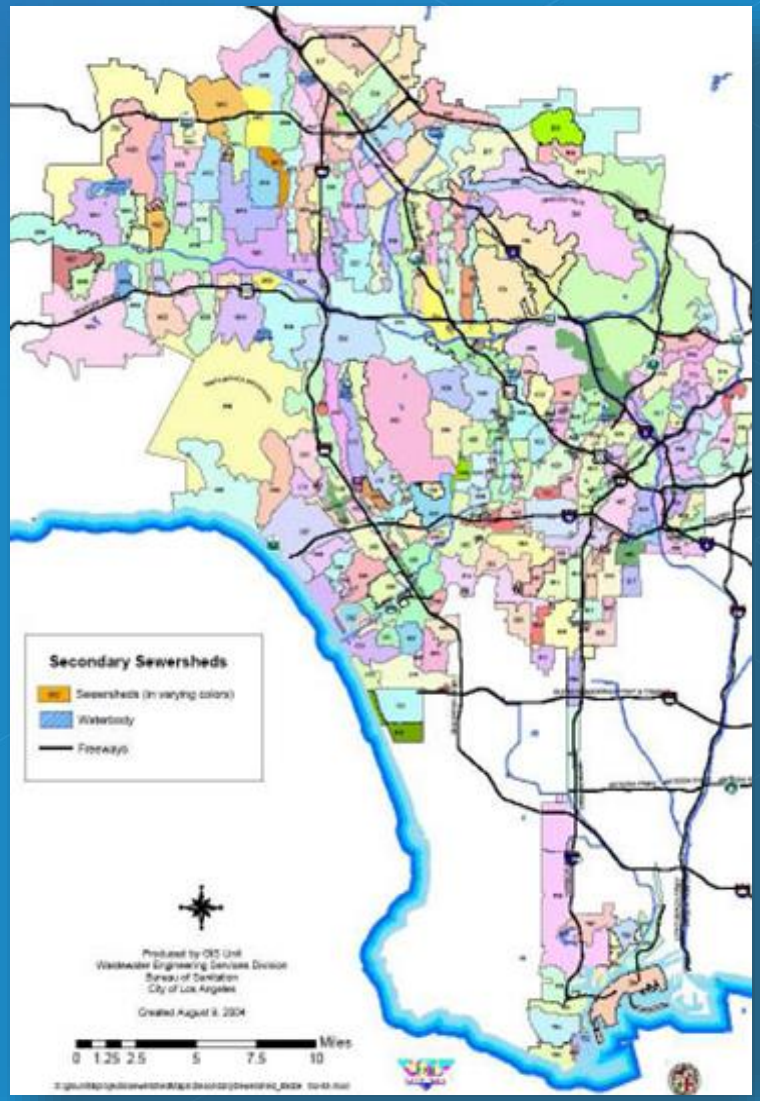
City of LA Wastewater System

- 90% (6,030 miles) are secondary sewers (≤15-in dia)
- 10% (670 miles) are primary sewers (≥16-in dia)
- 86% VCP, 10% Concrete
- 56% > 50 years old
- 4% (260 mi) > 100 years old



City of LA Wastewater System

- 25 Primary Sewer Basins
- 240 Secondary Sewer Basins
- 47 wastewater pumping plants
- 4 wastewater treatment plants
- 450 MGD average daily flow



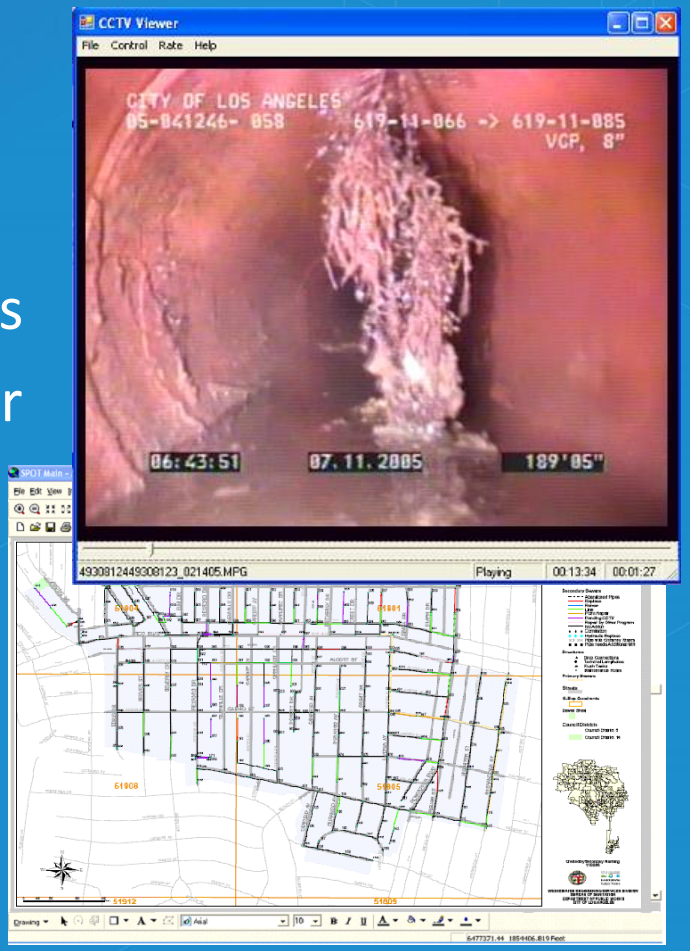
Advanced Sewer Planning

- Extensive advance planning program
- Planned and renewed thousands of miles of sewers over the years
- Planning for Primary and Secondary Sewers
- Sewer Planning Optimization Tool (SPOT) in 2007
- SPOT successfully used to prepare the 100 highest priority secondary sewer basin plans for CSSA
- Customized solution posed maintenance challenges
- Need for Commercial-Off-The-Shelf (COTS) tool

Data Sources and Collection

Data Sources and Collection

- Massive amount of data to be collected, organized and analyzed
  - 18 unique data sources
  - Pipe and MH inventory data
  - CCTV inspection videos and logs
  - Parallel emergency sewer repair
  - Maintenance data (SSOs, root control, cleaning, etc.)
- Data scattered through several servers maintained by various Divisions and Bureaus



Selection Of InfoMaster

Selection Of InfoMaster

- InfoMaster provides same basic functionalities as SPOT
  - Data viewing
  - Planning decision algorithm
  - CCTV data viewer
  - Data management
  - Planning report support
- Provides additional functionalities for enhanced planning
  - Risk Score: Likelihoods and Consequences of asset failures
- Supported by commercial vendor who provides maintenance and upgrade at nominal cost
- Minimal customization for City of LA use

Software Utilization

InfoMaster Overview

A living, breathing, proactive asset integrity management and capital planning tool

1 Store information about your assets

- Designed for Water and Sewer Utilities
- Access to different types of information

2 Defensible & repeatable capital planning analysis

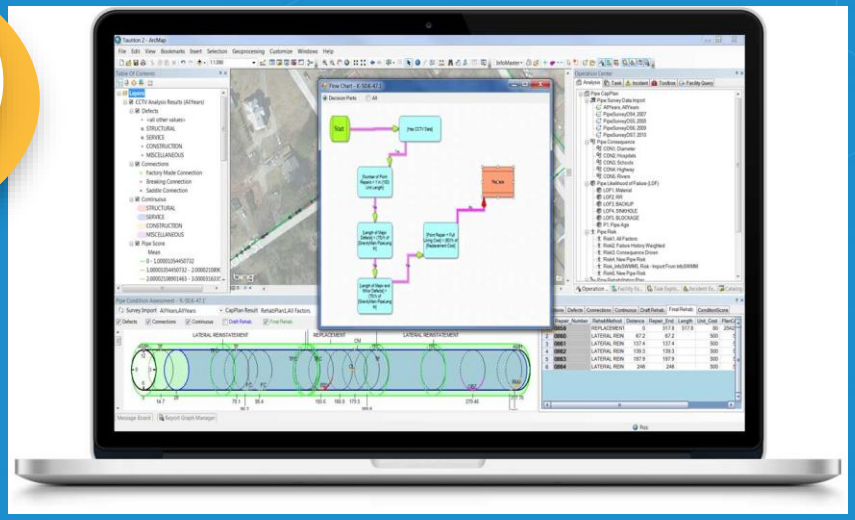
- Risk-based prioritization & budgeting
- Customizable decision tree for Capital Plans

3 100% GIS Integrated

- Leverages existing data
- Seamlessly links CCTV data
- Built-in data validation and clean-up tools

4 Rich results and reporting

- Fully configurable
- Share html/pdf reports
- Share analysis results through AGOL



InfoMaster Workflow

InfoMaster®

Field Data Formats

Facility Info from Field

Work Order Management

Sewer Only

REHAB PLAN (DRAFT)

Assign a Rehabilitation Method to each Defect

Detailed Plan for CCTV'd Pipes

Budget Rehab Plan

DECISION TREE

Fully customizable runs for each pipe is the system

Defensible and Repeatable Capital Planning

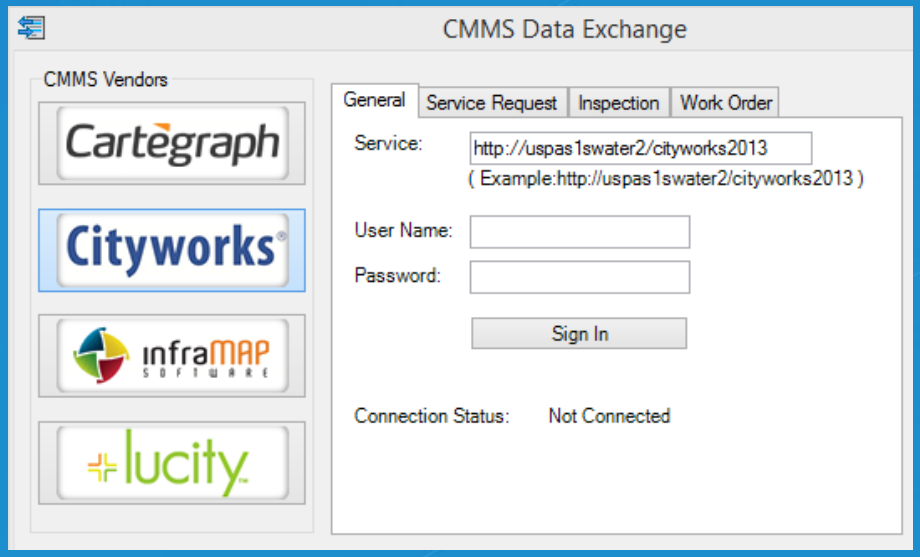
RISK ANALYSIS

Define CoF and LoF for each asset in the network and run a Risk Analysis

Prioritized List of Pipes to CCTV

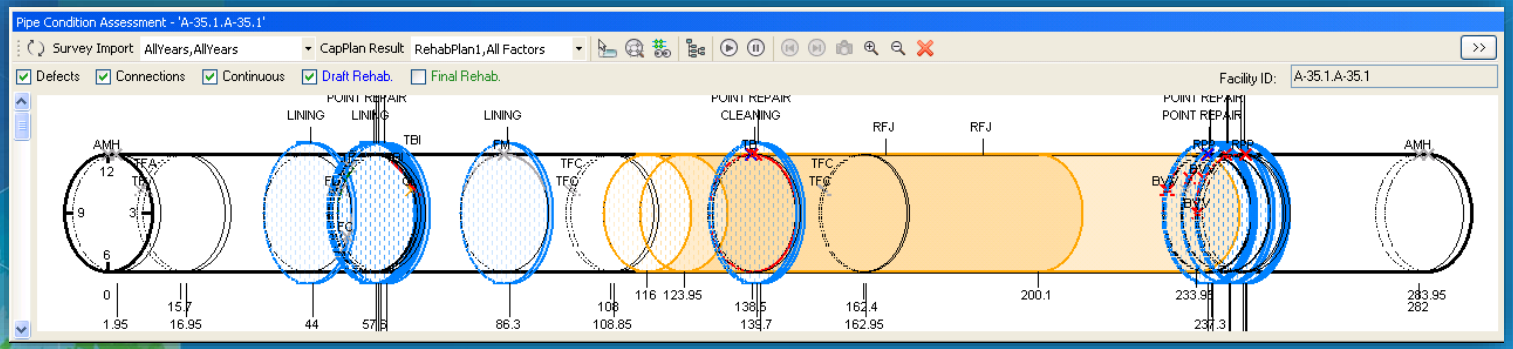
Software Utilization

- Provides centralized data platform for collecting, storing & disseminating data
- Pulls data automatically from three existing live servers
- Built-in & customized comparison/validation rules provide increased levels of data confidence:
  - invert elevation discrepancies
  - unusual pipe slopes
  - disconnected nodes
  - diameter discrepancies
  - crossing pipes
  - unusual manhole depths
  - invalid IDs



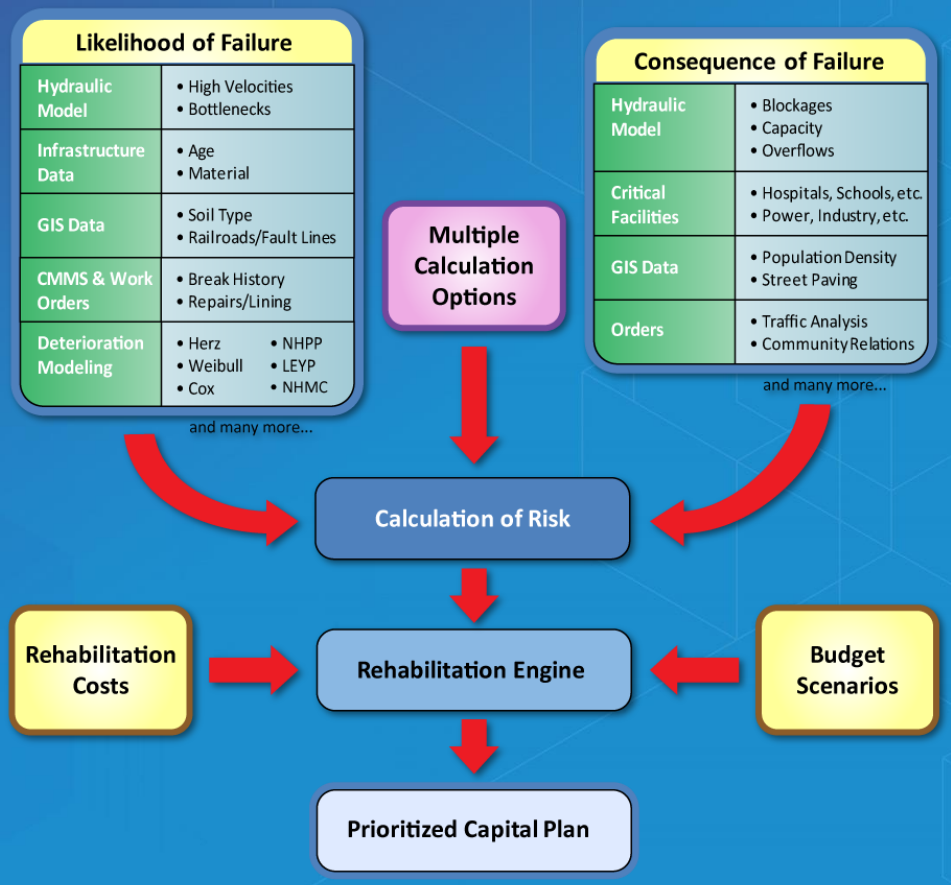
CCTV Analysis

- Automatically import videos, geocode defects, and track the history of the assets in terms of inspections
- View CCTV video & navigate to specific defects



Risk Analysis

- Applicable to assets with & without CCTV data
- Uses configurable algorithms to identify the Risk score of an asset based on Likelihood of Failure (LoF) and Consequence of Failure (CoF)

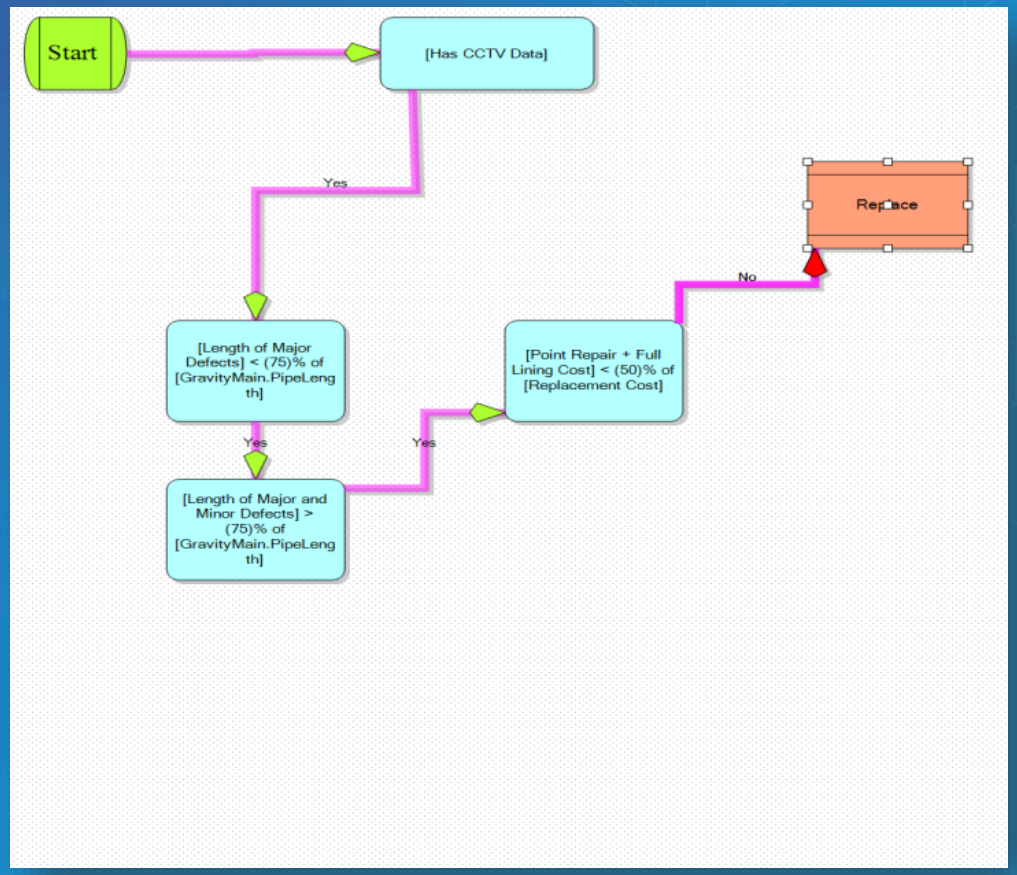


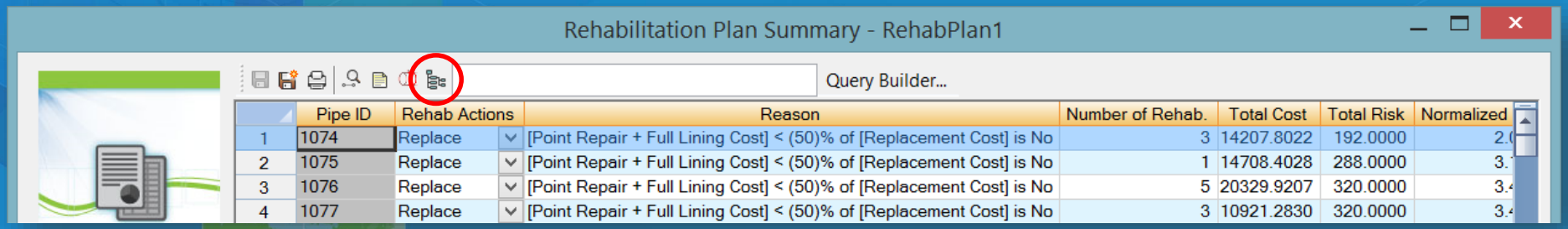
Risk Class	Capital Action
Extreme	High Priority in CIP / Yearly Operational Frequency
High	Standard Priority in CIP / Biannual Operational Frequency
Medium	Low Priority in CIP / 1 in 5 Years Operational Frequency
Low	1 in 10 Years Operational Frequency
Negligible	Wait for a problem to arise

Rehabilitation Planning

Multi-step decision algorithm to determine recommendations for pipe and structure repairs

- Employ ANY Logic
- Utilize ANY Data
- Defensible
- Repeatable
- Fast

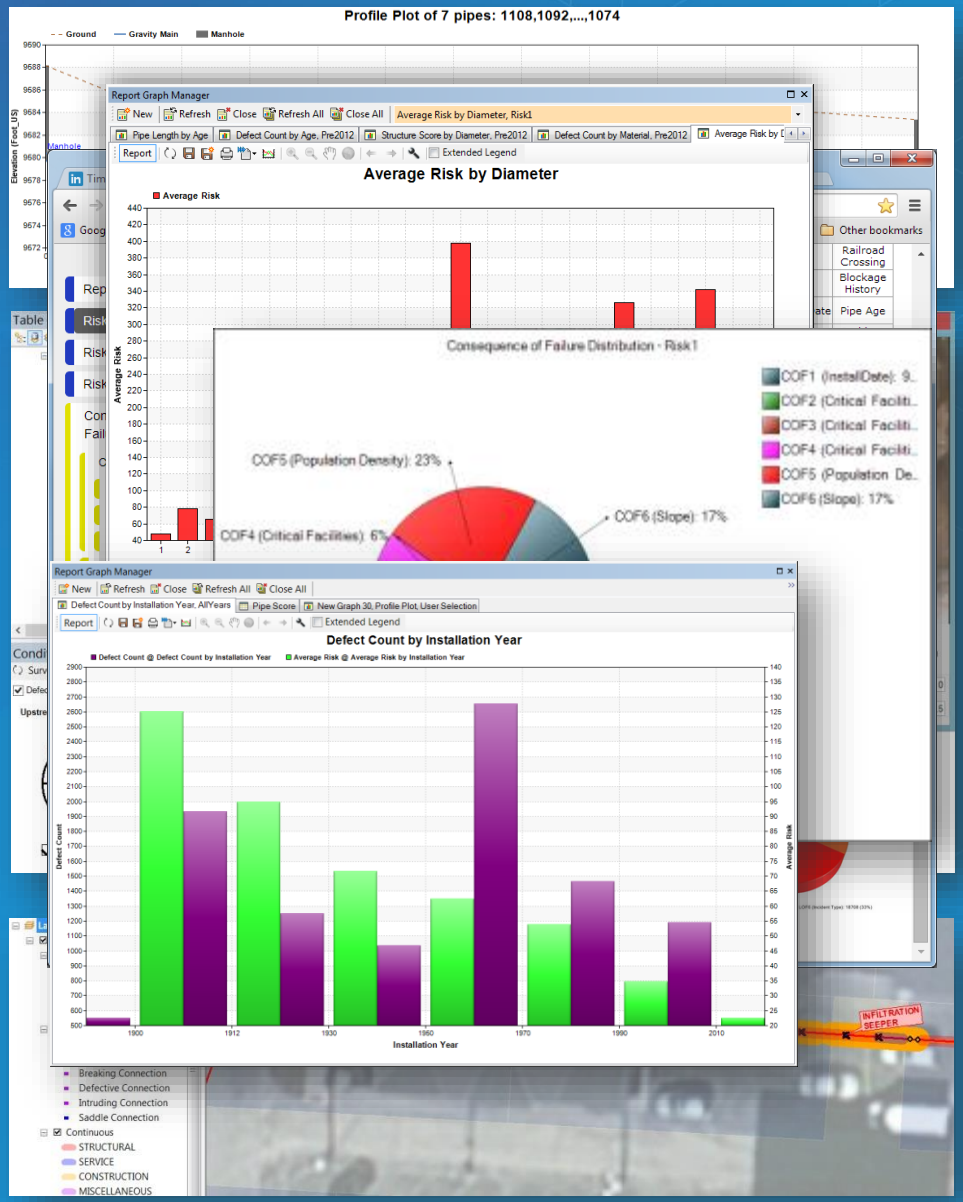




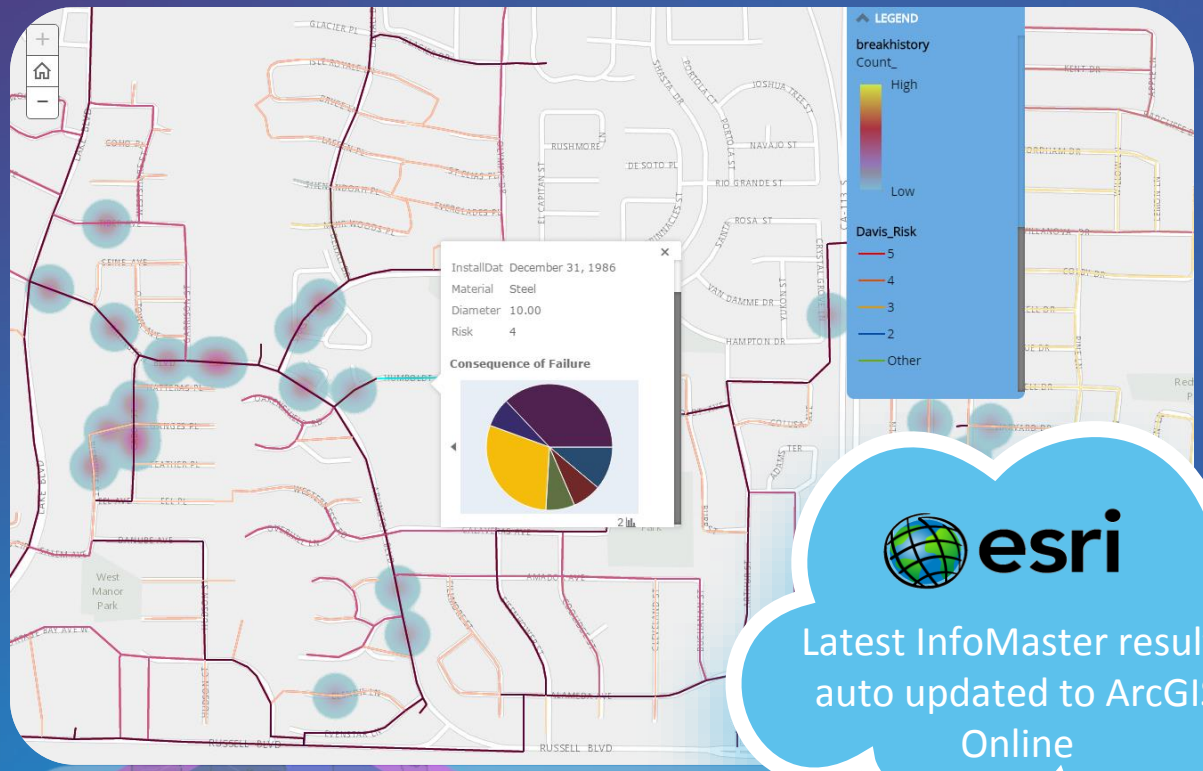
	Pipe ID	Rehab Actions	Reason	Number of Rehab.	Total Cost	Total Risk	Normalized
1	1074	Replace	[Point Repair + Full Lining Cost] < (50)% of [Replacement Cost] is No	3	14207.8022	192.0000	2.
2	1075	Replace	[Point Repair + Full Lining Cost] < (50)% of [Replacement Cost] is No	1	14708.4028	288.0000	3.
3	1076	Replace	[Point Repair + Full Lining Cost] < (50)% of [Replacement Cost] is No	5	20329.9207	320.0000	3.
4	1077	Replace	[Point Repair + Full Lining Cost] < (50)% of [Replacement Cost] is No	3	10921.2830	320.0000	3.

Custom Reporting

- Configurable graphical & tabular reporting and summarization based on existing reporting was critical
- LASAN able to configure tables of their entire system or by sewer basin
  - Summations of pipe length by age, material, soil type…
  - Pie charts
  - 2D and/or 3D graphs of maintenance history



Share Results via ArcGIS Online



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Latest InfoMaster results auto updated to ArcGIS Online

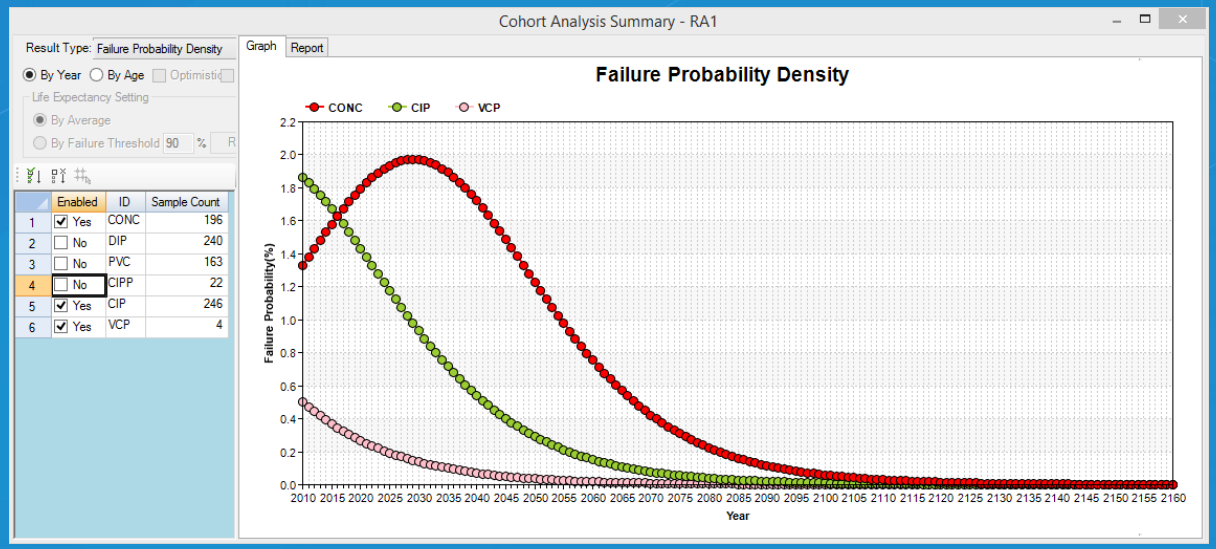
Sample Set of InfoMaster Users

American Water	Durham, Region of, ON	Pittsfield, MA
Anniston, AL	East Bay MUD, CA	Reading, MA
Baltimore, MD	Genessee Co., MI	San Antonio, TX
Cambridge, MA	Honolulu, HI	San Jose, CA
Charlotte, NC	Jacksonville, FL	Santa Ana, CA
Cincinnati MSD, OH	London, ON	South Placer WD, CA
Clayton County, GA	Los Angeles, CA	Scottsdale, AZ
Corpus Christi, TX	Mesa, AZ	Suburban Water, CA
Columbia, MO	North Charleston, SC	Sweetwater, CA
Dayton, OH	North Davis, UT	Tacoma, WA
DeKalb County, GA	Oakland, CA	Tampa, FL
Denton, TX	Otay WD, CA	United Water

Moving Forward

Next Steps

- LASAN to incorporate new data sets & results
- Significant time savings: manage and analyze the remaining 140 secondary sewer basins (began top 100 in 2007 with previous program)
- Produce full sewer basin reports utilizing the built-in custom reporting tools
  - auto-generate comprehensive CIP reports unique to their needs
- Full risk assessment capabilities
- Regression analysis
- Asset deterioration modeling



Thank You For Joining Us!



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