STORMWATER ASSET MANAGEMENT:
DEFINING THE ASSETS CONDITION

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CITY OF SYLVAN LAKE

• The Prettiest Little City in the State of Michigan!
• Nestled in Oakland County
• Population of about 2,000 residents
• Community with beautiful lakefront privileges
HISTORY

• Area discovered almost 200 years ago (1818) and was a tourist area

• Incorporated into a Village in 1921 and then into a Home Rule City in 1947

• City has an abundance of parks and lakefront property
PROJECT LOCATION
PROJECT BACKGROUND

• In May 2014 City of Sylvan Lake was awarded an MDEQ SAW Grant (Round 1)
• Asset Management Plan Grant ($959,386)
  • Storm Sewer System
  • Sanitary Sewer System
• Total Grant Amount - $1,065,984 including 10% City Match - $106,598
• Must complete within 3 years (May 2017)
• Storm Sewer System consists of:
  • Storm Structures – catch basins, manholes, yard drains, culverts
  • Storm Sewers and drainage ditches
  • Storm Pump Station

⇒ All discharge to Sylvan Lake
INVENTORY

• GIS database for storm sewer:
  • Original GIS database was incomplete
  • The entire City was mobile mapped (laser scanned) to develop the base for the structures
  • As-built plans utilized to complete the GIS
  • Manhole Inspections updated structure information
  • Televising information updated piping information
Metro Environmental Services performed televising in April – July 2016

- Televised 18,751 lft of storm sewers
- $18,034 total cost, average unit cost $0.96/lft
- 50% was 12” diameter or less
- Provided database as deliverable w/:
  - Unique IDs
  - NASSCO Quick Scores
  - Videos
  - Reports
SEWER CONDITION

Televising

Conclusions:

- 85% of sewers in good condition
- Minimal sewers found to have defects
Roots at Joints

Roots cut to traverse pipe

Counter: 77.6
Code: RTJ (Roots Tap Joint)
Percent: 005
Severity: 
From: 07
To: 
Remarks: 
Diam: 
Continuous Defect:

16:55 07.11.16
LC1: +0077.60 ft
Longitudinal Cracks & Deformed Pipe

- Longitudinal crack
- Pipe deforming & may eventually collapse
Pipe Collapse

- Pipe buckling
Hole in pipe
Joint Separated
• Apple iPad tablets utilized for collecting data

• ArcCollector interface with custom digital form

• Attributes were MACP Level I “plus” –
  • “Plus” - added a couple fields to indicate condition and any notes
STRUCTURE CONDITION

• Condition –
  • Given general qualitative structural score of 1, 3, 5 (Good, Fair, Poor)
  • “Gut Check” from Field Staff

• 654 Storm Structures Inspected
  • 78% in Good Condition
  • 19% in Fair Condition
  • 3% in Poor Condition
Storm Outfall Deteriorating

- Ground eroding around outfall
- Outfall exposed to grade
- Outfall rusting/deteriorating
Structure Collapsing

- Frame/Cover disconnected from structure
- Block frame loose
- Masonry brick interior walls – falling and crumbling into structure
Loose Block & Brick, Hole in Structure Wall
Cracks/Holes in Structure
Manhole Inspection Forms (created in GIS):
• Inspection data provided for the City
  • Can be utilized for work orders, etc.
• Includes:
  • All inspection data
  • Condition field (good, fair, poor)
  • Location map
• **Condition** of asset used to estimate **Probability of Failure (POF):**
  - May include factors such as age, soil type, material of construction, CCTV scores

• **Criticality** determined to estimate **Consequence of Failure (COF):**
  - May include location (surface water, railroad), surface type (road/grass), customers/flow, critical areas

• **Business Risk Evaluation (BRE) = POF x COF**
Using GIS to develop POF/COF/BRE:

- Cost Factors
- Rehab Factors
- Material
- Pipe Age
- Soil Type
- Rehab Costs
Using GIS Model Builder to develop COF:

- Diameter
- Depth
- Surface Type
- Critical Areas
- Proximity to Water body
Using GIS Model Builder to develop POF:

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Using GIS to develop BRE:

\[ \text{BRE} = \text{POF} \times \text{COF} \]

- Map identifies areas with BRE score results
- Also indicating any “critical” areas

\[ \Rightarrow \] Starting point to further refine and develop CIP and/or O&M costs
CCTV DATA INTERFACE WITH GIS

- CCTV Contractor used GIS extension
- Used ESRI CCTV Government Solution Package to integrate data
- Allows for viewing of CCTV data entries in GIS
CCTV data to GIS
• Giving locational value to the defects found in the CCTV data

Separated Joint
NEXT STEPS

• Finalize BRE/Sensitivity Analysis
• Determine O&M Costs & Capital Improvements
• Balance the City’s Needs and Cost ⇒ Rate Analysis