



DOT

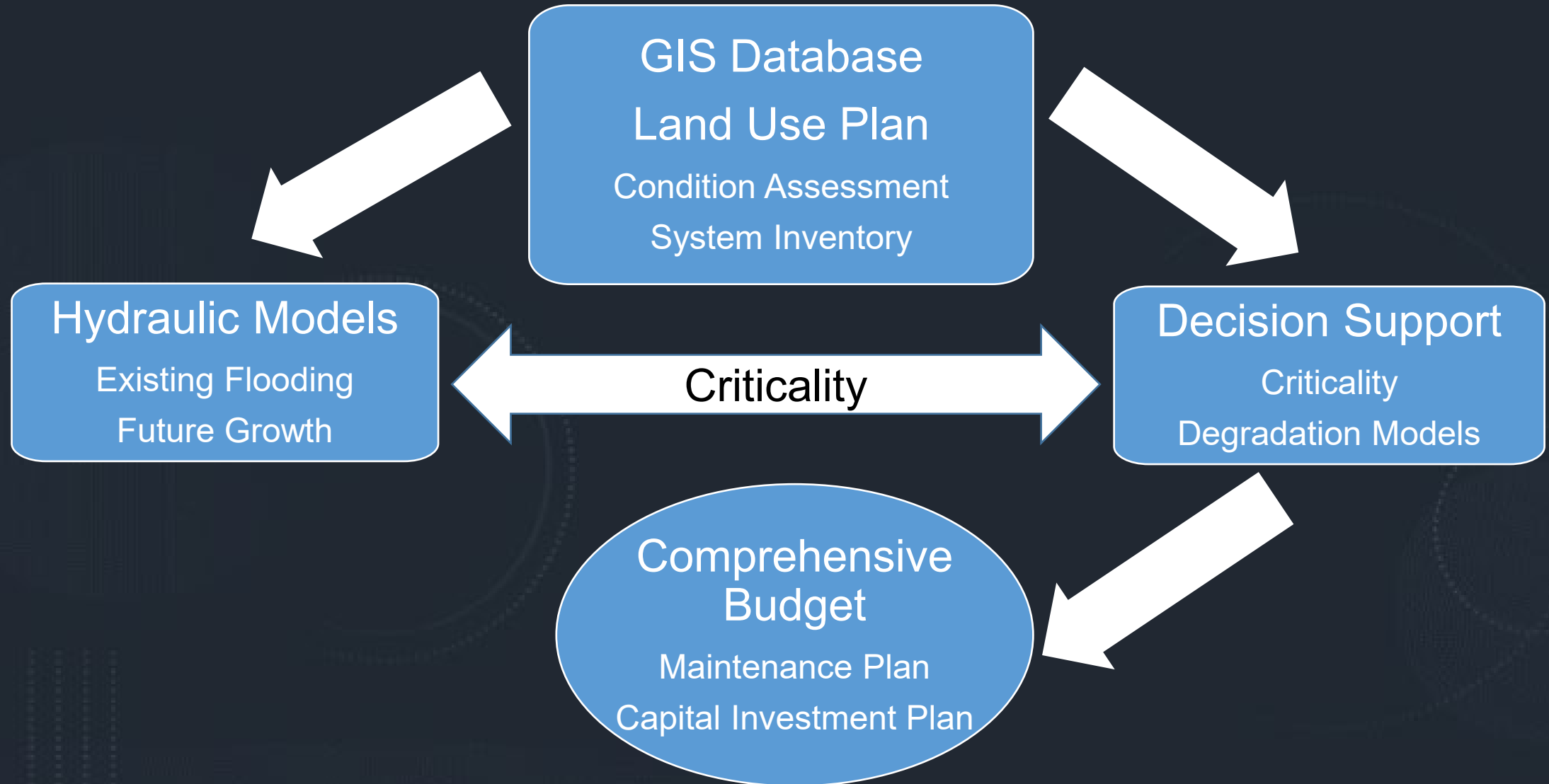
DECISION OPTIMIZATION TECHNOLOGY

“Building Better Asset Management and Capital Plans”
by Kurt Bialobreski, P.E., PTOE, Chief Innovation Officer,
Hanson Professional Services Inc.

Agenda

- House Bill 53 (HB 53) Understanding
- Why Decision Support Tools?
- Decision Support Tool Methods
- Using Hydraulic Models for Planning
- DOT™ Features
- Question and Answer
- Contact Information

HB 53 Understanding



Why Decision Support Tools?



REDUCE LIFE CYCLE
COSTS



CREATE STAKEHOLDER
BUY-IN



CONSIDER
SOCIOECONOMIC
BENEFITS



BUILD DATA DRIVEN
BUDGETS

Decision Support Tool Methods



SIMPLE RANKING

Sections are ranked and investments are determined based on current asset condition (worst-first). Budget is used until it is fully exhausted. This results in the lowest level of investment efficiency.

- X Multi-criteria analysis
- X Guaranteed best performance setting
- X Target level of performance
- X Considering multiple constraints
- X Investment timing and delay analysis



PRIORITIZATION & CBA

Sections are prioritized using multiple criteria such as condition or risk, or based on a cost-benefit analysis. The analysis is performed on a year-by-year basis to identify projects.

- ✓ Multi-criteria analysis
- X Guaranteed best performance setting
- X Target level of performance
- X Considering multiple constraints
- X Investment timing and delay analysis



TRUE OPTIMIZATION

A true multi-constraint multi-year analysis that results in a scientifically proven and mathematically guaranteed best possible solutions.

- ✓ Multi-criteria analysis
- ✓ Guaranteed best performance setting
- ✓ Target level of performance
- ✓ Considering multiple constraints
- ✓ Investment timing and delay analysis

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Hydraulic Modeling

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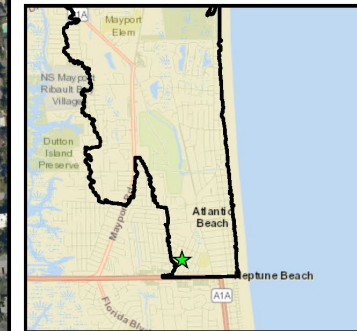


Design Event	Peak Stage Summary											
	Peak Water Surface Elevation (feet NAVD88)				Peak Water Surface Elevation (feet NAVD88)				Peak Water Surface Elevation (feet NAVD88)			
	Node NSP20000, Top EL = 4.91				Node NSP20010, Top EL = 4.99				Node NSP20020, Top EL = 5.2			
	Pre	Post	Change		Pre	Post	Change		Pre	Post	Change	
10-Year, 24-Hour	6.17	6.11	-0.06		6.14	6.1	-0.04		6.14	6.1	-0.04	
25-Year, 24-Hour	6.89	7.16	0.27		6.89	7.16	0.27		6.89	7.16	0.27	
Mean Annual, 24-Hour	5.4	5.04	-0.36		5.04	4.92	-0.12		4.9	4.87	-0.03	

Exhibit 5A

Seminole South

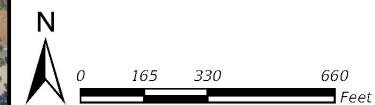
Section 16&17 Township 25 Range 29E



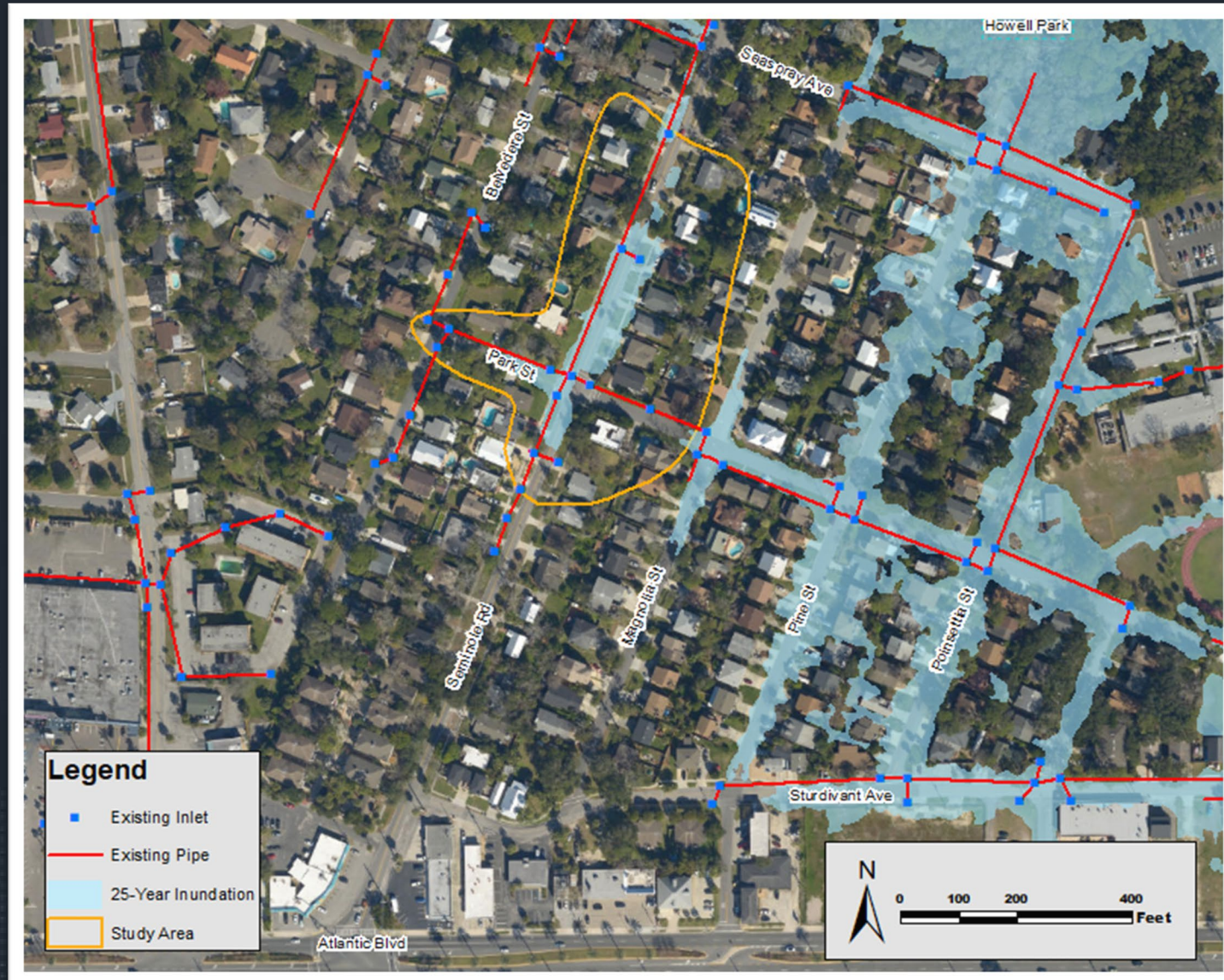
Legend

- STAGE/AREA NODES
- CHANNEL LINK
- PIPE
- WEIR LINK
- Proposed Pipes
- Proposed Mean Annual Flooding
- Existing Mean Annual Flooding

Mean Annual Results



Hydraulic Modeling

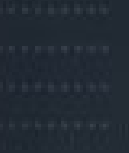


User Interface








Solutions



Asset Selection



Transportation

- ☒ Roads 
- ☐ Sidewalks 
- ☐ Curbs & Gutters 
- ☐ Street Lights
- ☐ Traffic Signals
- ☐ Traffic Signal Control Box
- ☐ Traffic Signs
- ☐ Footbridges
- ☐ Intersections
- ☐ Median



Wastewater

- ☐ Sewerlines 
- ☐ Treatment Plants (Sewer)
- ☐ Manholes (Sewer) 
- ☐ Pumping Station (Sewer)
- ☐ Lagoons
- ☐ Casing (Sewer)
- ☐ Valves (Sewer)



Water

- ☐ Waterlines 
- ☐ Manholes (Water)
- ☐ Treatment Plants (Water)
- ☐ Pumping Station (Water)
- ☐ Valves (Water)
- ☐ Hydrants 
- ☐ Water Meters
- ☐ Water Towers
- ☐ Watercourse
- ☐ Inland Water



Structures

- ☐ Bridge 
- ☐ Culverts (Structural)
- ☐ Tunnels
- ☐ Retaining Walls



Stormwater

- ☐ Stormlines
- ☐ Manholes (Storm)
- ☐ Pumping Station (Storm)
- ☐ Catch Basins
- ☐ Ponds
- ☐ Detention Ponds
- ☐ Culverts
- ☐ Ditches
- ☐ Catchbasin Lead
- ☐ Casing (Storm)

Apply

Visual Dashboard

ANYTOWN

ASSET TYPE

STORMLINES

NETWORK OVERVIEW

NETWORK GIS VIEW

ASSET INVENTORY

ANALYSIS

REPORTS

SETTINGS

ADMIN

Stormlines - Network Overview

Single Asset

Network Size
1,008,685.1 ft

No. of Assets
11,657

Population
1,000,000

Network Overall Condition



Network Condition Status



Condition Status by Material



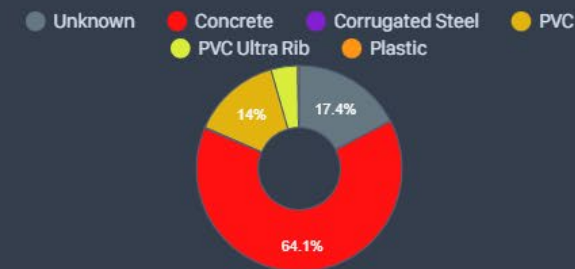
Condition Status by Type



Type Breakdown



Material Breakdown



GIS Inventory

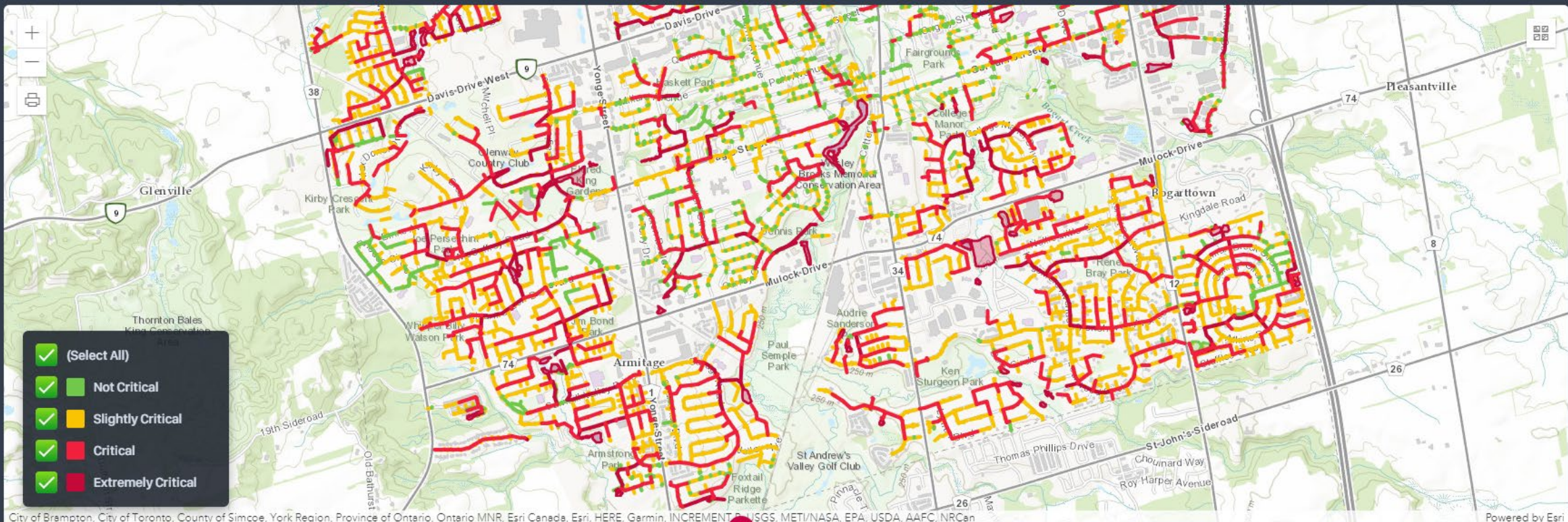
Stormlines - Network GIS View

Assets

Condition

Criticality

Risk



Socio-economic Factors

Stormlines - Analysis - Edit Scenario

[Back](#)[Save](#)[Scenario Info.](#)[Optimization](#)[Treatment Methods](#)[Level of Service](#)[Criticality Settings](#)[Network Subset](#)[Project Alignment](#)[Budget](#)[Capacity Limit](#)☐ Use Default Scenario Settings[Attribute-Based](#)[Community Impact](#)

Relative Importance Scale

0	Not Important
1	Slightly Important
2	
3	
4	
5	Important
6	
7	
8	Very Important
9	
10	
10	Extremely Important

Quantity of Flow

10

Environmental Impact

10

Impact on Surface Water

8

Public Health Impact

6

Transportation Impact

3

Business Impact

6

Design Redundancy

3

Difficulty of Access and Repair

5

Default & Custom Degradation Models

Stormlines - Settings

Select Curves

Asset Configuration

Condition Index

Criticality Index

Risk Index

Treatments

Degradation Curve

Family Class

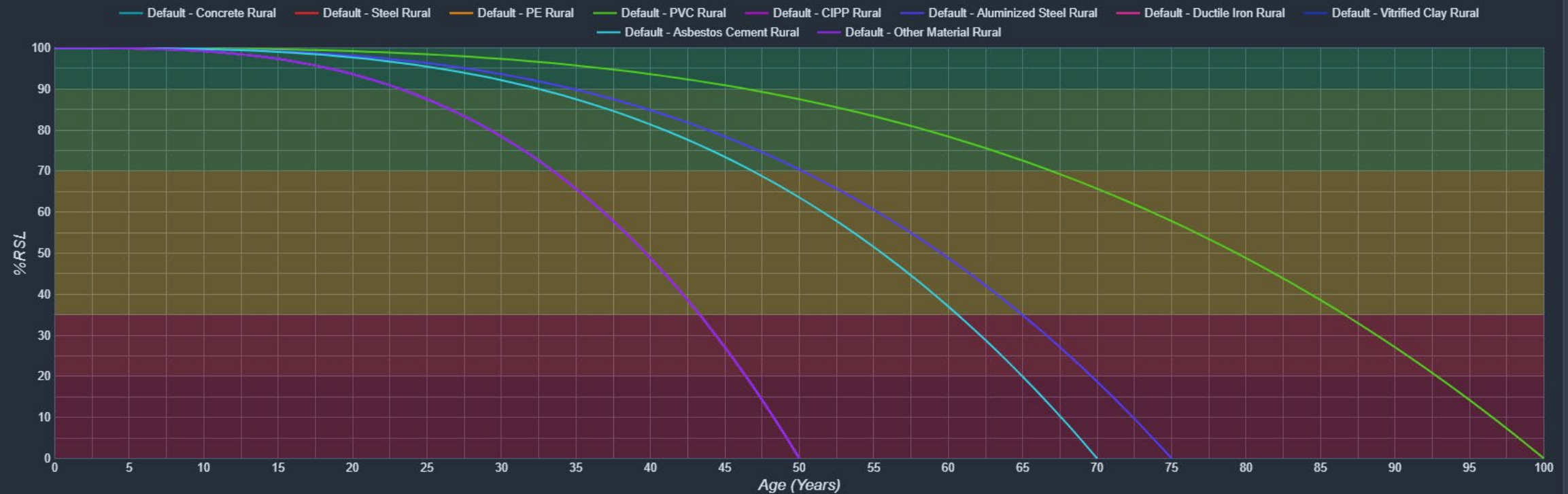
Performance Class

Price Index

Curve List

Curve View

☒ Show Condition States



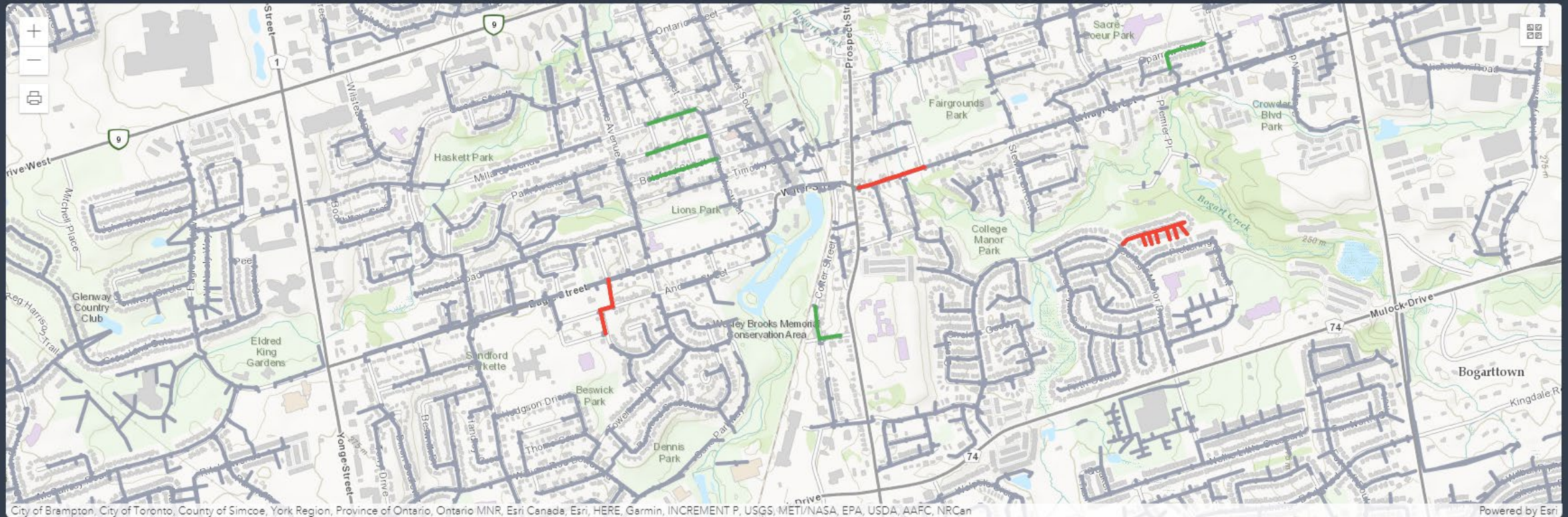
Project Alignment

Stormlines - Analysis - Edit Scenario

[Back](#)[Save](#)[Scenario Info.](#)[Optimization](#)[Treatment Methods](#)[Level of Service](#)[Criticality Settings](#)[Network Subset](#)[Project Alignment](#)[Budget](#)[Capacity Limit](#)☐ Use Default Scenario Settings

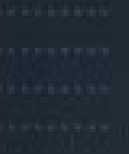
Year

All Years





Budgets & Funding Options



Scenario Info.

Optimization

Treatment Methods

Level of Service

Criticality Settings

Network Subset

Project Alignment

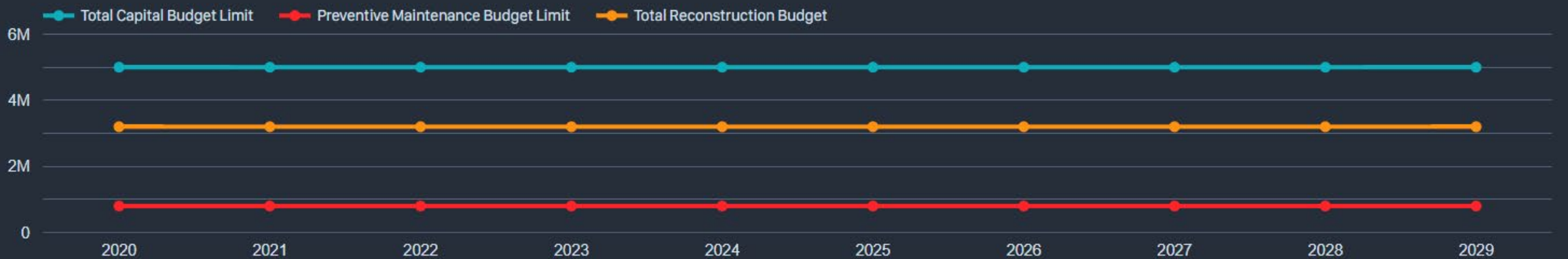
Budget

Capacity Limit

Budget Constraints List



	Name	Budget Type	Subset	Settings	From (Year)	To (Year)	AGF	Actions
	Total Capital Budget Limit	Total Capital Budget		≤ \$5,000,000	2020	2029	0%	
	Preventive Maintenance Budg...	Capital Budget for Treatment ...	Preventative Maintenance	≤ \$800,000	2020	2029	0%	
<input type="checkbox"/>	Total Routine Maintenance Bu...	Total Routine Maintenance Bu...		≤ \$0	2020	2029	0%	
	Total Reconstruction Budget	Capital Budget for Treatment ...	Reconstruction Treatment	≤ \$3,200,000	2020	2029	0%	



Capital Plans

Stormlines - Capital Plan

\$3M, 10 Year Plan

Applied Treatments

Asset List

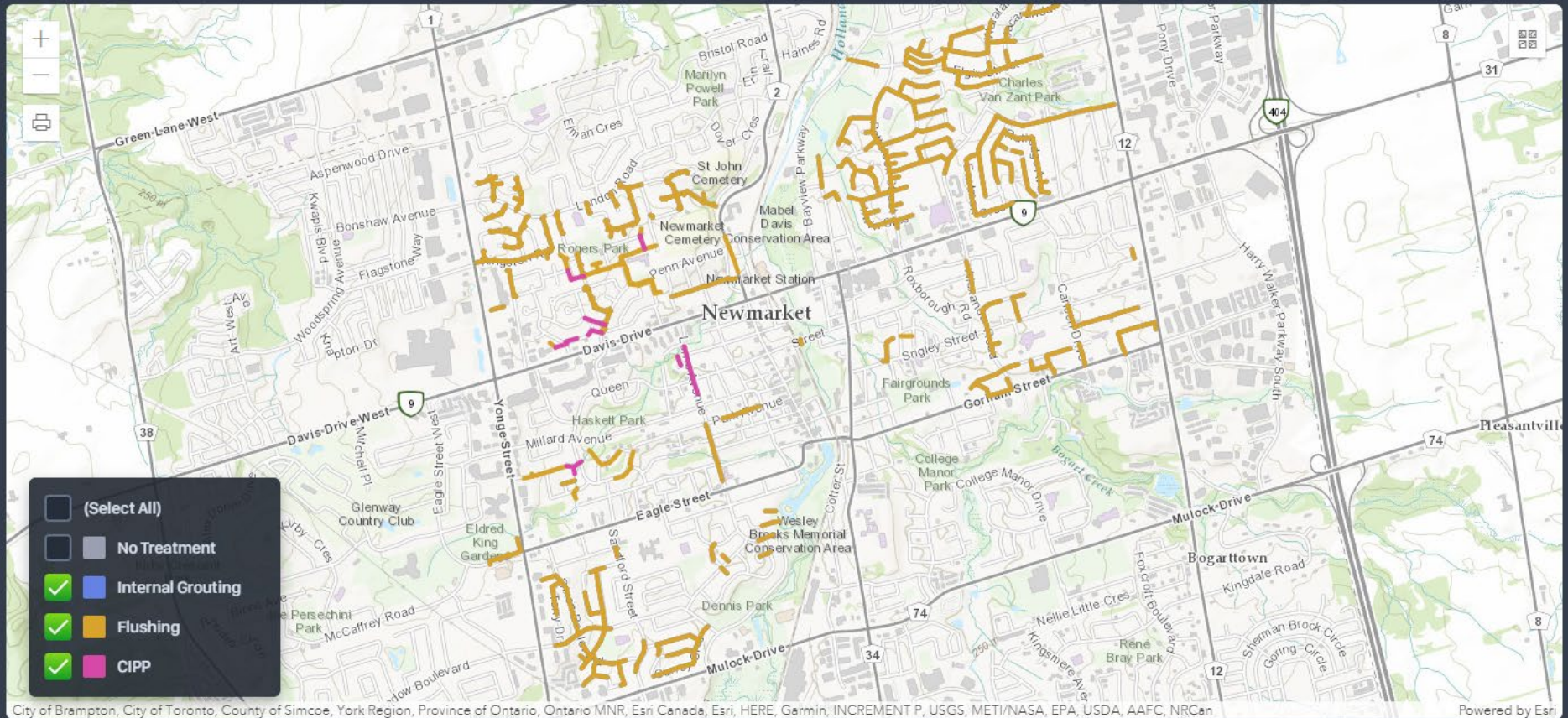
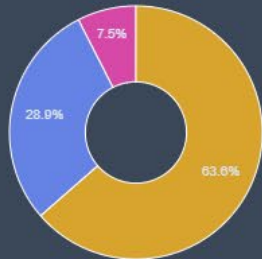
< 2021 >

Total Annual Expenditure
\$4,699,530

Network Condition



Budget Allocation



City of Brampton, City of Toronto, County of Simcoe, York Region, Province of Ontario, Ontario MNR, Esri Canada, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA, AAFC, NRCan

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QUESTIONS

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Thank you for attending the presentation today!