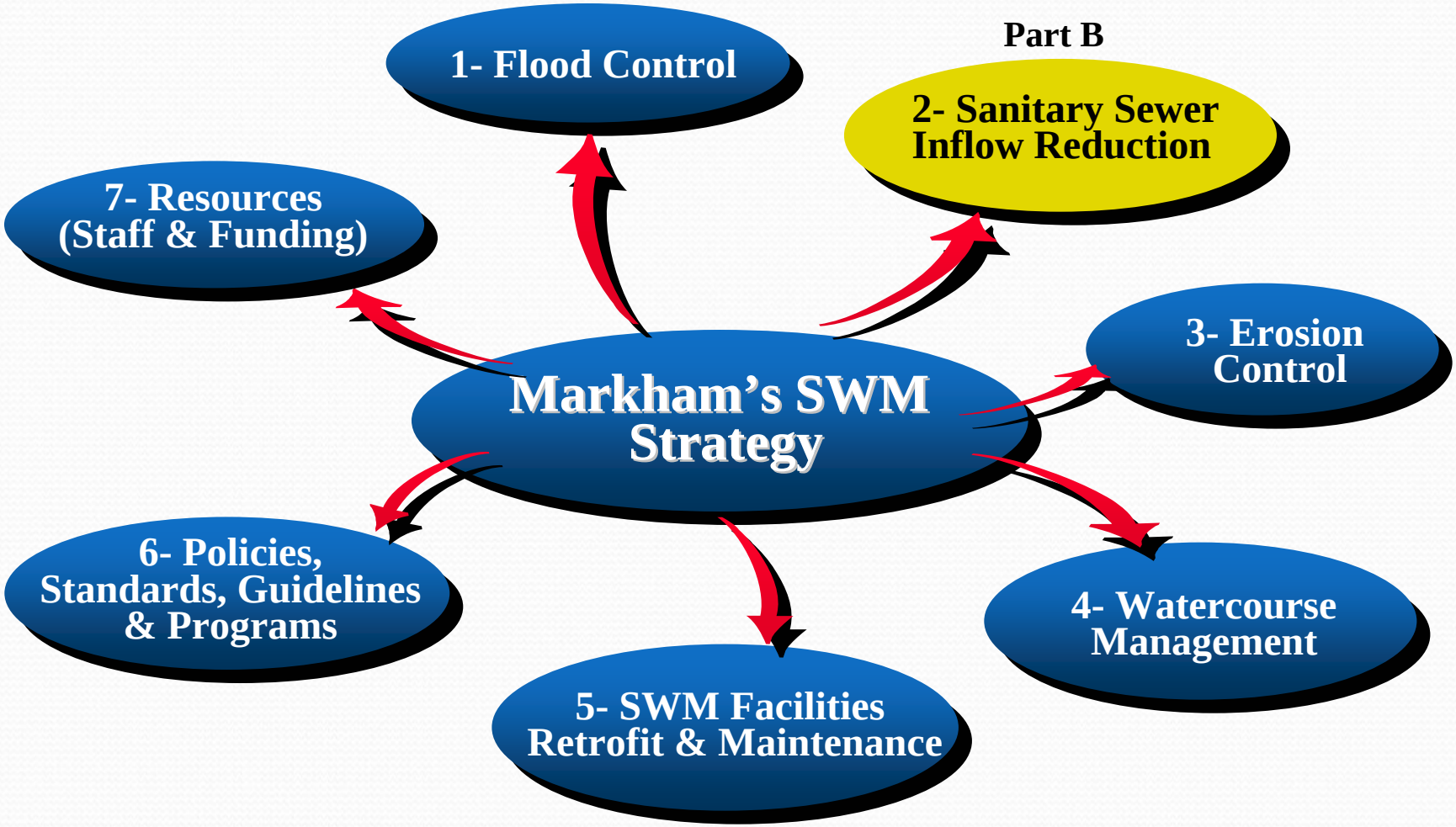
Part B -
West Thornhill Sanitary Sewer System Inflow and Infiltration Reduction

Town of Markham

Waterworks Department

Storm Water Management Strategy Overview



West Thornhill Sanitary Sewer System Inflow and Infiltration Reduction

Problem Identification or Opportunity:

- Sanitary sewers are designed to convey liquid waste along with a minimal amount of infiltration, and no allowance for direct rainwater inflow
- Sanitary sewers can be overloaded, sewage back-ups and basement flooding can occur during rain storms due to the unplanned inflow of rainwater

West Thornhill Sanitary Sewer System
Inflow and Infiltration Reduction

Problem Identification or Opportunity (Cont'd) :

Rainwater entering sanitary sewers is not permitted and causes numerous serious problems:

- Overloading of sewers resulting in back-ups and basement flooding
- Sanitary sewer overflows to creeks
- Overloading sewage treatment plants and pumping stations resulting in increased pumping and treatment costs

West Thornhill Sanitary Sewer System
Inflow and Infiltration Reduction

The goal is to improve the

Sanitary Sewer System

to provide a similar level of service

across the Town

West Thornhill Sanitary Sewer System Inflow and Infiltration Reduction

Solution Approach

- Minimize direct inflow from rainwater into sanitary sewer system in high priority areas through downspout disconnection and manhole sealing
- Minimization of inflow and infiltration (I/I) through system repairs and upgrades.

Note: Storm water system improvements will also reduce I/I

West Thornhill Sanitary Sewer System Inflow and Infiltration Reduction

Solution Approach (Cont'd) :

Step 1. Provide capacity improvements based on modelling results

Step 2. Identify and minimize sources of I/I in areas with the highest measured I/I

Step 3. On-going system maintenance and performance optimization

Step 4. Next Steps: Re-evaluate I/I rates, identify remaining high priority locations and recommend solutions

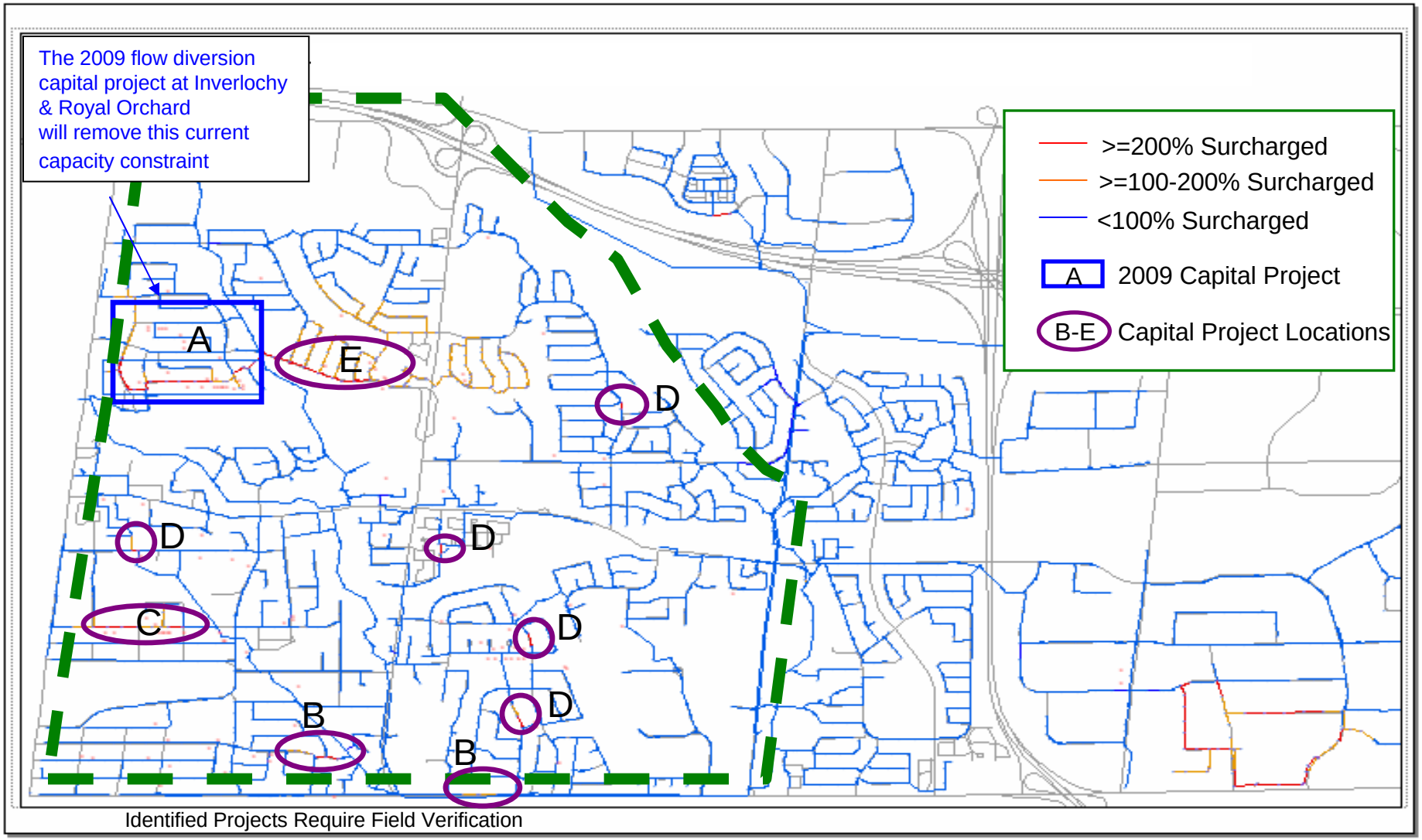
West Thornhill Sanitary Sewer System Inflow and Infiltration Reduction

Solution Approach (Cont'd) :

Step 1. Provide Capacity Improvements

- Identify system deficiencies compared to current Design Standards using completed sanitary sewer model

West Thornhill Sanitary Sewer System
Inflow and Infiltration Reduction



West Thornhill Sanitary Sewer System Inflow and Infiltration Reduction

Step 1. Provide Capacity Improvements

Year		Project Location	Pipe Length (m)	Estimated Cost ($)
2009	A	Royal Orchard, Iverlochy Blvd to Baythorn Drive	225	$450,000
	B	Pinevale Road; Steeles from Olde English Lane to Valloncliffe	415	$830,000
2010-2015	C	Clark Avenue, from Dudley to Lillian Avenue	700	$1,400,000
	D	Lauraleaf; Valloncliffe; Elgin/Alcain; Harris Way; Willowbrook	700	$1,400,000
	E	Royal Orchard, from Kirk Drive to Blue Spruce Lane	750	$1,500,000
Total Infrastructure Capacity Improvement Cost			**2,790**	**$5,580,000**

Construction to be coordinated with storm sewer projects & roads as possible

West Thornhill Sanitary Sewer System
Inflow and Infiltration Reduction

Step 2. Identify & Minimize Sources of I / I (in areas with highest measured I/I)

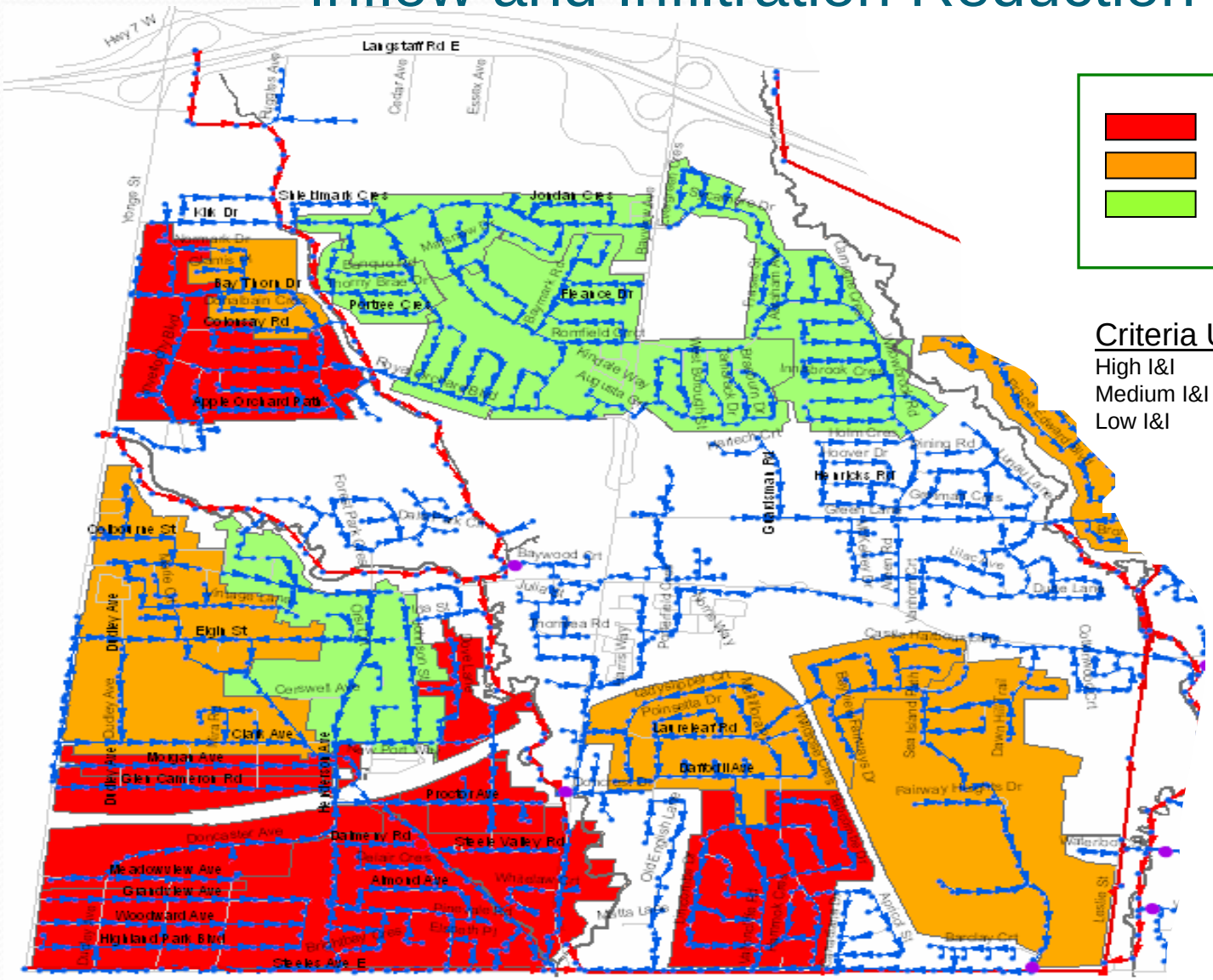
Project	Description	Year	Status
Existing Projects:			
(a) (Grandview) Downspout Disconnection Pilot Program	Evaluate Downspout Disconnection Pilot Program Prepare recommended work plan for West Thornhill	2009	underway
(b) 2008 I/I Study	Greater Thornhill Flow Monitoring – determination of I/I rates & prioritized I/I source investigation areas	2008-2010	underway
(c) 2009 I/I Study	I/I source investigation & system cross connection identification	2009-2010	RFP in April
(d) Eliminate System Cross Connections	Identify & eliminate cross connections between storm & sanitary systems	2009-2011	underway

West Thornhill Sanitary Sewer System
Inflow and Infiltration Reduction

Step 2. Identify & Minimize Sources of I / I (in areas with highest measured I/I)

Project	Description	Year	Total Cost ($)
Proposed Projects:			
(a) Downspout Disconnection Program (West Thornhill)	Field investigation including site survey, smoke testing, dye testing, flow monitoring etc. (6400 Properties)	2010-2013	1,360,000
	Downspout Disconnection (5-10% of total connected to sanitary) 320-640 properties	2010-2013	$500,000
(b) Elimination of Inflow through Manhole Covers	1700 Sanitary sewer Manhole Covers sealed	2009-2010	$66,000
(c) Re-lining of Sanitary Sewer System (Pilot Program)	Eliminate I/I into main lines & service connections through in-situ lining in pilot area (main plus lateral from main line to house)	2009-2011	$ 1.5M Town cost dependent on Federal & Provincial Funding ($5M total cost)
	Total Cost for Inflow Reduction Project		**$4.02 M**

West Thornhill Sanitary Sewer System
Inflow and Infiltration Reduction



High I&I
Medium I&I
Low I&I

Criteria Used:

High I&I : IPF>6.0 and RDII>560
Medium I&I : IPF=4-6 and RDII=280-560
Low I&I : IPF<4.0 and RDII<280

West Thornhill Sanitary Sewer System Inflow and Infiltration Reduction

Step 3. On-going System Maintenance and Performance Optimization

- Monitor system condition and identify defects
- Prioritize remedial work programs based on system deficiencies

West Thornhill Sanitary Sewer System Inflow and Infiltration Reduction

Step 4- Next Steps:

Re-evaluate I/I rates, Identify priority Locations & Recommend Solutions

- Continuously monitor sanitary sewer flows and identify the influence of I/I.
- Additional programs to be developed based on the need to control I/I.
- Implement water conservation programs to further reduce sanitary sewage flows

West Thornhill Sanitary Sewer System Inflow and Infiltration Reduction

Recommendations:

- That the presentation titled "West Thornhill Sanitary Sewer Inflow and Infiltration Reduction" be received, and
- Staff report back with the evaluation of the Downspout Disconnection Pilot Program, and with a proposed work plan for extending the Downspout Disconnection program in the 4th Quarter 2009.
- Staff report back on feasibility, timing & funding source for identified projects.

West Thornhill Sanitary Sewer System Inflow and Infiltration Reduction

Questions?

Q:\Commission Share\Operations and Asset Management\Reports\2008\Waterworks\West Thornhill Sanitary Sewer Presentation\Feb 9 2009 ver WW_Pres_Thornhill_San.ppt