West Thornhill Stormwater Flood Remediation Class EA Study

Project Update

Special Development Services Committee Meeting

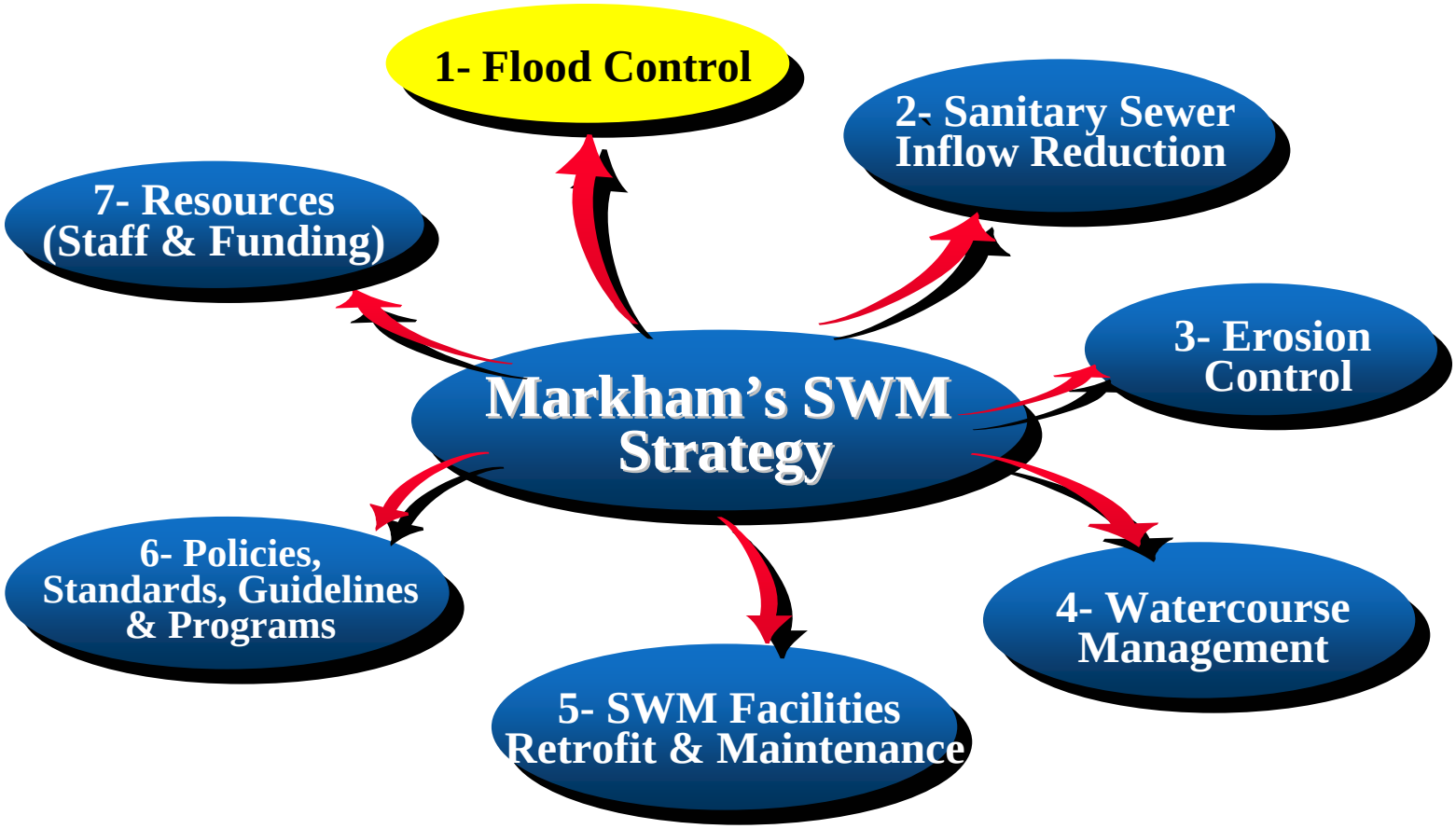
June 2, 2009

Asset Management Department

Agenda

- **Purpose of the Presentation**
- **Stormwater Management Strategy Overview**
  - Update on Current Studies
  - Townwide Areas Designed for 2 year Stormwater Sewers without Design for Overland Flow Routes
- **West Thornhill Stormwater Flood Remediation Study**
  - Study Area
  - Class EA Process
  - Problem Identification
  - Options/Alternatives Explored
  - Alternative Solutions
  - Summary of Public Information Centre #1 (PIC#1)
  - Funding Source / Analysis
  - Evaluation Criteria & Decision Making Process
  - Selection of Draft Preferred Alternative
  - Next Steps / Recommendations

Stormwater Management Strategy Overview



Stormwater Management Strategy Update

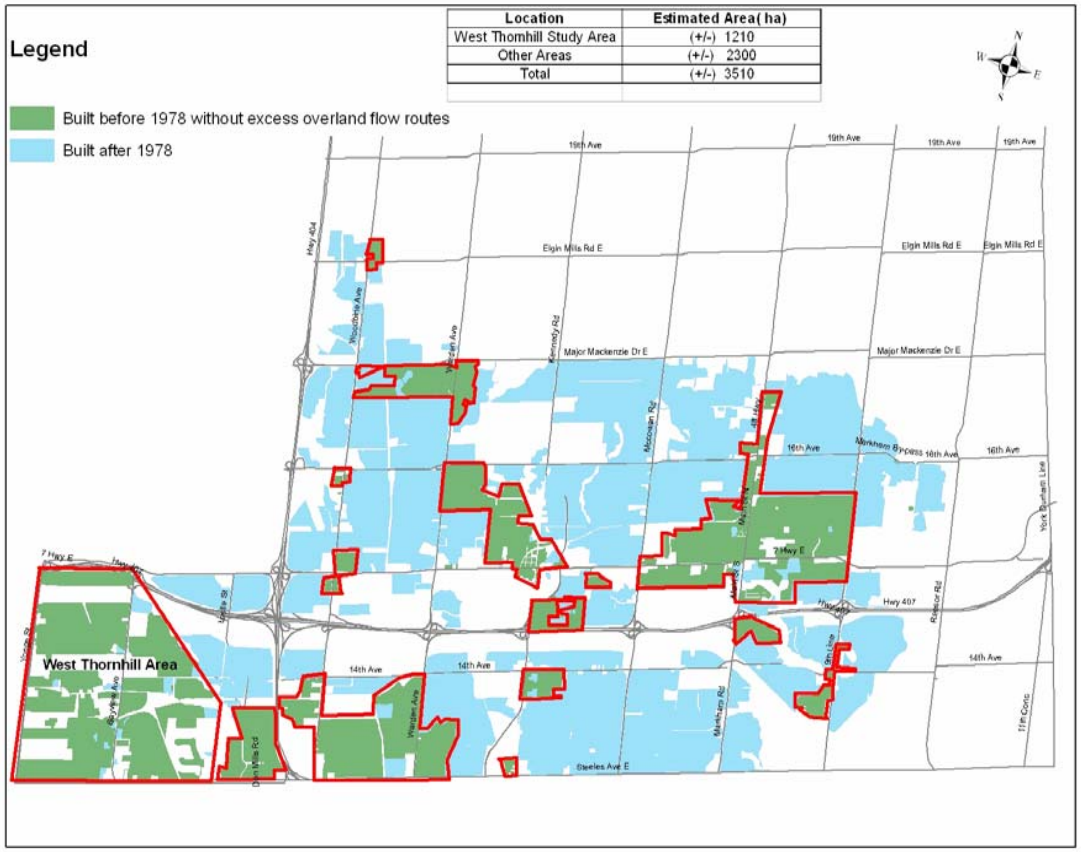
- **Flood Control**
  - West Thornhill Stormwater Remediation Study – ongoing (This study)
  - Thornhill Sanitary Model: ongoing (Part B of this Presentation)
  - Don Mills Channel Capacity Study – Underway. PIC #2 planned in Summer of 2009
  - Town Wide Flood Emergency Response Plan (FERP): Phase 3 will be initiated in March 2009
  - Elm Ridge Acre Road Storm Sewer Rehabilitation: construction completed in 2008
- **Sanitary Sewer Inflow Reduction**
- **Erosion Control (Town-wide Erosion Implementation Study)**
  - 2 sites construction completed in 2008
  - 3 sites currently under detailed design

Stormwater Management Strategy Update (continuation)

- **Watercourse Management**
  - ❖ Pomona Mills Creek Restoration Study – ongoing. Phase 1 of 4 construction completed.
  - ❖ PIC #2 planned in Summer of 2009
- **SWM Facilities Retrofit & Maintenance**
  - ❖ Stormwater Management Facility Maintenance Master Plan – completed
- **Policies, standards, guidelines and programs**
  - ❖ Master Servicing Plan for Growth Management Study: Awarded contract to consultants in February 2009
  - ❖ Stormwater Guideline Update – ongoing. To be completed in summer 2009
- **Total $11.5M funding available/designated for Storm Water Management Strategy**

Townwide Areas Designed before 1978 for 2 year Stormwater Sewers without Design for Overland Flow

- **What areas in Town were built similar to West Thornhill? (Green)**
  - ❖ West Thornhill: 1,210 ha
  - ❖ Rest of the Town: 2,300 ha
- **Other part of the Town have 100 year protection paid for by developers and then by the home purchasers (Blue)**

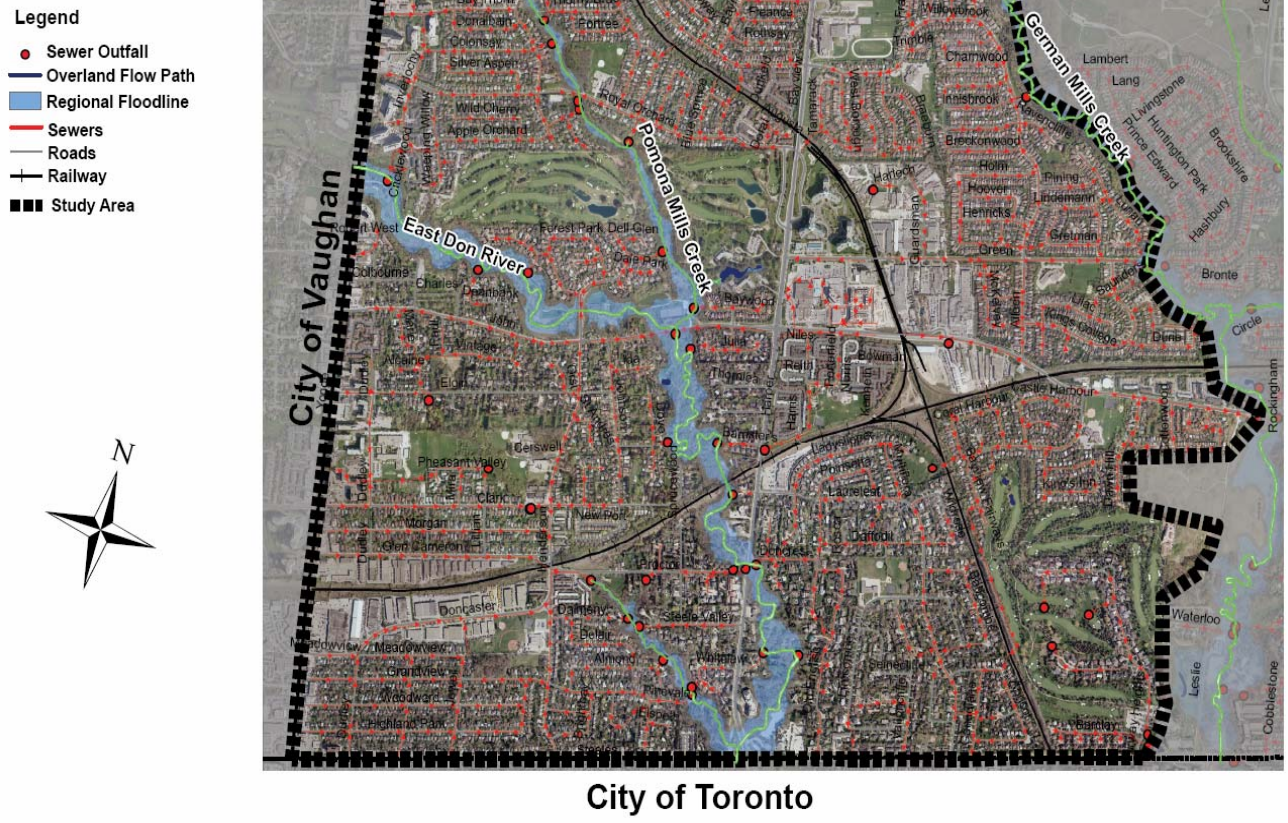


West Thornhill Stormwater Flood Remediation Class EA Study

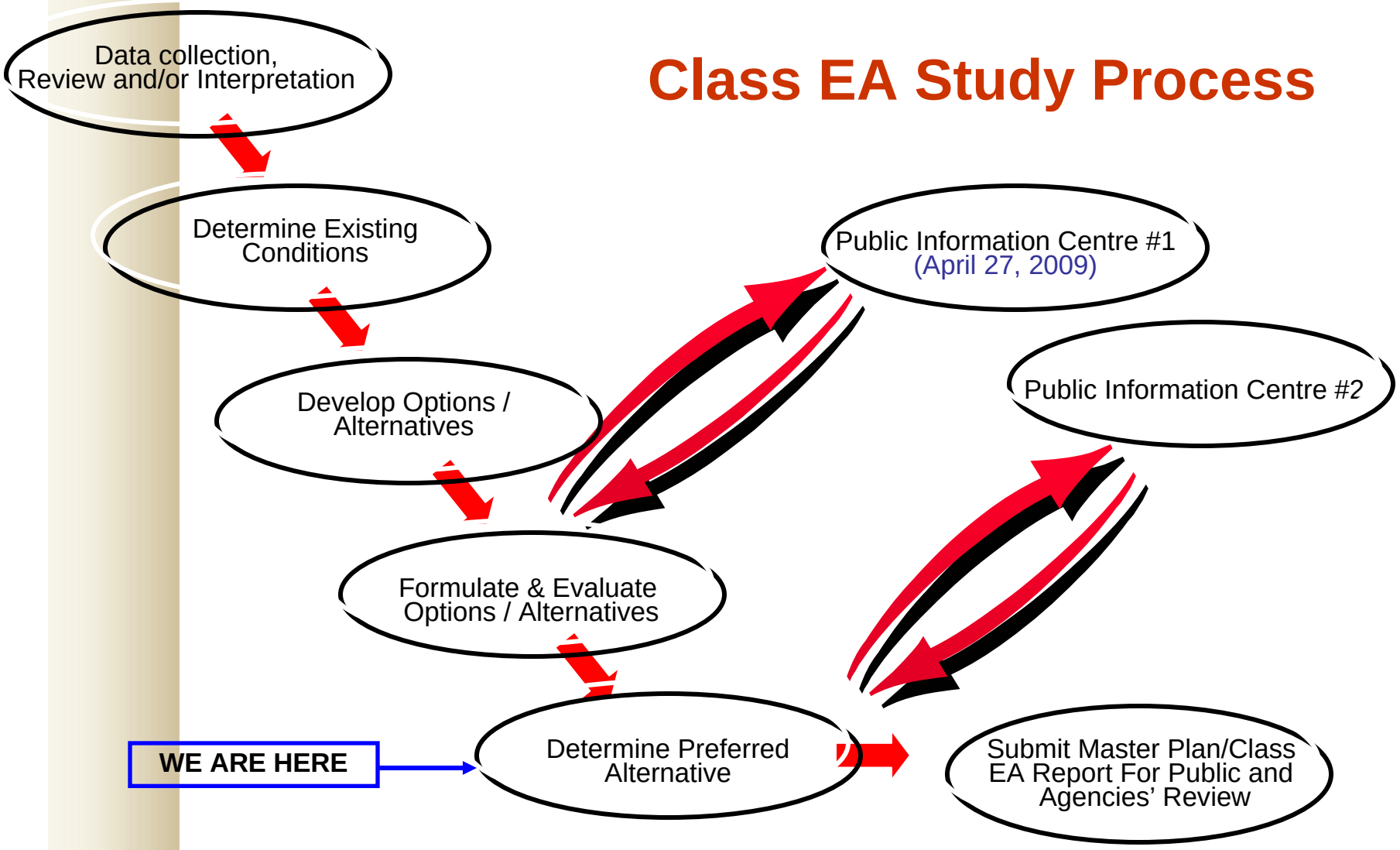
- **Council Authorization September 2007**
- **Consultant retained March 2008**
- **Liaison Group initiated in April 2008 – 4 meetings to date**
  - Councillor Valerie Burke (Ward 1), Deputy Mayor Jack Heath, Regional Councillor Tony Wong, Councillor Erin Shapero (Ward 2)
  - Bayview Glen Residents Association, Ward 1S Thornhill Residents Inc., German Mills Ratepayers Association, Grandview Area Resident Association
  - Town of Richmond Hill, City of Vaughan, Region of York, City of Toronto, TRCA
- **General Committee Presentation on Project Update on March 23, 2009**
- **Public Information Centre #1 held on April 27, 2009**

Study Area – West Thornhill

Approximate Study Area = 1,210 Ha
Approximate No. buildings = 8495



Class EA Study Process



Problem Identification

- **Problem Statement: The west Thornhill area is vulnerable to significant surface and building flooding during severe storm events. Storm flows and volumes during these severe storms exceeded the current storm drainage infrastructure capacity in the area.**
- **Objective: In response, the Town of Markham initiated in February 2008 a Municipal Class Environmental Assessment study and hired a consulting firm to assess the preferred alternative to improve the storm system performance in West Thornhill to an acceptable level of protection.**

Project Status – Tasks Completed

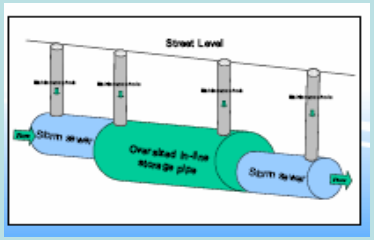
- **Flow and rainfall monitoring**
- **Existing data collection / analysis**
- **Alternative Solutions**
- **Public Information Centre #1 (PIC #1)**
  - ❖ 109 residents signed in (estimated 150 people attended)
  - ❖ 31 comment sheets received to date
- **Evaluation criteria**

Options/Alternatives Explored

Conveyance

Replacement of Existing Sewers

Oversized Pipes



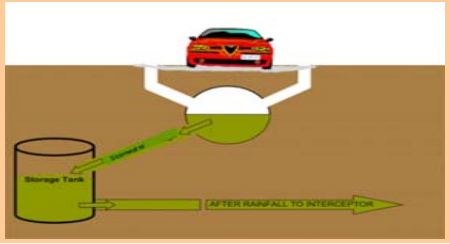
Source Control

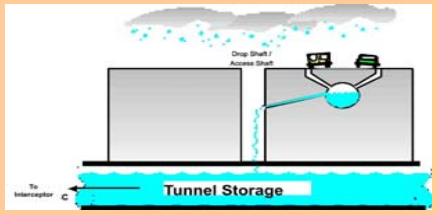
Porous pavement and surface storage

And:
- Downspout Disconnection
- Installation of inlet control devices and new catch basins/inlets

End of Pipe – Wet / Dry Ponds

Source Control / Conveyance – Underground Storage

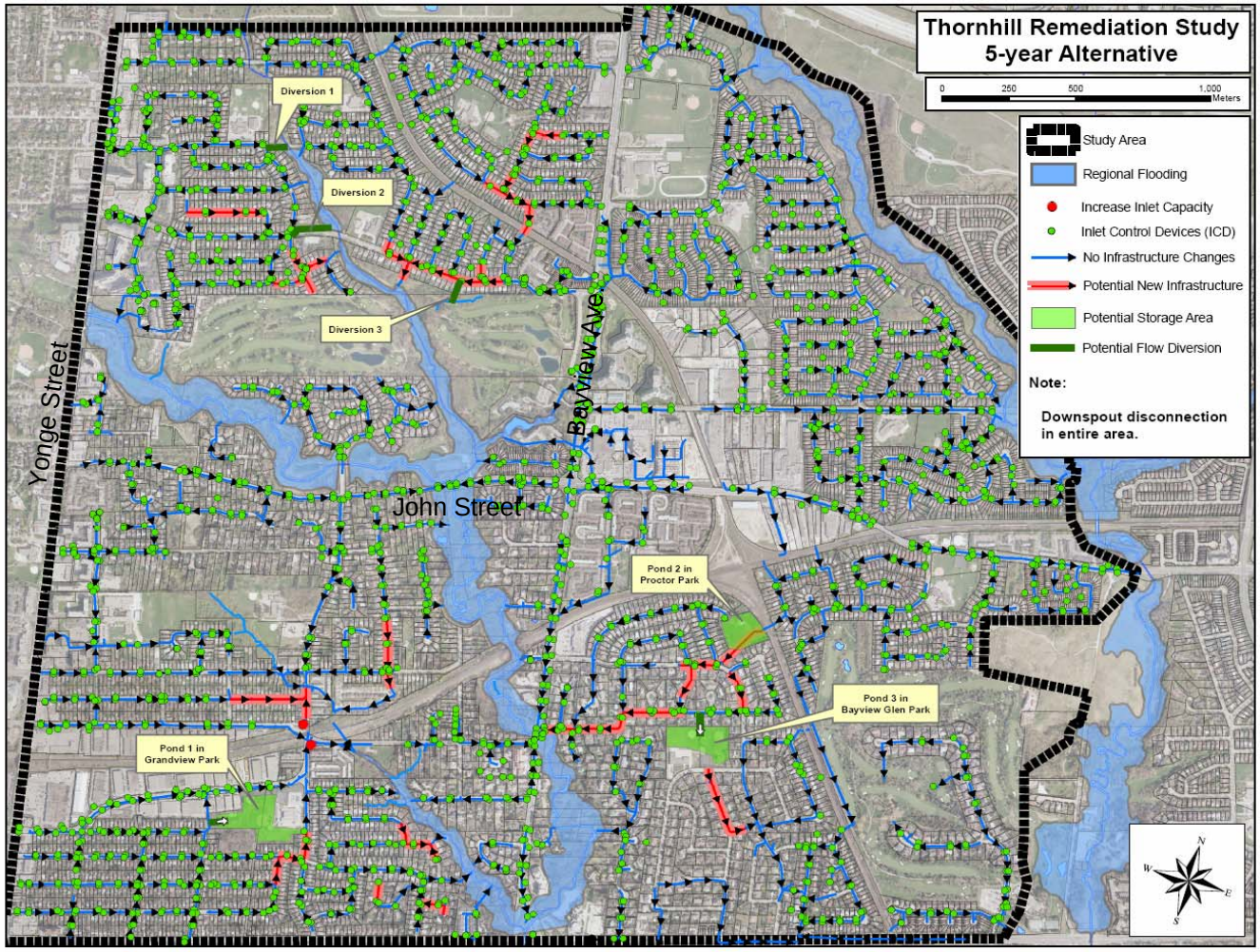




Alternative Solutions

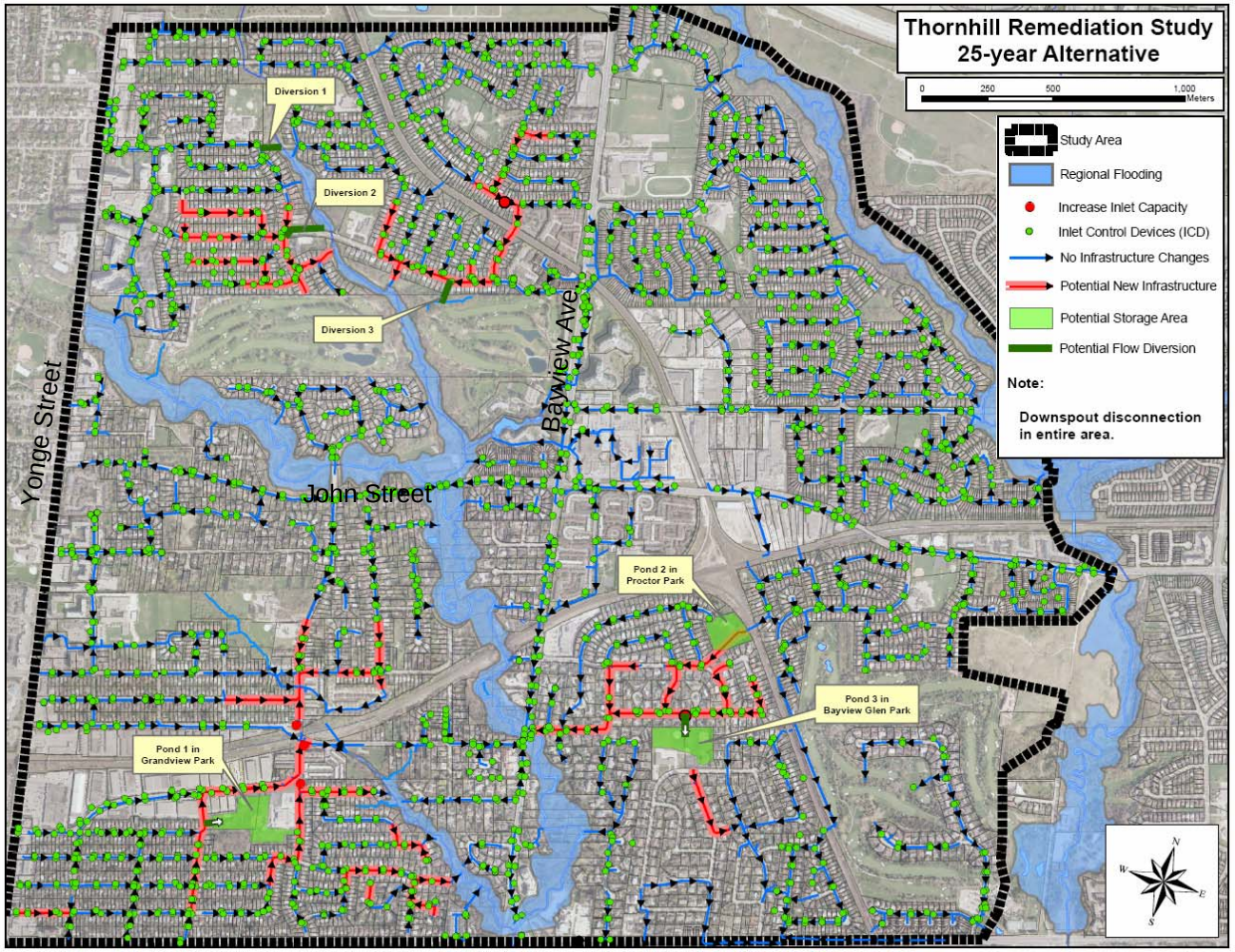
- **Each alternative solution (except for Do Nothing) is a combination of:**
  - Downspout disconnection
  - Inlet control devices (to reduce surface flow into storm sewers where capacity is insufficient)
  - New catchbasins (to increase surface flow into storm sewers where capacity is sufficient)
  - Potential new infrastructures (twining sewers and diversions) are only considered for basement flood prone areas
- **The variety of Alternatives have been evaluated for each of the following storm event return periods**
  - Alternative #1: Do Nothing
  - Alternative #2: 5 year level of protection **($17 million)**
  - Alternative #3: 25 year level of protection **($33 million)**
  - Alternative #4: 100 year level of protection **($40 million)**

Alternative Solution #1 – 5 year Level of Protection



Note: Stormwater Management Ponds will be reviewed at detail design stage

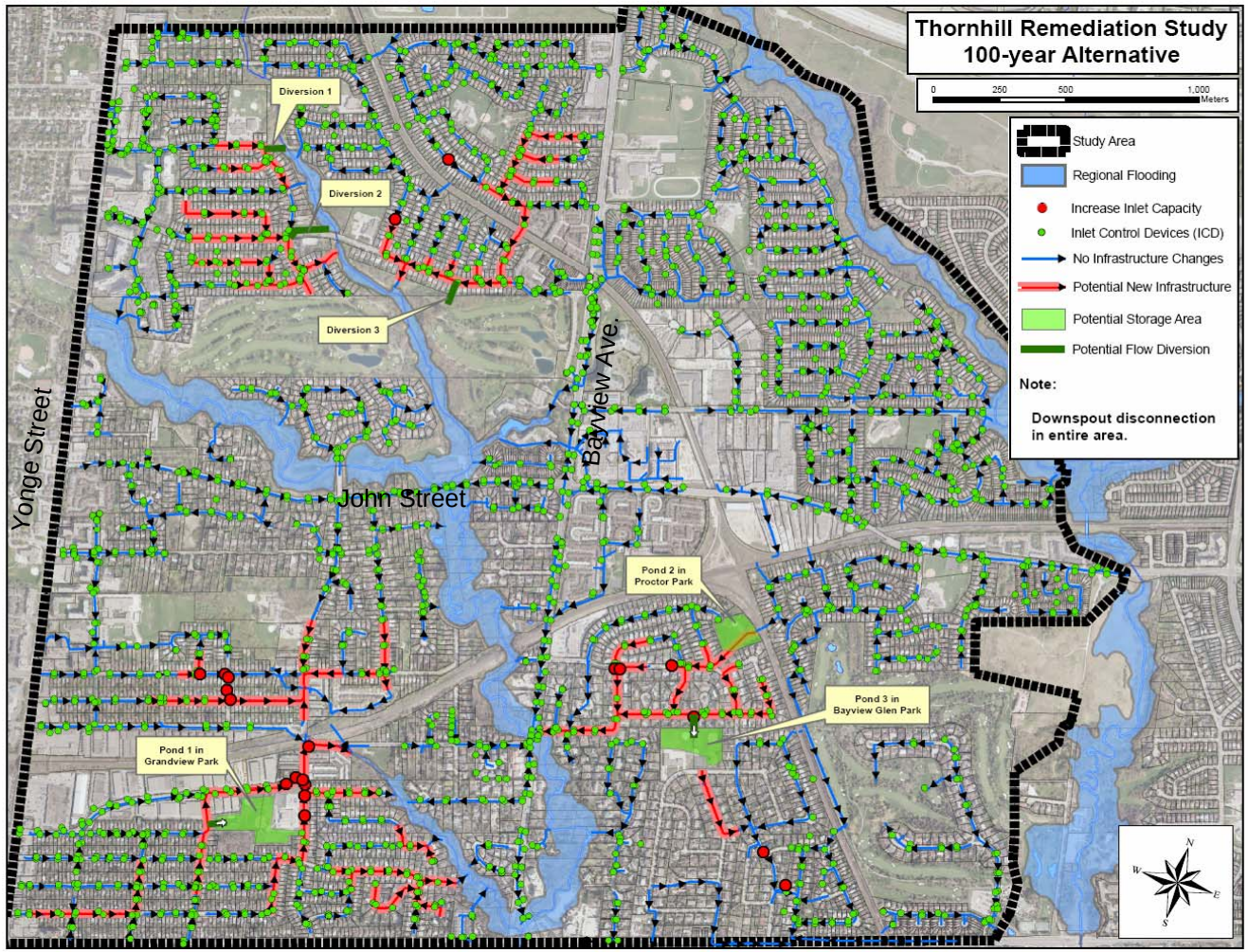
Alternative Solution #2 – 25 year Level of Protection



Note: Stormwater Management Ponds will be reviewed at detail design stage

Alternative Solutions #3 – 100 year Level of Protection

Note: Stormwater Management Ponds will be reviewed at detail design stage



PIC #1: Summary of Comments Received

- Why upgrade the drainage system in the area when not everyone is flooded?
- Will downspout disconnection increase surface runoff and flood homes that are not flooded currently?
- The 100-year level protection is needed, however there are concerns that it is still not enough due to climate change.
- There are concerns regarding how all the improvements will be paid. The local residents should not be charged.
- Town should assist residents on private lot drainage issues (potentially through education).
- Concerns with infill housing (increasing hard/impervious surface). This is a general concern with development intensification and impacts on existing conditions.
- Concerns with Regional initiatives such as Bayview Avenue widening. Stormwater should be a Regional issue as water from other municipalities is just passing through West Thornhill.

Townwide Stormwater Funding Feasibility Study

- Engineering Department has initiated Phase I Stormwater Funding Feasibility Study to address Townwide Stormwater Management (SWM) funding options
- This study will include all aspects of SWM Strategy (e.g. Erosion, SWM ponds, Creek improvements, flood remediation for areas built before 1978, etc.)
- Recommendation to Council in 2010
- Timing of this funding study does not align with the West Thornhill needs for upgrades
- Funding strategy recommended for West Thornhill can potentially be extended/modified by the results of this Townwide SWM Funding Study

Townwide Cost Estimates
SWM Strategy #1 Flood Remediation

Calculation based on West Thornhill Area = 1210 ha

and Rest of the Town = 2300 ha

Level of Protection	Stormwater System Improvements to Areas similar to West Thornhill EA		Total Townwide Flood Remediation Cost Projected
	West Thornhill Cost (A)	Rest of the Town Projected Cost (pro-rated based on area) (B)	(C)=(A)+(B)
5 year	$17 M	$33 M	$50 M
25 year	$33 M	$63 M	$96 M
100 year	$40 M	$77 M	$117 M
Sanitary Sewer Improvements			
Sanitary Sewer Replacements	$5.5 M	$11 M	$16.5 M
Inflow and Infiltration (I/I) Reductions	$32 M	$61 M	$93 M

Infrastructure Grant

- **Infrastructure Grant ($60 Million)**
  - Sanitary Sewer Rehabilitation ($37.5 Million)
  - Storm Sewer Rehabilitation ($20 Million)
  - Watercourse Rehabilitation and Environmental Remediation ($2.5 million)
  - Town's portion (1/3 of $60 million) = $20 million, of which $7.5 million (1/3 of $22.5 million) is for stormwater related works
- **If Infrastructure Grant is received**
  - Decision needs to be made immediately on the preferred alternative solution (which level of protection?)
  - Need to prioritize the work since funding received does not account for 100% funding required
- **If did not receive Infrastructure Grant**
  - Further consultation on the preferred alternative solution and funding sources can be conducted in the future
- **Potential implications for the fund**
  - Availability of consultants / contractors
  - Escalation of prices (e.g. cost estimates too low)
  - Major disturbance to community in a short period of time (all work needs to be completed by march 2011)

Funding Source

- **Option #1: Stormwater Flat Fee on the Water Bill - Townwide**
- **Option #2: Increase on water rate – Townwide**
  - ❖ Water rate is based on water consumption which is not directly relevant to storm runoff, and not guaranteed revenue due to fluctuation of usage
- **Option #3: Property Tax Rate Increase – Townwide**
- **Option #4: All West Thornhill Property Owners only - A fee charged under Section 391 of the Municipal Act, 2001.**
- **Assistance by Provincial/Federal Funds**

Funding Analysis Assumptions

- **Staff conducted a financial analysis to obtain the different level of protection over a 5 year period**
- **The assumptions can vary by:**
  - ❖ Have a longer period to generate the required funding (e.g. greater than 5 years) such that impact to the property owners can be minimized
  - ❖ There can be a combination of funding options
  - ❖ The funding option can be implemented for a short duration or last indefinitely such that additional funding can be used for other SWM initiatives in the future
  - ❖ Different rate / fee structure for ICI accounts
  - ❖ The funding strategy can be phased-in over time

Funding Analysis – West Thornhill

Calculation based on generating the required funding within 5 year	**Alt #2 – 5 Year Protection ($17 M)**	**Alt #3 - 25 Year Protection ($33 M)**	**Alt #4 - 100 Year Protection ($40 M)**
#1-Flat Rate – Residential	**$35 / yr**	**$68 / yr**	**$82 / yr**
#1-Flat Rate – ICI	**$525 / yr**	**$1,019 / yr**	**$1,235 / yr**
#2-Surcharge– Residential (Rate)	**$36 / yr**	**$70 / yr**	**$85 / yr**
#2-Surcharge – ICI	**$313-11,900/yr**	**$608-23,100/yr**	**$737-27,990/yr**
#3-Property Tax Increase (one time increase)	**3.23%**	**6.27%**	**7.60%**
#4-Local Improvement S391 (8495 property owners in West Thornhill study area. Assumes 5% interest rate increase per year)	**$2,311 / 5yr = $462 / yr** **$2,591 / 10yr= $259 / yr**	**$4,487 / 5yr = $897 / yr** **$5,031 / 10yr= $503 / yr**	**$5,438 / 5yr = $1,088 / yr** **$6,098 / 10yr= $610 / yr**

Evaluation Criteria - Definitions

- **Evaluation Criteria is used to evaluate the benefit or costs of implementing an alternative**
- **Criteria #1 - Technical and Engineering Considerations: Minimize impacts of flooding potential**
  - ❖ Minimize the potential for basement flooding
  - ❖ Protection of Human Environment: increase safety, reduce risk of injuries and health problems (ecoli and mold) to the public
  - ❖ Protection of Built Environment: continue use of public facilities, protection heritage sites, maintain aesthetics of built environment
  - ❖ Reduce cost of flooding to Resident (insurance, claims), Businesses and the Town (liability)
  - ❖ Maximum value (100 points) to most effective alternative (i.e. greatest reduction in flood potential)

Evaluation Criteria - Definitions

- **Criteria #2 - Economic Environment: Minimize Costs**
  - Minimize construction costs
  - Minimize Operation and Maintenance costs
  - Maximum value (100 points) to least cost alternative
- **Criteria #3 - Natural Environment: Minimize Environmental Impacts**
  - Minimize impacts to aquatic / terrestrial habitats
  - Minimize peak flow and erosion impacts to creeks
  - Minimize sediment transport to creeks
  - Minimize impact to water quality
  - Maximum value (100 points) to least environmental impacts

Evaluation Criteria – Definitions

- **Criteria #4 - Social and Cultural Environment: Minimize Community Impacts**
  - ❖ Minimize construction impacts:
    - ➢ Recreational areas
    - ➢ Aesthetics
    - ➢ Heritage District
    - ➢ Noise / Vibration / Dust
    - ➢ Traffic disruption
  - ❖ Maximum value (100 points) to least community impacts

Evaluation Criteria – Definitions

- **"Effectiveness of Alternative" = used to evaluate the benefits or costs of implementing an alternative. These values are assigned by Technical Team (Clarifica)**
- **"Weighting Factor" of the evaluation criteria (%) = relative importance of the criteria; used to compare different criteria. This value is assigned by public/decision makers**
- **"Score" = "Effectiveness of Alternative" x "Weight" of the evaluation criteria**

Alternative Evaluation Table (Clarifica Methodology)

Values to be assigned by Decision-Makers

#	Alternative Solutions Name	Evaluation Criteria								TOTAL SCORE
		1 - Minimize Impacts of Flood Potential		2 - Economic Environment: Minimize Costs		3 – Natural Environment: Minimize Environment Impacts		4 - Social and Cultural: Minimize Community Impacts		
		Weighting Factor ? / 100 A		Weighting Factor ? / 100 C		Weighting Factor ? / 100 E		Weighting Factor ? / 100 G		
		Effectiveness Of Alternative B	Score =A*B	Effectiveness Of Alternative D	Score =C*D	Effectiveness Of Alternative F	Score =E*F	Effectiveness Of Alternative H	Score =G*H	
1	Do Nothing	?	?	?	?	?	?	?	?	?
2	5 year Level of protection	?	?	?	?	?	?	?	?	?
3	25 year Level of protection	?	?	?	?	?	?	?	?	?
4	100 year Level of protection	?	?	?	?	?	?	?	?	?

Values to be determined/assigned by Technical Staff

Decision Making Process

- **Understanding of Alternative Solutions**
- **Implication to the decision on the selection of the Preferred Alternative**
  - Will the same program/level of service upgrades be applied Townwide?
  - Will the entire town pay for area specific upgrades?
  - Should the funding availability affect the preferred alternative selection?
- **Important to note that the Class EA Process does not incorporate Funding Source into the evaluation/selection analysis**
  - Preferred Alternative solution should be selected regardless of funding availability
  - Funding Source analysis is part of the implementation process after the Class EA is completed
- **PROCEED to SELECT the PREFERRED ALTERNATIVE SOLUTION**
  - Committee / Council should consider selection of a minimum level of protection for Townwide upgrade of stormwater systems
  - Committee / Council can consider additional level of protection for specific areas if funding or resource are available

See Evaluation Spreadsheet

- **Councillors to discuss "Weighting Value" for each criteria**

Preferred Alternative Solution

- **The Draft Preferred Alternative Solution is**

?

Next Steps

Item	with Infrastructure Grant	without infrastructure Grant
Council Workshop	June 2 (Today) (Special DSC/Workshop) (Preferred alternative solution + examine funding options + host PIC #2)	June 15 (GC Presentation) (Preferred alternative solution + examine funding options + host PIC #2)
Staff to host PIC #2	Week of June 15th	Fall 2009
Staff Report to GC (Preferred alternative solution + funding recommendation)	June 22 (All deadlines for report preparation will not be met)	Fall / Winter 2009

Recommendations

- **That the presentation title "West Thornhill Stormwater Remediation Class EA Study – Project Update" be received;**
- **That staff be directed to hold Public Information Centre (PIC) No. 2 and present the draft preferred alternative solution to increase the level of flood protection in West Thornhill Area;**
- **AND That staff report back to General Committee with final recommendations on June 22, 2009.**