Town of Markham
Don Mills Channel Capacity Study

Development Services Committee

June 26, 2007

clarifica
Water Resources and Environmental Consulting

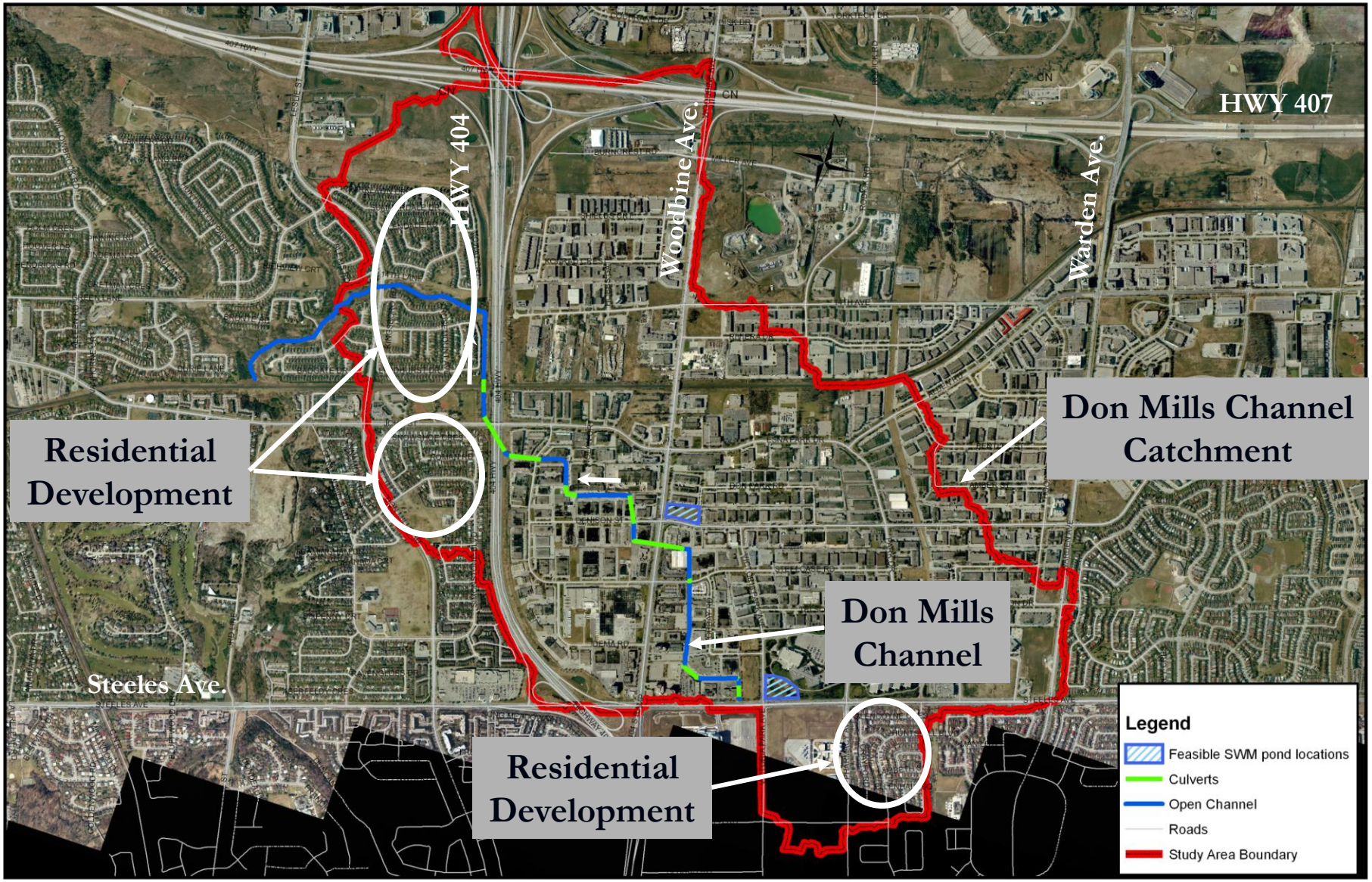
Presentation Agenda

- Purpose of the Presentation
- Background
- Study Objectives
- Existing Condition
- Alternative Options
- Financing Options for Property Owners
- Next Steps
- Q & A

Purpose of the Presentation

- Update Council on flooding issues in the Don Mills drainage area
- Present summary of work completed to-date including:
  - Existing flood condition
  - Alternative options
  - Financing options for property owners
- Seek Council's authorization to proceed with the next steps

Background: Study Area



Background (continued)

- The Don Mills Channel is an engineered channel built in the late 1960's
- Drainage area = 725 ha, channel length = 3.5 km
- The channel consists of approximately 1.1 km of enclosed channel with 10 culvert structures
- The channel has a 2-year storm event capacity
- Three culverts (private, municipal & regional culverts) within the channel have reduced the overall capacity of the system
- The catchment is comprised mostly of commercial and light industrial development, with some single-lot residential development west of Highway 404 and south of Steeles Avenue (City of Toronto)
- Limited Stormwater Management (SWM) controls exist within the catchment area

Background (continued)

- Lands and buildings in the vicinity of the channel floodplain are susceptible to frequent flooding which can cause property damage
- In the past 2 years, the area experienced 2 flooding events: August 19, 2005 and May 17, 2006. These flood events have resulted in a number of complaints and 2 claims being filed with the Town
- Due to a number of flood complaints received from business owners in the Don Mills area in summer of 2006, staff initiated a Schedule B Class Environmental Assessment to determine the extent of flooding and to evaluate potential mitigation solutions

Study Objectives

- Investigate capacity issues and flooding problems within the study area
- Determine the extent of flooding during various storm events
- Develop a suite of remediation options including costs
- Recommend a preferred option and implementation strategy
- Engage the public in assessing options and developing solutions

Existing Condition

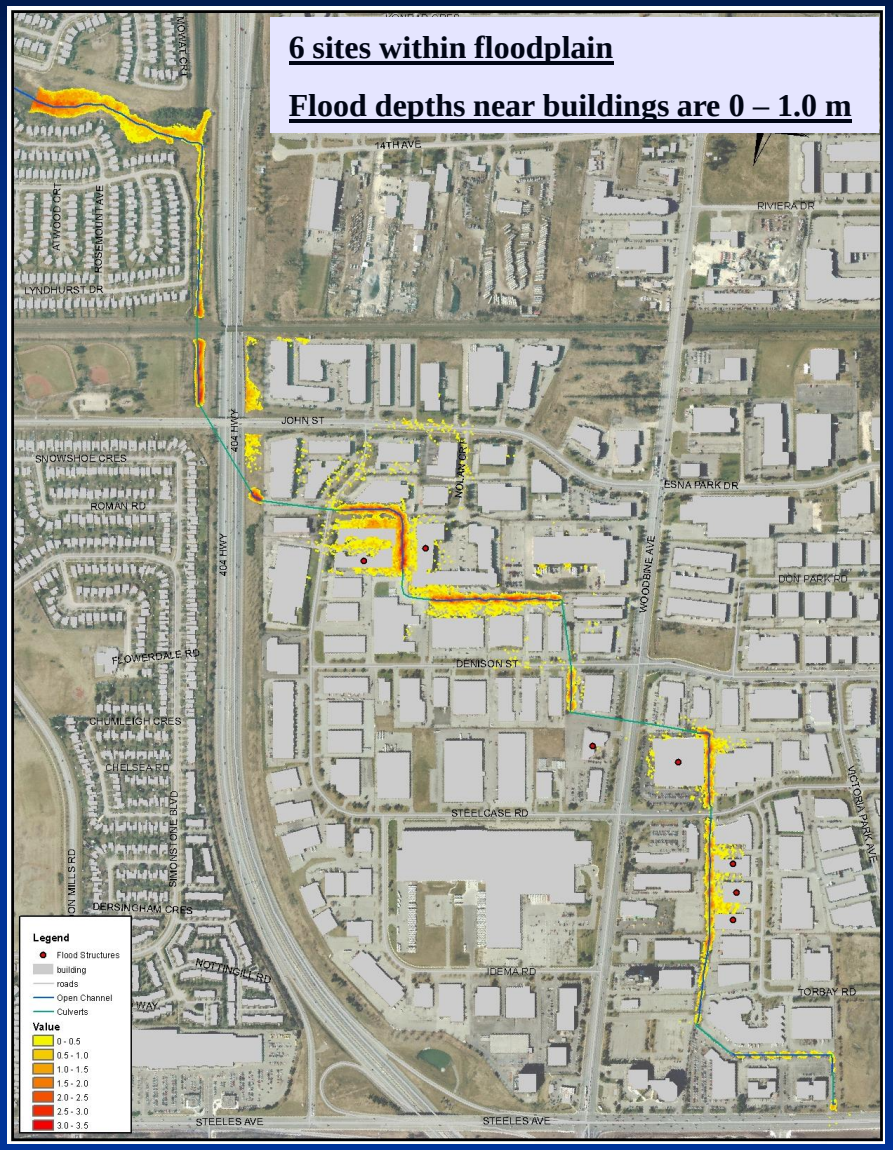
- The existing Don Mills Channel provides a 2-year storm event conveyance capacity which was the Town's standard in the 1960's
- Storm events over the 2-year storm event are causing flooding of businesses in the area
- Three of the existing culverts within the channel (private, municipal & regional culverts) have reduced the overall capacity of the system to ± 1.5-year storm event.

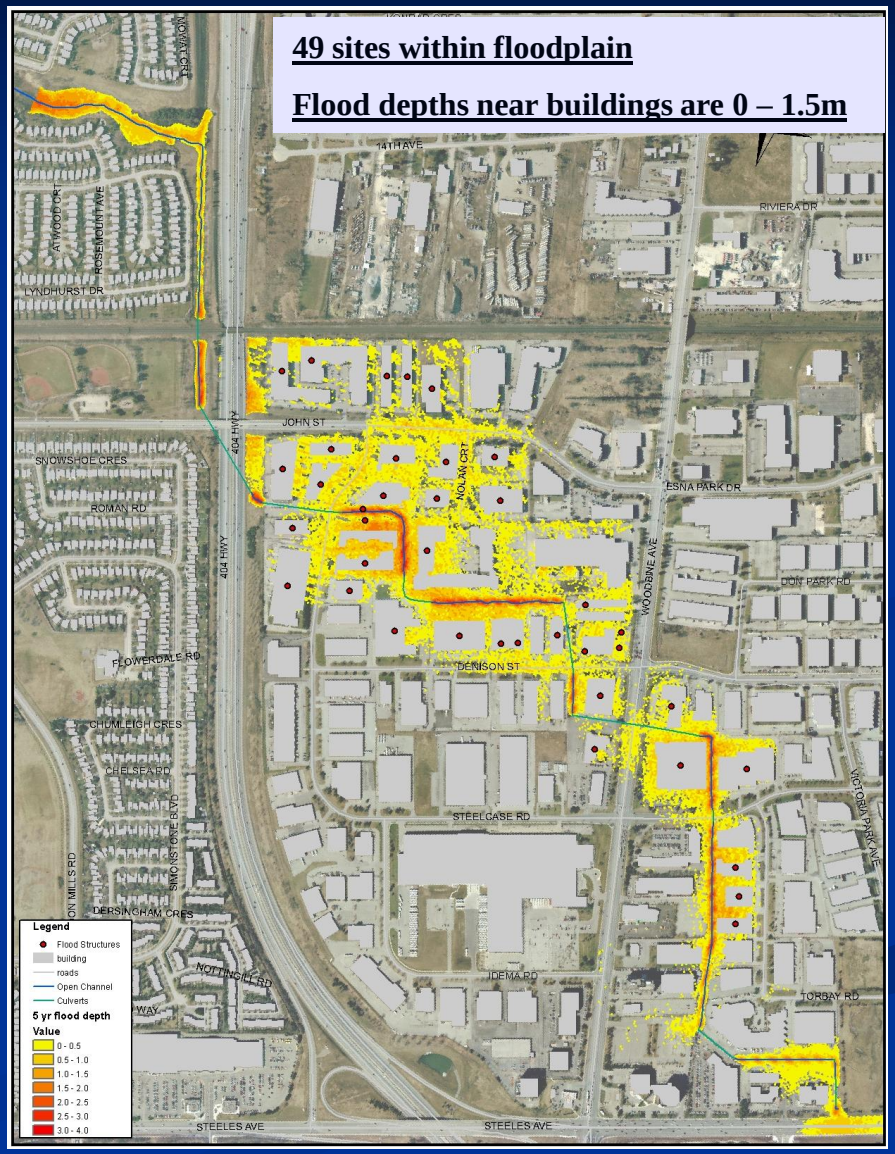
Existing Condition (continued)

- The catchment area is heavily urbanized with high percentage of paved surface and limited SWM control facilities

Existing Condition (continued)

Extent of Flooding (Based on computer modeling results)



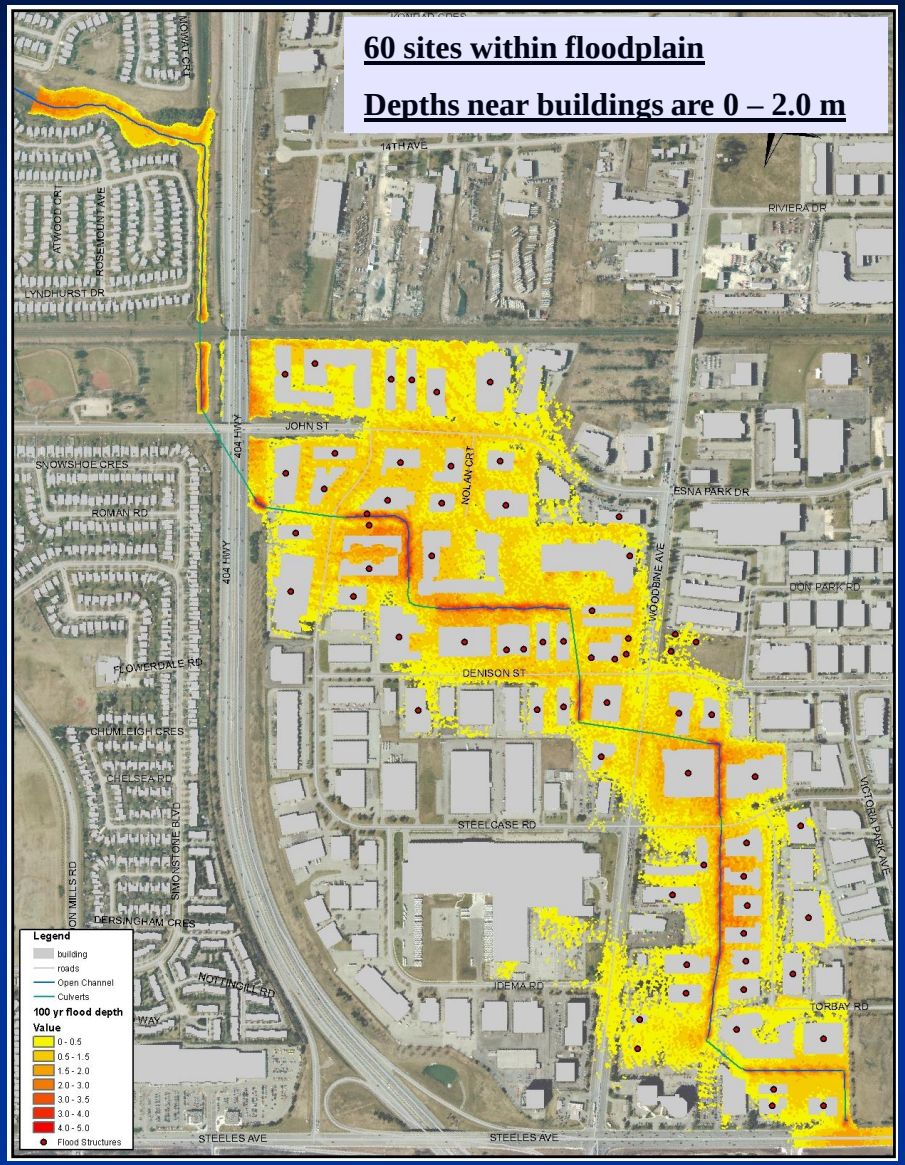


2-year return period (frequent flooding)

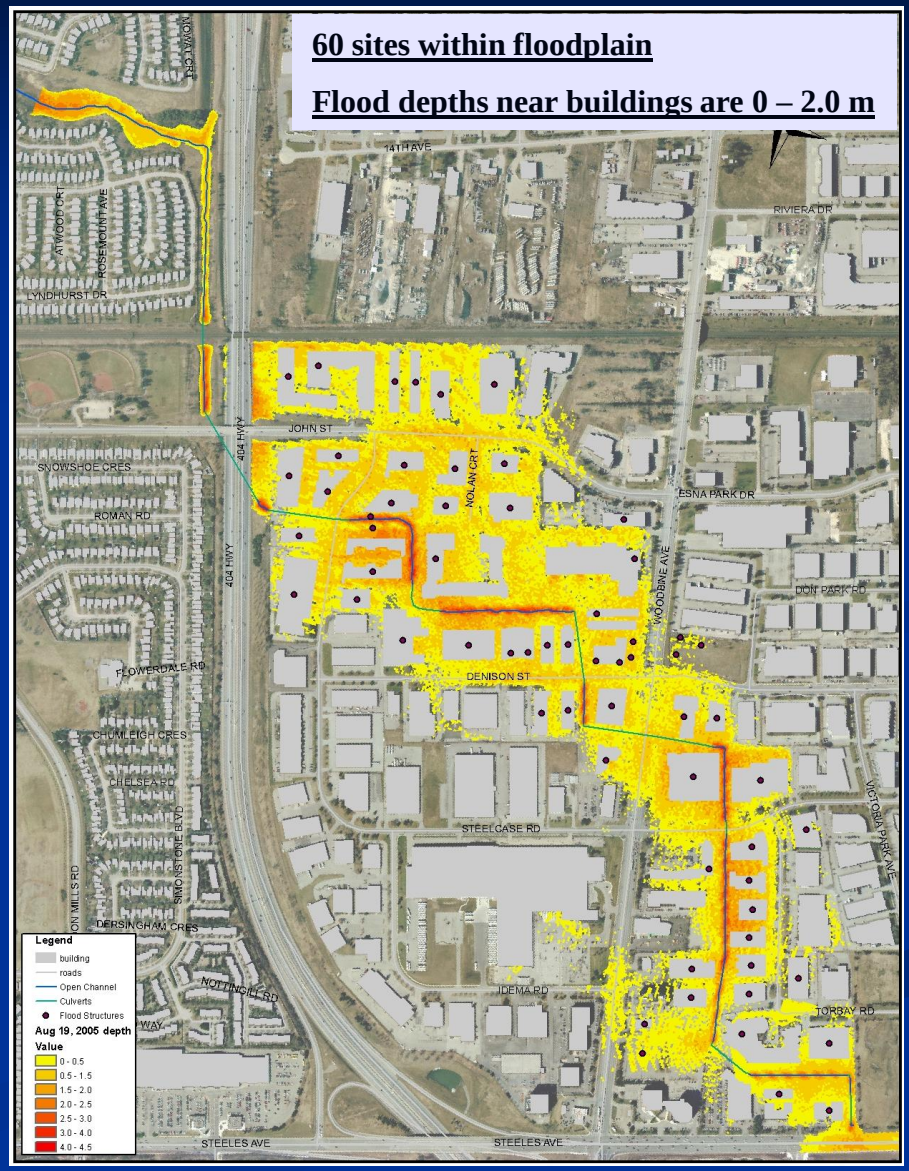
5-year return period (frequent flooding)

Existing Condition (continued)

Extent of Flooding (Based on computer modeling results)



100-year return period (infrequent flooding)



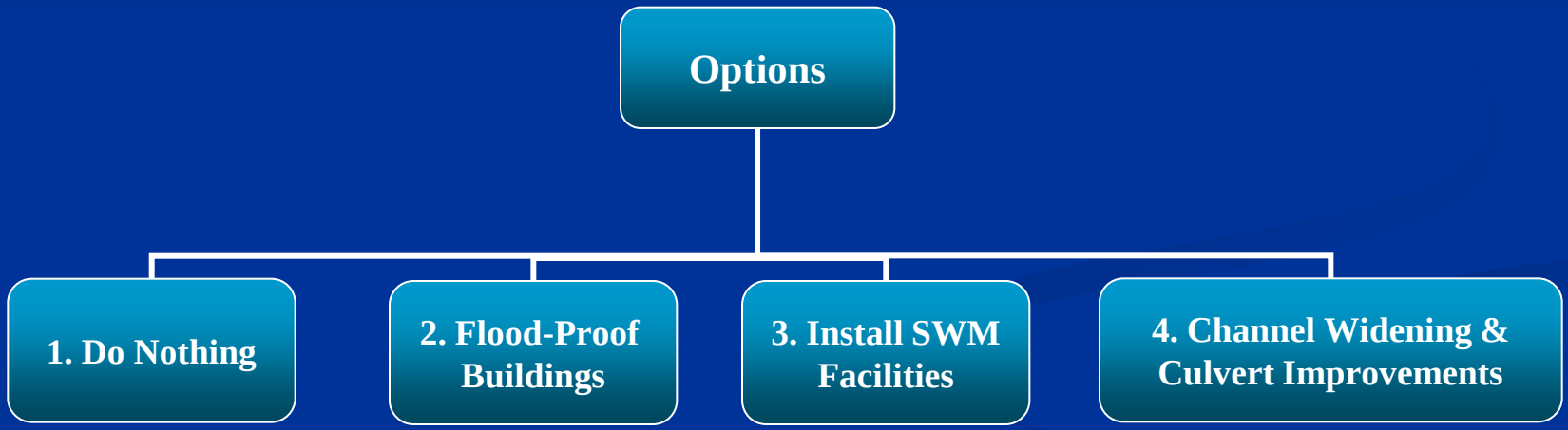
Aug. 19th, 2005 storm event (infrequent flooding)

Existing Condition (continued)

August 19, 2005 Flooding

Alternative Options

Options to improve and finance the level of services of the system should be reviewed with area property owners as part of this Class EA study



Option 1 - Do Nothing

- No restoration works would be undertaken, except on an emergency basis

Advantages	Disadvantages
• Limited capital cost	• Risk of flooding roads & structures • Risk of impact to health and life • Possibility of extensive damage to structures • Potential for claims

Option 2 – Flood-Proof Buildings

- Installing flood protection measures in/or around flood-impacted buildings. Flood-impacted buildings can be protected from flooding up to the 100-year storm event (refer to slide 21)

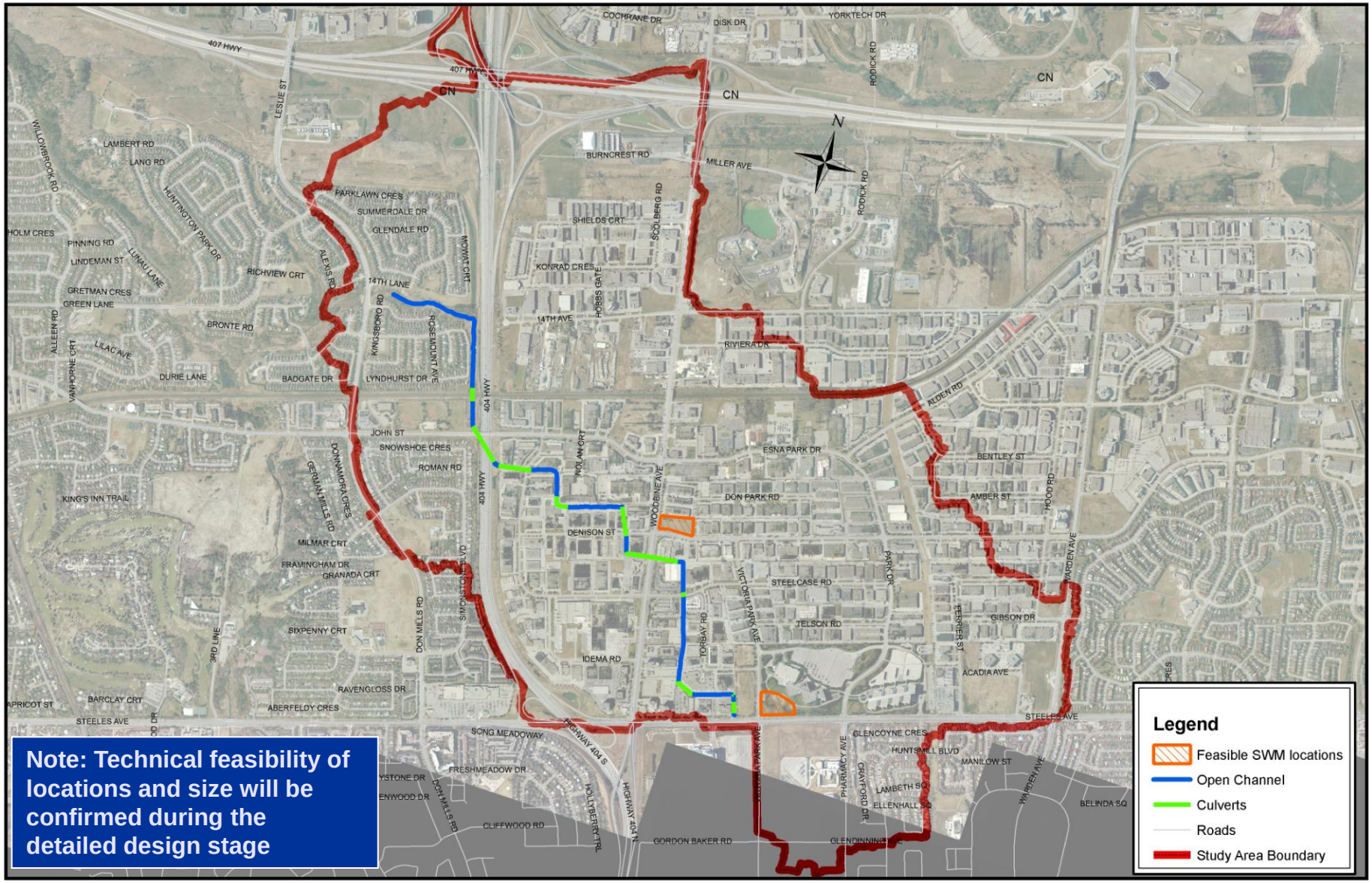
Advantages	Disadvantages
• Reduce damages associated with flooding buildings	• Requires cooperation of affected businesses and industries • Does not solve channel capacity issues • Roads will continue to be flooded • Many safety issues are not addressed

Option 3 - Install SWM Facilities

- Installation of surface and/or subsurface stormwater management facilities (quantity control ponds or underground storage). The maximum level of service this option can provide is 5-year storm event. The next slide indicates potential locations for SWM pond

Advantages	Disadvantages
• Provides storage of excess surface flows • Subsurface storage will be placed within Town's R.O.W. • Creates habitat and green space • Can provide water quality benefits • Anticipated to be well received by review agencies, including the TRCA	• High land cost for surface ponds • Requires maintenance • Costly construction for subsurface storage • Possible disruption of business and traffic during construction

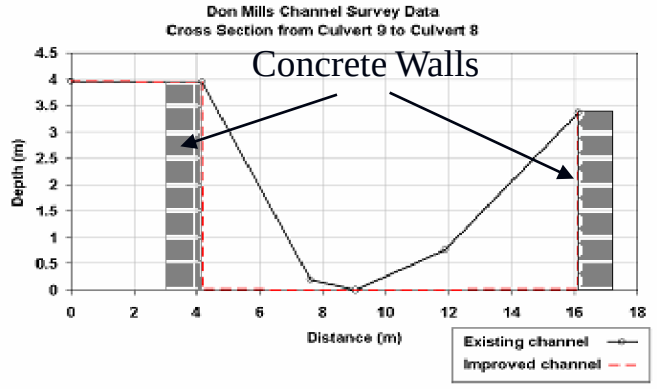
Option 3 - Potential New SWM Facility Locations



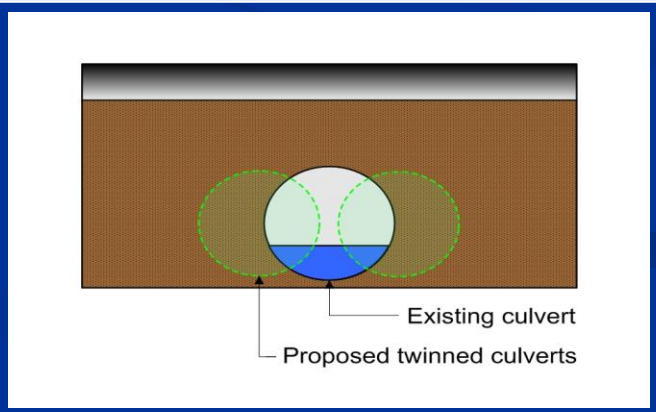
Option 4 - Channel Widening & Culvert Improvements

1. Channel widening and replacement of 3 culverts (Culvert # 3,4 & 6 with total length = 450 m) at key locations to increase conveyance capacity of the system up to the 100-year storm event

Advantages	Disadvantages
• Improve culvert & channel's conveyance & storage capacity • Reduce risk of flooding • Culvert improvements is anticipated to be well received by review agencies, including the TRCA	• May eliminate existing vegetation and habitat at certain locations • High design & construction costs • Channel widening is not a preferred option by review agencies, including the TRCA • Using retaining walls for channel widening is not a preferred option from a maintenance perspective • Construction will require temporary and permanent easements which will disrupt access to existing businesses



Channel Widening



Culvert Improvements

Alternative Options (continued)

Assumptions Used in the Cost Estimation

- All costs are considered estimates from generic sources
- Detailed cost estimates will be obtained during the design stage
- Option 3 includes land costs for the 2 SWM facilities. No lands are required for the other options
- Cost estimates do not include damages to buildings and/or costs associated with lost wages due to building closure (business losses) during flooding and clean-up periods

Alternative Options (continued)

Cost Estimates for Capital Improvements ($ Millions)

Options	Return Period (Years)*					
	1.5 → 2	1.5 → 5	1.5 → 10	1.5 → 25	1.5 → 50	1.5 → 100
Do Nothing	0	0	0	0	0	0
Flood-proof buildings	3	20	→	→	→	30
Install SWM facilities	6-10	10-15	No Benefit	No Benefit	No Benefit	No Benefit
Channel widening & culvert improvements	3	20	→	→	→	40

* Return Period is the probability of a particular storm event occurring in a one-year time period. Thus, a 10 year storm event has a 10% (1/10) chance of happening in any year during the 10 year period.

Alternative Options (continued)

Evaluation & Scoring Matrix

		Option 1 Do Nothing	Option 2 Flood-proof buildings	Option 3 Install SWM facilities	Option 4 Channel widening & Culvert improvements
Tech. Consideration	Effectiveness of control measure				
	Feasibility of control measure				
	Upstream & downstream impact				
Social Environment	Terrestrial & aquatic environment				
	Business disruption				
	Land use				
	Safety				
Cost	Capital				
	O & M				

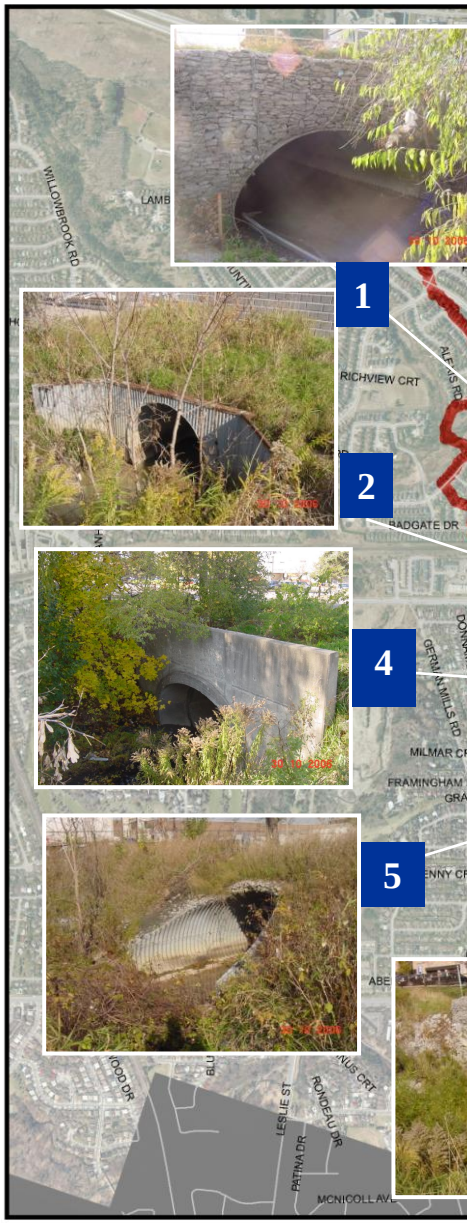
Financing Options for Property Owners

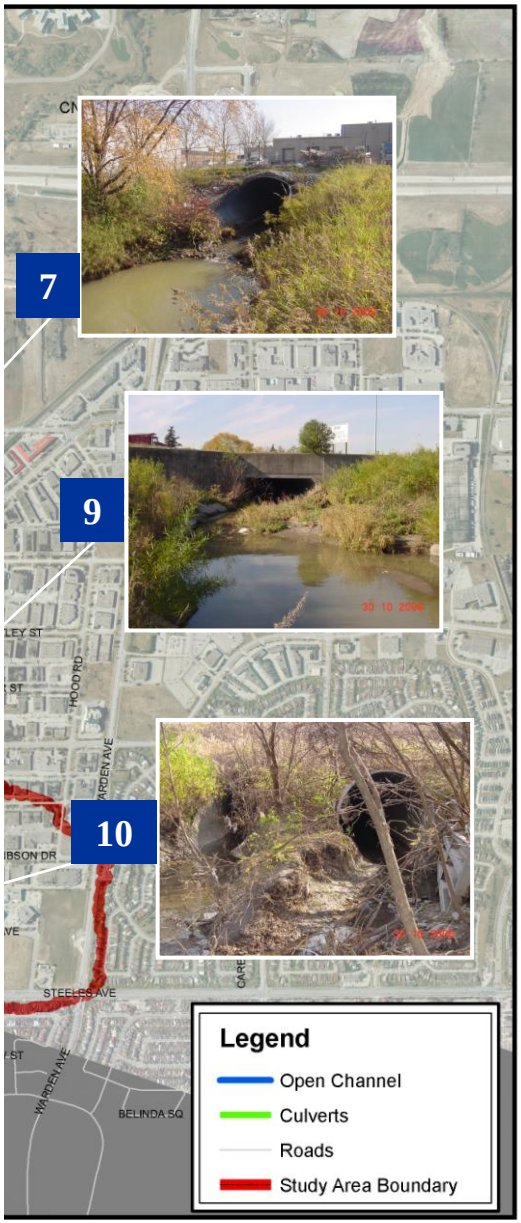
1. A fee charged under Section 391 of the Municipal Act, 2001
2. Special service charges under Section 326 of the Municipal Act, 2001
3. Local Improvement charges in accordance with the Ontario Regulation 586/06 made under the Municipal Act, 2001
4. Flat rate or surcharge on water/sewer bill
5. Town-wide tax rate increase

Next Steps

- Hold the 1st public meeting (September 2007) under the Class EA Act. Staff will strongly emphasize to the public that funding responsibility for any remedial work is an issue to be determined
- Finalize the selection of the preferred option, including cost estimate and funding, and present results to Council (October 2007)
- Subject to Council approval, present the preliminary design of the preferred option including cost estimate and funding at a 2nd public meeting (late 2007/ early 2008)
- File the Class EA Document (Spring 2008)
- Further consultation with property owners on the implementation and funding of the preferred option

Questions?


1
2
4
5
WILLOWBROOK RD
RICHVIEW CRT
BADGATE DR
GERMANMILLS RD
MILMAR CR
FRAMINGHAM
LESLIE ST
PATINA DR
RONDEAU DR
MCNICOLL AVE


7
9
10
HOOD RD
WARDEN AVE
STEELES AVE
BELINDA SQ
Legend
Open Channel
Culverts
Roads
Study Area Boundary