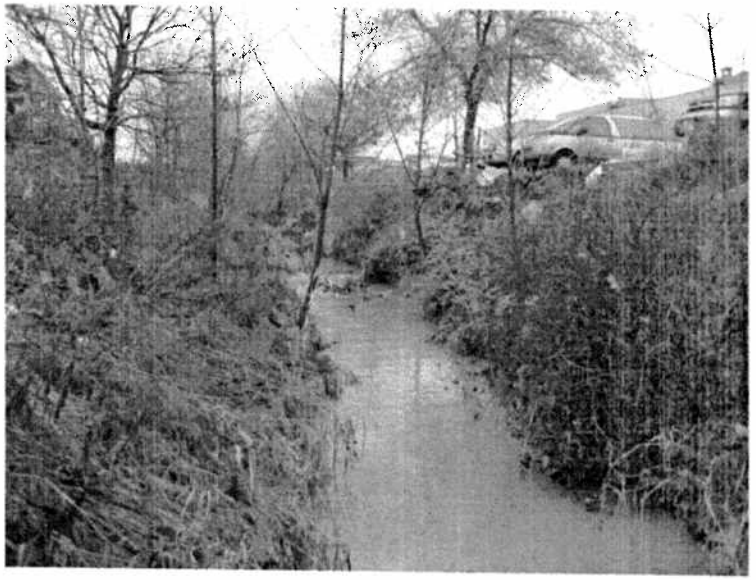
Town of Markham
Don Mills Channel Capacity Study

Development Services Committee

September 15, 2009

Presentation Agenda

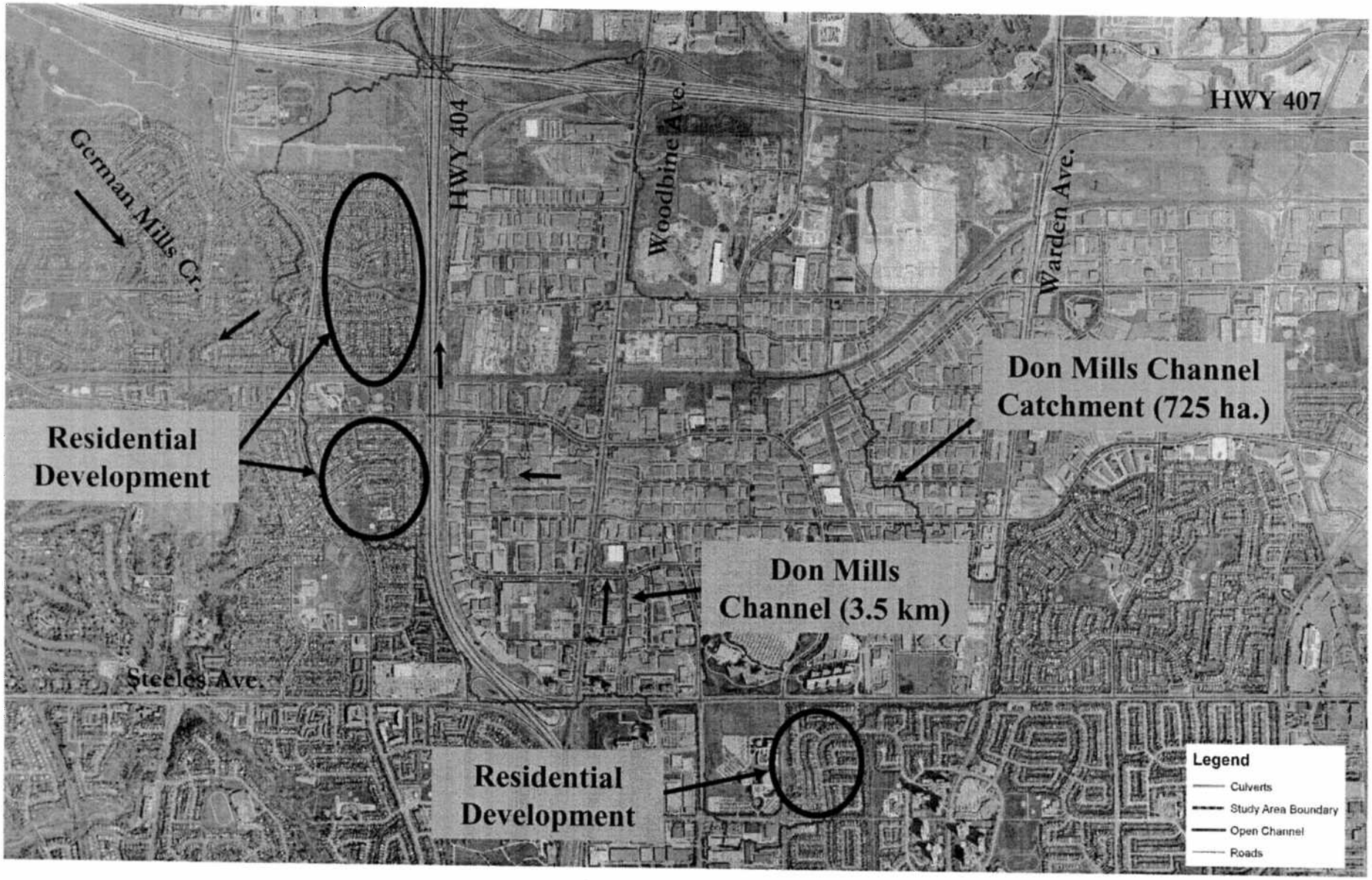
- Purpose of the Presentation
- Background
- Summary of Existing Conditions
- 1st Public Meeting
- Remedial Options
- Financing Options
- Conclusion



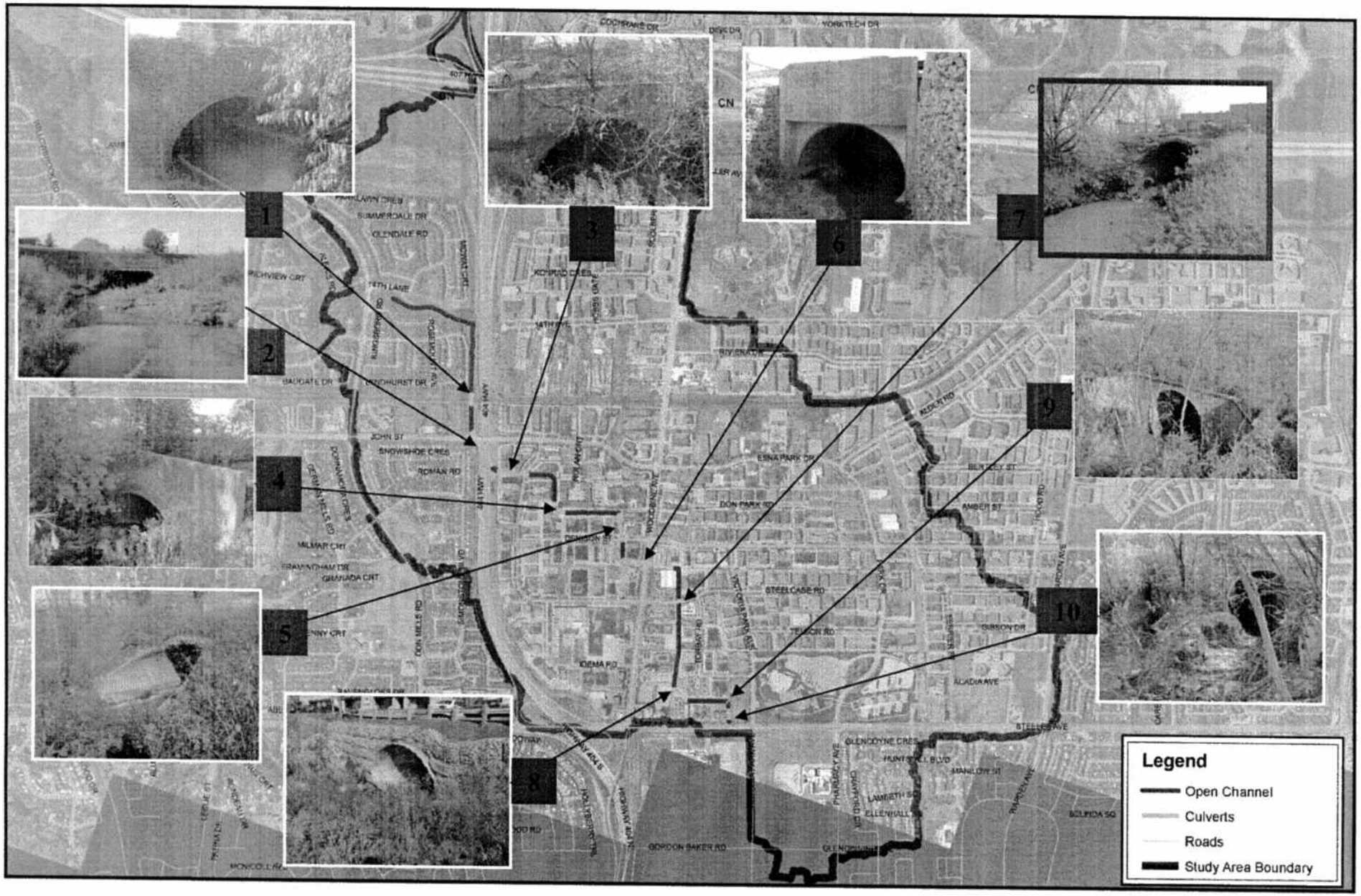
Purpose of the Presentation

1. Update Council on flooding issues in the Don Mills Channel drainage area
2. Present summary of work completed to-date including:
   - summary of existing flood condition
   - causes and extent of flooding
   - Remedial options & evaluation
   - summary of results from the 1st public meeting
   - preferred remedial option
   - Preliminary cost estimates and financing options of the preferred remedial option
3. Seek Council's authorization to proceed with the next steps

Background: Study Area



Background: Existing Culverts



- **10 culverts with total length of 1.1 km**

Background

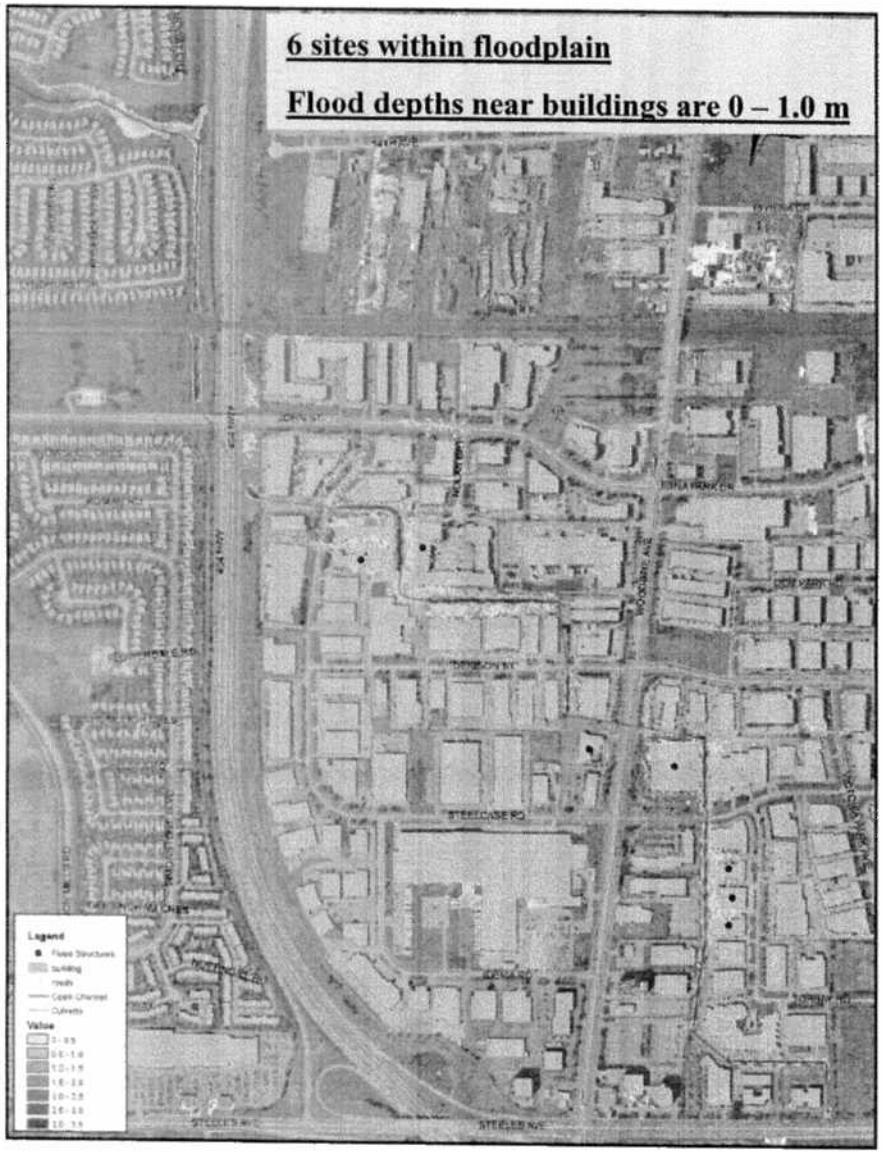
- The Don Mills Channel is an engineered channel built in the late 1960s to provide a 2-year storm event capacity which was the Town's SWM design standard at that time.
- The majority of development within the catchment area was built between early 1960s – late 1990s.
- The catchment includes mostly commercial and light industrial development, with some single-lot residential development west of Highway 404 and south of Steeles Avenue (City of Toronto).
- The catchment is highly impervious with very limited Stormwater Management (SWM) controls.
- The majority of the channel is **privately owned**. Town has easement over the majority of the channel for maintenance purposes only.
- Drainage area (catchment) = 725 ha.
- Don Mills Channel length = 3.5 km, average slope = 0.3% (very flat).
- Approximately 1.1 km (30%) of the channel is enclosed with 10 culverts.

Background

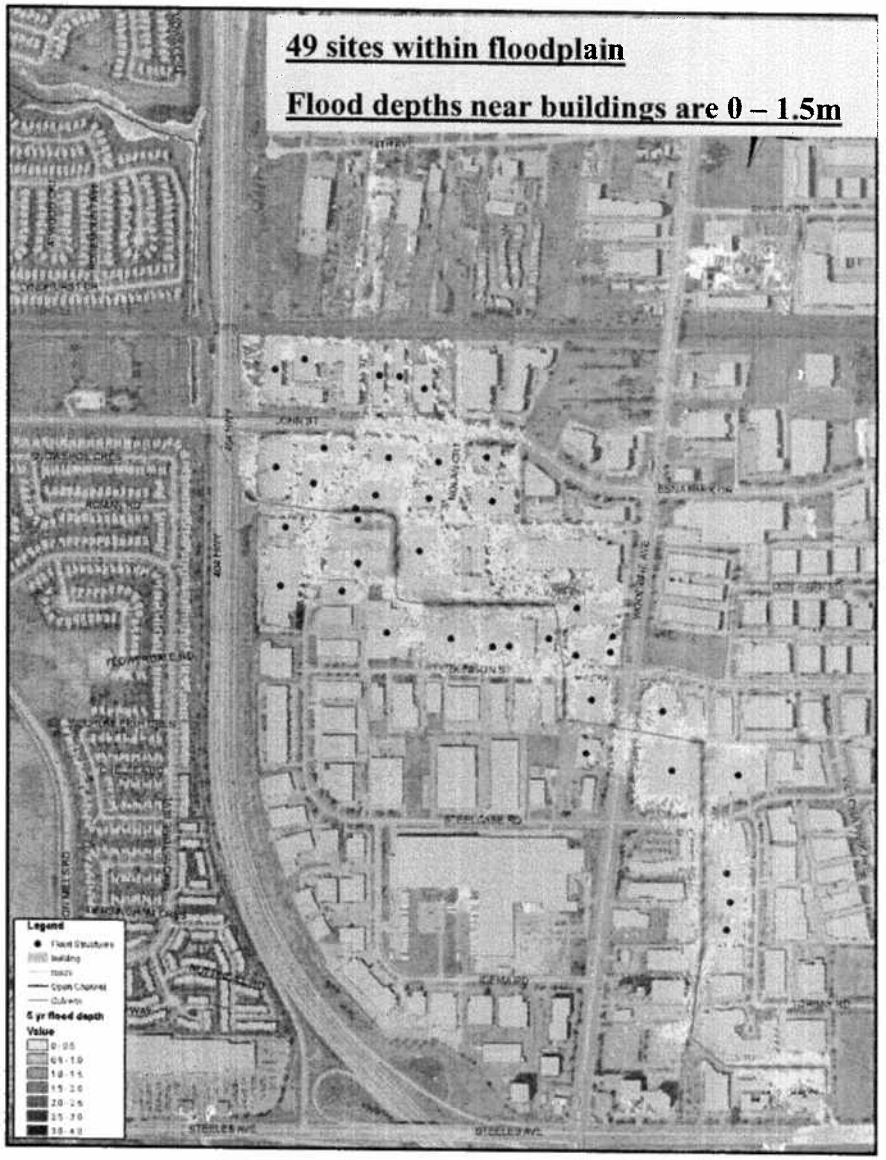
- Lands and buildings in the vicinity of the channel floodplain are susceptible to frequent flooding (over 2-year storm event) which is can cause property damage.
- In the past 4 years, the area experienced 4 flooding events over the 2 year storm event: **August 19, 2005**, **May 17, 2006,** June **15/16, 2008** and **July 23 2009**. These flood events have resulted in a number of complaints and 2 claims being filed against the Town.
- Due to the number of flood complaints received from business owners in the Don Mills area, the Engineering Department in summer 2006 initiated a Schedule-B Class Environmental Assessment to determine the extent of flooding and to evaluate potential remedial solutions.
- Existing flood condition, 4 remedial options and preliminary cost and financing options were presented to the Development Services Committee on June 26, 2007. Council authorized staff to hold the 1st public meeting.
- The 1st public meeting was held on December 4, 2007.
- As part of the Town's SWM Strategy, the Engineering Department has initiated a **Town-wide Stormwater Funding Feasibility Study** to assist the Town in exploring feasible options for funding existing and future stormwater related projects.
- Council has approved a total funding of $1.3M ($585,000 DCA + $715,000 Gas Tax) for the Don Mills Channel flood mitigation project.

Summary of Existing Conditions

Extent of Flooding (Based on computer modeling results)



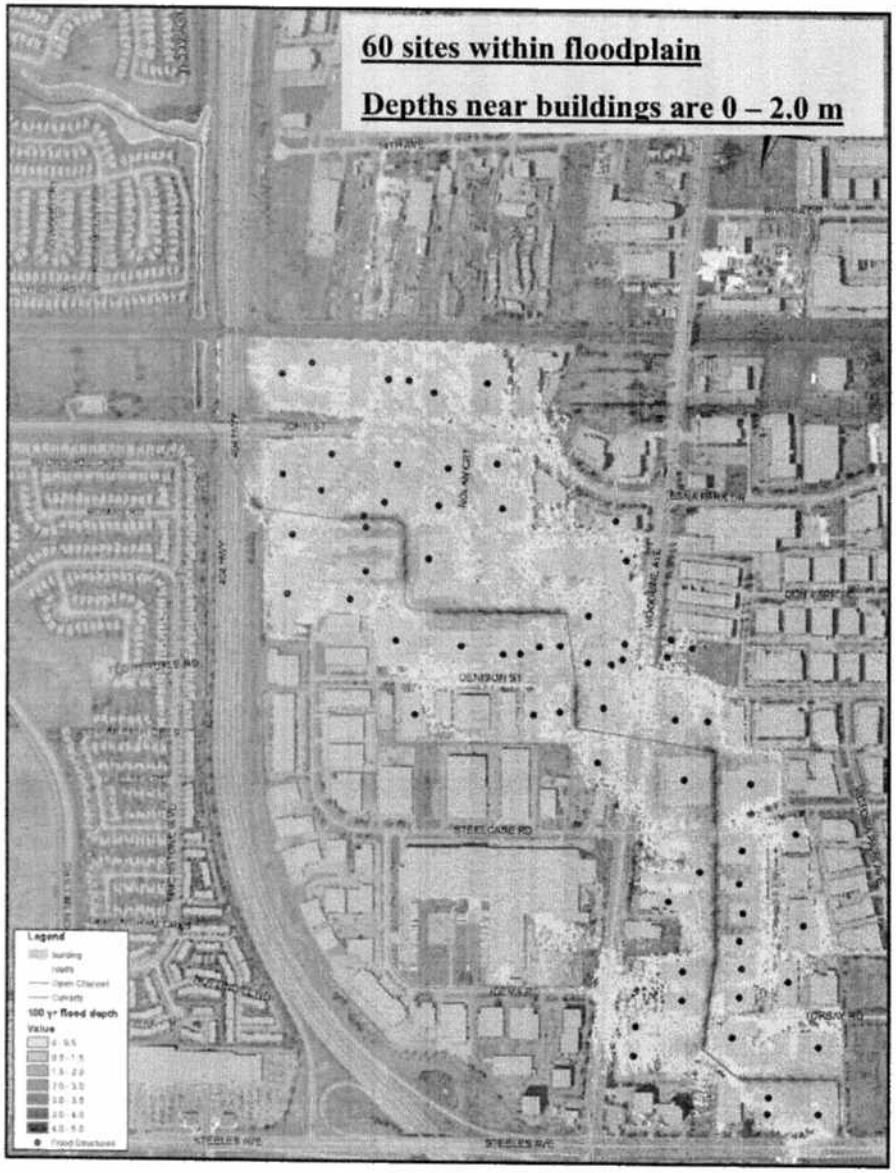
2-year return period (frequent flooding)



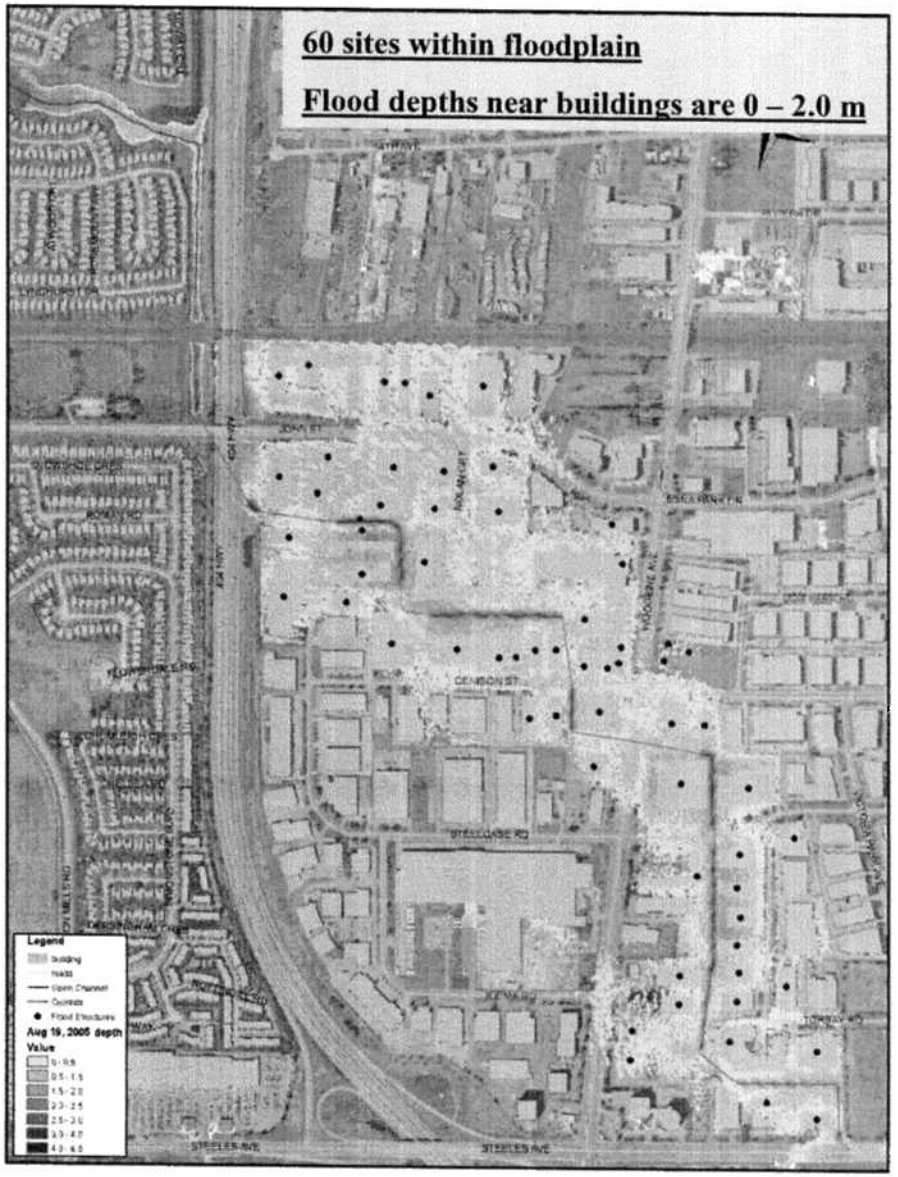
5-year return period (frequent flooding)

Summary of Existing Conditions

Extent of Flooding (Based on computer modeling results)



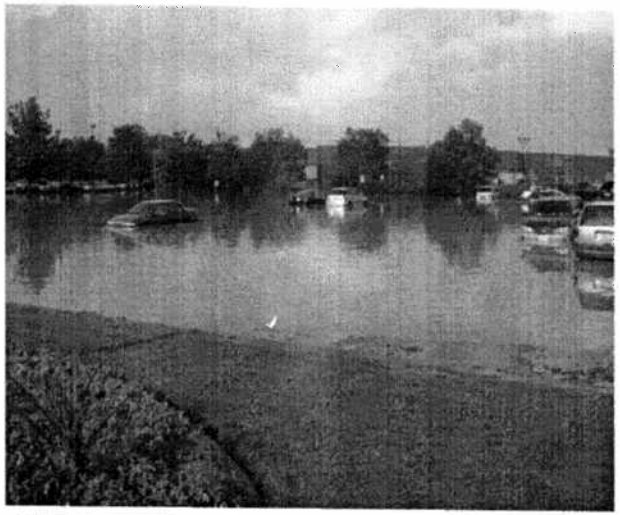
100-year return period (infrequent flooding)

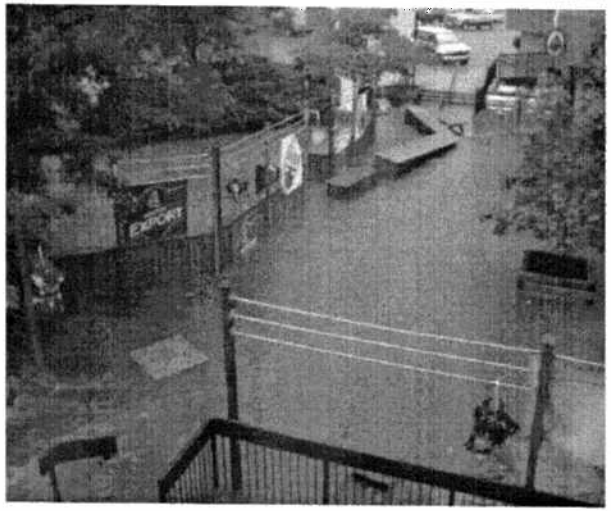


Aug. 19th, 2005 storm event (infrequent flooding)

Summary of Existing Condition

August 19, 2005 Flooding

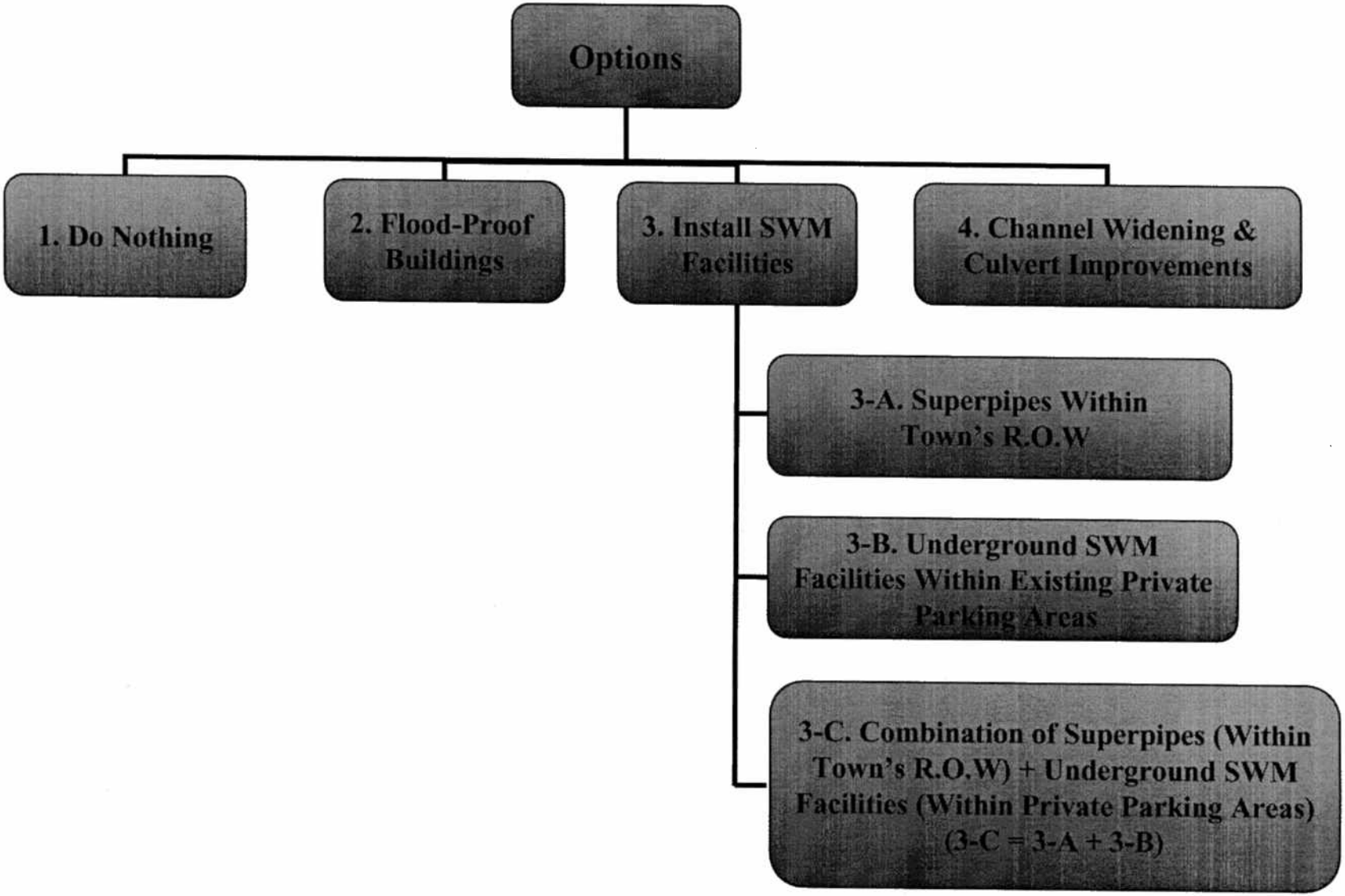




1st Public Meeting

- The 1st public meeting was held on December 4, 2007.
- Notice of the public meeting was posted in 2 local newspapers and Town's website.
- Only 13 members of the public attended this meeting.
- Background material and 4 remedial options including preliminary cost estimates were discussed in the meeting (options listed in the next slides).
- Following discussion of background material and options, a public survey was provided to each participant in the meeting.
- Due to the low attendance, the public survey was also hand delivered to approximately 117 affected property owners within the flood plain.
- In total, only 13 surveys were completed and submitted to Town.
- Results of the 13 surveys show that the majority of the participants in the survey:
  - have experienced flooding in the past (surface and/or storm sewer backup).
  - prefer the channel widening and culvert improvements remedial option (option 4, see next slides).
  - are **not willing** to contribute financially to the preferred option.

Remedial Options



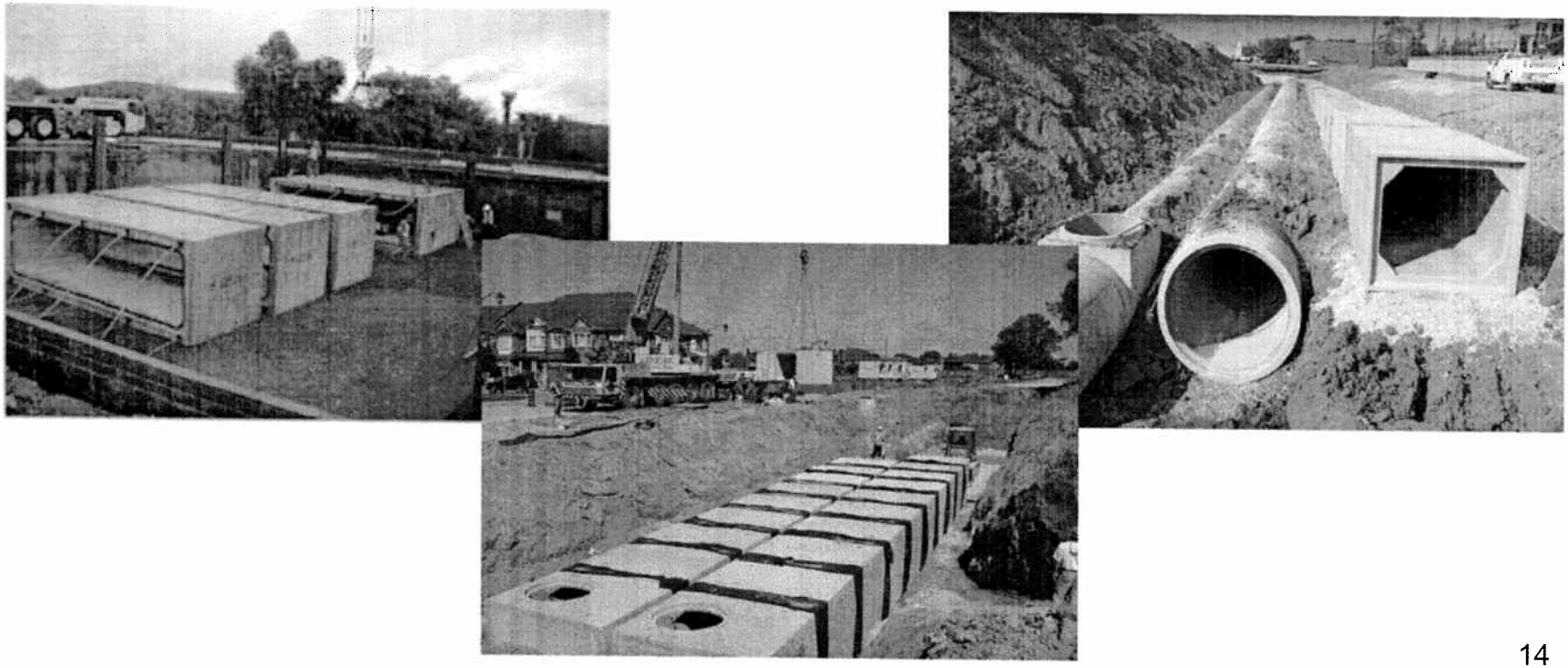
Remedial Options

- **Option 1 (Do Nothing)** will provide no remediation/improvement to the existing flood situation within the area. Affected properties within the existing flood plain will continue to be impacted during storm events greater than the 2-year event. Culvert # 7 is below the 2 year storm event capacity and must be upgraded to meet the 2 year capacity at a **total cost of $1.3M**. In addition, the Town (Operations Department) is obligated to maintain the channel clean from debris and vegetation annually.

- **Option 2 (Flood-Proof ±60 Buildings)** is not a practical solution because it will greatly impact the operation of the existing businesses in the area. Depending on the location and grading of each property, berming may not work for every property within the flood area. Flood-proof buildings with berms will result in loss of parking spaces which is most likely not acceptable to business owners in the area. This option requires agreements between the Town and each of ±60 property owners within the floodplain. This option could **cost $30M - $40M for the 100 year storm**.

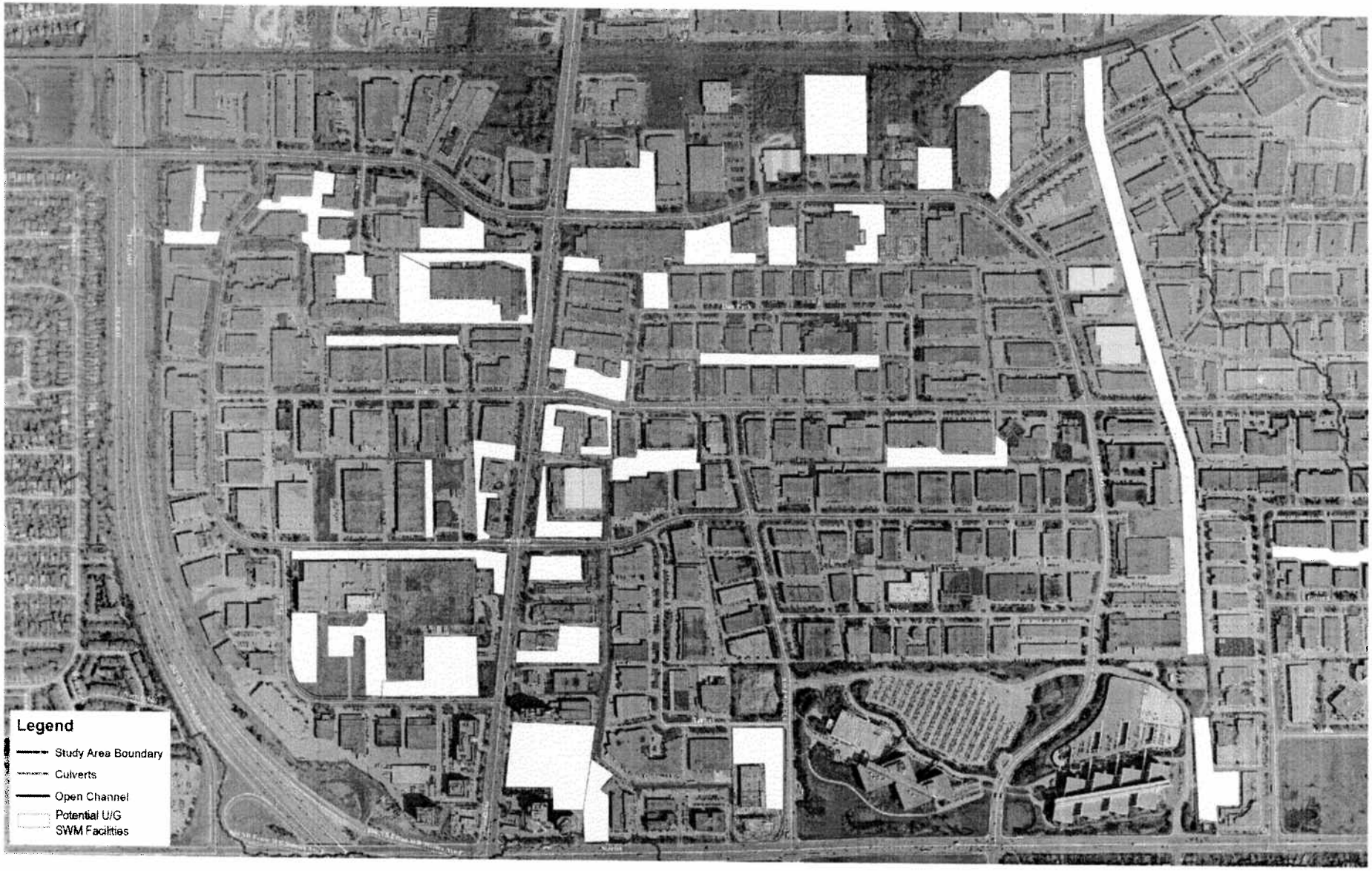
Remedial Options

- **Option 3 (Install SWM Facilities)** This option includes on-site underground facilities, superpipes within Town R.O.W., or a combination of both. The estimated cost for this option ranges from $42 million for a 5 year flood protection level to $112 million for a 100 year. Through redevelopment and implementation of current SWM standards (on-site SWM controls up to 100 year) the total cost could be significantly reduced. This option can be implemented gradually over the next 20-30 years to the extent financially, legally and technically feasible and up to level of flood protection that will be adopted by Council as the Town's standard. Potential locations for SWM facilities are shown in the next slide.



Remedial Options: Option 3

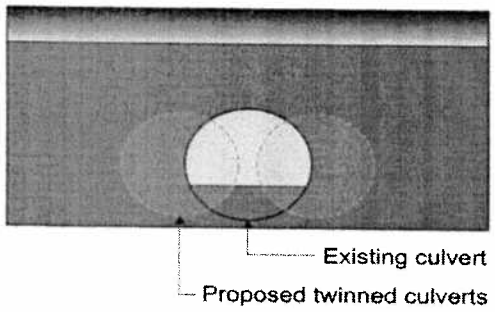
Potential Locations of U/G SWM Facilities



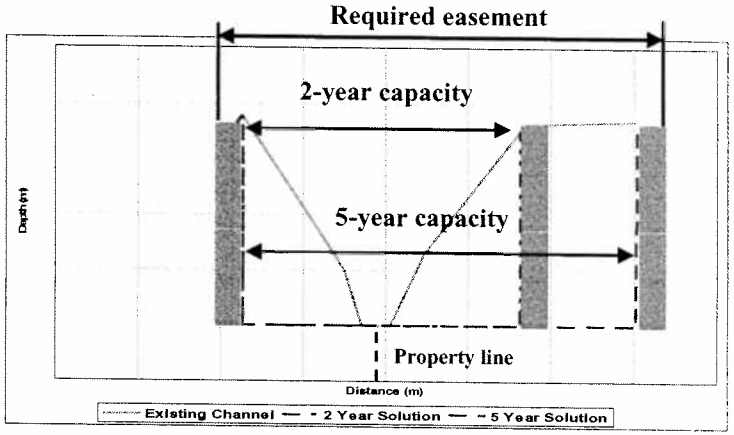
Remedial Options: Option 4

- **Option 4 (Channel Widening and Culvert Improvements)** is not recommended because:

1) can only provide limited flood protection (up to 5-year storm event) at a **cost of $40M**
2) requires agreements between the Town and each private property owner along the channel (±60 property owners)
3) requires the Town to obtain easements along the proposed channel widening for maintenance purposes
4) past experience with the Town-wide Erosion Implementation work has shown that obtaining agreements from all ±60 owners along the channel will be extremely difficult
5) will impact site plans through loss of private parking spaces adjacent to the channel banks
6) potentials for business loss claims
7) some impact on the natural ecosystem within the channel which may not be supported by approval agencies such as TRCA and DFO.



Option 4: Culvert Improvements
Culvert Twining



Option 4: Channel Widening
Vertical Armour Stone Walls

Financing Options

A Town-wide Stormwater Funding Feasibility Study is about to commence and will be completed by the end of 2010. The purpose of this study is to evaluate the level of existing SWM service in Markham (i.e. 2-100 year), recommend action plan and identify sources of funding for existing and future SWM programs.

Generally, existing SWM facilities within areas of Markham built prior to 1978 (see map next slide) do not meet current SWM standards and these areas could potentially be flooded during large storm events (e.g. Thornhill and Don Mills areas).

The following funding options will be reviewed as part of the Town-wide Stormwater Funding Feasibility Study:

- A fee charged under Section 391 of the Municipal Act, 2001. Cost would be allocated to all benefiting property owners
- Special service charges under Section 326 of the Municipal Act, 2001. Cost would be allocated to all benefiting property owners
- Local Improvement charges in accordance with the Ontario Regulation 586/06 made under the Municipal Act, 2001. Cost would be allocated to all benefiting property owners
- Flat rate or surcharge on water/sewer bill. Cost will be allocated to all benefiting property owners
- Town-wide tax rate increase
- Assistance from Provincial/Federal Grants.

Financing Options: Existing SWM Facilities

Conclusion

1. Town and property owners are obligated to maintain the channel at the current 2-year storm event capacity.

2. Under the "Do Nothing" option, the Town and property owners need to maintain the channel to provide the minimum 2 year storm event capacity. One culvert under Steelcase Road must be replaced by the Town with a larger culvert with a 2 year storm event capacity. Currently, the Asset Management Department has a $1.3M budget available that can be used for upgrading the Steelcase Culvert.

3. Upon completion of the Town-wide Stormwater Utility Study (end of 2010), Staff will report back to Council regarding Town obligations, recommended service level improvements, financing options and long term plans for the stormwater infrastructure including the Don Mills Channel.

4. Staff need to review with the TRCA special policies designated for the management of the Don Mills Channel floodplain and all future redevelopment within the drainage area.

5. Staff be authorized to defer hosting the 2nd Public Meeting for this study to 2011 pending the completion of the Town-wide Stormwater Utility Study.