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TECHNICAL MEMORANDUM TM5

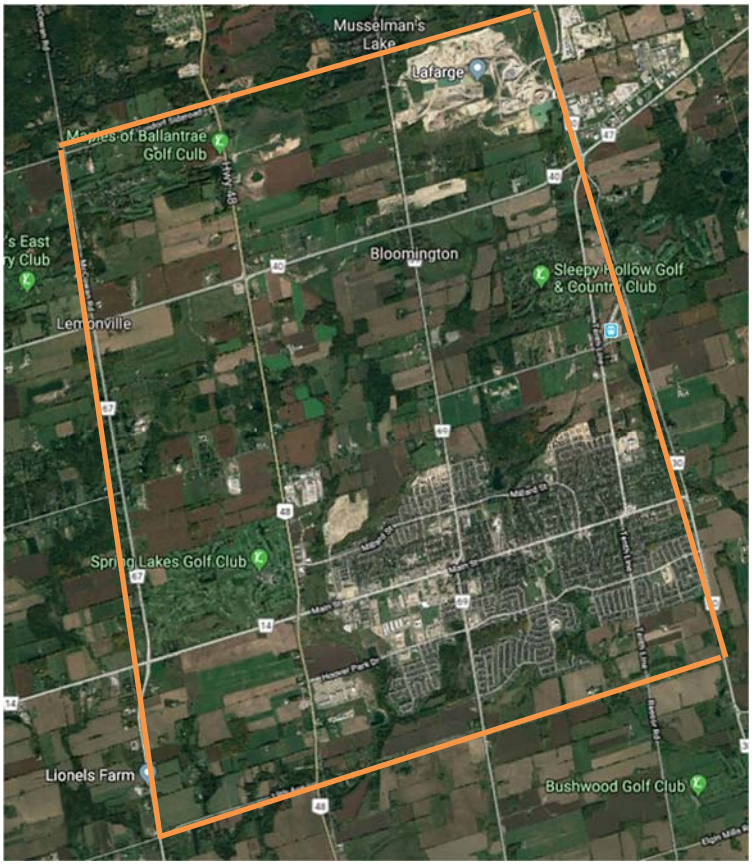
DATE	June 19, 2018
TO	**Shivan Narine, York Region**
SUBJECT	Stouffville Water Storage Class EA **Identification of Potential Impacts**
FROM	Kevin Brown, P.Eng
PROJECT NUMBER	17100

1 Introduction

This technical memorandum summarizes the environmental conditions within the Study Area, and identifies the relative magnitudes of the potential impacts that the identified alternative water supply and water storage solutions may have on the environment and affected stakeholders.

The study area is located in the Regional Municipality of York, and is approximately bordered on the north side by Vandorf Sideroad, on the east side by York-Durham Line, on the south side by 19th Avenue and on the west side by McCowan Road, in the Town of Whitchurch-Stouffville. The Study Area is shown in **Figure 1**.

FIGURE 1 STUDY AREA



2 Description of the Environment

A series of Environmental Screening Documents were prepared for the Region by Golder Associates as part of the overall Class Environmental Assessment (Class EA) process:

- Archaeological Screening;
- Cultural Heritage Screening;
- Natural Environment Screening; and
- Geotechnical Screening

The principal findings of those individual investigations are detailed in Technical Memorandum TM4 (dated March 1, 2018).

3 Review of Alternative Solutions

The alternative solutions for this Class EA were discussed in detail in Tech Memo 2/3. The memo also identifies the EA Schedule that each of the alternatives fall under. There are two categories of solutions: water supply and water storage.

Not all alternative solutions are being carried forward. The following are the two categories of solutions and respective alternatives which will be carried forward in this EA:

- **Water Supply**
  1. Do Nothing (maintain the existing facilities)
  2. Increase the percentage of water supplied from Lake Based (retire some facilities)
  3. Expand Existing Wells (retire some facilities)
  4. Develop New Well Site (retire some facilities)
- **Water Storage**
  1. Do Nothing (maintain the existing facilities)
  2. Limit Community Growth (retire some facilities)
  3. Build Additional Zone 2 Storage (retire some facilities)
  4. Facilitate Shared Fire Storage between Zone 1 and 2

The alternatives are further evaluated for socio-economic impact and natural environment impact in the Environmental Inventory Matrix.

4 Magnitude of Potential Environmental Impacts

The environmental inventory checklist will be used to assess the alternative solutions. The assessment will determine which alternative will have the lowest potential impact to the environment.

The environmental inventory checklist was developed through review of the site characteristics and the York Region Consultant Manual (Section 4.3.3.1).

The categories included in the Sample Environmental Inventory Checklist in the York Region Consultant Manual are listed below, with applicability to the Stouffville EA and a completed Environmental Inventory Assessment is attached. The categories generally apply to the evaluation of both the supply and storage alternatives. Those which do not apply will be identified.

TABLE 1 ENVIRONMENTAL INVENTORY CHECKLIST

Sample Environmental Inventory Checklist	Applicability to this EA
Aesthetics This includes removal of vegetation for landscape features, change of view, and a change of compatibility with landscape.	**Socio-Economic Environment:** This section is included due to the potential impacts to existing sites adjacent to any potential new infrastructure.
Agriculture This includes removal of productive land, change in crop yield, reduced viability due to land loss, change in water quality/quantity and effect on property loss.	**Socio-Economic Environment:** This section is included as there is a potential for future sites to be located on/near agricultural land.
Climatic Effects This includes vegetation removal or snow accumulation, wind screening and shade on adjacent buildings.	**Natural Environment:** This section is included as there is a potential to impact to greenhouse gas emissions, primarily relating to increased energy usage associated with new or expanded facilities.
Economic and Social Effects This includes change to tax base and change in tax rate or cost of service.	**Socio-Economic Environment:** This section is included as we must consider whether implementing a particular alternative solution would result in long-term water rates potentially becoming unaffordably-high.
Fish, Aquatic Wildlife and Vegetation This includes presence of endangered/threatened species, change or removal of existing habitat, effects of timing of construction activities on sensitive biological or ecological periods and lowering of water table.	**Natural Environment:** This section is included as there is a potential to impact water courses and aquatic habitats during construction or from groundwater drawdown and potential reductions in stream baseflow. *This section is applicable to Water Supply alternatives only*.
Groundwater This includes change in quantity, interference with flows/levels and interference with private wells or other municipal production wells.	**Natural Environment:** This section is included as there is a potential to impact existing wells and groundwater resources. *This section is applicable to Water Supply alternatives only*.
Heritage Resources This includes the potential disturbance of archaeological sites or artifacts, or structures with archaeological, heritage, or cultural significance.	**Socio-Economic Environment:** This section is included due to the high Archaeological Potential throughout the Study Area, and the potential impact to Heritage Properties/Sites.
Public Health This section includes effects on water quality, effects of air pollutants and effects on quality of life.	*(Not included. The potential Health effects related to possibly increasing the Region's water supply capacity are expected to be negligible. In fact, providing access to a municipally-treated water system could be seen as a health benefit).*

Sample Environmental Inventory Checklist	Applicability to this EA
Noise and Vibration This section includes changes in existing noise and vibration levels, and disruption during construction.	**Socio-Economic Environment:** This section is included as there is potential for noise and vibration during construction of any required new infrastructure.
Residential, Commercial, Industrial, Institutional This section includes temporary disruption during construction, effect of vehicular traffic during and after construction, safety and movement patterns of pedestrian traffic and change in property value.	**Socio-Economic Environment:** This section is included as there is potential to impact traffic and pedestrians during construction of any required new infrastructure. Proximity to an Elevated Tank has impacts on aesthetics (example: shadows)
Soil and Geology This section includes erosion or compaction during construction	**Natural Environment:** This section is included as there is potential for geological impacts during construction of any required new infrastructure. Also, subsurface conditions could impact on the technical feasibility or costs of the required works.
Watercourses and Surface Drainage This section includes diversion and/or channelization of watercourses and sedimentation and turbidity of adjacent water bodies due to construction activities	**Natural Environment:** This section is included as construction of any required new infrastructure has the potential to impact watercourses.
Terrestrial Vegetation and Wildlife This section includes presence of endangered/threatened species or their habitat, removal or disturbance of significant trees and/or ground flora and effect on wildlife habitat	**Natural Environment:** This section is included as there is a potential for forests and wildlife to be impacted during construction of any required new infrastructure.
Utilities This section includes effects on other utilities.	**Technical Merit:** This section is included as there may be conflict with existing utilities.

5 Affected Stakeholders

The affected stakeholders for this project are primarily the residents and businesses of the overall Study Area. Any construction activities associated with required new infrastructure has the potential to impact residents and businesses in both the short term (construction-related impacts: noise, dust, vibration, traffic) and in the long term (general aesthetics, loss of natural or cultural assets). A Stakeholder Sensitivity Analysis was developed in November 2017, which identified the various stakeholder groups and the respective impacts. The following is a list of stakeholder groups with examples:

- **Municipal/Political**
  - Town of Whitchurch-Stouffville (Engineering, Public Works, Planning, Clerks Office)
  - Town Council (and Regional Representative)
- **Residents**
  - Those identified in the Stakeholder Contact List, and in proximity to any identified infrastructure

- **Local businesses**
  - Identified in the Stouffville Chamber of Commerce Business Directory and Stakeholder Contact List
- **Local agencies**
  - Emergency Services, Schools, Transportation agencies
- **First Nations and Métis**
  - The seven Williams Treaties First Nations, the Huron-Wendat Nation, Métis Nation of Ontario, and others
- **Review agencies**
  - Aboriginal Affairs and Northern Development, Department of Fisheries and Oceans, Ministry of Environment and Climate Change, Toronto and Region Conservation Authority, Ministry of Transportation
- **Utility companies**
  - Hydro One, Bell Canada, Trans-Canada Pipelines, etc.

The stakeholders and their relationship to the categories in the Environmental Inventory Checklist is illustrated in the table below:

TABLE 2 STAKEHOLDER IMPACT TABLE

	STAKEHOLDER GROUP						
	Municipal/ Political	**Residents**	**Local Businesses**	**Local Agencies**	**First Nations**	**Review Agencies**	**Utilities**
Aesthetics	*I*	*D*	*D*	*I*	*N/A*	*N*	*N*
Agriculture	*I*	*D*	*D*	*I*	*N/A*	*N*	*N*
Climatic Effects	*I*	*D*	*D*	*I*	*D*	*R*	*N/A*
Economic and Social Effects	*I*	*D*	*D*	*I*	*N*	*N*	*N*
Fish, Aquatic Wildlife and Vegetation	*I*	*I*	*I*	*I*	*D*	*R*	*N*
Groundwater	*I*	*D*	*D*	*I*	*D*	*R*	*N*
Heritage Resources	*D*	*D*	*D*	*I*	*D*	*R*	*N*
Public Health	*I*	*D*	*D*	*I*	*I*	*R*	*N*
Noise and Vibration	*I*	*D*	*D*	*I*	*N*	*R*	*N*
Soil and Geology	*I*	*I*	*I*	*I*	*I*	*R*	*N*
Watercourses and Surface Drainage	*I*	*I*	*I*	*I*	*D*	*R*	*N*
Terrestrial Vegetation and Wildlife	*I*	*I*	*I*	*I*	*D*	*R*	*N*
Utilities	*I*	*I*	*I*	*I*	*I*	*R*	*D*
Residential, Commercial, Industrial, Institutional	*I*	*D*	*D*	*I*	*N*	*R*	*N*

(I) = Indirect, (D) = Direct, (R) = Reviewer/ Regulator, (N) = No Perceived Impact

In addition, the permitted water-takers within the Study Area are potentially additionally affected by any activities that could adversely impact the safety or security of their specific water supplies.

6 Mitigative Measures

Mitigative measures are generally identified once specific sites or required construction projects are confirmed. At this stage of the Class EA process, only general mitigative measures can be identified. Sample mitigative measures are as follows:

- Using the Archaeological, Cultural Heritage, and Natural Environment inventories to identify potential sites where new infrastructure could be constructed with lesser overall impacts to the environment;
- Being aware of required near-term major road works, such that any lineal infrastructure requirements (such as watermains) could be coordinated with those planned works to reduce the overall combined impact of future construction activities.

Once specific sites or required construction activities are identified, additional environmental investigations may be required (specific assessment of Natural features, Stage 1 Archaeological Assessment, etc). These additional investigations will include detailed mitigative measures associated with the specific impacts.

6.1 Groundwater Rebound

One item which has already been identified as a potential concern is groundwater rebound associated with the retirement of some existing wells.

Wells 3, 5, and 6 are all drawing water from the Upper Aquifer, which generally has a water surface elevation of approximately 282 m, compared with ground surface elevations in the range of approximately 287 m. Retiring Well 3 could result in a rebound in the groundwater table (GWT) within the Upper Aquifer, which could result in groundwater levels which could compromise existing infrastructure, or result in increased dewatering through residential sump pumps.

In other areas where water production wells in shallow aquifers have been retired, there have been instances where these wells have continued to operate (though not for water production) in order to control the groundwater levels. That mitigation measure (and the costs associated with it) will be considered in this Class EA, as shallow wells are being considered for retirement.

7 Conclusion

The potential impacts identified in this memo and the attached Environmental Inventory Matrix represents the current understanding of how the alternative solutions could impact the natural and socio-economic environments. Some of the impacts are subject to site selection and proximity to residential area, heritage sites and other well systems. These will be evaluated in detail if the alternative is selected moving forward in this EA.

These potential impacts should be presented to the identified stakeholders during the second Public Consultation Centre (PCC) to make them aware of how addressing the increased water supply requirements associated with the proposed growth of the Town of Whitchurch-Stouffville could impact the environment. The first PCC saw a high level of engagement from participants. Several participants indicated that they were expecting to see more information on decisions about storage facilities and potential locations for a new elevated water tank as well as alternative solutions with pros and cons. These will be discussed and stakeholders' input will be solicited at PCC #2, and they will be invited to propose other impacts that might not have been identified to date. Those potential additional impacts could be considered as part of the general categories that have already been identified (expanding the existing environmental considerations), or they might warrant additional categories (additional environmental considerations). Specific impacts on habitat and heritage sites can be identified once a potential construction site has been chosen for the options involving new facility construction.

These impacts will be more formally evaluated after the second Public Consultation Centre, in conjunction with a thorough technical and financial impact (both capital costs and operation costs).

WATER SUPPLY	Alternative 1: Do Nothing	Alternative 4: Change the % of water supplied from Lake Based	Alternative 5: Expand Existing Wells	Alternative 6: Develop New Well Site
Aesthetics -Removal of vegetation -Change of Compatibility with Landscape -Residents, Non-residents, Recreationalists and Tourists Exposed to New View	No new site required	No new site required	No new site required	New site(s) required
Heritage Resources -Disruption and/or Destruction of Sites, Cultural Heritage Landscapes and Structures having Archaeological, Historical, Architectural or Cultural/Heritage Significance	No new site required	No new site required	No new site required	Sufficient unconstrained land is available. Anticipate no adverse Heritage impacts (subject to confirmation of possible sites).
Noise and Vibration -Changes in Existing noise and vibration levels -Disruption during construction	There would be only minor works associated with well rehabilitation	No new infrastructure	There would be only minor works associated with well upgrades	Temporary disruption will be isolated to the selected site and the immediate area
Residential, commercial, industrial, institutional -Temporary disruption during construction -Safety and movement patterns of pedestrian traffic -Change in Property Value -Effect of Vehicular Traffic During and After Construction	No new infrastructure	Retirement of Well 3 could result in groundwater table rebound, which could impact basements.	Retirement of Well 3 could result in groundwater table rebound, which could impact basements.	Temporary disruption will be isolated to the selected site and the immediate area
Utilities -Effects on other utilities, e.g. Relocations	No new infrastructure	No new infrastructure	No new site required	Most of the construction work would be confined to the selected site
Agriculture -Change in crop yield -Reduced viability due to land loss -Change in Water Quantity/Quality -Removal of Productive Farm Land	No new infrastructure	No new infrastructure	No new site required	Small site required relative to total agricultural land within the Study Area
Fish, Aquatic Wildlife and Vegetation -Presence of Endangered / threatened species -Effects of timing of construction activities -Change or Removal of Existing Habitat -Lowering of Water Table	Negligible impact. Demands will increase but will stay within previously-approved daily water-taking (MOECC approval)	Increased baseflow in local creeks. Could be beneficial (increased habitats) or adverse (vegetation, habitat change)	Negligible impact. Demands will increase but will stay within previously-approved daily water-taking (MOECC approval)	Impact will depend on the selected site
Groundwater -Change in Quantity -Interference with private wells -Interference with Flows or Levels	Demands will increase but will stay within approved volumes	Groundwater table could rise causing problems where it is shallow	Small increase in the aquifer drawdown (depth and radius) Demands will increase but will stay within approved volumes	Impact will depend on the proximity of the proposed site to existing wells
Soil and Geology -Erosion or compaction during construction	No new infrastructure	No new infrastructure	No new site required	Disruption will be isolated to the selected site and the immediate area
Watercourses and Surface Drainage -Diversion and/or channelization of watercourses -Sedimentation and Turbidity of Adjacent Water Bodies due to Construction Activities	No new infrastructure	Increased baseflow in local creeks could result in creek migration	No new site required	Impact will depend on the selected site and would be temporary
Terrestrial Vegetation and Wildlife -Presence of Endangered/Threatened Species or their habitat -Removal or Disturbance of Significant Trees and/or Ground Flora -Effect on Wildlife Habitat	No new infrastructure	No new infrastructure	No new site required	Impact will depend on the selected site

Key to Magnitudes of the Potential Impacts:				
No impact	Low impact	Moderate impact	High impact	Undefined

WATER STORAGE	Alternative 1: Do Nothing	Alternative 2: Limit Community Growth	Alternative 3: Build Additional Zone 2 Storage	Alternative 4: Facilitate Shared Fire Storage between Zone 1 and 2
Aesthetics -Removal of vegetation -Change of Compatibility with Landscape -Residents, Non-residents, Recreationalists and Tourists Exposed to New View	No new infrastructure	No new infrastructure	Impact will depend on the construction site location and the area surrounding it	No new facilities
Heritage Resources -Disruption and/or Destruction of Sites, Cultural Heritage Landscapes and Structures having Archaeological, Historical, Architectural or Cultural/Heritage Significance	No new infrastructure	No new infrastructure	Sufficient unconstrained land is available. Anticipate no adverse Heritage impacts (subject to confirmation of possible sites).	No new facilities
Noise and Vibration -Changes in Existing noise and vibration levels -Disruption during construction	There would be only minor works associated with well rehabilitation	No new infrastructure	Temporary disruption will be isolated to the selected site and the immediate area	Some isolated works to install new Pressure Relief Valves
Residential, commercial, industrial, institutional -Temporary disruption during construction -Safety and movement patterns of pedestrian traffic -Change in Property Value -Effect of Vehicular Traffic During and After Construction	Will result in substandard fire flows	The approved growth of the Town would have to be reconsidered	Impact will depend on the proximity of the proposed site to residential commercial and industrial, institutions Any adverse impact may be mitigated by removing Zone 2 ET	Temporary disruption during installation of PRVs
Utilities -Effects on other utilities, e.g. Relocations	No new infrastructure	No new infrastructure	Most of the construction work would be confined to the selected site	Potential impacts on existing utilities
Agriculture -Change in crop yield -Reduced viability due to land loss -Change in Water Quantity/Quality -Removal of Productive Farm Land	No new infrastructure	No new infrastructure	Small site required relative to total agricultural land within the Study Area	Land outside of an existing right-of-way may be required for additional pressure-reducing valves
Soil and Geology -Erosion or compaction during construction	No new infrastructure	No new infrastructure	Impact will depend on the selected site	No land required
Watercourses and Surface Drainage -Diversion and/or channelization of watercourses -Sedimentation and Turbidity of Adjacent Water Bodies due to Construction Activities	No new infrastructure	No new infrastructure	Sufficient unconstrained land is available. Anticipate no adverse Watercourse impacts (subject to confirmation of possible sites).	No land required
Terrestrial Vegetation and Wildlife -Presence of Endangered/Threatened Species or their habitat -Removal or Disturbance of Significant Trees and/or Ground Flora -Effect on Wildlife Habitat	No new infrastructure	No new infrastructure	Sufficient unconstrained land is available. Anticipate no adverse Terrestrial impacts (subject to confirmation of possible sites).	No land required

Key to Magnitudes of the Potential Impacts:				
No impact	Low impact	Moderate impact	High impact	Undefined