

Ontario Land Tribunal

IN THE MATTER OF an appeal pursuant to Subsection 34 (11) and Subsection 51(34) of the *Planning Act*, RSO 1990, c. P. 13, as amended.

Applicant and Appellant:	Clublink Corporation ULC
Property Location:	7000 Campeau Drive
Municipality:	City of Ottawa
Municipality File No.:	D02-02-19-0123 (Zoning Amendment) D07-16-19-0026 (Plan of Subdivision)
OLT Case No.:	PL200195
OLT File No.:	PL200195, PL2001196

WITNESS STATEMENT – DOUGLAS NUTTALL

Qualification

1. I am a Professional Engineer and a member of the Professional Engineers of Ontario. I have a Bachelor of Science in Civil Engineering from the University of Alberta, which I received in 1994. I have been a practicing Professional Engineering in Ontario since 2001.
2. I am a Senior Water Resources Engineer with HDR, having started with them in 2021. My role with this firm is as the Technical Lead for a team of Water Resources engineers.
3. I have been qualified in the past as an expert witness on issues related to flooding and erosion at the Ontario Provincial Offences Court. More detailed information regarding my qualifications and experience are contained in my Curriculum Vitae, which is attached as **Attachment 1**. An executed copy of the Tribunal's Acknowledgement of Expert's Duty is attached as **Attachment 2**.
4. In my professional practice, I have undertaken hundreds of technical reviews of stormwater management plans relating to urban development proposals.
5. When I worked for Mississippi Valley Conservation Authority between 2005 and 2014, I had reviewed numerous applications within the same watershed as the Subject Lands. I am well acquainted with the Beaver Pond, Kizell Drain, and development in the area.

Retainer

5. The Kanata Greenspace Protection Coalition (KGPC) retained me on January 1, 2021, to provide professional advice related to the proposed development. I reviewed the background materials relating to this file and provided the board of the KGPC with detailed comments on the existing drainage system, the effect of the Restrictive Covenant (discussed further, below), and the current planning application from a perspective of Stormwater Management.
6. On July 19, 2021, I was hired by HDR as a Senior Water Resources Engineer.

7. On July 30, 2021, HDR was engaged by KGPC to provide professional advice related to the proposed development, and comments related to my review of the project were submitted to the City of Ottawa on August 4, 2021. This letter, and their response, are attached as **Attachment 3**.
8. I have reviewed the background materials relating to stormwater management of the Subject Property and the downstream system that were submitted to the City in support of this project and others in the watershed. I have considered these reports, where appropriate, in my professional opinions.
9. I have met with representatives from the City and the proponent's consultants on November 2, 2021, specifically to discuss the issues identified.
10. I have reviewed the work of the other expert witnesses who have been retained by KGPC on this file, and have included comments based on their work, where appropriate.
11. A full list of the documents that I have considered, reviewed, and/or evaluated in my opinions in relation to this matter is provided below. I may expand on any documents reference therein, or make reference to other documents, as may be necessary at the Hearing.

Summary of Findings

11. It is my opinion that the consultants for the proposed development have not demonstrated that the proposed works will not negatively impact the performance of the existing stormwater management system by the materials presented to the City of Ottawa in support of their application.
12. It is my opinion that the receiving water body (Beaver Pond) does not have capacity to receive the change in volume and flow that would come from the increase in imperviousness expected with development.
13. It is my opinion that the downstream channel (Kizell Municipal Drain) does not have capacity for any increase in flow, due to the presence of numerous structures (buildings, roads) within the existing floodplain that would be at more risk of damage from any increase in flow.

Location & Site Info

14. Description of Subject Lands
 - a) The Subject Lands are located within the City of Kanata, south of the Kizell Drain, north of Campeau Drive, and east of Terry Fox Drive, at 7000 Campeau Drive.
 - b) The Subject Lands have an area of 70.9 ha, which are intended by the Proponent for development of approximately 1500 new homes.
 - c) The subject lands are currently used as an 18-hole golf course that was constructed/expanded as part of the surrounding residential development.

History of Studies on Subject Lands

15. A restrictive covenant exists on the deed for the Subject Lands that indicates future work shall not be 'materially adverse' to the conclusions and recommendations relating to the stormwater management plans that were in place in 1996. This covenant is provided in **Attachment 4**. In my opinion, the reports that establish those stormwater management plans are:
 - a. *Master Drainage Plan – Storm Water Management Study for Marchwood Lakeside Community*, by Cumming-Cockburn & Associates Limited, dated April 25, 1984, prepared for and approved of by the City of Kanata

- b. *Kanata Lakes Storm Drainage Report*, by Oliver Mangione McCalla & Associates, dated March 1985, prepared for the Campeau Corporation, and approved of by the City of Kanata in April 1985
 - c. *Addendum to Kanata Lakes Storm Drainage Report*, by Oliver Mangione McCalla & Associates, dated September 1986.
 - d. *Kanata Lakes Dam & Outlet Structure Operation & Maintenance Manual*, by Oliver, Mangione, McCalla & Associates Limited. dated April 1990
 - e. *Kanata Lakes. Beaver Pond Urban Stormwater Quality Control*, by Cumming Cockburn Limited, dated November 16, 1994, prepared for the Ministry of Natural Resources
16. There have been several additional studies that provide background information relating to the current application that were reviewed for to develop my opinions that were published after the 1996 threshold for the restrictive covenant but before the current application:
- a. *Kanata Lakes North Serviceability Study*, IBI 2006
 - b. *Certificate of Approval for Municipal and Private Sewage Works*, MOE 2008
 - c. *Shirley's Brook and Watt's Creek Phase 1 Stormwater Management Study*, AECOM 2011
 - d. *Shirley's Brook and Watt's Creek Phase 2 Stormwater Management Study*, AECOM 2013-1
 - e. *Shirley's Brook and Watt's Creek Phase 2 SWM Study, Additional Hydrologic Model Calibration and Verification Assessment*, AECOM 2013-2
 - f. *SBWC Ph.2 - Beaver Pond Theoretical Storage Assessment* email, AECOM 2014-1
 - g. *SBWC Ph.2- Revised Shirley's Brook Calibration Assessment* email, AECOM 2014-2
 - h. *SBWC Ph.2 – Incorporation of Additional Storage in Upper Kizell Subwatershed Hydrologic Model*, AECOM 2014-3
 - i. *SBWC Ph.2 – Revised Draft*, AECOM 2014-4
 - j. *Meeting notes – Kanata Lakes Existing Conditions – Continuous Modelling*, IBI 2015
 - k. *Shirley's Brook and Wats Creek Phase 2 Stormwater Management Study – revised*, AECOM 2015 (includes modelling files).
 - l. *Continuous Modelling of Beaver and Kizell Ponds Under Existing Conditions*, JSFA 2015.
 - m. *KNL Lands – Proposed Drainage Diversion to the Kizell Municipal Drain*, City of Ottawa, Kanata North Ward, Stantec 2016.
 - n. *Watts Creek/Kizell Drain Flood Plain Mapping Study*, MVCA 2017.
17. The Current Application for development of the Subject Lands is supported by a number of reports that have been reviewed.
- a) Concept Plan – NAK 2021
 - b) Functional Servicing Plan – DSEL 2021
 - c) Geomorphological and Erosion Report – GeoMorphix 2021
 - d) Monitoring and Calibration Report – JSFA 2020
 - e) Stormwater Management Plan – JSFA 2021-1
 - f) Hydrologic Assessment – JSFA 2021-2
 - g) Geotechnical – Patterson 2021-1
 - h) Phase 1 ESA – Paterson 2021-2
 - i) Phase 2 ESA – Paterson 2021-3
 - j) Geo Response Memo – Paterson 2021-4

k) Subsurface Infiltration Review - Paterson 2021-5

Summary of Findings – prior to 1996

18. The restrictive covenant on Title, registered as Instrument No. LT1020194, as provided in Attachment 4, reads in part:

3. *Each and every part of the Golf Course Lands shall be subject to the following restrictions and covenants:*

(i) *The Transferee agrees that:*

- a. *It shall not alter the grading of the Golf Course Lands or any of the storm water management facilities on or serving the Golf Course Lands; and*
- b. *There should be no construction on any buildings, structures or other improvement on any of the Golf Lands which may cause surface drainage from the Golf Lands to be discharged, obstructed or otherwise altered*

in a manner that materially adversely affects the Transferor's or the City of Kanata's storm water management plan in respect of the transferor's Benefited Lands as such plan exists as at November 1, 1996. Without limiting the generality of the foregoing, the Transferee in respect of the Golf Lands shall comply with all applicable municipal agreements, by-laws, and regulations affecting the Golf Lands with respect to grading and storm water management.

Transferee = ClubLink Capital Corporation

Transferor = Imasco Enterprises

Benefitted Lands = provided in Schedule 1 of the Instrument.

19. It is my opinion that the concept of “materially adverse” would mean a change to the system of collection and conveyance of storm water so that it would increase the frequency of severe events or increase the magnitude of flows within the receiving stream, that were considered in the plan. Specifically, between the point of discharge from the Golf Course Land to a point where the upstream response time of the river is as long as the duration of the peak response in the Kizell Pond, plus the travel time to that point (normally expected to be between 6 and 24 hours), it would be considered materially adverse if;

- a) the long-term average channel factor of safety is reduced to be lower than 1.0.
- b) the elevation of the calculated flood line for any given event is increased by ½ of the precision of the predicted elevation.
- c) water diverts from the system into a neighbouring watershed (Watts Creek or Shirley's Brook).
- d) there is a reasonable expectation of an increase in required maintenance activity.
- e) there is an increase in flows for a given event where there is a known flood hazard.

20. The documents listed in 15. above have several recommendations, and these are:

Report	Recommendation	
CCL 1984	7.2.1.a	Minor sized for 1:5 year, major sized for 1:100 year events
	7.2.1.b	Channel stabilization where erosion is increased

	7.2.2.a	Outflow into Kizell Drain not to exceed 3.6 m ³ /s
	7.2.2.b	Distributed storage and pond modifications are required
	7.2.3.a	Diversion to Kizell from Shirley's Brook a better choice than no diversion
	7.2.3.c	An on-line detention facility to be located downstream on Shirley's
OMM 1985	5a	Minor system to carry 1:5 year without overtopping
	5b	Minor system has invert at Beaver pond of 89.1m
	5c	CB Orifices to be used to limit inflows into minor system
	5d	Dam and outfall structure will limit flow to 0.7cms and 1.1 cms leaving the Beaver Pond in 1:5 year and 1:100 year events, respectively.
	5e	Flows leaving site are 1.1 cms and 3.1 cms
	5f	Water levels in Beaver Pond will be 91.7m in 1:5 year event, and 92.8m during 1:100 year event. Normal water level to be 91.0m. Storage volumes will be 8.29 ha.m, and 18.71ha.m, for the 1:5 year and 1:100 year events, respectively.
	5g	Major system flows will be conveyed overland to 11 storage locations, for a total of 5.02 ha.m of storage
OMM 1986	Nothing new	The addendum provides clarification of some details, but no new recommendations
OMM 1990		Operating stage/storage/discharge for the various events are:
		90.5m/0 ha.m/0 m ³ /s
		91.5m/7.01 ha.m/0.63 m ³ /s
		92.6m/17.80 ha.m/1.07 m ³ /s
CCL 1994		No further dredging required – meets both MNR 1992 and MOE 1994
		Sediment forebays to be constructed for ease of maintenance
		Shoreline maintenance activities to be minimized to avoid further destruction of existing habitat
		Quality sampling to be done for 2 years after construction
		Outlet structure built with an invert elevation of 90.47m, baseflow brings water level to 90.55m

21. CCL 1984 relied on a 12 hr, 1:100 year event of 78.5mm storm event to design the volume of the Beaver Pond to manage flows. This was applied to:
- 240 ha of urban land to produce 33.9 cms to drain directly to the Beaver Pond and 143 ha of undeveloped land to produce 14.4 cms to drain directly to the Beaver Pond
 - A portion of the Shirley's Brook watershed to be diverted to the Beaver Pond, with an additional 114ha of urban land to produce a combined flow of 43.3 cms from urban land and an additional 255ha of undeveloped land to produce a combined flow of 18.7 cms from undeveloped land.
22. The 12hr 1:100 year event that Ottawa uses today is 93.89mm, based on data collected from 1967 through 1997, an increase of 20%. The imperviousness used is also increased, by as much as 25% for the 1:100 year event. This significantly increases the required design volume for the pond.

23. It is well understood that climate change is decreasing the level of service for any given storm event, so in my opinion, this value likely does not represent the design event that would be prudent to use into the future. No effort was described in the reports to ensure that the pond has the capacity for the change in volume the development would produce in the pond, in either current or expected future conditions.
24. It is my opinion that the change in the amount of runoff expected from the design event mean that any development within the watershed of the Beaver Pond must consider both volume and flow rate reaching the Beaver Pond to ensure that the available capacity in the pond will still be available after other planned development and diversion is in place, and that has not been done in the application that was made.

Summary of Findings – reports between 1996 and 2018

25. Of the list provided in 16. above, MOE 2008, JSFA 2015, Stantec 2016, MVCA 2017 were reviewed in detail. Each of these are summarized below:
- a. MOE 2008 describes the pond as it was designed at the time. The volumes that were available at the time are not available in the recent surveys (LIDAR and Topographic) referenced in JSFA 2015. The flow rates in MOE 2008 are in excess of what was calculated in both JSFA 2015 and MVCA 2017 – MVCA 2017 provides the formula used, and it is correct for simple modelling in a free-flow condition with a submerged outlet. JSFA 2015 predicts a lower outflow for the same water level – this is credible if the 1200mm outlet pipe is flowing under a significantly surcharged condition (such as a flood) or if the orifice is not fully submerged (which would be the case for frequent events).
 - b. The JSFA modelling includes the surveyed surface storage, under-utilized golf-course storage, and subsurface storage. The MVCA modelling included the surface storage, but not the subsurface storage, and didn't consider routing between the storage in the golf course and the Beaver Pond. Surface storage in the golf course appears not to be holding water – either surface grading doesn't bring water to it, or there is ample sub-surface percolation bypassing flow controls.
 - c. Stantec 2016 describes how the existing Kizell Drain downstream of Beaver Pond doesn't have the capacity for any increase in flows. Downstream works will be required prior to any increase of flow. While the restricted culvert under March Road is the obvious starting point (failing in structure and capacity), the crossing at Leggett Drive is identified in MVCA 2017 as having substantial road flooding during the 1:100 year. There are 10 other locations that indicate the channel is overloaded (either flooding buildings or roads) to varying degrees.
 - d. MVCA 2017 also identified that the 1:100 year rain-on-snow event would produce substantially more flow than the pond can handle, and it would overtop the weir, and increase flows significantly downstream. This is not unexpected, due to the amount of rural land and the response time of the system – any event that is of a comparable duration as the response time of the system should be checked to see if it produces the peak outflow, and the pond responds for 5 days. So, in addition to the 12 locations with roadway and building flooding issues, the channel could also experience higher flows than the regulatory event, without considering the effects of climate change. The flows the MVCA model predicts are intended to identify the regulatory limit of the flood plain, rather than predict a specific response to a specific event.

26. It is my opinion that there are technical problems downstream of the Beaver Pond at this time that prevent a significant increase in peak volume within the Beaver Pond, and thus the runoff rate entering Kizell Drain. These include the presence of flood prone structures and roads downstream, existing areas of channel instability, etc. They are all potentially resolvable by the City of Ottawa, but several are outside of the direct influence of the development. It is not obvious that the improvements that the City would undertake would include sufficient capacity to allow for sufficient additional upstream development for both the proposed KNL development and the proposed development of the Subject Lands. This is consistent with the conclusion of Stantec 2016.
27. It is my opinion that, even after the technical problems are addressed downstream, any new development would have to have sufficient storage to prevent an increase in flows downstream beyond the new channel improvements, for both the peak flow or the channel forming flow. Increasing the channel forming flow will change the morphodynamics of Kizell Drain and potentially Watts Creek. Increasing the peak flow will change the flooding limits and the potential of water spilling into adjacent watersheds. This is potentially a very restrictive condition, and would require unusual SWM, due to the very long response time (due to the wetland-dominated nature of the upstream area) and trailing limb (due to the quantity of storage) of the pond.

Summary of findings – current application

28. Monitoring and Calibration Report, JSFA 2020
- a. Sections 1-4 provide the method undertaken to collect the data and can be accepted without comment.
 - b. Section 5 refers to MVCA modelling of 2017 and AECOM modelling of 2015. No reference is made of the JSFA modelling of 2015 and the prediction of many thousands of cubic meters of subsurface storage that must be connected to the pond by a restricted outlet. AECOM 2015 includes a letter to Darlene Conway from March 2014, that states, in part "...a minimum additional storage of approximately 72,190m³ (17mm equivalent depth over the entire Study Area) would have to exist... to achieve these results." This is roughly ½ to ⅓ of the volume that is expected to reach the pond outlet. In the absence of that storage in the model, the results of the model would not predict existing conditions with accuracy.
 - c. Per the XPSWMM online support materials found here <https://help.innovyze.com/display/xps2016/Infiltration>, the Horton infiltration values are typical for loamy sand with an HSG of "A". While porous fill is found in some places in the development, as evidenced by the on-site infiltrometer tests and the geotechnical report, perched water, bedrock, and silty clays are also present at the surface, so it is my opinion that applying these values across the whole of the watershed can induce significant errors, since the watershed has a variety of land uses and soil properties. This would have the effect of under-estimating the runoff reaching the pond during the storm response.
 - d. All events monitored and calibrated for from 2019 are frequent, significantly below anything that would be considered 'flooding'. It is my opinion that volumes, peaks, and timing at the upper gauges seem reasonable, with the magnitude & timing of the peaks, and volume of the runoff events, being close to observed. It is my opinion that volumes, peaks, and timing at the pond do not seem reasonable; the actual decay curve is much longer than the predicted, and magnitudes are not close – with a ratio between the predicted and the observed of between 1/3 and 4. It is my opinion that this is not a 'good' fit, as described in the text. The modelling effort

by the same firm in 2015 using more data and including lower frequency events produced results that more closely matched the observed response of the system during infrequent events. The absence of this calibration data limits the accuracy of this model to predict the effects of the larger, more infrequent events.

29. It is my opinion that the existing conditions must be modelled with the subsurface storage included, and in the absence of information on the long-term availability of that subsurface storage, it must not be used to model the proposed conditions.
30. It is my opinion that in the absence of subsurface storage in the proposed condition model, the Beaver Pond will not have the capacity to accept additional flows from the subject site without risking over-topping and thus releasing uncontrolled flows.
31. It is my opinion JSFA 2020 has not demonstrated that the proposed works will not negatively impact the performance of the existing stormwater management system.
32. Functional Servicing Plan – DSEL 2021. Section 4 and 6 are germane to stormwater management
 - a. Section 4.1: Impacts Downstream of the Beaver Pond.
 - i. No discussion has been provided about the at-risk structures and properties downstream of the Beaver Pond identified in MVCA 2017.
 - ii. Subsurface storage identified in JSFA 2015 does not appear to be included in the model.
 - iii. No conclusions have been provided relating to the calculated value of the critical flow in Kizell Drain.
 - iv. No information has been provided on the long-term factor of safety for the channel. No information has been provided on the potential for aggradation in the absence or erosion.
 - v. Modelling suggests flows will reach the pond more slowly (thus total volume increases but peak flow drops) but it is my opinion that the model used does not reflect the trailing limb well, so the effect of changes in timing can't be well predicted.
 - b. Section 4.2: Infiltration
 - i. The questions relating to the suitability of site for using LIDs to provide storm water management have been copied from the TRCA/CVC LID Guideline, but not answered. It is my opinion that these questions should be answered at this time due to the importance of the proposed LID system in the performance of the SWM system as a whole.
 - ii. I have answered the questions based on the information provided in the various Patterson reports from 2021 listed above in 17.
 - (i) ***Does the site have a pollution hot spot (location on the site with high potential for contaminated runoff)?*** Phase 2 ESA says potential exists due for mercury contamination, but not hazardous if the site is to be used as a golf course. No opinion was provided relating to a change in land use or the impact of the expected grade changes.
 - (ii) ***What is the Soil Texture and borehole data? Can the underlying soils infiltrate runoff?*** Due to the presence of sensitive marine fine-grained soils with wildly varying depths, and bedrock outcrops identified in the Geotechnical Report, it is my opinion that infiltration may be problematic. Infiltration was not investigated at the depth of the proposed LID.
 - (iii) ***What is the water table depth? If water table depth is less than 1m from grade, LID should not be implemented and/or should be flagged for further assessment.***

Geotechnical report indicates the water table varies, but is present above existing grade in places, and above the expected infiltration elevation in places.

- (iv) ***What is the bedrock depth? If too high, infiltration will be difficult. Should be more than 1 m from the lowest point of the LID measure.*** Bedrock varies but is present above the infiltration elevation in places.
 - (v) ***How does the topography of the site affect the flow?*** Geotechnical report indicates topology highly variable, with standing water, steep subsurface hydraulic gradients, rocky outcrops, etc. It is my opinion that it likely has pockets of perched water table, and very complex subsurface flow paths due to the presence of blasting to create the existing subdivision.
 - (vi) ***Any trees or other features that might affect the installation of an LID measure?*** The presence of sensitive marine fine-grained soils and the presence of 10s of thousands of cubic meters of subsurface storage will both affect LID applicability. Trees are not recommended for significant portions of the site due to the potential of dewatering and destabilizing the existing soils.
 - (vii) ***Is there a receiving system that could be connected via buried pipes or under drains?*** Yes. To some extent.
 - (viii) ***Is the available space for LID measures too small to yield any benefit of controlling inflows?*** It is my opinion that this is likely No, but this is not quantified in the available reports.
- iii. An effort to answer these questions would show whether LIDs would be suitable for this site – this was not done - and yet the assumption was made that LIDs would manage the vast majority of runoff from the site. While it is possible that these questions can be addressed in more detail, it is my opinion that it is unlikely that LIDs would be appropriate to be applied generally through the Subject Lands, and thus the assumption is ill-advised.
- c. Section 4.2.1 Etobicoke Exfiltration System
 - i. 22mm of rainfall is used as the target rainfall depth for sizing the system. This is not consistent with the Draft MOE LID Design Guideline, which recommends 27mm of rainfall.
 - ii. The measured depth to groundwater varies from 0.1 to 3.5m below grade. 11 out of the 12 boreholes identified in Table 2 of Paterson 2021(1) show the groundwater would be intersected by the minimum depth of the proposed EES. It is my opinion that the presence of effectively permanent water bodies suggests groundwater elevation come to the surface in these locations.
 - iii. Long-term groundwater elevations are expected to be 2-3m below grade, generally above the 2.85m minimum depth to the drainage layer and well above the 5.3m maximum depth of the drainage layer.
 - iv. Dewatering the ground as part of the SWM of a site is not consistent with the TRCA/CVC LID design guideline or City policy regarding water balancing.
 - v. It is my opinion that where sensitive marine soils are present, there should be no draining of the groundwater as this has the potential of destabilizing the soils in a fairly large area, potentially past the limits of the development.
 - vi. Due to the weakness of the soils identified in Paterson 2021(1), there are restrictions to grade raise that would prevent raising the bottom of the infiltration to be above the sensitive clay soils.
 - vii. It is my opinion that where bedrock exists, and in the absence of a more detailed understanding of where the existing subsurface storage is occurring, there should be no

draining of the groundwater to prevent increasing the conveyance of the subsurface storage into the pond.

viii. It is my opinion that the use of the EES for this site is not appropriate.

d. Section 4.2.2 Etobicoke Exfiltration System Quality Control

- i. The MOE SWMP&D manual indicates that 33.3 m³/ha of storage would be required for infiltration to achieve 80% TSS removal, while 108m³/ha is made available. That assumes that all of the water that exfiltrates from the EES is prevented from moving downstream and into the Beaver Pond within the clear stone. As there is currently the potential of 10x as much subsurface storage as the proposal provides being utilized in the system, it is my opinion that it must be assumed that enhancing interflow has a substantial risk changing the performance of the system as a whole.
- ii. The MOE Storm Water Management Planning and Design Manual (MOE 2004) indicates that 33.3 m³/ha of storage would be required for infiltration to achieve 80% TSS removal, and DSEL 2021 indicates that 108m³/ha is available. This assumes that all of the water that percolates into the EES is prevented from moving downstream into the Beaver Pond. Due to the presence of low permeability soils and bedrock, it is my opinion that approximately 2/3 of flow will travel as interflow within the granulars and reach the Beaver Pond within 24 hours of the storm event. 1500m travel path, 4m of fall, gravel represented with 25mm spheres = approximately 24 hour draw down, while the infiltration would require 72 hours.
- iii. It is my opinion, based on a simple calculation of residency time within the clear stone that 80% TSS removal cannot be achieved with the conveyed flow. 2/3 at 60% treatment + 1/3 at 100% treatment = 73% TSS removal.
- iv. No information has been provided on how the change in flows and volume reaching the Beaver Pond will affect quality treatment in the pond. The ESS can be expected to produce just better than 70% TSS removal for a portion of the flows reaching the Beaver Pond, but that does not mean that it would have sufficient additional residency to deposit the remaining TSS within the Beaver Pond itself.
- v. It is my opinion that the change in flows and volume of runoff will have the potential of an impact on the quality treatment performance of the Beaver Pond, and the performance of the pond would have to be reconsidered with the change in flows included.

e. Section 4.2.3 Etobicoke Exfiltration System Maintenance

- i) Maintenance activities are discussed within Appendix D, based on a study for a different site by a different author. It is not clear where the 80% TSS that is expected to be removed will accumulate. It is my opinion that the obvious answer is both within the clear stone and within the pipe system, wherever there are decreases in velocity. The coarsest materials will accumulate in the catch basins – it is my opinion that this would not exceed 20% of the total mass if CB clean-outs were very frequent. The remainder is implied to accumulate in the pipe itself, if there is sufficient retention time to cause settling.
- ii) It is my opinion that it can be expected that a significant amount would exit the perforated pipe during normal operation due to the relatively low settling velocity, and this would be impossible to clean out of the clear stone. If the water velocities in the clear stone trench are low enough, the fines can be expected to settle out on the bottom of the trench, and would have a comparable permeability as the clays. If the water velocities are higher, such as would be expected if there was longitudinal conveyance, the fines would accumulate in

places where there is a sudden reduction in velocity, creating localized reductions in the available conveyance. In either case, the accumulated sediment cannot be removed with normal maintenance operations, as it would be outside of the pipe.

- iii) It is my opinion that the use of ESS without any form of quality pre-treatment has to potential of incurring significant replacement costs when the accumulated sediment fills the available pore space in the clear stone. The rate of accumulation should be estimated, and the City, as the ultimate owner of the infrastructure, has to confirm that the replacement cycle duration is appropriate.

f. Section 6 Site Grading

- i) Substantial fill is required through much of the site, with light-weight fill recommended, and substantial cut is required at several of the ponds, as much as 8m. It is my opinion that this is expected to produce meaningful impacts of groundwater flow and storage.
- ii) Existing ponds indicate where surface water/groundwater interactions occur – the piping in these areas will definitely be below the groundwater table since less than 2.5m of fill is recommended by the geotechnical report.

It is my opinion DSEL 2021 has not demonstrated that the proposed works will not negatively impact the performance of the existing stormwater management system.

33. Preliminary Stormwater Management Plan – JSFA 2021-1

- a. It is my understanding that the Draft Plan of Subdivision requires approval of, and conditions that are derived from, the Conceptual Stormwater Management Plan. In that Plan, the criteria of approval are provided by all of the approval authorities, the developer describes their proposed system, and it is shown how each of the various criteria can be met. There must be sufficient detail to be confident that the plan can be followed without revising lot lines (knowing of course that the lines could change in the future as the process continues) – essentially showing that the system as proposed can work. The conditions provided by the approval authorities generally require the developer to show how the system will work, and ensures that all of the various regulations and policies are adhered to. With each phase of development, the developer shows how they are following the Draft Plan of Subdivision, and how they have met the conditions with the detailed design – typically using tender-ready drawings and reports. JSFA 2021-1 does not provide either the criteria or the correspondence with the approval authorities where the criteria were discussed.
- b. A flow monitoring program was instituted in 2019, and it produced no events that exceeded the 1:2 year IDF curve. It is my opinion that this calibration exercise therefore does not represent flood conditions and it would be more useful if the data from JSFA 2015 and other subsequent monitoring was also included.
- c. The proposed site was separated from the surrounding lands, with the site run as a dynamic model. City default Horton's infiltration values of 76.2 mm/hr, 13.2 mm/hr, 4.14 1/hr & a 7 Day drying time were used. Per the XPSWMM online support materials found here <https://help.innovyze.com/display/xps2016/Infiltration>, these values are typical for pebbly loamy sand with an HSG of "A". It is my opinion that this does not reflect the site as described in the Patterson 2021 reports. The Horton parameters used are inconsistent with JSFA 2020.
- d. It is not obvious what the results of the pre-consultation with the approval authorities are. It is my opinion that this should be clarified.

- e. AECOM 2011 has been referenced, but it was superseded or amended by other reports including AECOM 2013-1, AECOM 2013-2, AECOM 2014-1, AECOM 2014-2, AECOM 2014-3, AECOM 2014-4, IBI 2015, AECOM 2015, JSFA 2015 and the new reports include a significant quantity of sub-surface storage that would need to be included in the existing conditions to complete the calibration exercise.
 - f. There is no indication that the City has been consulted on how they would expect the subsurface storage to be treated in the model. It is my opinion that the modelling would have to be calibrated with the missing storage in place to predict the existing conditions, and then the subsurface storage removed from the model for the future conditions unless it can be shown that it would continue to be available for the proposed development in perpetuity.
 - g. Ponds 1 and 3 require substantial excavation within bedrock to create. Pond 2 and 4 requires significant false grading to retain water. It is not clear what elevation the invert of the tank or the final ground surface is expected to be. It is my opinion that the reduction of the groundwater elevation is expected to reduce the available subsurface storage, and this in turn would produce a higher peak and shorter trailing limb in the Beaver Pond hydrograph.
 - h. As the Beaver Pond is not sensitive to velocities but rather total volumes, a reduction of peak flow but an increase in total runoff will have a meaningful negative downstream impact. This is not consistent with the restrictive covenant, or the existing MOE ECA.
34. It is my opinion that the conclusions made in the report are not fully supported by the materials presented. Specifically:
- a. The conclusion that the minor system (eg, the pipe system) can convey the 1:5 through 1:100 year event to the designated SWM facilities is not supported by material presented in the report. The report indicates that the minor system has been designed for the 1:2 year event, and up to 35 cm of surface ponding is required to convey the overland flows (major system) of the 1:100 year event.
 - b. The conclusion that the major system can convey beyond the 1:100 year event is not supported by the material presented in the report. The report indicates that the major system will convey beyond the 1:2 year, since the minor system has been designed to carry the 1:2 year event. The capacity of the major system beyond the 1:100 year event has not been discussed in the report.
 - c. The conclusion that quality control will come from EES is not supported by the material presented in the report. The expected performance can only occur when the invert of the lowest pipe in the EES is meaningfully above the groundwater elevation. That is not expected for the vast majority of the site. The cross-sectional area of storage required would have to average close to 1m² above the water table, which is substantially more than what has been proposed in the report.
 - d. The conclusion that no HGL increases will occur in the existing SWM infrastructure is partially supported by the material presented. The discussion on the SWM infrastructure relating to the Beaver Pond is not credible in the absence of subsurface storage or calibration data that includes less frequent events.
 - e. The conclusion that the peak flows into the Beaver Pond are equal to or less than predevelopment flows is supported by the materials presented, but it is of little value as the total volume in the pond governs the release rate from the pond, rather than the incoming flow rate. And one can not infer that the volume would not increase, as this requires shifting the peak response from the site by significantly more than existing response time of the pond. The on-site ponds will delay the peak flow leaving in the minor system, but the interference with the

groundwater will accelerate the peak flow that would be leaving via sub-surface drainage and this is not discussed.

35. It is my opinion JSFA 2021-1 has not demonstrated that the proposed works will not negatively impact the performance of the existing stormwater management system.

36. Hydrologic Assessment Downstream of 7000 Campeau JSFA 2021-2

- a. Flows into and out of the Beaver Pond have been calculated and are tabulated, together with total flows. A partial summary is here, showing contributing areas (eg., not infiltrating) in ha, Peak Flows in and out in m³/s, Runoff Volume in 1000 m³, the ratio between the peak flow out proposed /peak flow out existing, and the ratio between runoff volume proposed/runoff volume existing:

Event	Existing				Proposed					
	area	Q in	Q out	Vol.X	area	Q in	Q out	Vol.	Q _p /Q _{pX}	Vol/ Vol X
25mm4hr	415.85	4.626	0.139	14.8	320.66	4.593	0.131	16.7	0.942	1.13
12 hr SCS	415.85	4.644	0.314	30.6	362.97	4.609	0.283	39.1	0.901	1.28
12 hr SCS	415.85	7.164	0.486	48.6	382.23	6.941	0.463	63.7	0.953	1.31
12 hr SCS	415.85	9.686	0.599	65.2	390.47	9.071	0.578	85	0.965	1.30
12 hr SCS	415.85	13.964	0.718	90.3	397.17	12.648	0.689	115.3	0.960	1.28
12 hr SCS	415.85	17.893	0.792	109.5	400.3	15.935	0.749	137.6	0.946	1.26
12 hr SCS	415.8	24.521	0.854	129.9	402.35	22.183	0.805	160.5	0.943	1.24
24 hr SCS	415.85	6.603	0.358	39	365.28	6.502	0.322	48	0.899	1.23
24 hr SCS	415.85	10.871	0.548	63.5	383.14	10.398	0.521	79.2	0.951	1.25
24 hr SCS	415.85	14.605	0.642	82.5	390.21	13.588	0.618	102.2	0.963	1.24
24 hr SCS	415.85	19.1	0.745	108.5	395.75	17.526	0.714	132.3	0.958	1.22
24 hr SCS	415.48	23.303	0.813	129.9	397.92	20.855	0.776	155.6	0.954	1.20
24 hr SCS	415.01	34.161	0.881	153.8	400.19	30.8	0.833	181.4	0.946	1.18
3 hr CHI	415.85	7.098	0.238	22	352.07	7.039	0.219	28.2	0.92	1.28
3 hr CHI	415.85	12.18	0.437	38.4	377.97	11.954	0.419	52.2	0.959	1.36
3 hr CHI	415.85	15.175	0.533	50.5	386.48	14.594	0.513	69.1	0.962	1.37
3 hr CHI	415.68	19.916	0.626	66.5	392.22	18.503	0.603	90.6	0.963	1.36
3 hr CHI	415.09	25.585	0.692	79.4	395.33	23.931	0.659	107.6	0.952	1.34
3 hr CHI	414.44	29.457	0.75	93.9	397.84	27.321	0.711	126	0.948	1.14
24 hr SCS + 20%	413.86	50.926	1.007	207.7	403.28	46.667	0.95	237.4	0.943	1.14

- b. It is my opinion that these results demonstrate problems with the modelling. For example, with 25mm of rainfall (highlighted in the first row of the table), if the first 22mm are to be captured

from the 70.9 ha development, then the contributing area can not decline by nearly 100 ha. The expected value would be approximately $22/25 \times 70.9 \text{ ha} = 62 \text{ ha}$. There must be other, undocumented changes to the model between Existing and Proposed. The table also demonstrates that while the peak flow rate is reduced, the total runoff reaching the pond is increased by 13% to 37%. As the pond performance is governed by volume, not flow rate, this has the potential to interfere with the performance of the pond.

37. It is my opinion that JFSA 2021-2 has not been demonstrated that the receiving water body (Beaver Pond) has the capacity to receive the change in volume that would come from the increase in imperviousness expected with development, and thus has not demonstrated that there would be no increase in downstream water levels.

38. Preliminary Water Balance and Water Quality Controls JSFA 2021-3

- a. The math used to predict TSS removal is incorrect. It makes the assumption that the pre-treatment in the deep sump will remove the same particle size distribution as will pass the structure. It is my opinion that sumps will preferentially capture coarse materials. If it captures 25% of the TSS, it will be in the coarsest fraction of sands and gravels. If the finest 20% of sediment passes through the ESS, putting deep sumps will not decrease that. The only significant benefit of the deep sumps is the cost of cleaning the sump is significantly lower than cleaning the pipe. – it can not increase quality treatment.
- b. The estimated benefits from thermal mitigation are overstated. The stone trench acts as a thermal capacitor, capturing the heat from the stormwater runoff. But this heat is then released into and carried away by the interflow, so that over a few days, all of the heat ends up in the stormwater pond, anyway. Due to the response time of the pond, there is only a very small impact at the beginning of the response in Kizell Drain where a difference could be expected.
- c. Patterson 2021-1 provides the initial infiltration rate (Fc) and from that, the SCS soil group has been assigned. The method used is not consistent with the USDA Part 630 Hydrology, Chapter 7 Hydrologic Soil Groups, which is the original source material. Silty clay, for example, is shown in table B1-1 of JSFA 2021-3 as HSG B, while bedrock is shown as HSG C – both of these are inappropriate, as Fc alone cannot be used to assign HSG. Tables 7-1 and 7-2 of USDA provide the criteria for assessing the soil properties, and relies on permeability, depth to groundwater, and depth to bedrock observed together. Where there is water on the surface, for example, the depth to groundwater is 0, and therefore is HSG D, regardless of the soil type. Where the bedrock is at the surface, the depth to rock is 0, so therefore is HSG D. As indicated in Paterson 2021(1), the assessment of soil properties is to be done at the depth of the intended infiltration, which is generally immediately above the proposed ground water elevation.
- d. It is my opinion that Table B1 needs to be re-evaluated to consider the presence of surficial bedrock, subsurface bedrock, the elevation of the intended infiltration, and the groundwater elevation.
- e. A report is referenced to assign the 90th %ile rainfall event as 22mm. This is not consistent with the Provincial draft MOE LID manual, which indicates 27mm is the appropriate rainfall depth to utilize for LID sizing in this area.
- f. Infiltration via the ESS is expected to be 21% of the rainfall. This does not consider how much of the runoff will be conveyed to the pond as interflow in the clear-stone pipe bedding. In my

opinion, based on a calculation of flow through the interstitial spaces with 4m of fall in 1500m of length, it is expected that 7% of the rainfall, or about 45mm per year, will end up infiltrating. It is not clear how much groundwater would be intercepted, as the groundwater elevation is expected to drop as a result of the development.

39. It is my opinion that JSFA 2021-3 has not demonstrated that the proposed works will not negatively impact the performance of the existing stormwater management system.
40. It is my opinion that the supporting materials presented are inadequate and lacking, and when they are resubmitted, they should include:
 - a. The criteria for approval as provided by the approval authorities, the restrictive covenant, and any other applicable policies.
 - b. Modelling that shows that post-development flow rates within the Kizell Drain are not increased over pre-development flows. The existing conditions model must be calibrated with the largest rainfall events available, rather than only the smallest ones. The existing conditions model should include all estimated storage required to model the existing pond performance. The future conditions model should only include quantifiable storage – even if subsurface storage is required for calibration in the existing conditions model. If it cannot be determined that this volume and the release rate will be available in perpetuity, then it cannot be relied on in the future conditions model.
 - c. Demonstration that the change in flows and volume within the Beaver Pond does not impact the performance of the quality treatment of the Beaver Pond.
 - d. Documentation from the City of Ottawa that the use of EES for quantity and quality treatment is supported and under what conditions. If ESS is supported, it must be shown where it will be able to be used effectively – changing groundwater conditions in sensitive marine clays is known to be hazardous.
 - e. An analysis that demonstrates that all of the criteria for approval, including the restrictive covenant, can be met using acceptable techniques.

Conclusions - Expert Witness Statement
Douglas Nuttall P. Eng.

<u>Issue</u>	<u>Issue Description</u>	<u>Conclusion</u>
5	Is the subdivision premature (s.51(24)(b))?	Yes. The Conceptual Stormwater Management Plan for the site does not provide the criteria for approval as provided by the approval authorities, makes conclusions that are not supported by the studies provided, and relies on infrastructure that is not appropriate to the site. The Conceptual SWM plan has to be substantially reworked prior to resubmission.
10	Are the grading and drainage, and tree preservation plans consistent with one another? Will they provide effective protection for the trees and the landscape buffer and will they maintain positive drainage routes?	This can not be determined, because the fundamental principal of SWM for this site – the use of EES – is inappropriate and the entire concept needs to be reworked.
12	Does this plan of subdivision have a legal outlet for stormwater from the proposed development (s.51(24)(h) and (i))?	Not in its current form. The proposal does not demonstrate how the water level in the Beaver Pond would change as a result of the development, so the capacity of the downstream channel to convey the change in flows can not be determined. The Drainage Act defines “sufficient outlet” as “. . . a point at which water can be discharged safely so that it will do no damage to lands or roads . . .”. As existing roads and lands downstream are exposed to flood risk currently, any increase in flow has the potential of causing damage. Legal outlet would be contingent on not increasing water levels in the Beaver Pond.
15	Has the major overland flow from the proposed draft plan of subdivision lands, and connecting existing residential land, into the Beaver Pond been accounted for?	The model being used is not sufficient to answer this question. With the absence of the subsurface storage from the existing conditions model, any calibration exercise for infrequent, large magnitude events (as one would expect to produce Major flows) will be necessarily imprecise.
17	Does the technique for low impact development means of dealing with stormwater need to be determined prior to draft approval.	Yes. Many forms of LID would not be appropriate for this site, and it is not assured that there would be at least one that would be appropriate.
19	What is the appropriate number and location of stormwater ponds and should they be for both quality and quantity control?	They should be for both quantity and quality – adding flows to the Beaver Pond will defacto reduce the existing SWM quality treatment. And adding volume to the Beaver Pond will increase peak water levels, and therefore peak

downstream flows. The correct number and placement is of less importance than sufficient performance.

- 27 Does the proposed zoning amendment have appropriate regard to Section 2 with particular reference to Subsections (a), (h), (i), (o), (p) and (r)?
- a) Protection of ecological systems – supporting documentation that downstream flows will not be increased, and thus not increase river morphodynamics, has not been provided.
- o) protection of public health and safety – supporting documentation that downstream flows will not be increase, and thus not increase current flood risks, has not been provided.
- 28 Does the proposed zoning amendment have appropriate regard to Section 3(5) with respect to the proposed by-law being consistent with the Provincial Policy Statement 2020 as approved under this Section?
- Section 1.1.1.c** - protection of public health and safety – supporting documentation that downstream flows will not be increase, and thus not increase current flood risks, has not been provided.
- Section 1.1.1.j** preparing for the regional and local impacts of a changing climate – supporting documentation that lowering groundwater will not adversely affect vegetative communities has not been provided
- Section 1.1.3.4** mitigating risks to public health and safety – supporting documentation that downstream flows will not be increase, and thus not increase current flood risks, has not been provided.
- Section 1.6.6.7 c** minimize erosion and changes to water balance - supporting documentation that lowering groundwater will not adversely affect vegetative communities and soil stability has not been provided.
- Section 1.6.6.7 d** mitigate risks to human health, safety, property, and the environment — supporting documentation that downstream flows will not be increase, and thus not increase current flood risks or river morphodynamics, has not been provided.
- Section 1.6.6.7 f** promote stormwater re-use – no effort has been made to retain water on-site for irrigation, rainwater harvesting, etc.
- Section 2.2.1 d&e)** identify water resources systems – supporting documentation that the subsurface storage would be not negatively impacted from the proposed development has not been provided.

	<p>2.2.2 site alteration will be restricted near sensitive surface and groundwater features - supporting documentation that the surface/groundwater interactions would be not negatively impacted from the proposed development has not been provided.</p>
30	<p>Does the proposed plan of subdivision have appropriate regard to the provisions of Section 51(24) with reference to Subsections (a), (b), (c), (d), (e), (f), (g), (h) and (k)?</p> <p>b) yes, premature – insufficient information to draw required conclusions.</p> <p>c) no, OP lists 40% parkland dedication.</p> <p>d) no, sensitive marine clays and shallow bedrock prevent the proposed SWM approach.</p> <p>h) no, modelling of flood effects is inadequate.</p>
31	<p>Further to Section 51(24) Subsections (d) and (h), is it appropriate to consider the development of lands that will drain both overland and through piped infrastructure passing through a watershed with potential risk of flooding, erosion damage to tributaries and adverse impacts on natural wildlife given the unresolved pre-existing conditions as noted under Comments numbered 136, 140, 170, 171, 177, 178, 180, 181 and 191 in the City of Ottawa’s letter dated December 19, 2019 in that watershed?</p> <p>These City comments are requesting additional information on flows, flooding, erosion, fish populations and habitat, geomorphology, riparian rights holders’ concerns, and the strategy to mitigate the associated challenges. While additional information has been provided, it does not completely address all of these concerns, so it is therefore not appropriate to consider re-development of the land.</p>
32	<p>Is the proposed zoning amendment and plan of subdivision consistent with the PPS 2020 with particular reference to Section 1.1.1 b) and c); 1.1.3.4; 1.6.6.7; 2.2.1 a) and i); 2.2.2; and 3.2.2</p> <p>Section 1.1.1.c - protection of public health and safety – supporting documentation that downstream flows will not be increase, and thus not increase current flood risks, has not been provided.</p> <p>Section 1.1.1.j preparing for the regional and local impacts of a changing climate – supporting documentation that lowering groundwater will not adversely affect vegetative communities has not been provided.</p> <p>Section 1.1.3.4 mitigating risks to public health and safety – supporting documentation that downstream flows will not be increase, and thus not increase current flood risks, has not been provided.</p> <p>Section 1.6.6.7 c minimize erosion and changes to water balance - supporting documentation that lowering groundwater will not adversely affect vegetative communities and soil stability has not been provided.</p>

Section 1.6.6.7 d mitigate risks to human health, safety, property, and the environment — supporting documentation that downstream flows will not be increase, and thus not increase current flood risks or river morphodynamics, has not been provided.

Section 1.6.6.7 f promote stormwater re-use – no effort has been made to retain water on-site for irrigation, rainwater harvesting, etc.

Section 2.2.1 d&e) identify water resources systems – supporting documentation that the subsurface storage would be not negatively impacted from the proposed development has not been provided.

Section 2.2.1 i) ensuring stormwater management practices minimize stormwater volumes and contaminant loads, and maintain or increase the extent of vegetative and pervious surfaces – supporting documentation does not demonstrate stormwater volumes are minimized, extent of vegetative surfaces no increased.

2.2.2 site alteration will be restricted near sensitive surface and groundwater features - supporting documentation that the surface/groundwater interactions would be not negatively impacted from the proposed development has not been provided.

34 Is the proposed zoning amendment and plan of subdivision in general conformity with the Official Plan with particular reference to the following sections:

b) 2.3.3 - Drainage and Stormwater Management Services

g) 4.10 – Greenspace Requirements

2.3.3,1. Development will be in accordance with the system capacity for drainage – material provided does not demonstrate that the Beaver Pond has capacity for the change in volume.

2.3.3.3 applicable standards will be subject to consultation between City, CA, affected landowners, etc. – material provided does not demonstrate what standards or the effect of that consultation.

4.10.5.2 This land is part of the 40% parkland dedication. So, no.

Appendix

Attachment 1
Curriculum Vitae



Douglas Nuttall, P.Eng.

Senior Water Resources Engineer

EDUCATION

University of Alberta
BSc Civil Engineering 1994

PROFESSIONAL MEMBERSHIPS

P.Eng. (Ontario)

INDUSTRY TENURE

26 years

EMPLOYMENT HISTORY

Senior Civil Engineer JP2G
Apr 2016 to Oct 2020

Senior Water Resources
Engineer Parish
Geomorphic July 2014 to
January 2016

Water Resources Engineer
Mississippi Valley
Conservation Authority
Sept 2005 to July 2014

Project Engineer Robinson
Consultants 1999 to 2005

Doug is a broad-spectrum civil engineer with 26 years of professional experience. He has extensive experience in the planning and approval process and is skilled in providing in-depth technical review and quality control. He has performed numerous technical regulatory reviews of stormwater management plans, flood plain studies, channel modifications, and similar projects. Doug is an expert in modern hydrologic and hydraulic modelling software packages.

He will be leading technical investigation, analysis, modelling, and documentation for various planning studies and detailed design projects relating to stormwater management facilities, drainage infrastructure, and other surface water management systems, provide quality control, training and mentorship to junior staff, and participate in business development.

RELEVANT EXPERIENCE

Town of Perth, Western Annex Infrastructure Master Plan

Perth, Ontario

Engineering lead on Infrastructure Master Plan, intended to allow a 10% increase in the residential capacity of the Town. 2017 to 2019. Designed method to discharge stormwater into PSW using dispersed percolation. Attended meetings, liaised with Town officials, public. Compiled report.

City of Ottawa, Flood Plain Mapping Project

Ottawa, Ontario

Team lead for peer review of 22 flood plain mapping studies prepared by the 3 local Conservation Authorities in 2019. Checked modelling and reporting against project objectives.

Royal Military College, Flood Line Delinication

Kingston, Ontario

Team lead for flood plain mapping, wave uprush assessments of existing infrastructure, and recommendations for projects to reduce risk. Completed detailed uprush analysis for 12 reaches, directed mapping, wrote report, 2020.

Stantec, Riverside South Stormwater Management Conceptual Design

Ottawa, Ontario

Design Engineer. Provided channel capacities and cost estimates of changes in capacity to Stantec for Urbandale development, to allow them to find most efficient distribution of flows from ponds into existing drainage network. 2015

City of Ottawa, Kanata North Urban Expansion Area

Ottawa, Ontario



Design Engineer. Provided Headwater Drainage Feature assessments throughout the urban expansion area, quantified impacts of discharge into Shirley's Brook. 2015.

National Capital Commission, Shirley's Brook Realignment

Ottawa, Ontario

Design Engineer. Provided advice on historic planform restoration of Shirley's Brook as a means of improving ecosystem and reducing continuous road maintenance costs, 2015.

Attachment 2

Acknowledgement of Expert's Duty



Ontario
Ontario Land Tribunal
Tribunal ontarien de l'aménagement du territoire

Acknowledgment Of Expert's Duty

OLT Case Number	Municipality
PL200195	City of Ottawa

1. My name is.....**Douglas Nuttall, P.Eng.**
I live at theVillage of McDonalds Corners
in the.....Lanark County
in theProvince of Ontario
2. I have been engaged by or on behalf of The Kanata Greenspace Protection Coalition (KGPC) to provide evidence in relation to the above-noted Ontario Land Tribunal ('Tribunal') proceeding.
3. I acknowledge that it is my duty to provide evidence in relation to this proceeding as follows:
 - a. to provide opinion evidence that is fair, objective and non-partisan;
 - b. to provide opinion evidence that is related only to matters that are within my area of expertise;
 - c. to provide such additional assistance as the Tribunal may reasonably require, to determine a matter in issue; and
 - d. not to seek or receive assistance or communication, except technical support, while under cross examination, through any means including any electronic means, from any third party, including but not limited to legal counsel or client.
4. I acknowledge that the duty referred to above prevails over any obligation which I may owe to any party by whom or on whose behalf I am engaged.

Date...November 12, 2021

Signature

Attachment 3

Comments to City & Reply



August 4, 2021

Laurel McCreight MCIP, RPP
Planner II
Planning Services
Planning, Infrastructure & Economic Development Department
110 Laurier Avenue West, 4th Floor
Ottawa ON K1P 1J1 sent by email: Kanatalakes@ottawa.ca

Re: Rezoning File #D02-02-19-0123; Subdivision Application #D07-16-19-0026
7000 Campeau Drive
Peer Review for Stormwater Management

Dear Ms. McCreight

I have been retained by the Kanata Greenspace Protection Coalition (KGPC) to conduct a peer review assessment of the Stormwater proposals included in the above applications.

I have been a Professional Engineer in Ontario for 20 years, and the last 16 years of my career has focused on stormwater management systems and riverine processes, with much of my career being at the Mississippi Valley Conservation Authority, providing technical reviews on precisely this kind of development. A copy of my resume is attached to this letter for your reference.

Several concerns are identified within the supporting materials provided by the consultants JFSA, Paterson Group, and DSEL to support the proposed SWM design for this proposal.

1) Design Criteria

There are a number of existing documents which provide the constraints relating to stormwater management for this site. While there are some design criteria identified in earlier versions of the existing reports, in my opinion a concern exists that some of the documents that provide relevant constraints to stormwater management for this site have not been considered. For example, a restrictive covenant on the deed of the property that specifically addresses stormwater management is not listed. The developer should provide the complete list of the constraints obtained during the mandatory pre-consultation for this project.

2) Sensitive Soils

Much of the development is identified as having sensitive fine-grained marine soils (e.g., Leda Clay). As such, changes in the groundwater conditions have a risk of producing unstable soil conditions. While tree restrictions, preloading, and limited grade raise can reduce the risks to future developments, those controls cannot be expected to decrease the risks to the existing properties immediately surrounding the site. Changes in groundwater conditions do not stop at property lines. The developer must demonstrate that the proposed site alterations will not negatively impact adjacent properties.

3) Groundwater Mounding

The geotechnical report indicates that there is a groundwater surface observed at and near the existing ground surface, to as deep as 3m below the ground surface. It also indicates that this is present only because of the presence of overland drainage coming from off-site, and that once that flow is directed into a subsurface sewer system, the surficial groundwater will drop down to 2-3m below ground surface. In my opinion, this strongly implies that groundwater mounding can be expected to reach up to 2m above the groundwater surface. When designing the Etobicoke Exfiltration System (EES), the invert of the clearstone trench is to be a minimum of 1.0m above the groundwater or bedrock elevation, and due to the presence of significant groundwater mounding, this could be considered an absolute minimum clearance, with 2m being a more appropriate average value.

Within the clay soils, the geotechnical report indicates there are grade change limitations that require that the finished ground surface is not increased beyond 2 or 2.5m above the existing grade, due to the inherent weakness of the sensitive marine soils. The minimum depth to invert on the storm sewer is 1.8m, the invert of the clear stone trench is a minimum of 1.05m below the invert of the storm sewer, and there is to be 2m to the groundwater surface. This puts the highest acceptable groundwater elevation to be 2.35m below the existing ground, which is 0.35m lower than the top of the range of expected groundwater. The lowest expected invert (not necessarily within the clays soils) is significantly deeper.

Existing ground + 2.5m of grade raise – 1.8m of frost protection – 1.05m to bottom of EES = 0.35m of excavation below existing ground

Existing ground – 2m down to future GW elevation + 2m of mounding = impeded infiltration if the bottom of excavation is below existing grades

As this is below the top of the expected range of groundwater, there will be places where infiltration can be impeded, making those areas inappropriate for the use of this approach. In my opinion, the consultant must identify where infiltration will be impeded (ideally graphically), and remove the EES from these areas.

4) LID design

The proposed EES is expected to infiltrate up to approximately 7000m³ during a 'typical' rainfall event and to capture the runoff from a 22mm rainfall event. This is inconsistent with the MECP Draft LID manual, which would recommend 27mm of treatment in this location. The LID system as proposed in all roads, can be expected to convey water as interflow. By my calculation, the flow rate within the clear stone trench would cause approximately 2/3 of the captured water to reach the Beaver Pond while the Beaver Pond was still responding to the storm event. This suggests that the interflow has the potential of impacting the total volume in the pond and, as a result, the flow rate downstream through the balance of the Kizell Drain. Placing clay plugs within the clear stone trench to reduce longitudinal flow would be of limited value, due to the requirement of blasting and shattering within the bedrock to create the trench. In my opinion, there will be flow paths around the clay.

Likewise, there is approximately 72000m³ of subsurface storage within the catchment of the Beaver Pond, however its location and description is not well defined. It is assumed to be within the pore spaces created by shattering stone subsequent to blasting in the previous phases of development of the golf course and the existing residential community. If the proposed development interferes with the existing storage by increasing subsurface conveyance to the Beaver Pond, then the potential exists to further increase the pond elevation, and thus the downstream flows into the receiving stream.

5) SWM design

4 ponds and 1 subsurface storage unit are proposed. 2 of the 4 ponds (Ponds 1 and 3) will require extensive rock excavation (up to 8m), which will, by necessity, interfere with existing groundwater flows. Ponds 1 and 3 are proposed as dry ponds with an impervious liner constructed within surrounding bedrock. This design runs the risk of experiencing an upward hydraulic gradient from the groundwater, unless there are specific efforts made to lower the groundwater table, by increasing the rate of subsurface conveyance. Interfering with groundwater has the potential of destabilizing sensitive soils and decreasing groundwater recharge.

6) Hydrologic modelling

The design as proposed by the consultant is based on a hydrologic model that was calibrated in 2019 with no infrequent events included and does demonstrate a high accuracy when limited to the site lands. When extended to the entire watershed, it produces, in my opinion, a poor representation of the existing system response. The Beaver Pond has a well-defined, mostly linear response for about 5 days after a major event, and the hydrologic model used does not reflect this well. In addition, there is no discussion of the previous work done by the consultant in 2015 that explored both the subsurface storage and the Beaver Pond response. Without defining both the storage capacity within the model and including infrequent events in the calibration, the model cannot be relied on to predict the existing conditions during severe events. In the absence of a predictive model for severe events, forward-looking conclusions will be of limited value.

SWM systems designed for infill development must demonstrate two functionalities. They can neither introduce new problems to an existing system nor can they exacerbate existing problems. In this case, I am of the opinion that the proposed works have the potential to increase water levels in the receiving water body (downstream Kizell Drain) and negatively impact unstable soils. No development proposal should be considered for the 7000 Campeau site unless the proponents can adequately address these concerns.

Sincerely,
HDR - Transportation



Douglas Nuttall, P.Eng.
Senior Water Resources Engineer

Nuttall, Douglas

From: Kanata Lakes <KanataLakes@ottawa.ca>
Sent: Tuesday, October 19, 2021 7:52 AM
To: Nuttall, Douglas
Cc: Barbara Ramsay
Subject: RE: KGPC WR Peer Review.pdf

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Hello Mr. Nuttall,

Thank you for your comments on behalf of Kanata Greenspace Protection Coalition (KGPC). Your comments have been well received and match with many of the comments the City has made in the past and has made in this submission's review.

We agree that there are several stormwater management (SWM) constraints for this infill subdivision and all need to be considered. If this subdivision were to achieve draft plan approval of subdivision after future submission(s), several stormwater management conditions are expected. The need for restrictive covenants will be considered at that time and they will be dependent on their need given the final and agreed upon stormwater management approach at that time.

The underground soil, bedrock and groundwater profile, as well as slope stability, of the existing and proposed site is an area of focus for the City's review as well; particularly where the site abuts existing residential lots. Since the applicant is proposing use of a low-impact development technique (LIDs), several City comments relate to the stability of the soils, appropriateness of the proposed LIDs given the site conditions, correctness of the LID calculations and request for additional geotechnical information. Please note that the City has not accepted the blanket use of the Etobicoke exfiltration system (EES) and more information has been requested before considering its use in localized areas.

The City has requested a hydrogeological analysis of the soils and groundwater as they relate to the SWM design among several other related comments. Ideally, this report will address several of the City's, and therefore KGPC's, concerns.

The City has made several comments and has had a meeting with the applicant's consultants related to the site SWM model and the subwatershed model used to support this proposal. This is an area that still needs to be refined and the City will continue to discuss the appropriate approach with the applicant's consultants.

We are in agreement that developments are to neither introduce new problems to an existing system nor should they exacerbate existing ones. These are some of very reasons for Development Review's involvement in privately led projects and we take our work seriously and professionally. All of KGPC's concerns have already been identified by the City and we will continue to review this file with these and other concerns in mind.

Thank you again for your comments.

Please do not hesitate to contact me with any questions.

Regards,
Laurel

Laurel McCreight MCIP, RPP

Planner
Development Review West
Urbaniste
Examen des demandes d'aménagement ouest

City of Ottawa | Ville d'Ottawa
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From: Nuttall, Douglas <Douglas.Nuttall@hdrinc.com>
Sent: August 04, 2021 11:59 AM
To: Kanata Lakes <KanataLakes@ottawa.ca>
Cc: Barbara Ramsay <barbararamsay@me.com>
Subject: KGPC WR Peer Review.pdf

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Attached, please find my peer review of the documents relating to Water Resources for the Kanata Lakes Golf Course redevelopment.

Douglas Nuttall, P.Eng.
Senior Water Resources Engineer

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Attachment 4
Restrictive Covenant

FOR OFFICE USE ONLY 1020194 CERTIFICATE OF RECEIPT RÉCEPISSE OTTAWA-CARLETON (4) '97 01 8 14 18 MONICA WASAG CERTIFICATION OFFICER	(1) Registry <input type="checkbox"/> Land Titles <input checked="" type="checkbox"/>	(2) Page 1 of 1 pages
	(3) Property Identifier(s) Block 04513 Property 0027(LT) 04512 0840(LT)	Additional: See Schedule <input checked="" type="checkbox"/>
	(4) Nature of Document APPLICATION TO REGISTER RESTRICTION AND COVENANTS (Subsection 119(1) of the Act)	
	(5) Consideration Dollars \$	
	(6) Description In the City of Kanata, in the Regional Municipality of Ottawa-Carleton: FIRSTLY: Block 69, Plan 4M-510 SECONDLY: Block 126, Plan 4M-651 As continued on Schedule "A" attached hereto.	
New Property Identifiers Additional: See Schedule <input type="checkbox"/>	(7) This Document Contains: (a) Redescription New Easement Plan/Sketch <input type="checkbox"/> (b) Schedule for: Description <input checked="" type="checkbox"/> Additional Parties <input type="checkbox"/> Other <input checked="" type="checkbox"/>	
Executions Additional: See Schedule <input type="checkbox"/>		

(8) This Document provides as follows:

CLUBLINK CAPITAL CORPORATION, the registered owner of the land described in Box (6) of this Document General, HEREBY REQUESTS you to register as annexed to the aforesaid land the restrictions and covenants set out in the attached Schedule "B"

Continued on Schedule ☐

(9) This Document relates to instrument number(s)

(10) Party(ies) (Set out Status or Interest) Name(s) CLUBLINK CAPITAL CORPORATION (owner) I have authority to bind the Corporation	Signature(s) Per: Name: Justin A. Connidis Title: Vice President & Secretary	Date of Signature Y M D 1997 01
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(11) Address for Service c/o ClubLink Corporation, 15675 Dufferin Street, King City, Ontario, L7B 1K5 Attn: Justin A. Connidis

(12) Party(ies) (Set out Status or Interest) Name(s)	Signature(s)	Date of Signature Y M D

(13) Address for Service

(14) Municipal Address of Property 7000 Campeau Road Kanata, Ottawa	(15) Document Prepared by: WEIR & FOULDS Suite 1600, Exchange Tower 2 First Canadian Place Toronto, Ontario M5X 1J5 (Attn: R. Wayne Rosenman)	FOR OFFICE USE ONLY Fees and Tax Registration Fee Total
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Additional Property Identifier(s) and/or Other Information

Schedule "A"

In the City of Kanata, in the Regional Municipality of Ottawa-Carleton:

- THIRDLY:** PIN 04513-0091 (LT)
Block 132, Plan 4M-651.
- FOURTHLY:** PIN 04511-0214 (LT)
Block 183, Plan 4M-652.
- FIFTHLY:** PIN 04511-0700 (LT)
Part Block 184, Plan 4M-652, being designated as Part 2 on Plan 4R-7217.
- SIXTHLY:** PIN 04511-0659 (LT)
Block 185, Plan 4M-652.
- SEVENTHLY:** PIN 04511-0658 (LT)
Block 186, Plan 4M-652.
- EIGHTHLY:** PIN 04512-0357 (LT)
Block 160, Plan 4M-739.
- NINTHLY:** PIN 04511-0779 (LT)
Block 76, Plan 4M-741.
- TENTHLY:** PIN 04512-0740 (LT)
Block 76, Plan 4M-828, save and except Plan 4M-925.
- ELEVENTHLY:** PIN 04512-0140 (LT)
Block 1, Plan 4M-881, save and except for (i) Plan 4M-925; and (ii) Parts 1, 2, 3, 4, 5 and 6, inclusive, on Plan 4R-12476.
- TWELFTHLY:** PIN 04512-0683 (LT)
Block 55, Plan 4M-883.
- THIRTEENTHLY:** PIN 04512-0676 (LT)
Block 56, Plan 4M-883, save and except for Part 7 on Plan 4R-12476.
- FOURTEENTHLY:** Part of PIN 04511-1007 (LT)
Part of Lots 5 and 6, Concession 3 and part of the road allowance between Lots 5 and 6, Concession 3 of the geographic Township of March designated as Part 2, Plan 4R-7987.
- FIFTEENTHLY:** Part of PIN 04511-1003 (LT)
Part of Lot 6, Concession 3, designated as Part 1, Plan 4R-7987.
- SIXTEENTHLY:** PIN 04511-1002 (LT)
Part road allowance as widened between Lots 5 and 6, Concession 3 of the geographic Township of March, being that part of Beaverbrook Road and Richardson Side Road (as stopped up and closed by LT552228) being designated as Part 4, Plan 4R-6557.
- SEVENTEENTHLY:** PIN 04512-0358 (LT)
Part Block 192, Plan 4M-652, designated as Part 2, Plan 4R-7259.

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Schedule "B"

RESTRICTIONS AND COVENANTS

1. To the intent that the burden of these covenants and restrictions shall run with each and every part of the Golf Lands (as hereinafter defined) and to the intent that the benefit of these covenants and restrictions may be annexed to and run with each and every part of the Benefitted Lands (as hereinafter defined), ClubLink Capital Corporation covenants and agrees with Imasco Enterprises Inc. and its successors and assigns that ClubLink Capital Corporation and its successors and assigns entitled from time to time of all or any portion of the lands described in Box (6) will keep, observe, perform and comply with the stipulations, provisions and covenants set forth in this Schedule.
2. The following definitions shall apply for the purposes of this Schedule:
 - (a) **"Benefitted Lands"** means all or any portion of the lands and premises described in Schedule 1 hereto;
 - (b) **"Golf Lands"** means all or any portion of the lands and premises described in Box (6) of the Form 4 Document General to which this Schedule is annexed;
 - (c) **"Transferor"** means Imasco Enterprises Inc. and its successors and assigns; and
 - (d) **"Transferee"** means ClubLink Capital Corporation and any transferee of any of the Golf Lands affected by these restrictions and covenants and their respective heirs, administrators, executors, successors and assigns.
3. **Each and every part of the Golf Lands shall be subject to the following restrictions and covenants:**
 - (i) The Transferee agrees that:
 - (a) it shall not alter the grading of the Golf Lands or any of the storm water management facilities on or serving the Golf Lands; and
 - (b) there should be no construction of any buildings, structures or other improvements on any of the Golf Lands which may cause surface drainage from the Golf Lands to be discharged, obstructed or otherwise altered,

in a manner that materially adversely affects the Transferor's or the City of Kanata's storm water management plan in respect of the Transferor's Benefitted Lands as such plan exists as at November 1, 1996. Without limiting the generality of the foregoing, the Transferee in respect of the Golf Lands shall comply with all applicable municipal agreements, by-laws and regulations affecting the Golf Lands with respect to grading and storm water management.
 - (ii) The Transferee acknowledges that the Transferor as the owner of the Benefitted Lands, which Benefitted Lands are intended primarily for residential development, may require from time to time access to and the use of parts of the Golf Lands for the purpose of providing underground water drainage, sewage and other water management and municipal services and utilities serving the Benefitted Lands. The Transferee agrees to act reasonably in considering any such request from the Transferor on its behalf or on behalf of any governmental authority for such access and use and in granting any such access and use the Transferee, acting reasonably, may impose appropriate conditions including, without limitation, that such access and use does not materially interfere in any way with the playing of golf on the Golf Lands or otherwise materially interfere with the business carried on by the Transferee

of the ownership, operation and management of a golf club, that any damage caused by the Transferor's activities be promptly repaired to the Transferee's satisfaction, acting reasonably, and that the Transferee be indemnified by the Transferor against all costs and damages relating to such access and use. The Transferor agrees that it shall not enter on or install any of the services or utilities referred to above on or under any part of the Golf Lands except in accordance with the prior written agreement of the Transferee obtained in accordance with the provisions of this Schedule.

- (iii) To the extent that any of the restrictions and covenants contained in this Schedule may create an interest in the Golf Lands, such interest shall be effective only if the subdivision control provisions of the *Planning Act*, R.S.O. 1990, Chap. P.13 as amended, are complied with. The Transferor shall be responsible for obtaining at its expense any required consent under the said *Planning Act* and the Transferee shall cooperate with and assist the Transferor in obtaining any such required consent and the Transferor shall reimburse the Transferee for any reasonable costs incurred by the Transferee in so doing in favour of an arm's length third party. Without limiting the generality of the foregoing, the Transferor at its expense shall be responsible for preparing any necessary descriptions required to implement and confirm the rights granted by this Schedule.
- (iv) The Transferee covenants and agrees that it shall not sell, encumber, transfer or lease any portions of the Golf Lands unless it shall obtain from any such purchaser, transferee, encumbrancer or tenant a covenant in favour of the Transferor to comply with all of the restrictions and covenants contained in this Schedule, including without limiting the generality of the foregoing, a covenant to obtain a similar covenant from any subsequent purchaser, transferee, encumbrancer or tenant.
- (v) The Transferor and the Transferee from time to time at the request and at the expense of the other party and without further consideration shall execute and deliver such other documents and take such further steps as the other party may reasonably require to more effectively implement the intent of this Schedule.
- (vi) If any covenant or restriction contained herein, or the application thereof, to any person, corporation, partnership, trustee or unincorporated organization or circumstance shall, to any extent be invalid or unenforceable, the remainder of the covenants and restrictions or the application of such covenants and restrictions to persons, corporations, partnerships, trustees or unincorporated organizations or circumstances other than those as to which it is held invalid or unenforceable, shall not be affected thereby and each such covenant and restriction contained herein shall be separately valid and enforceable to the fullest extent permitted.

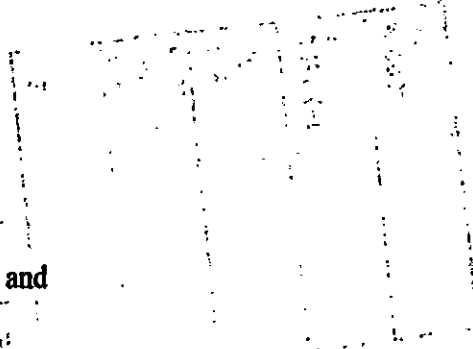
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Schedule 1 to Schedule "B"

BENEFITTED LANDS

In the City of Kanata, in the Regional Municipality of Ottawa-Carleton:

FIRSTLY: All lots and blocks on each of the following plans of subdivision:

- (a) Plan 4M-510;
 - (b) Plan 4M-651;
 - (c) Plan 4M-652;
 - (d) Plan 4M-653;
 - (e) Plan 4M-739;
 - (f) Plan 4M-741;
 - (g) Plan 4M-827;
 - (h) Plan 4M-828;
 - (i) Plan 4M-847;
 - (j) Plan 4M-881;
 - (k) Plan 4M-883;
 - (l) Plan 4M-884;
 - (m) Plan 4M-909; and
 - (n) Plan 4M-925.
- 

SECONDLY: Those portions of the following lands registered in the name of Genstar Development Company Eastern Ltd. as of November 1, 1996:

- (a) Part of Lot 5, Concession 3 of the geographic Township of March;
- (b) Part of Lot 6, Concessions 2 and 3 of the geographic Township of March;
- (c) Part of Lot 7, Concessions 2 and 3 of the geographic Township of March;
- (d) Lot 8, Concessions 2 and 3 of the geographic Township of March; and
- (e) Part of Lot 9, Concessions 2 and 3 of the geographic Township of March.

THIRDLY: Part of Block 1, Plan 4M-881, designated as Parts 1, 2, 3, 4, 5 and 6, inclusive, Plan 4R-12476.

FOURTHLY: Part of Block 56, Plan 4M-883, designated as Part 7, Plan 4R-12476.

FIFTHLY: *Part* Lot 3, Concession 2 and 3 of the geographic Township of March.