

**TO:** The Town of Niagara-on-the-Lake July 7, 2021

**CC:** SORE Association  
Wood Environment & Infrastructure Solutions

**FROM:** Catherine A. Lyons **FILE NO:** 181547

**SUBJECT:** 200 John Street East and 588 Charlotte Street  
Files OPA-02-2020, ZBA-11-2020 & 26T-18-20-01  
Peer Review – Drainage and Stormwater Management

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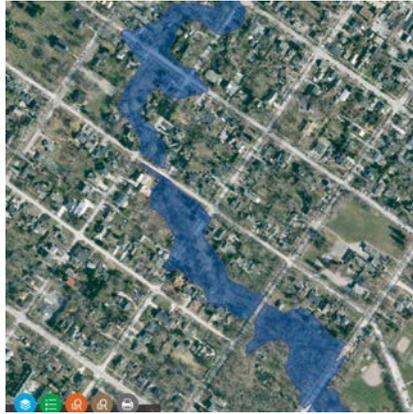
As noted in our memorandum of June 16, 2021 regarding the above noted applications, we are solicitors for Save Our Rand Estate Association (“**SORE**”). SORE has retained a number of experts to provide SORE with advice regarding the reports submitted on behalf of Solmar in support of its applications. Enclosed is an initial Summary of Issues and Concerns related to drainage and stormwater management matters prepared by Wood Environment & Infrastructure (“**Wood**”) dated July 6, 2021.

Wood has raised a number of concerns and we ask that the Town investigate all of these concerns as part of its review of the above noted applications. There are three main points which are of immediate concern to SORE which arise through Wood’s review. They are set about below.

### **Flooding and Erosion**

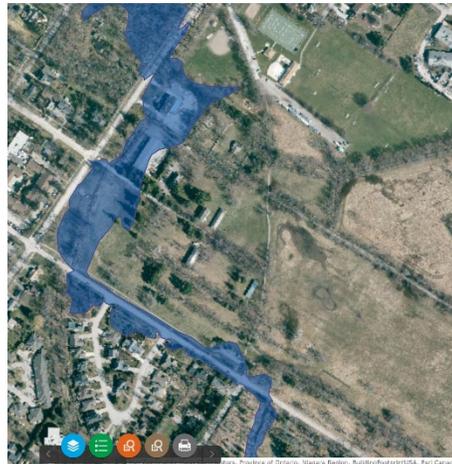
We note that Wood has indicated that there is insufficient analysis of the on-site and receiving watercourses with regard to flood flows. Furthermore, it appears that a more thorough and comprehensive erosion analysis is required. Given that parts of the site as well as the downstream area are flood prone and regulated by the Niagara Peninsula Conservation Authority (“**NPCA**”), it is critical that this work be properly completed. WSP also flagged this issue in its memorandum of May 19, 2021 which was forwarded to you on June 16, 2021.

Extracts of the NPCA flood risk mapping of the lands and vicinity are shown below.

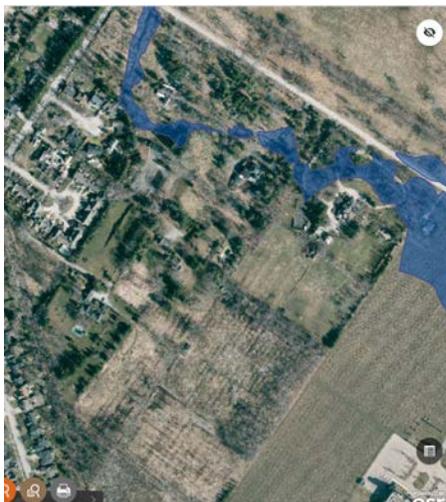


The residential neighbourhoods to the north are shown here.

The Commons and the Lincoln and Welland Regiments Museum is shown here.



The 200 John Street East and 588 Charlotte Street lands are shown here.



These extracts show that the flood plain includes the Lincoln and Welland Regiments Museum and residential neighbourhoods between King Street and Simcoe Street north of Williams Street. The flood plain continues west of Simcoe Street as well.

The NPCA web page is clear about who is responsible for dealing with urban flooding: “*Urban flooding is caused by rainfall that exceeds the capacity of local storm sewer systems. The local municipality is responsible for studying and addressing issues caused by their storm sewer system”*. Ensuring no impacts to the off-site receiving systems is essential, as is the consideration of off-site flooding (tailwater) on the site’s drainage design.

### **Massive Stormwater Management Structure under the Park**

The Solmar applications propose two very large stormwater storage tanks beneath the “park”. Wood notes as follows:

“The FSR proposes an underground storage system however, does not conduct a review of alternatives; underground systems are costly to maintain and costly to replace at the end of their capital life, plus are more prone to failure due to blockage. On the basis of these concerns, Wood would advocate for a more fulsome review of the advantages and disadvantages of management alternatives with a preference to open, above ground systems . . .”

Wood also observes that the design proposed is “complex” due, in part, to the requirement that the One Mile Creek tributary be maintained as an open water feature. “This design approach will be prone to collecting sediment and blockage . . .” An odour concern is also raised.

We note also that the emergency access is proposed through Charlotte Street so the stormwater infrastructure and a vehicular crossing of the water feature would have to be able to bear the heavy weight of emergency vehicles. Such access will also impact the park design.

WSP has also raised concerns regarding this proposed approach.

### **On-Site Infiltration Measures (Private measures)**

In order to manage run-off on site, measures are proposed to provide for infiltration of stormwater into the ground. The FSR proposes that many of these measures will be placed in the rear yards of residential units. These rear yards are already smaller than is typical in the Town because Solmar’s application seeks to reduce the lot sizes and setbacks and increase the lot coverage. As a result, there may be an increased likelihood that these infiltration measures, which include swales which are underlain with granular material, will become encumbered and cease to function as designed as owners plant gardens or install sheds and patios. Run off which is not captured in these areas must be accommodated in the stormwater pipes and tanks.

**Conclusions**

Wood has identified a number of concerns. We underscore the question of how flooding and erosion will be addressed in Solmar's stormwater management and drainage plans. In addition, a number of issues arise that are caused in part by the proposed intensity of development. Far too much is being jammed onto the back half of the Rand Estate. The park must play triple duty by accommodating significant stormwater infrastructure as well an emergency access route, while being bisected by the One Mile Creek tributary. The scale of the development requires that infiltration measures be accommodated on private lots rather than in public road allowances and other public spaces. The smaller lots and larger units proposed will require that the infiltration measures be accommodated in smaller yards.

We respectfully ask that the Town investigate these issues and concerns identified by Wood as part of the Town's review of the above noted applications.

Attachment

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July 6, 2021  
Our File: WW21011058

Kate Lyons, Partner  
Goodmans LLP  
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333 Bay Street, Suite 3400  
Toronto, ON M5H 2S7

Dear Ms. Lyons:

**RE: Drainage and Stormwater Management  
Peer Review of Randwood Estates Development Proposal,  
Niagara-on-the-Lake, Ontario**

Further to our retainer for the peer review of matters related to drainage and stormwater management associated with the proposed development at 588 Charlotte Street and 200 John Street, Wood Environment & Infrastructure (Wood), has prepared the following summary of issues and concerns associated with this development for consideration by the Save Our Randwood Estates community group (SORE) and the Town of Niagara-on-the-Lake. In terms of the scope of this review, Wood has primarily relied on the following documentation:

- Functional Servicing Report (FSR)  
Solmar Development Corp.  
Residential Subdivision  
200 John Street East  
Town of Niagara on the Lake, Schaeffer & Asc., July 2020
- Scoped Environmental Impact Study  
200 John St. & 588 Charlotte Street  
Niagara-on-the-Lake, Savanta, July 2020
- Draft Plan of Subdivision  
Solmar  
Lots 145 and 156  
Registrar's Compiled Plan 692 And Lot 14, Plan M-11  
Town of Niagara-On-The-Lake  
Regional Municipality of Niagara, SGL, July 2020
- Randwood Estates Development  
Review for Implications to Adjacent Properties, WSP, May 2021
- Schedule A-2 Zoning By-Law  
Old Town Community Zoning District, March 2014

Other documentation has also been considered in this review including earlier servicing assessments and regulator comments for the "Front Properties" located at 144 & 176 John St. E.

The peer review summarized herein has exclusively focused on matters related to drainage, including stormwater management and grading; other matters specific to water and wastewater servicing have been addressed by others (WSP). The following provides a summary of Wood's issues and concerns stemming from a review of the subject information cited in the foregoing:

1. Stormwater Management (SWM) Criteria

- a. The Region of Niagara has prepared new draft SWM Guidelines, 2021, which will need to be referenced in any development application going forward.
- b. The required level of stormwater quality treatment needs to be specified within the document; it is our understanding that NPCA requires stormwater quality control to an "Enhanced" level of treatment, however this should be reviewed and the stormwater quality control system updated as appropriate.
- c. Erosion Control is prescribed on the basis of 25 mm storm runoff, released over 24 hours rather than based on an erosion threshold methodology focused on the sensitivity of the receivers; given the potential for off-site erosion of the receiving tributary a more holistic assessment is considered warranted.
- d. The Water Balance criteria cited is "best efforts"; while it is acknowledged that later on in the reporting by Schaeffer and Cole, a more formative water balance assessment is conducted, the criteria should be based on site conditions and managing runoff volume to pre-development levels.
- e. The One Mile Creek floodplain mapping is cited however it does not appear that the hydraulic modelling associated with the floodplain determination has been used in the assessment of the proposed hydraulic crossing at the entrance, nor tailwater conditions related to the on-site tributary and its hydraulic performance.

2. Major (Overland)/Minor (Subsurface/Sewer) System

- a. The criteria in the FSR state that the minor system will be designed to convey the 5-year event and the overland system will be designed to the 100-year event.
- b. The FSR however indicates that "the minor system will be sized to convey storms up to and including the 100-year storm without surcharge. Overland flow routes will be provided for rainfall events exceeding the 100-year storm event by providing emergency overland flow routes towards 1 Mile Creek". This approach will necessarily require an inlet capture system capable of handling all storms up to and including the 100-year event resulting in numerous large inlets and correspondingly increased O&M requirements; alternatives need to be considered.

3. Headwater Drainage Feature H1-S4

- a. As outlined in the Scoped EIS by Savanta, July 2020, the headwater drainage feature (HDF) draining across the site from south to north (H1-S4) has, based on the application of the Provincial HDF protocol, been classified as "Conservation", which indicates it must remain open; the plan provided by the applicant shows this feature as open.
- b. Wood though has numerous concerns with the proposed management and assessment strategy for this feature, as follows:
  - i. The SWM approach will effectively "starve" the feature of water from the lands currently draining to it by collecting this runoff in a proposed tank and discharging this to the downstream limit of the HDF.

- ii. No data or information have been provided related to either the drainage area to this feature or its hydraulic performance; this is required to determine the form and function of the feature as part of a sustainable long-term water management strategy.
- iii. The feature is noted a regulated on NPCA mapping hence any alteration will need to meet the requirements of the Authority; this will include no upstream or downstream impacts on flooding and maintenance of riparian storage
- iv. Per the criteria discussion noted above, there is no mention of the potential erodibility of this feature and associated treatment requirements post-development.

#### 4. External Drainage

- a. The proposed drainage plan depicts capturing external drainage from the lands to the east of the proposed development in the "greenbelt".
- b. In order to convey the flows as show, a cut-off system will be required along the eastern limit of the development lands. Further, as noted in the review by WSP, the conveyance of this drainage through the site in a clean water collector appears problematic due to very shallow grades; if the drainage is instead captured in the stormwater management tank the sizing criteria will change.
- c. No discussion is provided regarding the external contributing drainage area to the storm sewers along Charlotte Street. This information is required to support the impact assessment and capacity assessment for the storm sewer, as the calculations presented in the report only consider change in minor system flows from the site.

#### 5. Stormwater Management

- a. The FSR indicates the need to control post-development runoff to pre-development levels for the 2 to 100-year events.
- b. The FSR proposes an underground storage system with open bottom, however does not conduct a review of alternatives; underground systems are costly to maintain and costly to replace at the end of their capital life, plus are more prone to failure due to blockage. On the basis of these concerns, Wood would advocate for a more fulsome review of the advantages and disadvantages of management alternatives with a preference to open, above ground systems due to reduced routine and capital maintenance.
- c. The geometry of the proposed tank is complex in that it has storage on either side of the water feature (H1-S4) and connection between the two storage zones is via a subsurface connection which is below the outlet. This design approach will be prone to collecting sediment and blockage and also may impact the hydraulic performance during filling and release; furthermore, there will be standing water which will lead to odour concerns; these issues will need to be clearly addressed if an underground system continues to be advanced.
- d. The underground tank is proposed to have an extended detention component associated with managing erosion potential – 48-hour discharge, however no details are provided as to how this would be accommodated in an underground system; again this form of system is complex and the criteria need to be addressed in design at this functional stage to determine any potential implementation issues, as well as potential for blockage at the facility outlet.
- e. As noted in the review of WSP's servicing assessment, the location on the site with the highest seasonal groundwater levels is in the area proposed for the underground tank. The FSR acknowledges this and states that the tank will therefore not be an exfiltration system but rather a wrapped storage unit. There is concern regarding the potential for uplift during high groundwater which can affect the functionality of the storage unit and also lead to structural concerns/failure.

- f. The SWM plan includes (in addition to the underground tank), Oil/Grit Separators (OGS), CB Shields and Low Impact Development (LID) practices. An extensive network of LID practices is proposed on private lands, particularly in the rear of lots in the form of infiltration trenches. Maintenance of these private systems is a concern, as is long-term functionality; the applicant should consider forms of back-up or redundancy to meet the requisite water budget requirements in the future.
- g. The report specifies that the stormwater quality control is to be achieved using a treatment train approach with ADS units designed to provide "Basic" – Level 3 water quality treatment and CB shields or OGS units provided for further stormwater quality treatment. Supporting calculations are required for the proposed treatment train approach to demonstrate that the required level of stormwater quality treatment is achieved. Also as noted in the review by WSP, the runoff from the entrance roadway from John St. is currently proposed to be treated; this needs to be reviewed to protect the receiving watercourse from urban contaminants. Lastly, the report should clarify the type of OGS units proposed as part of the treatment train; current practice by Conservation Authorities require that OGS units be ETV approved, however this should be confirmed with NPCA and the stormwater management plan revised as appropriate.

## 6. Hydrologic Modelling

- a. The modelling approach is very simplistic with limited catchments. Given the need to manage external flows, control site flows, discharge to a local watercourse and confluence with another tributary, more refined modelling will be required to appropriately assess impacts and also develop more detailed management strategies.
- b. Consideration should be given to continuous simulation to assess off-site erosion impacts.
- c. The methodology to establish storage by using flow rates from one temporal rainfall distribution with another design event is considered atypical and should be re-visited. The more conservative distribution for storage generation should be applied to establish runoff controls/volumes.
- d. The groundwater assessment has indicated low permeable soils however the SCS Curve Number applied in the hydrologic modelling has considered the soils as AB indicating comparatively high permeable soils; this discrepancy should be rationalized.

## 7. Hydrogeology

- a. The separate hydrogeology study by Cole was not reviewed and will be reviewed by another team member as to the appropriateness of the assumptions and associated findings and recommendations, including the water balance.

## 8. Grading

- a. The Cultural Heritage Landscape mapping by LHC for the Rand Estate depicts various buildings on the lands proposed for development. None of these features is protected/preserved in the submitted development plans. In the event that these features will be protected in-place, the proposed grading plan will need to respect the existing grades in the vicinity of these structures and a reasonable buffer provided. Currently fill depths are extensive in the areas around the identified features (1-3 m) hence this could have a dramatic impact to the overall grading plan.
- b. The site is back graded in that drainage from the lower, more northerly lands is proposed to drain to the south and then into the tank; this has the impact of raising site grades unnecessarily; alternatives which locate a SWM control system closer to the north west outlet of the site would be less impactful in this regard.

- c. Several locations across the proposed development area (south flankage and western flankage in particular) have walkouts to address grading requirements from the comparatively higher internal site to match existing lower grades around the perimeter. In some locations the means to manage surface runoff is not clear and will need to be addressed through analysis and functional design.
- d. The entrance road grades from John St. need to accommodate a new culvert designed to meet the hydraulic and stream morphological, and perhaps terrestrial movement criteria for this watercourse; no information is provided in this regard.

In summary there are a number of central and formative concerns with respect to the proposed drainage and SWM plan for this development proposal. If you have questions, please contact our office at your convenience.

Yours truly,

**Wood Environment & Infrastructure Solutions,  
a Division of Wood Canada Limited**



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