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21-1019
June 16, 2023

2524214 Ontario Ltd.
c/o Danny Bawa
10158 Jane St.
Maple, ON
L6A3K1

Attention: Mr. Bawa

Re: Stormwater Management Memorandum for Countryside & Algonquin Retirement Residence Development, City of Greater Sudbury, ON

TULLOCH has completed preliminary design work on this proposed development in 2021 including high level grading design and computation of stormwater management volumes. The purpose of this memorandum is to summarize stormwater design criteria in support of an application for rezoning to facilitate the development. This memorandum is intended to be submitted for review to the City of Greater Sudbury & Conservation Authority.

The property is undeveloped in its existing condition and is heavily treed. Based on topographic survey, the property is sloped from the south to the north. The property is bisected by a regulated flood plain as depicted in the figure below. As it relates to stormwater management needs, the development is proposed to consist of a 6-storey retirement home of approximately 150 rooms and associated on-site parking. The proposed development concept is shown in the figure below.

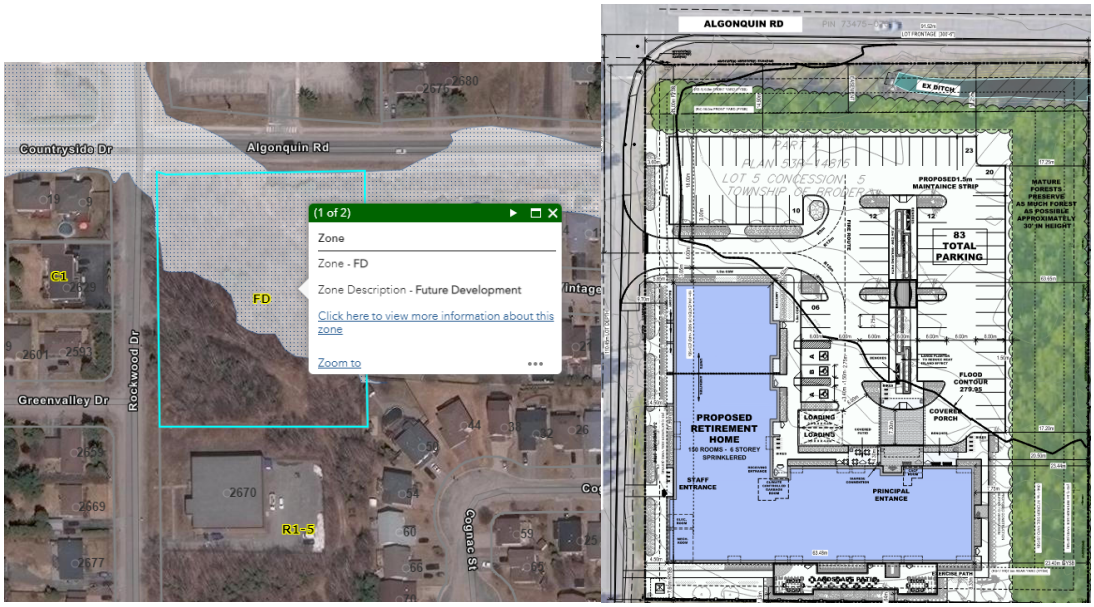

Figure 1 – Flood Plain Limits (left), Concept Site Plan (right)

Stormwater Management:

In accordance with the City's pre-consultation memorandum, stormwater management requirements for proposed development include:

- Post to pre-development stormwater peak flow control
- Enhanced stormwater quality control for all impervious areas
- To support the proposed development, the proponent must demonstrate that the building is designed so that there is a fully accessible entrance and exit on the west side of the building directly onto Rockwell Dr. This will allow the residents of the building to exit safely in case of flooding and will allow emergency services access during a flooding event.

Based on the high-level stormwater management calculations completed in 2021, estimated post-development release rates are compared to pre-development (allowable) release rares as described in the table below:

Post-Development to Pre-Development Comparison (L/s)		
Return Period/Storm	**Pre-Development Release Rates**	**Post Development Release Rates**
2 year	16.38	120.85
5 year	21.91	161.72
10 year	25.55	188.58
25 year	33.15	244.68
50 year	40.25	297.05
100 year	46.18	340.81

Stormwater quantity control volumes are estimated at about 260 m^3 in order to attenuate post-development release rates to pre-development levels. This is proposed to be achieved through rooftop storage at the building, and surface storage or underground storage where feasible within the parking lot area.

Flood Hazard:

The flood elevation over the subject property is at an elevation of 275.95 according to Conservation Sudbury. This flood hazard must be evaluated in addition to stormwater management and poses additional constraints to the development which may lead to a potential loss in density. Based on our review of the site topography, the site area located below the flood elevation is roughly half of the property (0.5 ha), with maximum depth below flood elevation of about 0.7m.

A high-level site grading plan was prepared for the post development conditions. The findings from the high-level site grading design are summarized below:

- Site grading works to address pre-consultation comments regarding fully accessible access in event of flooding, and to facilitate the design of parking lot and site services result in a net fill volume of roughly 750m^3.
- Rockwood Dr. is of rural cross section with roadside ditch according to the City's as-built drawings.
- Countryside Dr. has a 1200mm diameter storm sewer which outlets to the ditch along the frontage of the property on Algonquin Rd, where stormwater flows easterly and appears to be restricted by downstream culverts.
- The ditch along the frontage of the property would be the most probable stormwater outlet. Stormwater conveyance overland is preferable given the elevation differential between the bottom of ditch and proposed finished grade of about 1.2m. The use of on-site storm sewers would require additional fill than mentioned above to provide adequate frost cover and may not be feasible given the flood elevation. This would be reviewed in further detail at the design stage.
- Stormwater conveyance and site grading must be completed with utmost care for the neighboring properties considering the flood hazard, especially the residential lots located east of the development.

TULLOCH has presented preliminary findings to Conservation Sudbury in 2021/2022 and held high-level discussions surrounding proposed stormwater management techniques. At the request of the Owner, the question was posed whether or not the reviewing agencies would consider a stormwater offsetting fee in place of on-site stormwater controls. Given the significance of the flood hazard, Conservation Sudbury will not consider a stormwater offsetting fee for the proposed development. Discussions continued at a high-level basis with Conservation Sudbury, however no definitive path forward to address the flood hazard in relation to stormwater management controls were able to be established at the preliminary design stage and this would be deferred to detailed design once additional subsurface investigations have been completed.

In accordance with Conservation Sudbury's requirements for working within flood hazards, compensatory cut plans must be developed based on the following guidance:

- The cut and fill volumes are required to be incrementally balanced in 0.5m elevation increments.
- Only the volume of removed material below the regulatory flood elevation will be included in the compensatory cut volume calculation.

- The full extent of cut areas must be hydraulically connected to the adjacent flood plain via overland flow.
- Cut areas will tie back to original ground elevations at their perimeter at a slope no greater that 3 horizontal to 1 vertical.

Based on the size of the site (1.0ha), and the fact that roughly half the site (0.5ha) is located within the flood hazard, where filling of the proposed development is required within the flood hazard, compensatory cut measures are proposed to be designed underground. The underground storage volumes are very preliminary and would need to be refined at the detailed design stage. It is anticipated the underground storage volumes would double for compensatory cut volume as well as stormwater quantity control, however this shall be confirmed through detailed design and hydraulic modelling. Underground storage volumes estimated at this preliminary stage are about 750m^3. Further hydrologic modelling of the flood plain is recommended to support the proposed development.

It is strongly recommended that geotechnical investigations occur prior to detailed design to determine the impact of the groundwater table elevation and condition of the underlying soils, supportive of the proposed design techniques for stormwater management and compensatory flood volume control noted herein, since these will have a significant impact on the feasibility on the installation of these underground controls.

Conclusion

This memorandum is intended to be distributed to the City of Greater Sudbury & Conservation Authority for review and feedback supportive of an application for rezoning to facilitate the development. TULLOCH will not be held liable for the accuracy of the information noted herein given the preliminary stage of the development.

Sincerely,

Peter Derro, P.Eng.
Project Manager