TATHAM ENGINEERING

5335 Canotek Road, Unit 100
Ottawa, Ontario K1J 9L4

T 613-747-3636
E info@tathameng.com
tathameng.com

File 517651

September 8, 2023

Iain Mudd, B.A., MCIP, RPP
County of Peterborough
470 Water Street
Peterborough, ON K9H 3M3

Re: 3358 Lakefield Road, Township of Selwyn, County of Peterborough
Responses to 1st Submission Comments

Dear Iain:

We have reviewed the following comment letters from the County and Township's peer review consultant and the Otonabee Region Conservation Authority:

1. ORCA Plan Review and Permitting Services Memo dated July 6, 2021
2. Peer Review of the Functional Servicing and Preliminary SWM Report, Stantec June 30, 2021

Our responses to each comment letter are as follows:

ORCA PLAN REVIEW AND PERMITTING SERVICES MEMO, JULY 6, 2021

1. The proposed conditions CN, Ia, Tp calculation tables are not properly labeled.

The proposed condition hydrologic parameter calculation sheets are now properly labelled.

2. What are the Township of Selwyn's minimum runoff coefficients for land use types? Please provide their chart with the various land use (i.e low, medium and high residential, apartment, commercial, etc.). I have attached a sample table below with standard Landuse Runoff Coefficients.

Standard Landuse Runoff Co-efficient

Parks – over 4.0 ha	0.20
Parks – 4.0 ha and under	0.25
Single family residential-15m lots	0.55
Single family residential-12m lots	0.65
Single family residential-9m lots	0.75
Semi-detached	0.80
Townhouses	0.85
Apartments	0.90
Schools and Churches / Industrial	Varies
Commercial	0.90
Heavily Developed Areas	0.90
Asphalt, Concrete, Roofed Areas	0.95

The Township of Selwyn does not publish minimum runoff coefficients for land use types. However, we have confirmed that the runoff coefficients used in the preliminary drainage and SWM design are within the acceptable ranges of the revised MECP Design Criteria 2022 (see table below) thereby confirming the values are appropriate. Since we are using Visual Otthymo, curve number and % imperviousness are the sensitive parameters and the weighted runoff coefficient parameter is only being used to determine when the airport method (RC<0.4) and Bransby-Williams (RC> 0.4) time of concentration formulas are used and within the Airport Method time of concentration calculation itself.

Source	Runoff Coefficient (C)
Asphalt, concrete, roof areas	0.90-1.00
Grassed areas, parkland	0.15-0.35
Brick Roads	0.7-0.85
Sandy Soil	0.05-0.25
Playgrounds	0.2-0.35
Gravel	0.6-0.7
forest and dense wooded areas	0.10–0.25
Permeable pavements	0.15 to 0.25

3. SWMF#1 – Catchment Area 201

a. The hydrologic parameter sizing table identifies a drainage area of 2.2 ha. However, the breakdown is Imp 1.59 ha and SWMF 0.3 ha for a total of 1.89 ha. Please make the appropriate corrections.

The catchment 201 drainage area is a combination of 0.02 ha pasture/lawn, 1.88 ha impervious and 0.30 ha SWMF, for a total of 2.2 ha as is shown on the hydrologic parameter calculation sheet included in Appendix D.

b. Catchment Area 201 impervious calculations identify high density residential and apply impervious values Timp of 75% and Ximp of 75%. The grading plan shows apartment buildings and parking lot which should a minimum Timp & Ximp value of 90%. Please make the appropriate corrections to parameter calculations and VO model.

The value of Timp and Ximp for all areas within catchment 201, with the exception of the SWMF, have been updated to 90%, as requested. The percent impervious estimates will be refined again at the site plan stage.

c. Water quality volume calculation uses a % impervious of 72%. Please adjust the % impervious calculations based on the corrected area (approximately 86%).

The water quality volume calculation is now based on an imperviousness of 86%.

d. The pond volume will need to change based on increased % impervious and TIMP & XIMP values. The 100-year water level within SWMF#1 will be below the emergency spillway elevation.

The required pond volume has increased to 1,172 m^3 as a result of the increased % imperviousness whereas the preliminary pond grading provides for 1,353 m^3 below the emergency spillway elevation. The pond block sizing is believed to be conservative based on the % impervious value that is being used.

e. Please provide a stage-stage discharge table for SWMF#1.

A stage storage discharge table will be provided at the detailed design stage. However, the work completed to date confirms the SWMF 1 block is adequately sized to provide the requisite water quantity control.

f. Please provide the control orifice size and invert.

The outlet controls for the proposed pond (consisting of orifice(s) and weirs) will be provided at the detailed design stage. The invert of the low flow outlet control is 236.00, based on the preliminary stage-storage table. The work completed to date confirms the SWMF 1 block is adequately sized to provide the requisite water quantity control.

g. The 40 m^3/ha or the 25 mm runoff volume doesn't apply to dry ponds. Please provide the detention time calculations for the revised water quality volume based on revised % impervious calculation. A minimum detention time of 24 hours is required.

The revised water quality volume was determined to be 243.4 m^3/ha or 536 m^3 based on the revised % impervious calculation. The water quality volume will form part of the water quantity control volume and the outlet control structure will be designed to provide a minimum 24 hr detention time of the water quality volume.

h. The level spreader outlet will be properly designed to integrate point source discharge into a sensitive wetland feature. The outlet will be designed during detailed design stage. The proposed hard surface (riprap stone) spillway should be switched with the vegetated filter strip/level spreader as presented in Section 4.5.12 of the 2003 MOE manual.

i) Please modify the design using the criteria within the manual and provide calculations.

We acknowledge that the pond outlet including a level spreader will be designed at the detailed design stage. Due to the point source discharge from the pond, a vegetated filter strip between the pond outlet and the level spreader will be highly susceptible to erosion. On this basis, we will design an in-ground level spreader (similar to a surface infiltration trench) at end of the pond discharge pipe to disperse pond outflow to the sensitive receiving wetland feature. The detailed design of the level spreader will ensure that the leading edge (i.e the edge closest to the wetland buffer) of the in-ground level spreader is level to ensure properly dispersed flow. Based on literature review and

our experience, utilizing a level spreader length perpendicular to pond outflow of 4.0 m / 0.028 m^3/s of the 5-year storm peak pond outflow, is appropriate to achieve the flow dispersion goal and to protect the receiving wetland buffer from point source discharge. The proposed level spreader is shown schematically on Drawing SWM-1 and will be designed, including calculations supporting the in-ground level spreader length, width, depth, stone size, etc. at the detailed design stage.

ii) Based on the existing vegetation in that area, what is the proposed vegetation to be planted within the filter strip component?

An in-ground level spreader is proposed in place of the suggested vegetated filter strip and level spreader. Plantings within the SWM pond block will be specified at the detailed design stage.

iii) Please provide a cross section on the grading plan

A pond cross section including the in-ground level spreader concept is provided on Drawing SWM-1.

iv) The vegetated filter strip/level spreader will be located outside of the Ray's Creek floodplain, the wetland and 30 m buffer.

We confirm the proposed in-ground level spreader will be located outside of the Ray's Creek floodplain, the wetland and 30 m buffer.

i. The Environmental Impact Assessment discussed the negative impact of warm water being discharged from stormwater management facilities. Please provide a description and design criteria that will be implemented within the stormwater management facility to deal with thermal impacts.

SWMF 1 is a dry pond and therefore thermal impacts are not anticipated.

4. SWMF#2 – Catchment Area 202

a. Catchment Area 202 applies the following impervious values Timp of 53% and Ximp of 41% within the VO model. The grading plan shows a mixture of townhouses, apartment buildings with parking lots, 9 m , 12 m and 15 m residential lots and roads. The Timp & X imp values are too small.

i) Please make the appropriate corrections to hydrologic parameters.

The percent imperviousnesses have been revised. For low density (single detached housing) TIMP and XIMP have increased to 55% and 45% respectively. For medium density (townhouse blocks) TIMP and XIMP have increased to 75% and 55% respectively. For high density (apartment buildings with parking lots), the TIMP and XIMP have increased to 90% and 90% respectively. A weighted Timp and Ximp of 60% and 51% are now used within the VO model and we believe these values are conservative.

ii) Provide break-down of area based on land use and runoff co-efficient.

The breakdown of area based on land use is provided on the 'Impervious Area Calculation' sheet included in Appendix D. The runoff coefficient breakdown, also based on landuse (and soil type) is provided in the hydrologic model parameter calculation sheets and conforms to the 2022 MECP Design Criteria (see response to Comment 2 above).

iii) Please make the appropriate changes to the VO model.

The VO model has been revised based on the updated hydrologic parameter calculations.

b. Catchment Area 202

- **Hydrologic parameter calcs (Appendix D) use area of 15.5 ha**
- **DP-2 proposed Conditions Drainage Plan delineates an area of 15.5 ha**
- **VO model, HYD 087, Standyd uses an area of 16.2 ha**

i) Please make the appropriate corrections to hydrologic parameters.

The Catchment Area 202 hydrologic parameters has been updated including a catchment area of 16.5 ha.

ii) Please make the appropriate changes to the VO model.

Catchment area 202 in the VO model has been updated to match the hydrologic parameter calculations and the proposed conditions drainage plan.

c. The stormwater management facility is designed as two wet ponds (water quality) draining into a dry pond (quantity control)

i) The wet ponds have been sized according to Table 3.2 (2003 MOE Manual). However, this is only one component, the permanent pool of a wet pond design. The complete design also includes the active storage component designed to settle suspended solids over a minimum 24-hour period. This component is missing therefore, the wet ponds are not providing the intended water quality control target.

The preliminary SWMF 2 grading has been revised and is no longer proposed as a multi-tiered pond. SWMF 2 is now designed as a single-celled wet pond (with a pond forebay).

ii) Technically, the proposed SWMF #2 is comprised of two (2) sediment forebays draining into a dry pond.

See response to Comment 4ci above.

iii) Otonabee Conservation suggests that SWMF#2 design be changed to include two (2) sediment forebays draining into a wet pond.

See response to Comment 4ci above. Sediment forebays will be designed for each pond inlet or the forebays will be combined as appropriate based on the final pond layout which will be determined at the detailed design stage.

d. Please provide a stage-storage-discharge table for SWMF#2

A stage storage discharge table will be provided at the detailed design stage. However, the work completed to date confirms that the SWMF 2 block is adequately sized to provide the requisite water quantity control.

e. Please provide the control orifice size and invert.

The outlet controls for the proposed pond (consisting of orifice(s) and weirs) will be provided at the detailed design stage. The invert of the low flow outlet control is 243.00, based on the preliminary stage-storage table. The work completed to date confirms the SWMF 2 block is adequately sized to provide the requisite water quantity control.

f. The current pond design is a multi-tiered system with above ground berms and permanent water/pools on a slope. Please provide a slope stability study to investigate the existing soils, pond berms, volume and weight of ponding water on a slope.

See response to Comment 4ci above and note the revised pond configuration does not include a multi-tiered system. A review of all of the SWM pond berms will be conducted by a geotechnical engineer at the detailed design stage and recommendations for the pond berm material and construction recommendations will be provided.

g. The facility location as delineated on drawing SG-1 Preliminary Site Grading Plan and Stormwater Management has the facility limits against the wetland buffer. However, the facility berm, including berm width and the extent of the side slopes is not delineated.

i) There will be no development, including fill placement within the wetland buffer.

The limits of grading of SWMF 2, based on the preliminary design, are now shown on Drawings SG-1 and SWM-2. We acknowledge there will be no development, including fill placement within the wetland buffer.

ii) The facility location will need to be adjusted.

See response to Comment 4gi above.

h. The level spreader outlet will be properly designed to integrate point source discharge into a sensitive wetland feature. The outlet will be designed during detailed design stage. The proposed hard surface (riprap stone) spillway should be switched with the vegetated filter strip/level spreader as presented in Section 4.5.12 of the 2003 MOE manual.

i) Please modify the design using the criteria within the manual and provide calculations.

See response to Comment 3hi above. The proposed level spreader is shown schematically on Drawing SWM-2 and will be designed, including calculations supporting the in-ground level spreader length, width, depth, stone size, etc. at the detailed design stage.

ii) Based on the existing vegetation in that area, what is the proposed vegetation to be planted within the filter strip component?

An in-ground level spreader is proposed in place of the suggested vegetated filter strip and level spreader. Plantings within the SWM pond block will be specified at the detailed design stage.

iii) Please provide a cross section on the grading plan

A pond cross section including the in-ground level spreader concept is provided on Drawing SWM-2.

iv) The vegetated filter strip/level spreader will be located outside of the Ray's Creek floodplain, the wetland and 30 m buffer.

We confirm the proposed in-ground level spreader will be located outside of the Ray's Creek floodplain, the wetland and 30 m buffer.

i. Habitat Zone 10 (a &b) which includes a tributary of Ray's Creek, wooded area and wetland are being removed to construct houses, roads and stormwater management facility. Please refer to ORCA Ecology Review of the Environmental Impact Assessment (dated June 28, 2021) for comments. Additional information is required to address outstanding issues which may affect the layout of the proposed road network, lot & house location and stormwater management.

The proposed lots, roads and SWM facility are located outside of the environmental constraint boundary that has been established by GHD.

j. The Environmental Impact Assessment discussed the negative impact of warm water being discharged from stormwater management facilities. Please provide a description and design criteria that will be implemented within the stormwater management facility to deal with thermal impacts.

SWMF#2 will be equipped with a bottom draw reverse slope pipe to reduce the thermal impacts.

5. SWMF#3 – Catchment Area 203 & EXT-1

a. Habitat Zone 6 (a,b,c & d) which includes a tributary of Ray's Creek, wooded area and wetland are being removed to construct houses, roads and stormwater management facility. Please refer to ORCA Ecology Review of the Environmental Impact Assessment (dated June 28, 2021) for comments. Additional information is required to address outstanding issues which may affect the layout of the proposed road network, lot & house location and stormwater management.

The proposed Draft Plan has been revised to maintain and protect the existing wetland feature including a 15 metre setback in the southwest corner of the site.

b. Catchment Area 203 applies the following impervious values Timp of 51% and Ximp of 38% within the VO model. The grading plan shows a mixture of townhouses, apartment buildings with parking lots, 9 m , 12 m and 15 m residential lots and roads. The Timp & X imp values are too small.

i) Please make the appropriate corrections to hydrologic parameters.

The percent imperviousnesses have been revised. For low density (single detached housing) TIMP and XIMP have increased to 55% and 45% respectively. For medium density (Townhouse blocks) TIMP and XIMP have increased to 75% and 55% respectively. For high density (apartment buildings with parking lots), the TIMP and XIMP have increased to 90% and 90%, respectively. A weighted Timp and Ximp of 60% and 50% are now used within the VO model and we believe these values are conservative.

ii) Provide break-down of area based on land use and runoff co-efficient.

The breakdown of area based on land use is provided on the 'Impervious Area Calculation' sheet included in Appendix D. The runoff coefficient breakdown, also based on landuse (and soil type) is provided in the hydrologic model parameter calculation sheets and conforms to the 2022 MECP Design Criteria (see response to Comment 2 above).

iii) Please make the appropriate changes to the VO model.

The VO model has been revised based on the updated hydrologic parameter calculations.

c. Catchment Area 103

- Hydrologic parameter calcs (Appendix D) use area of 13.3 ha
- DP-1 Existing Conditions Drainage Plan delineates an area of 13.3 ha
- VO model, HYD 27, Standhyd uses an area of 14.7 ha

i) Please make the appropriate corrections to hydrologic parameters.

The Catchment Area 103 hydrologic parameters have been updated including a catchment area of 13.3 ha.

ii) Please make the appropriate changes to the VO model.

Catchment Area 103 in the VO model has been updated to match the hydrologic parameter calculations and the existing conditions drainage plan.

d. Catchment Area 203

- Hydrologic parameter calcs (Appendix D) use area of 9.0 ha
- DP-2 Proposed Conditions Drainage Plan delineates an area of 9.0 ha

- VO model, HYD 90, Standhyd uses an area of 7.4 ha

i) Please make the appropriate corrections to hydrologic parameters.

The Catchment Area 203 hydrologic parameters have been updated including a catchment area of 5.4 ha.

ii) Please make the appropriate changes to the VO model.

Catchment Area 203 in the VO model has been updated to match the hydrologic parameter calculations and the existing conditions drainage plan.

e. SWM Facility 3 sizing table in Appendix D doesn't provide the volume calculations for the Main Cell of the wetland.

SWMF 3 has been revised to a wet SWM facility and the stage-storage table in Appendix D has been revised.

f. Please provide a stage-storage-discharge table for SWMF#3

A stage storage discharge table will be provided at the detailed design stage. However, the work completed to date confirms that the SWMF 3 block is adequately sized to provide the requisite water quantity control.

g. Please provide the control orifice size and invert.

The outlet controls for the proposed pond (consisting of orifice(s) and weirs) will be provided at the detailed design stage. The invert of the low flow outlet control is 249.50, based on the preliminary stage-storage table. The work completed to date confirms the SWMF 3 block is adequately sized to provide the requisite water quantity control.

h. Based on the route reservoir NHYD 104 for the 100-yr storm (24-Hr SCS Type II), SWMF#3 doesn't actually provide enough storage volume in its current state, undersized drainage area and impervious levels. Please make the appropriate corrections.

The SWMF 3 location and storage have been revised based on revised drainage area and imperviousness.

i. The storage requirements to control the 100-year storm peak flows must be done below the emergency spillway elevation.

The required pond volume for SWMF 3 is 1,872 m^3 whereas the preliminary pond grading provides for 2,133 m^3 below the emergency spillway elevation. The pond block sizing is believed to be conservative based on the % impervious value that is being used.

j. Forebay Design

i) Please provide the forebay settling length calculations.

The final pond layout including the forebay layout and settling length calculations will be provided at the detailed design stage. At this stage the preliminary pond design is intended to confirm adequate area is allowed for in the proposed SWM block sizing.

ii) Please provide the forebay dispersion length calculations.

The final pond layout including the forebay layout and dispersion length calculations will be provided at the detailed design stage. At this stage the preliminary pond design is intended to confirm adequate area is allowed for in the proposed SWM block sizing.

k. The level spreader outlet will be properly designed to integrate point source discharge into a sensitive wetland feature. The outlet will be designed during detailed design stage. The proposed hard surface (riprap stone) spillway should be switched with the vegetated filter strip/level spreader as presented in Section 4.5.12 of the 2003 MOE manual.

i) Please modify the design using the criteria within the manual and provide calculations.

See response to Comment 3hi above. The proposed level spreader is shown schematically on Drawing SWM-3 and will be designed, including calculations supporting the in-ground level spreader length, width, depth, stone size, etc. at the detailed design stage.

ii) Based on the existing vegetation in that area, what is the proposed vegetation to be planted within the filter strip component?

An in-ground level spreader is proposed in place of the suggested vegetated filter strip and level spreader. Plantings within the SWM pond block will be specified at the detailed design stage.

iii) Please provide a cross section on the grading plan

A pond cross section including the in-ground level spreader concept is provided on Drawing SWM-3.

iv) The vegetated filter strip/level spreader will be located outside of the Ray's Creek floodplain, the wetland and 30 m buffer.

We confirm the proposed in-ground level spreader will be located outside of the Ray's Creek floodplain, the wetland and 30 m buffer.

k. The Environmental Impact Assessment discussed the negative impact of warm water being discharged from stormwater management facilities. Please provide a description and design criteria that will be implemented within the stormwater management facility to deal with thermal impacts.

SWMF 3 will be equipped with a bottom draw reverse slope pipe to reduce the thermal impacts.

6. SWMF#4 – Catchment Area 204, PEXT-3 & EXT-2

a. The pre-development Catchment 104 landuse is defined as 15.5ha of pasture. The post development catchment 204 is defined as 5.17 ha of pasture, 9.83 ha impervious and 1.3 ha of wetland.

i) Why doesn't the pre-development landuse curve number calculations include the 1.3 ha of wetland?

The 1.3 ha in the post development condition is related to the SWMF 4 area and is shown as, 'Wetlands/Lakes/SWMF' in the hydrologic parameter calculation sheets included in Appendix D.

ii) If the proposed SWM#4 is built on-top of the wetland, why does the post development landuse curve number calculations include the 1.3 has of wetland.

See response to Comment 6ai above.

iii) Please make the appropriate corrections to both hydrologic parameter tables and the VO model.

Catchment area 204 in the VO model has been updated to match the hydrologic parameter calculations and the existing and proposed conditions drainage plans.

b. Catchment Area 204 impervious calculations identify high density residential and apply impervious values Timp of 60% and Ximp of 53%. The grading plan shows a mixture of low density & medium residential and apartment buildings with parking lots. The Timp & X imp values are too small. Please make the appropriate corrections to hydrologic parameters.

The percent imperviousnesses have been revised. For low density (single detached housing) TIMP and XIMP have increased to 55% and 45%, respectively. For medium density (Townhouse blocks) TIMP and XIMP have increased to 75% and 55%, respectively. For high density (apartment buildings with parking lots), the TIMP and XIMP have increased to 90% and 90%, respectively. A weighted Timp and Ximp of 69% and 64% are now used within the VO model and we believe these values are conservative.

c. Catchment Area 104

- Hydrologic parameter calcs (Appendix D) use area of 15.5 ha
- DP-1 Existing Conditions Drainage Plan delineates an area of 15.5 ha
- VO model, HYD 28, Nashyd uses an area of 14.8 ha

i) Please make the appropriate corrections to hydrologic parameters.

The Catchment Area 104 hydrologic parameters have been updated including a catchment area of 15.5 ha.

ii) Please make the appropriate changes to the VO model.

Catchment area 104 in the VO model has been updated to match the hydrologic parameter calculations and the existing conditions drainage plan.

d. Catchment Area 204

- Hydrologic parameter calcs (Appendix D) use area of 16.3 ha
- DP-2 Proposed Conditions Drainage Plan delineates an area of 16.3 ha
- VO model, NHYD 100, Standhyd uses an area of 15.5 ha

i) Please make the appropriate corrections to hydrologic parameters.

The Catchment Area 204 hydrologic parameters have been updated including a catchment area of 16.3 ha.

ii) Please make the appropriate changes to the VO model.

Catchment area 204 in the VO model has been updated to match the hydrologic parameter calculations and the existing conditions drainage plan.

e. Based on Section 7.5 Stormwater Management Plan, Outlet 4, Catchments 204, EXT-2 and PEXT-3 will be controlled by a wet pond facility with sediment forebays at each inlet location. The current design does not include the sediment forebays. Please provide the following information:

i) Please provide the design for each forebay.

The final pond layout including the forebay design will be provided at the detailed design stage. At this stage the preliminary pond design is intended to confirm adequate area is allowed for in the proposed SWM block sizing.

ii) Please provide the forebay settling length calculations.

See Response to Comment 6ei above.

iii) Please provide the forebay dispersion length calculations.

See Response to Comment 6ei above.

iv) Forebay volumes within stage-storage table

The forebay volumes are part of the provide stage-storage tables. See Response to Comment 6ei above.

f. Please provide a stage-storage-discharge table for SWMF#4

A stage storage discharge table will be provided at the detailed design stage. However, the work completed to date confirms the SWMF 4 block is adequately sized to provide the requisite water quantity control.

g. How does the surface area of the pond jump from 5350 m^2 to 12009 m^2?

The pond area below 246.30 corresponds to the permanent pool portion of the pond. At 246.30 there is a large 'shelf' at the transition from permanent pool to active storage which explains the large increase in pond surface area. Please see the cross section on Drawing SWM-4.

h. Please provide the control orifice size and invert.

The outlet controls for the proposed pond (consisting of orifice(s) and weirs) will be provided at the detailed design stage. The invert of the low flow outlet control is 246.30, based on the preliminary stage-storage table. The work completed to date confirms the SWMF 4 block is adequately sized to provide the requisite water quantity control.

i. The level spreader outlet will be properly design to integrate point source discharge into an existing watercourse on adjacent property and wetland. The spreader will incorporate velocity reduction (i.e plunge pool) and vegetation suitable for tying into existing conditions. The outlet will be designed during detail design stage, however suitable space between the pond and property limit should be allotted now.

Since point source discharge from the pond is proposed to discharge to an existing intermittent watercourse, a level spreader is not required. 24 hr extended detention will be provided within the SWM pond for erosion protection of the downstream watercourse. Additional details related to the pond outlet will be provided at the detailed design stage however the preliminary design completed to date confirms the SWM block size is appropriate.

j. Habitat Zone 5 which includes a headwater watercourse, wooded area and wetland are being removed to construct houses, roads and stormwater management facility. Please refer to ORCA Ecology Review of the Environmental Impact Assessment (dated June 28, 2021) for comments. Additional information is required to address outstanding issues which may affect the layout of the proposed road network, lot & house location and stormwater management.

The proposed lots, roads and SWM facility are located outside of the environmental constraint boundary as established by GHD.

k. The Environmental Impact Assessment discussed the negative impact of warm water being discharged from stormwater management facilities. Please provide a description and design criteria that will be implemented within the stormwater management facility to deal with thermal impacts.

SWMF 4 will be equipped with a bottom draw reverse slope pipe to reduce the thermal impacts.

7. VO Model

a. None of the NHYD numbers within the detailed output match the pre & post schematics.

The VO model has been updated such that the detailed output matches the pre & post schematics.

b. Why do the NHYD number change between the Chicago and SCS runs.

The VO model has been updated and the NHYD numbers are now the same in the Chicago and SCS scenarios.

c. The model runs are only identified by "Run 1". Please provide the list of Run numbers to the storm event being modeled (i.e Run 1 – 2-yr storm)

The VO model runs has been renamed as requested.

d. Please provide a digital copy of the VO model, including all scenarios and storm files.

The VO model digital files are provided with this submission.

e. Please modify the outflow-storage table with the route reservoir command (VO model) for all SWM facilities to include an initial row of zero flow with zero volume (see error in output file)

The VO model has been revised to includes an initial row of zero flow and zero volume.

8. Drawing SG-1 Preliminary Site Grading and Stormwater Management

a. Several lots abut the property limit. All grading will be done within the limits of the lot. Will meet existing grade at the property limit. No development, including grading extent, will affect adjacent properties.

We acknowledge that all proposed grading, to be determined at the detailed design stage, will occur within the property boundaries and will not impact adjacent properties.

b. SWMF#3 sites in the corner of south-west property limits

i) All grading for the pond including top width and side slopes for the berm will be done within the limits of this development.

See response to Comment 8b above.

ii) The pond outlet including velocity/flow spreader will be within the limits of this development and will not impact adjacent properties.

See response to Comment 8b above.

iii) The grading plan doesn't show the location of the outlet, velocity/flow spreader or the pond berm (width) and extent of side slope.

The SWMF 3 top of berm, side slopes and outlet location are shown on the Drawings SG-1 and SWM-3. Further details will be provided at the detailed design stage.

c. Please modify the SWMF#4 layout to represent the wet pond with two sediment forebays.

The preliminary pond configuration for SWMF 4 is shown on Drawing SWM-4. Additional pond details will be provided at the detailed design stage.

d. Please modify the SWMF#2 layout to represent a wet pond with two sediment forebays.

The preliminary pond configuration for SWMF 2 is shown on Drawing SWM-2 Additional pond details will be provided at the detailed design stage.

e. Catchments 201, 202, 203 and 204 all have overland flow routes between lots and/or conveyance between the road and the SWM facility. These routes need to convey the 100-year storm flows without affecting adjacent lots.

i) Please providing grading and conveyance calculations

Hydraulic calculations including a Major System Conveyance Plan (Drawing DP-3) showing cross sections are now provided for all overland flow routes within Catchments 202, 203 and 204. Note, the overland flow calculations within Catchment 201 will be provided at the detailed design stage as this will be a private development and therefore will follow the Site Plan approval process.

ii) Please delineate the extent of ponding on the road and water level within the overland flow routes.

The major system hydraulic calculations provided confirm the conveyance limits are within the roadway or drainage easements boundaries based on the standard road cross section grading and proposed grading within the drainage easements.

iii) Lot layout may need to be changed to provide appropriate overland drainage function.

The hydraulic calculations provided in Appendix D confirm sufficient capacity exists within the limits of the right-of-way or drainage easements for safe conveyance of the 100-year flow.

f. An overland flow route is required to convey the 100-year storm flows from PEXT-3 to SWMF#4.

i) Please delineate a flow route with elevations.

A 10 metres wide overland flow route (7 metre bottom width, 0.3 m deep with 5:1 side slopes) is proposed through the park block and is now shown on Drawing SG-1. It is assumed this will be registered as a drainage easement and this will be confirmed at the detailed design stage.

ii) Please provide the conveyance calculations

Major storm conveyance calculations are included in Appendix D.

g. All of the SWM facilities require the

i) Access/maintenance road

An access/maintenance road has added to all SWM facilities that have inlets and outlets that are not already accessible from an internal road.

ii) Sediment drying area for use during regular clear-out and maintenance,

Sediment drying volume calculations (10-year accumulation) are provided in Appendix D and a note has been added to Drawings SWM-2, SWM-3 and SWM-4 regarding sediment drying areas to be incorporated at the detailed design stage.

h. Please remove the dashed line representing a future road and its associated note/label. The proposed road location is within the wetland boundary buffer and is not a suitable location.

The dashed line representing a potential future road has been removed.

9. Drawing SWM-1 Preliminary Stormwater Management

a. Please delineate the bedrock and groundwater elevation on each of the four (4) SWMF cross-sections.

An approximate bedrock profile has been provided on each SWMF cross section which are now shown on Drawings SWM-1 to SWM-5, there was no groundwater observed in any of the test pits in the proposed pond locations.

b. Please plot the original ground location on each of the four (4) SWMF cross-sections.

An approximate existing ground profile has been provided on each SWMF cross section which are now shown on Drawings SWM-1 to SWM-5.

c. The bedrock elevation across the site varies from surface outcrops to 2.2 mbgs.

i) Which SWMF will be constructed in rock?

SWMF 2 and SWMF 4 will be constructed in rock.

ii) Based on the fractured surface from excavation and/or blasting, which facilities will require a pond liner.

The need for a pond liner will be reviewed with the geotechnical engineer at the detailed design stage as this detail does not affect the size or feasibility of any of the proposed SWM blocks or the overall development.

iii) Please delineate the pond liner on each on each of the four (4) SWMF cross-sections.

See response to Comment 9cii above.

a. SWM Facility 3 (Wetland) Detail

i) The detail provides two swm facility quantity storage volumes, 2901 m^3 & 2505 m^3. Which is correct?

SWMF 3 has been redesigned as a wet SWM facility. Details of SWMF 3 are provided in the revised report.

d. Modify Section E-E SWM Facility 4 (Wet Pond) to include the sediment forebays.

The cross section for SWMF 4 is provided on Drawing SWM-4 and has been updated to show the sediment forebays.

PEER REVIEW OF THE FUNCTIONAL SERVICING AND PRELIMINARY SWM REPORT STANTEC JUNE 30, 2021

1. Stantec pg. 3/13

Future watermain connections from 7th line, Peacock Road, Seaforth Crescent and Lakefield Road, as recommended in the June 2003 D.M.Wills Infrastructure Assessment, were not taken into account in the FSSWMR.

The full buildout of the proposed development relies on a looped watermain connection via Murray Street and Tower Road. The small portion of the subject property with frontage on Seaforth Crescent and Lakefield Road are the subject of applications for consent for them to be severed as individual building lots having private water and wastewater services as it is not practical for them to be serviced with municipal services. Future watermain connections to Peacock Road and to the 7th line can be contemplated as part of future development applications within the LSDA by others but are not required to support development of the subject lands.

2. Stantec pg. 4/13

The catchment areas on Drawing Dwg. S-1 are colour coded and are meant to correlate with colour coding references in the text of the FSSSWMR, but the correlation is not exactly clear. As well, the 10 Phases of the development which are delineated on other drawings in the report and on the Draft Plan of Subdivision should also be delineated on drawing Dwg. S-1 for clarify and correlation with the text and discussion in the report.

Additional details and clarifications have been provided in the report to assist with correlating the report with Drawing S-1. The proposed phasing boundaries are now shown on Drawing S-1.

3. Stantec pg. 4/13

Twinning of the forcemain under the Otonabee River is required for redundancy under all options in the Lakefield Sanitary System Upgrades Environmental Assessment, not for just when flows from the development exceed 20 litres/sec.

The report has been updated to clarify that the Township is planning to twin the existing forcemain under the Otonabee River but that this work is not specifically related to or triggered by future development within the Lakefield South Development Area, including development within the subject lands.

4. Stantec pg. 4/13

Sanitary flows from the Ontario Speed Skating Oval were not accounted for.

The speed skating overall site is designated as 'Recreation/Open Space' in the currently approved Official Plan and is designated as 'Parks & Conservation' in the Official Plan that is pending approval by MMAH and therefore no sanitary flows have been assigned to this parcel of land. We note that the proposed Rays Creek gravity sanitary sewer has increased from 300 to 375 mm in diameter and includes excess capacity as to not constrain the future development potential of the skating oval property.

5. Stantec pg. 4/13

Any upgrades to the existing 200 mm diameter section of sanitary sewer on Tower Road should be done before any development occurs and not during the development.

The Township retained D.M.Wills to review the capacity of the Tower Road sanitary sewer and recommendations for the Tower Road sanitary sewer improvements are summarized in the D.M.Wills technical memo dated March 13, 2023. It is recommended that the timing for upsizing the Tower Road gravity sanitary sewer be resolved with the Township and that the proposed sewer be sized with sufficient capacity for the ultimate buildout of the LSDA.

6. Stantec pg. 4/13

The design of the 300 mm diameter sewer along Rays Creek in terms of the percent full of the pipe with the peak flow and grade of the pipe could cause surcharging of serviced connections downstream on Lakefield Road.

Tatham further clarified the above comment with Township staff and Stantec during a meeting on May 12, 2022 and the concern is related to the capacity of the proposed Rays Creek sewer and not the potential for surcharging of service connections downstream on Lakefield Road. A 375 mm diameter sewer along Rays Creek (previously 300 mm in diameter) is now proposed and upon full buildout, is expected to operate at approximately 50% of its full flow capacity, which is appropriate in order to allow for reasonable construction tolerances related to pipe slope.

7. Stantec pg. 5/13

The capacity of the section of the 300 mm diameter sewer on Tower Road between maintenance holes 208 and 212 could be exceeded with all of the flows from the development converging at MH 208 as previously mentioned.

As indicated above, the Township retained D.M.Wills to review the capacity of the Tower Road sanitary sewer and recommendations for the Tower Road sanitary sewer improvements are summarized in the D.M.Wills technical memo dated March 13, 2023. Timing for design and implementation of the improvements will be resolved with the Township.

It is noted that the sanitary structure identifiers have changed since the previous submission and are now based on the Township's GIS database.

8. Stantec pg. 5/13

The findings in the 2016 Environmental Assessment and resulting upgrades that have taken place since then have been calculated on estimated flows based on the current "Low Density" zoning designation and not "Medium Density" zoning designation requested in the Official Plan and Zoning By-Law Amendment Applications that will result in higher flows.

The proposed sanitary servicing analysis for the subject lands is based on the proposed densities and the Township have retained D.M.Wills to review the capacity of the receiving downstream infrastructure and to plan for system improvements to accommodate the latest estimated sanitary flows from the LSDA as required.

9. Stantec pg. 9/13

SWM facilities 3&4 – proposed wetland depth of 1.7 m and 2 m (2,901 m^3 and 4,755 m^3 respective storage volumes) can add to increased maintenance related to sediment.

SWMF 3&4 will be designed with sediment forebays to capture the majority of incoming sediment close to the inlet thereby avoiding the scenario of having to remove sediment from the total pond footprint area. Maintenance related to sediment removal is a function of the size and source(s) of sediment in the contributing catchment area as opposed to the depth of the SWM facility.

10. Stantec pg. 9/13

SWM facility 3 – 2.6 m elevate drop and 3:1 slope on the emergency overflow and outlet bank will likely lead to erosion and stability issues.

The SWM facility grading has been developed to reduce rock excavation to the extent possible. All emergency spillways will be protected from long term erosion as part of the detailed design of each facility. Design of the pond berms will also include input from a geotechnical engineer to confirm they will remain stable.

11. Stantec pg. 9/13

Pond designs should include an access for routine maintenance and all maintenance holes should be accessible by a vehicle.

A minimum 3.0 m wide access/maintenance road has been allowed for in all SWM facility blocks that have inlets and outlets that are not already accessible from an internal road.

12. Stantec pg. 11/13

There did not appear to be any discussion regarding sidewalks within the road right-of-ways of the internal streets. The report should include standard roadway cross sections approved by the Municipality.

The proposed road cross sections are provided on Drawing SG-1 for approval by the Township. Significant consultation between April and June 2023 occurred between Triple T, the Township, and the County to arrive at an active transportation concept that the Township and County will support. The Active Transportation Concept Plan, Drawing ATC, is attached at the back of the report.

13. Stantec pg. 11/13

It is not clear and there are no specific details as to how the connection of the internal road to the south end of Tower Road will be made and to how the connection of the internal road to Murray Street will be made, even though these details may be provided in the separate Traffic report prepared for the development.

Road connection details for the south end of Tower Road and at Murray Street will be provided at the detailed design stage.

14. Stantec pg. 12/13

As well there are no details as to if any improvements will need to be made to Tower Road.

Sanitary sewer improvements will be required on Tower Road as identified in D.M.Wills' technical memo dated March 13, 2023. There are no other road improvements planned for Tower Road at this time however this will be confirmed again at the detailed design stage.

15. Stantec pg. 12/13

There were no details in this Section, or the Utilities Section, regarding roadway lighting. However, is assumed that street lighting will be in accordance with Township requirements. However, depending on those standards, Stantec recommends that the streetlight fixtures be of the LED full cut-off (FCO) type to minimize light trespass and light pollution.

Streetlighting will be designed at the detailed design stage in coordination with the Township's requirements.

We trust the above responses and adjusted materials are sufficient to confirm the feasibility of the proposed development, as it relates to servicing and SWM, in support of the Official Plan and Zoning By-Law Amendment applications. If you have any questions or require additional clarification, do not hesitate in contacting the undersigned.

Yours truly,
Tatham Engineering Limited

Jeremy Ash, B.Sc.Eng., P.Eng.
Director, Manager – Ottawa Office
JA:akm

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