



Technical Memorandum

Date: February 27, 2023 Memo No.: 01
Project Name: Hunter Farm Development Project No.: LON-21008138-A0
Written By: Hagit Blumenthal, Cassandra Wallace
Subject: UTRCA Comment Response
To: Dan Vucetic (Stantec)
Stephen Stapleton (Auburn)
Distribution: email

EXP Services Inc. (EXP) is providing this memo which summarizes the hydrogeological assessment and water balance comments received from the Upper Thames River Conservation Authority (UTRCA) in their letter dated January 20, 2023. The subject site is the Hunter Farm Development located at 1598 Richmond Street (Parts of Lots 9&10 Concession 4) in the Municipality of Thames Centre (File No. 39T-TC2202 & Z17-22).

The comments from the UTRCA are outlined below. The hydrogeological assessment report dated June 14, 2022 will be updated to address the comments below in further detail at the Focused/Design Studies stage once more information becomes available.

Water Balance Assessment

UTRCA Comment 18:

The Report states that localized infiltration rates will vary based on factors such as the saturated hydraulic conductivity of surface soils, land slope, rainfall intensity, and relative soil moisture at the start of a rainfall event, and type of cover on the ground surface. Please use the actual infiltration in the final water balance by conducting infiltration/percolation tests on the site.

EXP Response:

In conjunction with the Focused/Design Studies submission, the Owner shall have a professional engineer and professional geoscientist update the hydrogeological report including the water balance using infiltration rates assessed based on infiltration/percolation tests to be completed on site.

UTRCA Comment 19:

The drainage areas identified on Figure 2, Existing Storm Drainage Area Figure, of the SWM Report, does not match with the areas shown on Drawing 16, Drainage Catchments of the Hydrogeological Assessment. Please make sure that the drainage areas are correct and the areas contributing to the wetland features are identified correctly.

EXP Response:

In conjunction with the Focused Design Studies submission, the Owner shall have his consulting engineer prepare and submit a Storm/Drainage and SWM Servicing Functional Report or a SWM Servicing Letter/Report of Confirmation to address the following:

- Identifying the storm/drainage and SWM servicing works for the subject and external lands and how the interim drainage from external lands will be managed, all to the satisfaction of the Municipality.

UTRCA Comment 20:

The water balance states that due to the infiltration volume deficits observed across the site in the post-development environment, it is recommended to use secondary infiltration and run-off reduction techniques to improve post development infiltration. The infiltration under the post-development condition using SWM LIDs should provide the same volume to be infiltrated under the post-development conditions as per the water balance.

a) LIDs measures have been proposed as a method of increasing infiltration. As noted in comment 18, field percolation tests should be conducted at the proposed LID locations to confirm the feasibility of these measures, and water quality will need to be accounted for in the design of any mitigation measures.

b) Section 5.4 of the report provides of list of secondary infiltration opportunities which includes the use of pervious pipes to promote infiltration of water collected in the storm sewer system as an option to reduce the infiltration deficit. The storm runoff may have dissolved pollutants such as phosphorous and chlorides. The UTRCA strongly recommends infiltrating only clean water keeping in view the local groundwater recharge.

EXP Response:

In conjunction with the Focused Design Studies submission, the Owner shall have a professional engineer or professional geoscientist prepare a hydrogeological investigation and/or addendum/update to the existing hydrogeological investigation(s) based on the final subdivision design, to determine the potential short-term and long-term effects of the construction associated with the development on existing groundwater elevations and to assess the impact on the water balance of the subject plan, identifying all required mitigation measures, including Low Impact Development (LIDs) solutions to the satisfaction of the Municipality. Hydrological support to features identified in the approved EIS should also be included in the functional SWM design. Elements of the hydrogeological investigation should include, but are not to be limited to, the following, all to the satisfaction of the Municipality:

- Completion of a water balance and/or addendum/update to the existing water balance for the proposed development, revised to include the use of LIDs as appropriate;

- Completion of a water balance for any nearby natural heritage feature (i.e., all open space Blocks) to include the use of LIDs as appropriate;
- Details related to proposed LID solutions, if applicable, including details related to the long-term operations of the LID systems as it relates to seasonal fluctuations of the groundwater table and potential road salt application impacts; and
- To meet allowable inflow and infiltration levels as identified by OPSS 410 and OPSS 407, include an analysis to establish the water table level of lands within the subdivision with respect to the depth of the sanitary sewers and recommend additional measures, if any, which need to be undertaken.

UTRCA Comment 21:

The water balance calculation has been undertaken for the whole site considering the overall development on the site. The UTRCA requires a detailed feature-based water balance for all retained and created natural heritage features (e.g. woodlands, wetlands, watercourses) to demonstrate that sufficient area is available within the proposed buffers to provide the appropriate infiltration of clean water to maintain the groundwater-dependent features in perpetuity. If this cannot be demonstrated, larger buffers may be required which may impact the configuration of the proposed Draft Plan of Subdivision.

EXP Response:

Prior to the submission of Focus Design Studies, the applicant will complete and submit to the Municipality and UTRCA for review an updated Environmental Impact Study (EIS) which will include details on the wetland compensation that demonstrates no net loss of natural heritage features and their functions. The updated EIS will determine the appropriate buffers to all the natural heritage features and compensation areas. Possible redline revisions will be made to the draft plan to adjust for additional buffers/compensation areas as required.

The hydrogeological assessment report will be updated with a feature-based water balance accordingly.

UTRCA Comment 22:

The Draft Plan proposes removal of wetland Community 5 (MAS) and partial removal and compensation for wetland Community 8 (MAM2). As noted in comment 43, the UTRCAs policies generally do not support the relocation and removal of wetlands. Please provide a detailed feature-based water balance for the existing and proposed wetland features to confirm:

- a) *That the removal and modifications to the features will not result in any flooding issues to the proposed development; and*
- b) *That the relocation and enhancement areas will provide similar functions to the feature that was removed.*

EXP Response:

Prior to the submission of Focus Design Studies, the applicant will complete and submit to the Municipality and UTRCA for review an updated Environmental Impact Study (EIS) which will include details on the wetland compensation that demonstrates no net loss of natural heritage features and their functions. The updated EIS will determine the appropriate buffers to all the natural heritage features and compensation areas. Possible redline revisions will be made to the draft plan to adjust for additional buffers/compensation areas as required.

The hydrogeological assessment report will be updated with a feature-based water balance accordingly.

UTRCA Comment 23:

The Report mentions that the figures used in the water balance are reported in Appendix K. However, the figures are not included in the Appendix K. Please include the figures showing the pre- and post-development areas used in the water balance to maintain the base flows to the features on the site.

EXP Response:

In conjunction with the Focused/Design Studies submission, the Owner shall have a professional engineer and professional geoscientist update the hydrogeological report including figures indicating pre-and post-development areas used in the water balance assessment as requested.

Hydrogeological Assessment

UTRCA Comment 24:

The Report states that EXP staff confirmed that Porter Subdivision Drain does not exist on the subject lands. According to the UTRCA mapping, the drain enters the lands west of Richmond Street, flowing from northwest corner to the southwest corner of Parcel 1 where it outlets to the Sandusky Drain. The feature is an ephemeral watercourse therefore it will have water flow only after rain/snowmelt with no base flow in other times. The UTRCA staff are aware of existing flood concerns associated with this feature that extend outside of the floodplain identified on our mapping. Please revise the Report to include the Porter Subdivision Drain as an existing feature.

EXP Response:

In conjunction with the Focused/Design Studies submission, the Owner shall have a professional engineer and professional geoscientist update the hydrogeological report to include the Porter Subdivision Drain as an existing feature.

Prior to approval of the first phase and prior grading or site alteration activities, the Owner shall complete a Floodplain Assessment, to the satisfaction of UTRCA, to delineate the extent of the flood hazard of the Porter Subdivision Drain, located to the west of the development limit. If any of the proposed lots are located within the floodplain, as determined through the Floodplain Assessment, they shall be appropriately floodproofed, to the satisfaction of the UTRCA, with floodproofing details to be included on the final grading plan and in the Subdivision

Agreement. If any roads are identified as being located within the floodplain limit, safe access during a Regional Storm must be demonstrated to the satisfaction of the UTRCA. If the flood hazard cannot be safely addressed, as per Provincial access and floodproofing standards, revisions to the proposed lot lines may be required, to the satisfaction of the UTRCA and the Municipality.

UTRCA Comment 25:

Section 3.3 states that Wetland B (Community 5) is proposed to be removed and may be either compensated on-site, adjacent to Wetland C (Community 2), or may be compensated off - site; Wetland A (Community 8) will be predominantly retained as Park space. The EIS identifies removal of Community 5 and partial removal of Community 8. Please provide further details to confirm that the proposed relocation/compensation area can recreate the features/functions of the wetlands that are proposed to be removed. Please note as discussed in comment 43, enhancements within the existing feature and within the required buffer of the Sandusky Drain, cannot be considered within the calculation for the compensation.

EXP Response:

In conjunction with the first submission of engineering drawings and consistent with the approved Environmental Management Plan, the Owner shall submit a buffer planting and habitat enhancement plan which addresses restoration, compensation and plantings that shall occur around the woodlot and wetland, prepared by a qualified professional, to the satisfaction of the Municipality.

UTRCA Comment 26:

Section 3.4.3 notes discontinuous layers of sandy soil. However, sandy soil was observed in various test pit locations and may not be discontinuous. Please confirm.

EXP Response:

In conjunction with the Focused/Design Studies submission, the Owner shall have a professional engineer and professional geoscientist update the hydrogeological report to provide clarifications in regards to site stratigraphy and the continuity of the sandy soils.

UTRCA Comment 27:

Please explain the reasons for discrepancies between the data logger and the manual measurements for MW3/BH between November 2021 and January 2022, and in April 2022, and between two monitoring events for BH9/MW.

EXP Response:

In conjunction with the Focused/Design Studies submission, the Owner shall have a professional engineer and professional geoscientist update the hydrogeological report to provide clarifications in regards to the discrepancies between the manual measurements and the data logger.

UTRCA Comment 28:

Please identify the groundwater flow direction on Drawing 13 for the portion of the site west of Richmond Street.

EXP Response:

In conjunction with the Focused/Design Studies submission, the Owner shall have a professional engineer and professional geoscientist update the hydrogeological report to provide clarifications in regards to groundwater flow direction west of Richmond Street.

UTRCA Comment 29:

Section 4.7 notes metal exceedances in groundwater and surface water. Please comment on the potential source(s) of exceedances.

EXP Response:

In conjunction with the Focused/Design Studies submission, the Owner shall have a professional engineer and professional geoscientist update the hydrogeological report to provide clarifications in regards to water quality.

UTRCA Comment 30:

Please comment on the interpreted source of differences in the chemical signature of samples collected from SW Station 4 in September 2021 and March 2022

EXP Response:

In conjunction with the Focused/Design Studies submission, the Owner shall have a professional engineer and professional geoscientist update the hydrogeological report to provide clarifications in regards to water quality.

UTRCA Comment 31:

Please add a description on the Schoeller Diagrams with respect to the interaction of groundwater and surface water based on the chemical analyses results. Based on the chemical analyses of the surface water and groundwater samples please:

a) Include comments on if the wetlands and other site features are groundwater dependent, or surface water dependent; and

b) Clarify the interpretations regarding runoff, groundwater, and surface water interactions in the wetlands and watercourses.

EXP Response:

In conjunction with the Focused/Design Studies submission, the Owner shall have a professional engineer and professional geoscientist update the hydrogeological report to provide clarifications in regards to water quality.

UTRCA Comment 32:

Section 5 notes mitigation measures to increase the post development infiltration to 80% in all four drainage areas. Please confirm:

a) If the mitigation measures are only those noted in Section 5.4 Secondary Infiltration Opportunities; and

b) If the mitigation measures can achieve post development infiltration to 80%.

EXP Response:

In conjunction with the Focused/Design Studies submission, the Owner shall have a professional engineer and professional geoscientist update the hydrogeological report providing additional detail regarding infiltration mitigation measures as requested.

UTRCA Comment 33:

Section 7.3 notes that "Wetlands A and C as well as the Sandusky Drain will be predominantly retained". The SWM Report identifies an external catchment area of 479.35 ha that drains to the Hunter Branch Drain, which crosses Block 27 and connects to Sandusky Drain. The UTRCA recommends that the Hunter Branch Drain should be retained post development as well. Please include details related to the Hunter Branch Drain. Please refer to comment 47 as it relates to Block 27 and the Hunter Branch Drain.

EXP Response:

In conjunction with the Design Studies submission, the Owner shall have a report prepared by a qualified consultant, and if necessary, a detailed hydro geological investigation carried out by a qualified consultant to determine the effects of the construction associated with this subdivision on the existing ground water elevations and springs, water wells and domestic or farm wells in the area and identify any abandoned wells in this plan, assess the impact on water balance and any fill required in the plan, to the satisfaction of the Municipality Engineer. If necessary, the report is to also address any contamination impacts that may be anticipated or experienced as a result of the said construction as well as provide recommendations regarding soil conditions and fill needs in the location of any existing watercourses or bodies of water on the site.

UTRCA Comment 34:

The Report includes potential contamination from surface sources. Please comment on other impacts of construction dewatering and development on the surface water features noted in Section 7.3 with respect to water quality and quantity.

EXP Response:

In conjunction with the Focused Design Studies submission, the Owner shall have a professional engineer or professional geoscientist prepare a hydrogeological investigation and/or addendum/update to the existing hydrogeological investigation(s) based on the final subdivision design.

Elements of the hydrogeological investigation should include, but are not to be limited to, the following, all to the satisfaction of the Municipality:

- address any contamination impacts that may be anticipated or experienced as a result of the said construction

UTRCA Comment 35:

Section 7.4 dewatering target is assumed to be 0.5 m below base of excavation at 3.0 m bgs (basement foundation) and 3.5 m bgs (sanitary sewer). However, for dewatering calculations in Appendix M, the ground elevation is at 256 masl and the lowest basement bottom is at 253.5 masl leaving only 2.5 m for the basement bottom. Additionally, the precipitation events and volume are not included in the dewatering calculations. Please confirm the depths used in the calculations and note duration of dewatering.

EXP Response:

In conjunction with the Focused/Design Studies submission, the Owner shall have a professional engineer and professional geoscientist update the hydrogeological report including, but not limited to, the following:

- i) servicing, basement foundation depths/elevations
- ii) dewatering duration
- iii) dewatering rates
- iv) dewatering drawings

UTRCA Comment 36:

Section 7.4 notes that the dewatering activities are expected to cause short term impacts to the shallow groundwater regime up to 307.48 m surrounding basements and servicing infrastructure. Please provide a map illustrating:

-The location of the proposed basements;

-The location of proposed linear infrastructure; and

-The radius of influence under normal conditions and for the “worst case” scenario to identify features that may be impacted by construction dewatering.

EXP Response:

In conjunction with the Focused/Design Studies submission, the Owner shall have a professional engineer and professional geoscientist update the hydrogeological report including, but not limited to, the following:

- i) servicing, basement foundation depths/elevations
- ii) dewatering duration
- iii) dewatering rates
- iv) dewatering drawings

UTRCA Comment 37:

According to Section 4.2.1 shallow groundwater was observed across the entire site. As noted, basement foundations are expected to be at 3 mbgs and as such many of the houses will intercept the water table and may require year-round dewatering via basement sump pumps. The dewatering through the basements will reduce groundwater discharge to the wetlands and other watercourses.

a) Please provide mitigation measures for the potential impacts to the wetland features; and

b) Please confirm that the Municipality is satisfied with the proposed basements on the subject lands based on the findings of the hydrogeological assessment.

EXP Response:

In conjunction with the Focused Design Studies submission, the Owner shall have a professional engineer or professional geoscientist prepare a hydrogeological investigation and/or addendum/update to the existing hydrogeological investigation(s) based on the final subdivision design, to determine the potential short-term and long-term effects of the construction associated with the development on existing groundwater elevations and to assess the impact on the water balance of the subject plan, identifying all required mitigation measures, including Low Impact Development (LIDs) solutions to the satisfaction of the City. Hydrological support to features identified in the approved EIS should also be included in the functional SWM design.

UTRCA Comment 38:

Please provide details on the contingency measures noted in section 7.4 with respect to the surrounding water supply wells.

EXP Response:

In conjunction with the Focused Design Studies submission, the Owner shall have a professional engineer or professional geoscientist prepare a hydrogeological investigation and/or addendum/update to the existing hydrogeological

investigation(s) based on the final subdivision design, to determine the potential short-term and long-term effects of the construction associated with the development on existing groundwater elevations and to assess the impact on the water balance of the subject plan, identifying all required mitigation measures, including Low Impact Development (LIDs) solutions to the satisfaction of the Municipality. Hydrological support to features identified in the approved EIS should also be included in the functional SWM design. Elements of the hydrogeological investigation should include, but are not to be limited to, the following, all to the satisfaction of the Municipality:

- Development of appropriate contingency plans (if applicable) in the event of groundwater interference related to construction.
- the effects of the construction associated with this subdivision on the existing ground water elevations and domestic or farm wells in the area
- identify any abandoned wells in this plan

UTRCA Comment 39:

The EIS discusses the need for a Monitoring Plan. The UTRCA recommends that the Monitoring Plan studies the impact of post-construction dewatering on the site features including the water courses and wetlands.

EXP Response:

In conjunction with the Focused Design Studies submission, the Owner shall have a professional engineer or professional geoscientist prepare a hydrogeological investigation and/or addendum/update to the existing hydrogeological investigation(s) based on the final subdivision design, to determine the potential short-term and long-term effects of the construction associated with the development on existing groundwater elevations and to assess the impact on the water balance of the subject plan, identifying all required mitigation measures, including Low Impact Development (LIDs) solutions to the satisfaction of the Municipality. Hydrological support to features identified in the approved EIS should also be included in the functional SWM design.

Elements of the hydrogeological investigation should include, but are not to be limited to, the following, all to the satisfaction of the Municipality:

- Development of appropriate short-term and long-term monitoring plans (if applicable);

- Development of appropriate contingency plans (if applicable) in the event of groundwater interference related to construction.

Closure

We trust the responses provided in this Technical Memorandum meet your present requirements.

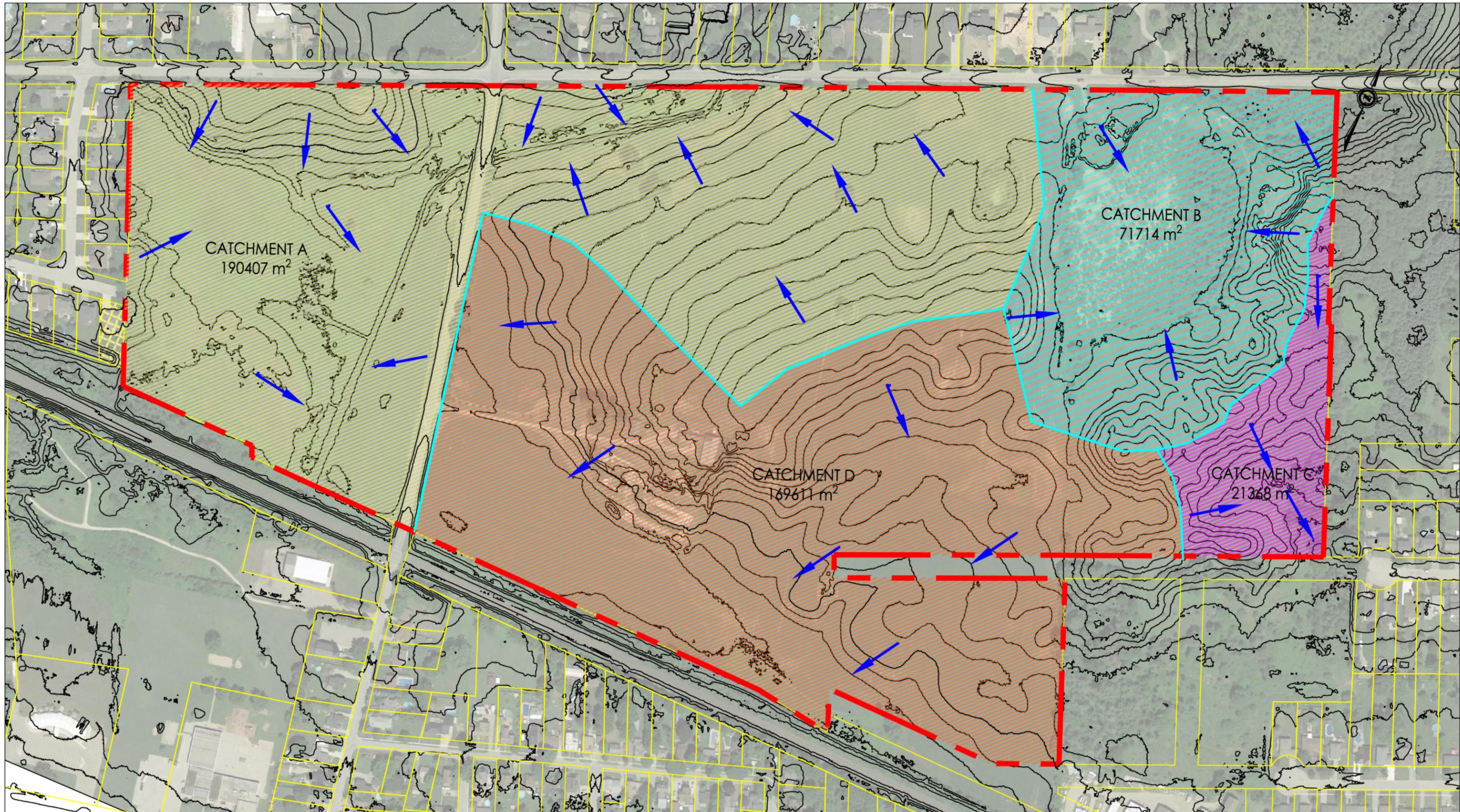
Regards,



Hagit Blumenthal, M.Sc., P.Geo.
Hydrogeologist
Environmental Services



Kassandra Wallace, B.B.R.M.
Project Manager
Environmental Services



-LEGEND-
 Approximate Site Boundary
 Surface Flow Direction

-NOTES-
 1. The drawing should be read in conjunction with EXP Report dated September 2021 (Report No. LON-21008138-A0).

Hydrogeological Assessment
Hunter Farm Development
 Marion Street, Dorchester, Ontario

CLIENT Auburn Developments Inc.		
TITLE Drainage Catchments		
DRAWN BY: K.D.	REVIEWED BY: H.B.	DATE JUNE 2022
		EXP Services Inc. 15701 Robin's Hill Road London, ON, N5V 0A5
SCALE 1:3000	PROJECT NO. LON-21008138-A0	DWG. 16

Post-Development Conditions:

Sub-Catchment	Area (ha)	TIMP	AxC	XIMP	AxC	CN	AxCN	IA	AxIA	Description
201	1.61	0.65	1.047	0.55	0.886	61	98.210	5	8.050	MD on the north of the west of Richmond part from the site.
202	2.96	0.20	0.591	0.05	0.148	75	221.700	5	14.780	Park block on west of Richmond
203	1.76	0.55	0.968	0.45	0.792	61	107.360	5	8.800	SF blocks on the south of the west of Richmond part from the site
204a	0.99	0.20	0.198	0.20	0.198	75	74.250	5	4.950	Sandusky drain on west of Richmond
204b	0.68	0.20	0.136	0.20	0.136	75	51.000	5	3.400	Sandusky drain on east of Richmond
205a	0.89	0.65	0.579	0.55	0.490	61	54.290	5	4.450	MD between Sandusky drain and Richmond
205b	0.78	0.70	0.546	0.60	0.468	61	47.580	5	3.900	Richmond street
206a	0.59	0.20	0.118	0.05	0.030	75	44.250	5	2.950	West park block on south boundary of west of Richmond
206b	0.18	0.20	0.036	0.05	0.009	75	13.500	5	0.900	East park block on the south boundary of west of Richmond
207	0.45	0.65	0.293	0.55	0.248	61	27.450	5	2.250	MD between Sandusky drain and Marion Street.
208a (MD)	0.91	0.65	0.592	0.55	0.501	61	55.567	5	4.555	-
208a (SF)	0.37	0.55	0.204	0.45	0.167	61	22.626	5	1.855	-
208a (Roads)	0.15	0.70	0.105	0.60	0.090	61	9.150	5	0.750	-
208a (OS)	0.17	0.20	0.034	0.05	0.009	61	10.412	5	0.853	-
208a (Weighted)	1.60	0.58	0.935	0.48	0.766	61	97.754	5	8.013	Proposed uncontrolled toward the Drain
208b (MD)	4.21	0.65	2.737	0.55	2.316	61	256.810	5	21.050	-
208b (SF)	12.00	0.55	6.599	0.45	5.399	61	731.840	5	59.987	-
208b (Roads)	4.00	0.70	2.798	0.60	2.399	61	243.849	5	19.988	-
208b (OS)	3.95	0.20	0.790	0.05	0.198	61	240.950	5	19.750	-
208b (Weighted)	24.15	0.54	12.92	0.43	10.31	61	1473.45	5	120.77	Proposed site toward south SWMF toward Sandusky drain
209 (MD)	1.56	0.65	1.017	0.55	0.860	61	95.404	5	7.820	-
209 (SF)	0.25	0.55	0.138	0.45	0.113	61	15.250	5	1.250	-
209 (Roads)	0.31	0.70	0.217	0.60	0.186	61	18.910	5	1.550	-
209 (OS)	0.49	0.20	0.098	0.05	0.025	61	29.890	5	2.450	-
209 (Weighted)	2.61	0.56	1.47	0.45	1.18	61	159.45	5	13.07	Proposed site toward north SWMF toward Sandusky drain
210 (OS)	2.20	0.20	0.440	0.05	0.110	75	164.850	10	21.980	Undeveloped open space area
210 (Roads)	0.48	0.70	0.336	0.60	0.288	75	36.000	5	2.400	-
210 (Parks)	1.58	0.20	0.315	0.05	0.079	75	118.200	5	7.880	-
210 (Weighted)	4.25	0.26	1.09	0.11	0.48	75	319.05	8	32.26	Proposed parks on northeast toward the north
211	0.54	0.55	0.297	0.45	0.243	61	32.940	5	2.700	SF blocks on the southeast toward IDA Street
212	1.26	0.55	0.693	0.45	0.567	75	94.500	5	6.300	SF blocks on the northeast
Total	45.31	0.48	21.92	0.37	16.95	64	2916.74	5	237.55	-

Sub-Catchment	Area (ha)	C	AxC	CN	AxC	IA	AxIA	Description
EXT-1	19.09	0.20	3.818	75	1431.750	5	95.450	External on northwest with runoff toward Sandusky Drain
EXT-2	479.35	0.20	95.870	75	35951.250	5	2396.750	External on north with runoff toward Sandusky Drain Via Hunter Branch
EXT-3	186.58	0.20	37.316	75	13993.500	5	932.900	External on northeast with runoff toward Sandusky Drain through site
EXT-4	0.91	0.20	0.182	75	68.250	5	4.550	External on southeast corner of site through IDA toward Sandusky Drain
Total	685.93		137.19		51444.75		3429.65	

Airport Method

$$T_c = \frac{3.26(1.1-C)L^{0.5}}{S^{0.33}}$$

T_c = Time of Concentration (min)
 C = Runoff Coefficient
 L = Catchment Length (m)
 S = Catchment Slope (%)

730.70
 730.70