PUSLINCH

Comment Summary – September 5, 2024 Submission - Zoning By-law Amendment Application – WDD Main St. Inc.

3rd Submission

Consultant	Comments
NPG – Township Planning Consultant	See letter attached
GEI (formerly GM BluePlan) - Engineers	See letter attached
County of Wellington Planning	County Planning has no concerns with deeming the subject Zoning By-law amendment application complete and we concur with the comments provided by the Township Planning Consultant (NPG Planning Solutions) dated September 19th, 2024. Our office will provide more detailed comments on matters of interest to the County once the Zoning By-law amendment application is deemed complete and circulated, if comments are required, and through the Draft Plan of Subdivision application once it is deemed complete and circulated by the County. This development and the associated Draft Plan will need to demonstrate consistency with Provincial policies and Official Plan policies. Comments from Conservation Halton will also need to be considered and addressed.
Township Ecologist	See letter attached
Township Hydrogeologist	See letter attached
Township of Puslinch Fire Department – Brent Smith	More details are required for fire protection water supply/ location/size of tanks, connection types, etc.

Township of Puslinch Building Department – Andrew Hartholt	No comments
Township of Puslinch Public Works – Mike Fowler	No comments
Township of Puslinch By-law – Jacob Normore	By-law has no comments
GRCA Comments	No comments
Halton Conservation	CH has reviewed the ZBA and has the following comment: • CH staff still recommends that all of CH's regulated area (wetland hazard plus the 30m regulatory setback) be zoned appropriately and be conveyed to public ownership. The current zoning schedule provided appears to zone the wetland hazard and a minimum 15m limit to the wetland as NE. This is a recommendation and is deferred to the Township and/or the County if they are in acceptance of the approach shown in the ZBA schedule. With respect to the Subdivision Application, CH has the following key comment that will need to be addressed prior to Draft Plan approval: • As stated previously, CH regulates 30m from the limits of the staked wetland and no development is permitted within the 30m regulatory setback to the wetland. The Engineering Drawings currently show the septic system and building envelop within the 30m regulatory setback on Lot's 1, 2 and 3. • CH currently does not have policy that will allow development within the 30m setback to the staked limit

	of the wetland. Development includes septic system, building envelop, grading, deck, swimming pool etc. • Please ensure that all drawings show the staked limits of the wetland plus the 30m regulatory setback. • CH may have additional comments on the Functional Servicing & Preliminary Stormwater Management Report and other reports during the Subdivision Application (detail design).
MTO	See letter attached
Township Traffic Consultant	See letter attached
County of Wellington Transportation	No Objection with the zoning application and further comments will be provided during the draft plan of subdivision application is submitted.

September 19, 2024

Lynne Banks
7404 Wellington Road 34,
Puslinch, Ontario

Dear Lynne Banks,

RE: **NPG Comments**
Main St
RE: Application for Zoning By-law Amendment & Draft Plan of Subdivision

NPG Planning Solutions Inc. (NPG) has been retained to provide comments regarding a Zoning By-law Amendment Application and a Draft Plan of Subdivision Application proposing a residential subdivision consisting of 21 detached dwelling lots, environmental protection lands, a stormwater management pond and a municipal road. The Subject Lands are approximately 23.10 hectares in size and have frontage along Highway 6, Main St and Ochs St. The Subject Lands are currently vacant and are in proximity to residential uses to the north and west, and agricultural and natural lands to the east and south.

This is the third submission for this application.

Comments:

1. The Township should clarify as to whether they are accepting ownership of the natural environment block as per Section 3.3 of the PJR, and any additional requirements that are to be met prior to taking ownership of said block.

2. The cover letter submitted with the Applications suggests that the residential subdivision consists of 20 detached dwelling lots. This description is not consistent with the Draft Plan that has been submitted or supporting studies. Please confirm if the Draft Plan and supporting studies are correct and up to date. The supporting studies should include the most updated version of the draft plan of subdivision dated September 3, 2024.

3. Previous planning comments sought clarity as to whether there were any technical assessments submitted assessing all the dwelling types permitted in the Urban Residential (UR) Zone or the permissions for additional residential units. While it is noted that the Draft Zoning By-law has been revised, the submitted technical studies only assess

single-detached dwellings. There has been no information provided by the studies that supports the permission of additional residential units and/or home businesses on the Subject Lands. The technical studies should have regard to whether the additional residential units and/or home businesses are supportable from a technical perspective.

4. Previous planning comments noted that the Zoning By-law should address the exclusion of uses on the proposed stormwater management pond block. The revised Zoning By-law does not include any language addressing this matter.

5. Previous planning comments noted that conformity with the County Official Plan had not been met yet in regard to the Greenland System based on the comments of the Township/County consulting Ecologist. The Township/County consulting Ecologist will need to confirm that all their comments have been addressed and that the proposed development will not result in any negative impacts to the regulated natural heritage features on and the adjacent subject property.

6. The PJR provides that "the proposed detached dwelling lots will be serviced with individual private services as municipal services are not available in Morriston. The lots have been sized to accommodate private drilled wells and septic systems. The depth, size and locations of the wells will be determined during the detailed design of each individual lot." The Townships Engineering and Hydrogeological Consultant will need to confirm that site conditions are suitable for the long-term provision of individual onsite sewage services and individual on-site water services without negative impacts. Of note, the Provincial Planning Statement defines negative impacts as follows:

   > *potential risks to human health and safety and degradation to the quality and quantity of water, sensitive surface water features and sensitive ground water features, and their related hydrologic functions, due to single, multiple or successive development. Negative impacts should be assessed through environmental studies including hydrogeological or water quality impact assessments, in accordance with provincial standards.*

7. The Townships Traffic Consultant and the Ministry of Transportation will need to be satisfied that access to the Subject Lands is acceptable.

8. As a result of the PPS (2024) coming into effect on October 20,2024, the PJR and EIS should be revised to address the policies of the Provisional Planning Statement.

Sincerely,

[redacted]

Jesse Auspitz, MCIP, RPP
Principal Planner
NPG Planning Solutions Inc.
jauspitz@npgsolutions.ca

September 27, 2024
Project No. 2402578 / 122006-002

VIA EMAIL: lbanks@puslinch.ca

Lynne Banks
Township of Puslinch
4704 Wellington Road 34
Puslinch, ON N0B 2J0

Re: Zoning By-Law Amendment 3rd Submission
11 Main Street (Morriston)
Puslinch, ON

Dear Ms. Banks:

Following our review of third submission documents for Zoning By-Law Amendment and Draft Plan of Subdivision Application received on September 5, 2024, we are providing comments related to the proposed residential subdivision on the subject lands located at 11 Main Street in the Township of Puslinch. The Draft Plan of Subdivision submitted identifies twenty-one (21) residential lots. Twenty (20) of the lots front a proposed right-of-way, connected to an extension of Ochs Street, while one (1) lot fronts Main Street.

The second submission was received on January 10, 2024, per our review letter dated February 9, 2024.

The following third submission documents were received and reviewed:

- Third Submission Cover Letter, prepared by Weston Consulting, dated September 5, 2024.
- Comments Response Matrix, prepared by Weston Consulting, dated September 2024.
- Draft Plan of Subdivision, prepared by Weston Consulting, dated September 9, 2024.
- Functional Servicing and Preliminary Stormwater Management Report, prepared by Crozier Consulting, dated September 2024.
- Engineering Plans (Rev. 2), prepared by Crozier Consulting, dated August 29, 2024, including:
    - Fig. 1 - Preliminary Site Servicing Plan (East)
    - Fig. 2 - Preliminary Site Servicing Plan (West)
    - Fig. 3 - Site Grading Plan (East)
    - Fig. 4 - Site Grading Plan (West)
    - Fig. 5 - External Grading Plan (Ochs Street)
    - Fig. 6 - Pre-Development Drainage Plan
    - Fig. 7 - Post-Development Drainage Plan

We defer detailed review of the remaining documents to Township staff and other consultants.

Based on our previous submission comments and review of third submission documents identified above, we provide the following comment for Zoning By-Law Amendment and Draft Plan of Subdivision:

Deficiencies / Outstanding Matters

No.	Matter	Document	Date Identified	Comment
3.	Quality Control	Functional Servicing & Preliminary SWM Report	April 20, 2023	GEI Comment (April 20, 2023) The FSR needs to demonstrate how Enhanced quality control is met (i.e. 80% total suspended solid removal). It appears that a treatment train is not created as grassed swales are the only method of quality control for the runoff being infiltrated. An additional mechanism such as but not limited to an oil/grit separator would be required to have a treatment train. Crozier Response (January 2024) Enhanced quality control will be met through the implementation of an oil grit separator upstream of the proposed stormwater management facility. The stormwater management facility will provide additional settling to meet the enhanced quality control requirements. GEI Comment (February 9, 2024) The Functional Servicing & Preliminary SWM Report states that quality control will be provided by an oil grit separator in series with dry pond settling. However, the MOE SWMPD Manual states that dry ponds should not be used for combined quantity and quality control unless a forebay is included. Table 4.8 lists the forebay requirement for dry ponds. Conversely, Puslinch Municipal Development Standards support the use of oil-grit separators as part of a treatment train, not the only method of treatment. Please provide additional discussion on the treatment train proposed. Crozier Response (September 2024) Enhanced quality control will be met through the implementation of an oil grit separator upstream of the proposed stormwater management facility. The stormwater management facility will provide additional settling to meet the enhanced quality control requirements based on MOE criteria. Additional design sheets have been prepared to show the combination of the dry pond and oil-grit separator. Based on the New Jersey Stormwater Best Management Practices Manual Table 4.1 extended detentions (dry

No.	Matter	Document	Date Identified	Comment
				ponds) provide a TSS removal rate of 60%. Through a combination of the dry pond (60% TSS) and oil-grit separator (50% TSS) a total TSS removal of 80% will be met. Additionally, following treatment from the OGS and Dry Pond treated stormwater will outlet through a level spreader and then travel at least 30 meters overland through the existing woodlot prior to discharging to the watercourse. This flow path will provide additional TSS removal. Details will be provided through detailed design of the subdivision. <u>GEI Comment (September 2024)</u> Please revise the stormwater quality control section using **local design criteria** (Ontario MECP criteria rather than New Jersey). MOE SWMPD Manual Table 3.2 provides the storage volumes required for dry ponds to provide 60% TSS removal, and while this calculation is used in the Extended Detention calculation in Appendix D, Appendix F should also be updated accordingly. Please provide calculations based on an MECP approved methodology to support that 80% TSS removal is provided by a combination of the dry pond and OGS. The Erosion Control Volume Calculations in Appendix D should be based on a drainage area of 3.50 ha plus the areas of EX2 and EX3, which also contribute. During the detailed design stage, information should be provided to support the TSS removal capabilities of the Stormceptor EFO8 system based on specific site conditions.
4.	Infiltration Water Quality	Functional Servicing & Preliminary SWM Report	April 20, 2023	<u>GEI Comment (April 20, 2023)</u> The proponent should be cognizant of any potential impacts of infiltrating road runoff which contains chlorides and other pollutants. There could be a potential for contaminant spills or oils to be infiltrated in the ground via the proposed infiltration trenches (no oil/grit separator is proposed in the FSR). We recommend infiltration of 'clean' runoff only (i.e. infiltration of building rooftop runoff and/or grassed areas only). In addition, the proposed drinking water wells are located at the front of the lot in close proximity to the infiltration trenches which introduces further concerns regarding infiltration of possible roadway contaminants. We defer to the Township Hydrogeologist and Wellington Source Water Protection for comments on the infiltration water quality and the effect on drinking water wells.

No.	Matter	Document	Date Identified	Comment
				Crozier Response (January 2024) Based on the Hydrogeological Report the soils on-site are not conducive to infiltration (10 mm/hr infiltration rates); therefore, lot level infiltration has not been proposed. All infiltration trenches have been removed and replace with storm sewer and an end of pipe stormwater management facility. GEI Comment (February 9, 2024) The response to this comment states that infiltration is not proposed while the Hydrogeological Report recommends lot level soakaway pits for roof runoff. Please coordinate and revise reports accordingly. Crozier Response (September 2024) The in-situ hydraulic conductivity of the soils on-site ranged from 1.18 x 10-6 to 1.21 x 10-6 m/s which correlates to an infiltration rate of approximately 10 mm/hr. Therefore, the soils onsite are not conducive to infiltration, and it is recommended that end of pipe LID practices are not implemented onsite to meet the water balance objectives. Additional topsoil over the lots could also be implemented to increase void storage within the lots without having directing stormwater to a specific infiltration system. Lot level soak away pits are not being proposed for this subdivision. However, the design has been revised to include an infiltration facility downstream of the dry SWM facility to address the water balance. Details will be provided at detailed design but the footprint shown on the attached Figures is based on sufficient retention to balance the water budget for the site. GEI Comment (September 2024) Infiltration facilities require 1.2 m frost cover depth and 1 m separation with groundwater per MOE SWMPD Manual criteria. The proposed facility is 1 m in depth while the maximum depth is 0.6 m per MOE SWMPD Manual criteria. Please show relevant **elevations** on the Servicing Plan including top of infiltration facility, bottom of infiltration facility, frost cover depth, groundwater separation, inlet elevation and outlet elevation. Clearly show how flow is to be transferred from the pond outlet to the infiltration facility.

No.	Matter	Document	Date Identified	Comment
10.	Quantity Control of Stormwater	Functional Servicing & Preliminary SWM Report	April 20, 2023	GEI Comment (April 20, 2023) The post-development 2-year storm event does not appear to match pre-development flow rates. Please revise. Crozier Response (January 2024) The stormwater management modelling has been revised to incorporate the quantity controls within the proposed stormwater management facility. Based on the modelling the post-development flows have been reduced to the pre-development flows for all storm events. Details of the outlet control structure will be included during the detailed design stage. GEI Comment (February 9, 2024) The design of the outlet control structure will impact volume of storage required. Please provide preliminary design of the structure or provide discussion on the volume of storage provided versus storage required. Crozier Response (September 2024) Detailed outlet control structure sizing has been completed and is included in Appendix D. GEI Comment (September 2024) Please indicate the size, location and elevation of the proposed orifice on the Servicing Plan. Based on Appendix D calculations, the proposed orifice size is to be 50 mm. Per Table 4.8 in the MOE SWMPD Manual, the minimum orifice size for a dry pond is 75 mm with a preferred diameter of 100 mm, as small orifices can be clogged easily. Please revise calculations to adhere to **MECP criteria** or describe how a 50 mm diameter orifice would be protected. At detailed design, please provide a detail for the outlet control structure.
15.	External Area Topography	Engineering Plans	February 9, 2024	GEI Comment (February 9, 2024) The FSR states that, based on existing LiDAR contour mapping, runoff from external catchment EX1 ponds along existing berms and then drains southwest towards Bronte Creek. Please show these existing contours and berms on the Engineering Plans to confirm that this flow route will be maintained. Additional topographic survey may be required on the adjacent lands.

No.	Matter	Document	Date Identified	Comment
				Crozier Response (September 2024) The existing contour mapping (LiDAR) has been added to the engineering drawing set to show the external runoff drainage conditions. GEI Comment (September 2024) The LiDAR mapping does not appear to show the berms. Please provide **topographic data** for the existing ball diamond area (EX1) to show the low-lying depression area where ponding reportedly currently occurs per the report, and the existing berms. Please demonstrate the conditions under which it can be expected that the existing storage limits will be exceeded, and stormwater will flow onto the subject lands. Please clearly show how these flows will be routed around the development, specifically lots 1 and 2, to the Bronte Creek outlet. Please demonstrate that flows from EX1 will not enter the proposed stormwater facility. As previously discussed, site visit photos may be helpful to show the extents of existing surface ponding in the park area under typical conditions.
16.	Drainage Easement	Engineering Plans	February 9, 2024	GEI Comment (February 9, 2024) Please confirm ownership of the small rectangular parcel in the south corner of catchment EX1. Please note that a drainage easement will be required between Lots 1 and 2 for the overland flow route from EX1 to the Bronte Creek tributary. Crozier Response (September 2024) Acknowledged. GEI Comment (September 2024) Please indicate any required **drainage easements** on the engineering plans.
17.	Ponding at Catchbasin	Engineering Plans	February 9, 2024	GEI Comment (February 9, 2024) The Site Grading Plan shows that proposed catchbasin CB 36 has a T/G elevation of 316.89, which is 1.5m lower than the adjacent curb elevation proposed. Considering the proximity of CB 36 to the property line, there is concern that stormwater will pond onto the neighbouring property at catchment EX2. Please show that the storm sewer leaving CB 36 will have the capacity to convey the flow generated by EX2 with ponding contained to the subject property up to and including the 100yr storm event. Additional topographic survey may be required on the adjacent lands.

No.	Matter	Document	Date Identified	Comment
				Crozier Response (September 2024) CB 27 (formerly CB 36) and the receiving storm sewer system have been designed to convey the 100-year storm event. The sizing was complete utilizing Visual Otthymo and Flowmaster. Further details will be provided at detailed design. GEI Comment (September 2024) Per Puslinch development standards, storm sewers are to be designed using the rational method and a **storm sewer design sheet** is to be provided to demonstrate that the 100-year storm can be conveyed. The first reach of the storm sewer in the cul-de-sac bulb should have a slope of at least 1%, currently it is shown as 0.5%. All other storm sewer should have a slope of at least 0.5%. As discussed with Crozier staff, additional topographic data may be required to show the 100-year storm event ponding limits at detailed design.
21.	Conservation Regulation Limit	Engineering Plans	February 9, 2024	GEI Comment (February 9, 2024) Please show the approximate regulation limit of Conservation Halton on the Engineering Plans. Crozier Response (September 2024) Conservation Halton regulation limits are available on their online portal. The Engineering Plans indicate the linework associated with the natural hazards only. Considering their regulation limits can change, we suggest leaving this information off of the engineered plans. GEI Comment (September 2024) Engineering Plans should show all relevant property and regulatory limits. Please show the latest **Conservation Halton regulation limit** on the plans.
26.	Proposed Streets	Draft Plan	September 2024	GEI Comment (September 2024) The Draft Plan in previous submissions showed two proposed streets while the latest submission shows only one proposed street. Why has Street B been removed? How will emergency access be provided to the subdivision if Street A is blocked? The Township Public Works department should be consulted regarding the feasibility of a cul-de-sac of this length. The Catchment 201 and 202 paragraphs of Section 6.2 of the FSSWM report still refer to Street B and may need to be updated.

No.	Matter	Document	Date Identified	Comment
27.	Inconsistency	Functional Servicing & Preliminary SWM Report	September 2024	<u>GEI Comment (September 2024)</u> The following inconsistencies should be corrected in future submissions: 1. Third paragraph of page 1 refers to first and second submissions but should refer to second and third submissions respectively in this case. 2. The volume in Table 1 should be 2160 m^3 per the appendix and not 5400 m^3. 3. Per the appendix, the additional flow area – floor area in Table 2 should be 1800 L/day, for a total flow per unit of 3800 L/day. The flow per day should also be updated in the following paragraph. 4. Table 3 should be updated per the appendix. Using a flow per day of 3800 L/day, a minimum stone area of 76 m^2 is calculated in the appendix, rather than 72 m^2. As 72 m^2 is the reported provided amount, this will need to be increased slightly. Likewise, the minimum sand area calculated in the appendix is 190 m^2. The provided sand area is shown as 368 m^2 on drawings but reported as 352 m^2 in the appendix. 5. There are inconsistencies between the catchment names used in Tables 6 and 7, the model and drainage plans, i.e. catchments 101A and 101B modelled as catchments 101 and 103, EX3 and EX4 not included on the pre-development plan, labelling for EX catchments are different in the model. Can these names be made more consistent? 6. Notes 1 and 2 below Table 8 should state that runoff from EX3 is also included. 7. In Table 9 the total contributing area to the dry pond should also include the areas of EX2 and EX3. The labelling of this table needs to be clearer – the required volume of 384 m^3 calculated is based on a quality requirement of 110 m^3/ha and not an extended detention requirement of 40 m^3/ha. Likewise, it should be clearer what the provided volume of 462 m^3 represents. 8. In Table 11 it states that the required storage is 93 m^3, whereas the appendix seems to differ. 9. Please confirm that the infiltration target in bullet 5 of the Stormwater Management section on page 15 matches the appendix. 10. The top of grade elevations for HW1 and HW2 on the Servicing Plan do not match the grading plan. 11. Some of the labels for the areas of the Type A dispersion beds on the drawings do not match the

No.	Matter	Document	Date Identified	Comment
				calculations and information provided in the report appendix.
28.	Flow Directions	Functional Servicing & Preliminary SWM Report	September 2024	GEI Comment (September 2024) The Catchment EX4 paragraph of Section 6.2 describes post-development flows from this catchment being conveyed via proposed storm sewer infrastructure and internal roadway within the Ochs Street extension to existing storm sewer on Badenoch Street. There does not appear to be proposed storm sewer on Ochs Street within EX4, and flows are directed towards Badenoch Street via the roadway. The second last paragraph of page 7 states that 100-year flows from catchment 201 are conveyed to the SWM facility. Catchments EX2 and EX3 are also conveyed to the SWM facility. The EX4 row of Table 5 states the outlet for these flows is the Bronte Creek Tributary. Is this true for flows conveyed to Badenoch Street? Bullet 2 of the Stormwater Management section on page 15 should reference that EX3 is also conveyed to the SWM facility.
29.	Model Outputs	Functional Servicing & Preliminary SWM Report	September 2024	GEI Comment (September 2024) For future submissions can model outputs for all storms including the 25 mm storm be provided? The pre-development peak flows for the 50- and 100-year storms and uncontrolled post-development peak flows for the 10-to-100-year storms appear to be less than for the regional events. It would be useful to review the model outputs to see why this is the case. The regional storm controlled post-development peak flow is greater than the pre-development peak flow. Can this be addressed briefly in terms of impacts to the downstream receiver, and how stormwater control measures being taken will help mitigate the impacts.
30.	Percolation Time	Functional Servicing & Preliminary SWM Report	September 2024	GEI Comment (September 2024) A percolation time of 20min./cm., is used in the septic system sizing calculations in Appendix B, whereas the report states that a value of 30min./cm. was to be used. At detailed design, please use a value justified in the report.

No.	Matter	Document	Date Identified	Comment
31.	Construction North	Drawing Set	September 2024	GEI Comment (September 2024) At detailed design, it may be helpful to label construction north on the drawing set as the report refers to directions on the subject lands that aren't necessarily accurate.

Additional Commentary

No.	Comment
1.	GEI Comment (February 9, 2024) Please provide a copy of the review comments as received by Conservation Halton.
2.	GEI Comment (September 2024) As there is no quality control for Catchment 202, the Township and future homeowners should be made aware that it will not be acceptable for driveways, parking areas etc. to be extended into the rear parts of the proposed lots in the future.

Completed / Approved Matters

No.	Matter	Document	Date Identified	Comment
1.	Right-of-way Profiles	Grading Plans	April 20, 2023	GEI Comment (April 20, 2023) The proposed development proposes an 18m wide rural cross section complete with roadside ditches and reduced pavement widths. A 20m wide urban cross-section complete with curb and gutter, storm sewer system and sidewalk is required per Township of Puslinch Municipal Development Standards and Township of Puslinch Standard Drawing 102 (STD-102). Please revise for the next submission. Crozier Response (January 2024) All drawings have been updated with a 20 m urban right-of-way per Standard Drawing 102 (STD-102). Storm sewer has been incorporated to direct stormwater runoff to the proposed stormwater management facility. GEI Comment (February 9, 2024) Accepted, no further comment.
2.	Cul-de-sac Radius	Grading Plans	April 20, 2023	GEI Comment (April 20, 2023) As per Township of Puslinch Municipal Development Standards, the cul-de-sac bulb right-of-way radius shall be revised from 18m to 20m. Crozier Response (January 2024) The cul-de-sac radius has been revised from 18m to 20m. GEI Comment (February 9, 2024) Accepted, no further comment.
5.	Infiltration Trenches / Galleries	Servicing Plans / FSR	April 20, 2023	GEI Comment (April 20, 2023) The FSR proposes surface ponding up to 0.3m in the roadside ditches and subsurface storage/infiltration in a series of longitudinal infiltration galleries located below the proposed roadside ditches. While this concept could work in principle for a flat area, we express concerns in the ability to capture and store the runoff when some of the roads are graded at close to an 8% slope. The stormwater management calculations assume that 0.3m ponding is available throughout the roadside ditches and that the sub-surface galleries can fill up with water. Even with the construction of check dams, terracing or elevated culverts as mentioned in the FSR, due to the steepness of the roads, the volume potential outlined in the stormwater management calculations would be extremely challenging to achieve.

No.	Matter	Document	Date Identified	Comment
				Furthermore, it is unclear how the 0.3m ponding in the ditch is proposed to work with driveway culverts. The Town is not in support of a roadside ditch system in urban centers and hamlets, let alone a roadside ditch system that has the potential to pond water for prolonged periods of time. Additional concerns with the location of infiltration galleries and utility infrastructure – this will introduce a maintenance concern for the Township. <u>Crozier Response (January 2024)</u> Acknowledged. All infiltration trenches have been removed and replace with storm sewer and an end of pipe stormwater management facility. <u>GEI Comment (February 9, 2024)</u> Accepted, no further comment.
6.	Post-Development Drainage Plan	FSR	April 20, 2023	<u>GEI Comment (April 20, 2023)</u> Please label the imperviousness of the external areas on the Post-Development plan for consistency. <u>Crozier Response (January 2024)</u> The Post-development Drainage Plan has been revised to include the imperviousness of the external drainage catchments. <u>GEI Comment (February 9, 2024)</u> Accepted, no further comment.
7.	Roadway Grade	Grading Plan	April 20, 2023	<u>GEI Comment (April 20, 2023)</u> Please note that the maximum allowable roadway grade is 6% in the Township of Puslinch. <u>Crozier Response (January 2024)</u> Maximum allowable roadway grades have been maintained everywhere possible. There are a few minor locations where the maximum grade exceeds 6%. <u>GEI Comment (February 9, 2024)</u> The proposed “Street B” contains a grade of 7.6%. Please revise. Ochs Street contains grades of 8%. Please revise or provide cross-sections to justify deviation from the Township standard (see comment #19). <u>Crozier Response (September 2024)</u> The grading of the internal roadway has been revised. <u>GEI Comment (September 2024)</u>

No.	Matter	Document	Date Identified	Comment
				Accepted, no further comment.
8.	Ochs Street Labels	Plans	April 20, 2023	GEI Comment (April 20, 2023) Please label Ochs Street on all plans. Crozier Response (January 2024) Ochs Street has been labelled on all plans. GEI Comment (February 9, 2024) Accepted, no further comment.
9.	Infiltration Gallery Detail	Grading Plan	April 20, 2023	GEI Comment (April 20, 2023) The function of the 150mm diameter perforated pipe and surface ponding capability of the system is questionable. It appears that the 150mm diameter perforated pipe would convey the drainage prior to the ability of the system to pond on the surface or use the last 150mm of storage in the gallery. Inconsistencies between the FSR and infiltration gallery detail with respect to gallery and overflow pipe dimensions. (i.e. FSR states 1.0m deep gallery with 100mm diameter overflow pipe, detail shows 0.9m deep gallery with 150mm diameter overflow pipe). The notes regarding placing sod on top of geotextile wrapped media need further clarification as the topsoil is not proposed to be wrapped in geotextile. Crozier Response (January 2024) Acknowledged. All infiltration trenches have been removed and replace with storm sewer and an end of pipe stormwater management facility. GEI Comment (February 9, 2024) Accepted, no further comment.
12.	Stormwater Model – Visual OTTHYMO	FSR – VO Schematics	April 20, 2023	GEI Comment (April 20, 2023) Please replace the wording of the “Post-Development” schematic title to reflect a post-development uncontrolled scenario. Please replace the wording of the “Post-Development w/ Mitigation” to be “Post Development Controlled”. This will make it consistent with Table 8 in the report and will make ultimate conditions clear. Crozier Response (January 2024) The Visual OTTHYMO and schematics has been updated to reflected Table 8. GEI Comment (February 9, 2024) Accepted, no further comment.
11.	External Areas	Functional Servicing &	April 20, 2023	GEI Comment (April 20, 2023)

No.	Matter	Document	Date Identified	Comment
		Preliminary SWM Report		Please confirm if the external catchments are to be conveyed through the site in the proposed development. In the Visual OTTHYMO (VO) model, the external catchments are added in at the end of the model while the report text it states that the catchments will drain through the site to Bronte Creek. If these areas are conveyed through the site, the stormwater management calculations (quality and quantity control) need to demonstrate that the proposed stormwater management system can handle the conveyance of the two external areas without surcharging the system. <u>Crozier Response (January 2024)</u> The VO model and Functional Servicing and Stormwater Management Report have been updated to discuss the external catchment flows in greater detail. All storm events from Catchment EX1 are directed to a low-lying depression area located in the eastern corner of the Old Morriston Baseball Diamond. An earth berm along the south and east property limits of the baseball diamond allows stormwater to pond within the park limits. If the storage limits are reached, stormwater will drain southwest between the Lot 1 and Lot 2 towards the Bronte Creek tributary via sheet flow, consistent with predevelopment conditions. Note, a figure has been prepared and included in Appendix D of the revised report outlining this scenario. All storm events from Catchment EX2 are to be conveyed through the site by the proposed storm sewer infrastructure and internal roadway towards the proposed stormwater management facility, ultimately outletting to the Bronte Creek tributary. The stormwater modelling has been updated to reflect this scenario. Storm sewer design sheets will be completed at the detailed design stage to ensure the proposed storm sewer network can accept the additional external flows. <u>GEI Comment (February 9, 2024)</u> Based on the grades shown in the Site Grading Plan at the property line along external catchment EX1, stormwater ponding at the corner of this external catchment will flow onto the site and enter the proposed storm sewer network. Additionally, Ochs Street in external catchment EX2 appears to be draining towards the existing Badenoch Street right-of-way rather than the proposed site. Please review and account for in stormwater management calculations.

No.	Matter	Document	Date Identified	Comment
				For clarity, add overland flow arrows to both external catchments in the drainage area plans (Figures 6 and 7). Crozier Response (September 2024) Acknowledged. The external catchment areas have been refined and are illustrated on Figures 6 and 7. SWM calculations have been updated accordingly. Overland flow arrows are also provided to demonstrate overland flow direction. GEI Comment (September 2024) No further comment.
13.	Fire Storage Tank	Servicing Plans	April 20, 2023	GEI Comment (April 20, 2023) Please give representation to the location of the fire storage tank on the Servicing Plans. Crozier Response (January 2024) The location of the fire storage tank has been represented on the Site Servicing Plans (Figure 1). GEI Comment (February 9, 2024) Accepted, no further comment.
14.	FSR Text	FSR	April 20, 2023	GEI Comment (April 20, 2023) Please review the text presented in Section 7.3 paragraph four describing imperviousness. Crozier Response (January 2024) Section 7.3 has been reviewed and revised to account for the removal of the infiltration trenches and the implementation of the end of pipe stormwater management facility. GEI Comment (February 9, 2024) Accepted, no further comment.
18.	Proposed Sidewalk	Engineering Plans	February 9, 2024	GEI Comment (February 9, 2024) The Badenoch Street right-of-way includes an existing sidewalk that should be continued into the proposed development. Sidewalk is required on one side of local residential streets per Township of Puslinch Municipal Development standards. Please indicate proposed sidewalk on the Engineering Plans, including Ochs Street. Crozier Response (September 2024) Acknowledged. The proposed sidewalk is indicated on the draft plan and engineering plans. GEI Comment (September 2024) No further comment.

No.	Matter	Document	Date Identified	Comment
19.	Ochs Street Cross-Section	Engineering Plans	February 9, 2024	GEI Comment (February 9, 2024) Please provide cross-sections for the proposed Ochs Street right-of-way, including proposed retaining walls and swales due to their close proximity to existing buildings. Crozier Response (September 2024) Cross-sections of the proposed Ochs Street right-of-way have been prepared and can be referenced on Figure 5. GEI Comment (September 2024) No further comment.
20.	Well Setback	Engineering Plans	February 9, 2024	GEI Comment (February 9, 2024) The well location shown in Lot 21 does not appear to meet the 15m minimum setback from the septic bed in Lot 17. Additionally, OBC 8.2.1.6.A specifies a 5m setback from structures and 3m setback from property lines. Please revise. Crozier Response (September 2024) Acknowledged. The well has been relocated. GEI Comment (September 2024) No further comment.
22.	Storm Parameters	Functional Servicing & Preliminary SWM Report	February 9, 2024	GEI Comment (February 9, 2024) The IDF curve parameters are outdated. Please revise stormwater quantity control calculations using the latest City of Guelph Development Engineering Manual. Crozier Response (September 2024) Acknowledged. The updated Guelph IDF parameters have been used. GEI Comment (September 2024) No further comment.
23.	Qualified Professional	Engineering Plans	February 9, 2024	GEI Comment (February 9, 2024) All reports and drawings are to be signed and sealed by a qualified professional for future submissions. Crozier Response (September 2024) Acknowledged. GEI Comment (September 2024) No further comment.
25.	Internal Road Geometry Figure	Traffic Impact Study	February 9, 2024	GEI Comment (February 9, 2024) Section 10 of the TIS needs to be revised using the Township of Puslinch 20m wide urban road cross-section.

No.	Matter	Document	Date Identified	Comment
				Additionally, the TIS states that the proposed right-of-way is 18m wide. Please revise to 20m to be consistent with the engineering reports and drawings. Crozier Response (September 2024) Report has been updated to reflect the proposed 20 metre right-of way for Street A. GEI Comment (September 2024) No further comment.

If you have any questions or require additional information, please do not hesitate to contact us.

Sincerely,

GEI Consultants Canada Ltd.

[redacted]

Parth Lad, E.I.T.
Technical Specialist

[redacted]

Andrea Reed, P.Eng.
Project Engineer

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

September 19, 2024 2765

Township of Puslinch
7404 Wellington County Rd 34
Puslinch, ON
N0B 2J0

Attention: Ms. Justine Brotherston
Deputy Clerk

RE: 11 Main Street, Morriston, Township of Puslinch
3rd Submission - Environmental Impact Study and Tree Preservation Plan - Peer Review

Natural Resource Solutions Inc. (NRSI) was retained by the Township of Puslinch to undertake a peer review of an Environmental Impact Study (EIS) and Tree Preservation Plan (TPP) prepared by Colville Consulting Inc. (Colville), as well as additional application materials, for the proposed residential development ("proposed development") at 11 Main Street, Town of Morriston. These materials have been prepared as part of a third submission for a Zoning By-Law Amendment (ZBA) and Draft Plan of Subdivision application (the "Application") prepared by Weston Consulting ("the proponent"). Our comments are set out below.

Background

The property intended for development is located at 11 Main Street Pt. Lt. 31, Con. 8 and Lots 7 & 8 Plan 135, Morriston, Township of Puslinch ("subject property"). The current development concept consists of 21 single detached residential lots 0.2 hectares (ha) in size. The subject property is situated southeast of Badenoch Street and northeast of Highway 6/Queen Street. NRSI was previously retained to review pre-consultation documents submitted in December 2021 and provided review comments on January 17, 2022. An EIS and TPP were prepared and submitted in February 2023, in addition to other application materials. These reports were submitted as part of the 2023 ZBA Application and outlined natural heritage features existing on and adjacent to the subject property, as well as potential direct and indirect impacts the proposed ZBA and associated development may have on these features. NRSI staff subsequently reviewed this submission and provided peer review comments on the EIS and TPP (April 2023), as well as completed a site visit (May 18, 2023) with Ian Barrett and Brett Espensen of Colville. A second submission was provided to the Township in January 2024 and peer review comments on this submission were subsequently prepared by NRSI staff (February 2024). It is understood that this third submission and supporting materials have been prepared to address peer review and agency comments made in 2023 and 2024, as well as modifications in the Draft Plan of Subdivision for the proposed development. This letter exclusively addresses remaining natural heritage questions or concerns relevant to the second and third ZBA submissions, as well as comments on the revised TPP.

Tasks Completed

In order to complete this assignment, NRSI staff have reviewed the following materials:

- Environmental Impact Study: 11 Main Street, Morriston, Township of Puslinch. Prepared by Colville Consulting Inc. for WDD International. August 2024.

- Updated Tree Preservation Plan for 11 Main Street, Village of Morriston. Prepared by Colville Consulting Inc. for WDD International. August 23rd, 2024.

In addition to the EIS and TPP, NRSI staff also conducted a high-level review of the additional reports and plans provided as part of the third submission in order to further understand potential impacts to existing natural heritage features on and adjacent to the subject property. The review comments provided below are primarily focused on the EIS and TPP.

The review comments are based on a desktop review of the above-described materials, aerial imagery, and available natural heritage information for the subject property and surrounding lands, in addition to the site visit completed by Jack Richard and Colville staff in May 2023.

Relevant Policy Framework

Our review considered the adequacy of the Application and the potential impacts of the proposed development on natural heritage features identified within the County of Wellington Natural Heritage System, or "Greenlands System", and the *Provincial Policy Statement* ("PPS"). Both Greenlands and Core Greenlands, as identified by the County of Wellington Official Plan (OP) (2024), exist within the subject property. Additionally, our review evaluated the level to which the Application adheres to the requirements of the *Endangered Species Act* (ESA) (2007), and the *Township of Puslinch Comprehensive Zoning By-Law* (2021). This analysis was undertaken to identify whether the EIS and TPP sufficiently addressed relevant natural heritage policies, evaluated the potential direct and indirect impacts the proposed development may have on the existing natural features, as well as considered the proposed avoidance and mitigation of these impacts.

Comments on Reviewed Materials

Environmental Impact Study

NRSI staff previously commented that all background information considered as part of the background review be detailed within the EIS and that additional natural heritage information resources such as the Ontario Reptile and Amphibian Atlas (Ontario Nature 2019), Ontario Butterfly Atlas (MacNaughton et al. 2024), Ontario Mammal Atlas (Dobbyn 1994), and Ontario Odonate Atlas (OOAD 2023) be consulted as part of the background review. The revised EIS has addressed this recommendation and included the requested information.

It is understood that the development will include the extension/improvement of Ochs Street, north of the subject property. The 2024 EIS, as well as the TPP, appears to have considered impacts that may occur as a result of the Ochs Street extension works, in addition to impacts associated with the proposed development within the subject property. It is noted that ecological impacts appear to be limited to the removal of trees, which has been characterized appropriately within the TPP.

Field Surveys

Previous peer review comments provided by NRSI staff requested rationalization as to why all wetland communities within the subject property were not assessed for suitable amphibian breeding habitat during the field survey program. Within the 2024 EIS, the author identifies that a preliminary evaluation of all wetlands on the subject property was completed in advance of the first monitoring period for calling amphibians, and only the MAM2-2 and SWT2-5 communities were determined to contain potential amphibian breeding habitat. The 2024 EIS also provides a comparison of the results of Beacon Environmental's amphibian call surveys to those completed by Colville staff in 2023. It is noted that, while additional amphibian calling was recorded by

Beacon staff during their field program, the results are generally comparable to those of Colville's 2023 field program. NRSI staff are supportive of the conclusions provided in the 2024 EIS on this matter.

Habitat for Endangered or Threatened Species

The revised EIS has provided additional discussion with respect to SAR bats and their habitat within and adjacent to the subject property, in response to the previous peer review comments on this matter. Specifically, the number of acoustic recordings collected that were unable to be categorized as "Low" vs "High" frequencies have been identified and manual vetting of the recordings has occurred. Additional consideration with respect to the timing of Little Brown Myotis (*Myotis lucifugus*) detections has also been provided in addition to an assessment of the potential for bat habitat to occur within isolated trees throughout the property.

Advisory Comment

It should be noted that Eastern Red Bat (*Lasiurus borealis*), Hoary Bat *(Lasiurus cinereus*), and Silver-haired Bat (*Lasionycteris noctivagans*) (all reported as present within the EIS) have been newly assessed as Endangered by the Committee on the Status of Species at Risk in Ontario (COSSARO) and will be protected by the ESA as of January 31, 2025. As a result, it is recommended that ongoing and future considerations regarding SAR bats and their habitat should extend to these species.

Significant Wildlife Habitat

Within previous comments provided by NRSI staff it was recommended that an approach to compensation for the removal of portions of the Fresh-Moist Deciduous Woodland (WODM5) community be provided in order to offset the partial removal of this feature, portions of which have been identified as Significant Wildlife Habitat (SWH). The revised EIS has prescribed that the buffers identified between the proposed lot boundaries and adjacent woodlands, and wetlands, should be restored to enhance the ecological function of those buffers. This is proposed to be achieved through the planting of native trees and shrubs, and additional habitat enhancement works. It is noted that the EIS recommends that a detailed enhancement plan will be prepared as a condition of future approvals. NRSI staff are supportive of this approach and recommend that a detailed habitat enhancement plan be prepared as a future condition of approval, and include relevant restoration details such as the species, location, size, and quantity of plantings. It is recommended that this plan also include details of a monitoring program and survivorship thresholds to be achieved through the restoration works.

Recommendations

- Consistent with the recommendation provided in the EIS, a detailed restoration/habitat enhancement plan should be prepared as a condition of approval. This plan should include specific details of the proposed restoration/habitat enhancement works to be completed within the woodland and wetland buffer areas, as well as a monitoring program to evaluate the success of the proposed restoration effort.

Significant Woodlands

As discussed within previous peer review comments, the EIS identifies that the proposed stormwater management pond will discharge into the adjacent woodland area, which includes both Significant Woodland and SWH. The EIS author identifies that the function of the woodland will not be negatively impacted and that individual tree mortality may be offset by the planting of salt-tolerant tree species native to the subject property. Previous peer review comments provided by NRSI staff expressed the need for greater detail regarding the quantity

and quality of water being directed into the woodland areas. The revised EIS contains an additional assessment of impacts, including mitigation and offsetting measures (i.e., replacement planting) in response to potential future impacts within the woodland. In addition, the EIS recommends that a future monitoring program be prepared and completed to evaluate downstream impacts from the stormwater outfall, including potential impacts on tree health and the stability of soils within the outfall area. Where impacts are noted, it is recommended that replacement tree species known to be tolerant to salt, while still being consistent with the existing ecological community, are installed. NRSI staff are generally supportive of this proposed approach and agree that the proponent's ecologist and stormwater engineers should collaborate throughout the detailed design process and throughout the 2-year proposed monitoring period to determine mitigative options and identify necessary adaptive management activities.

As prescribed within the EIS, a specific monitoring plan should be prepared that outlines the frequency of monitoring, provides a description of the assessments that will be completed, and mortality thresholds that will trigger the requirement to plant replacement trees within this area. It is anticipated that this plan could be provided as a future condition of approval and that a more detailed analysis of potential stormwater management outfall impacts on the woodland can be provided at the detailed design stage.

The EIS has also provided additional recommendations towards the mitigation of impacts to the Significant Woodland area, in response to the peer review comments provided in February 2024. This includes recommendations regarding the installation of rear-yard fencing and other mitigation measures known to be appropriate to reduce impacts where woodlands occur in proximity to residential development. It is our opinion that the proposed mitigation measures are suitable.

Recommendations

- As prescribed in the EIS, a detailed monitoring plan should be prepared to evaluate potential downstream impacts of the stormwater management outfall within the woodland for a minimum of a 2-year period. Details should include the frequency of monitoring, assessments that will be completed, and mortality thresholds that will trigger the requirement to plant replacement trees within this area.

Wetlands (Core Greenlands)

As previously stated in the 2023 peer review comments, a considerable portion of the proposed development limit overlaps with the regulated wetland areas in the southwestern portion of the property. Specifically, Lots 1-4 and 6-8 appear to be partially overlapped by the 30m regulation limit associated with the wetland areas identified in Figure 4. It is noted that the wetland limits were refined through a site visit with Conservation Halton staff and the 30m regulation limit has been identified, in response to the February 2024 peer review comments.

The EIS references Ontario Regulation 41/24 and the HRCA Policy Document (HRCA 2024). The HRCA Policy Document states that "except as provided for in Policies 2.32.1 and 2.32.2, no new development is permitted within 30 metres of a Provincially Significant Wetland or a wetland greater than or equal to 2 ha in size". The size of the wetland overlapping a portion of the subject property has not been identified within the EIS. The extent of the wetland has also not been identified outside of the subject property. However, based on the extent of the wetland identified in Figure 4 and the extent of the vegetation community the EIS identifies as corresponding with the wetland limits, it is anticipated that this wetland area is greater than 2 ha in size. The author does not address whether or not the proposed development conforms to

this policy requirement. It is anticipated that consultation with Conservation Halton will be required in order to confirm whether or not the proposed development conforms with the Conservation Authority's policy requirements. Specifically, confirmation should be sought from the conservation authority as to whether a reduced setback will be accepted. Confirmation of the suitability of the reduced setback from the conservation authority is also a requirement of the *Township of Puslinch Zoning By-law* (2021).

The EIS states that changes in the wetland hydrology as a result of the proposed development are not anticipated to impact this feature. In response to previous peer review comments, a preliminary water balance assessment has been completed to support the conclusion that the water quality and quantity directed to the adjacent wetland will not amount to a negative impact in the post-development scenario. While it is understood that the assessment provided as part of this EIS is considered preliminary, it is anticipated that a further assessment of water balance may be completed in conjunction with a stormwater management report at the detailed design stage. NRSI staff generally agree with the preliminary conclusions provided in the EIS and can provide further review upon receipt of the detailed water balance assessment.

As recommended in the February 2024 peer review comments, additional mitigation measures have been prescribed within the revised EIS to support the reduction of potential impacts to the adjacent wetland features. It is understood that the prescribed buffers will undergo planting and additional enhancement management activities and that the details of these works will be provided in a detailed restoration/habitat enhancement plan to be prepared as a condition of approval. As stated above, this plan should include specific details of the proposed restoration/habitat enhancement works, as well as a monitoring program to evaluate the success of the proposed restoration effort.

Recommendations

- Consult with Conservation Halton to confirm the suitability of proposed development in relation to Conservation Halton regulated areas. Confirmation should be provided as to whether the proposed development limits in relation to the identified regulated wetland areas conform to the Conservation Authority's policy requirements; and,

- Consistent with the recommendations provided above, a detailed restoration/habitat enhancement plan should be prepared as a condition of approval. This plan should include specific details of the proposed restoration/habitat enhancement works to be completed within the woodland and wetland buffer areas, as well as a monitoring program to evaluate the success of the proposed restoration effort.

Tree Preservation Plan

The following comments and recommendations have been provided based on our review of the revised TPP prepared by Colville:

- The TPP states that the Butternut (*Juglans cinerea*) directly adjacent to the subject property and development area is presumed to be a hybrid. Based on the site visit completed during May 2023 and the physical attributes observed, we agree with this conclusion. The revised TPP has identified the prescribed tree protection zone for this tree in relation to the development area. Based on the TPP mapping, it appears that the tree is well-setback from the proposed development works and the TPP shall be maintained in order to effectively preserve this tree. Consistent with the recommendation provided in the TPP, we agree that additional hybridity testing may be required, should changes to the development design require impacts with the tree protection zone for this tree;

- It is recommended that a revised TPP be prepared as a future condition of approval and that this revised TPP be informed by a detailed grading plan. The updated TPP should identify the tree protection zone of trees to be retained, which should be established using a suitable method consistent with arboricultural best practices (i.e., Dripline + 1m, ISA diameter-based calculation method, etc.). The tree protection zone for all trees to be retained should be visually identified in relation to the required grading works in order to effectively demonstrate how trees will be protected from development impacts;
- Many of the boundary trees currently prescribed for retention appear to have canopies and associated root zones that overlap the development area. This includes the canopy/root zone of tree #544, an off-property tree, which appears to be directly overlapped by "Street A". Similar to the above comment, the tree protection zone for each of these trees and a combined "tree protection area" should be mapped and delineated with a proposed tree protection fencing alignment;
- Consistent with the comments made within the TPP, any injury or removal of a boundary tree will require the written permission of each respective landowner prior to its removal. This is a requirement of the provincial *Forestry Act* (1990), and it is recommended that this be obtained prior to any tree removal activity being initiated;
- Consistent with Colville's comments under "Summary and Recommendations", tree retention and removal prescriptions should be informed by final grading and development details; and,
- We are in agreement with Colville's comment that compensation for trees removed from the subject property should be considered. In lieu of specific tree replacement requirements within the County or Township, it is recommended that tree compensation of 2:1 replacement, or greater, be considered.

Conclusion

Based on our review of the EIS, TPP, and additional application materials, it is our opinion that recommendations made within the February 2024 peer review letter prepared by NRSI have been generally addressed through the revised reports prepared by Colville. Additional comments and recommendations have been made within this letter; however, it is anticipated that these may be addressed through future conditions of approval.

Please do not hesitate to contact us if you require further clarification on these matters.

Sincerely,
Natural Resource Solutions Inc.

Jack Richard, R.P.F.
Registered Professional Forester and Biologist

Wellington Hydrogeology File No. 24001.001

September 20, 2024

Township of Puslinch
7404 Wellington Road 34
Puslinch, Ontario N0B 2J0

Attention: Lynne Banks
Development and Legislative Coordinator

RE: Hydrogeological Review Comments – 3rd Submission
WDD Main Street Inc. – 11 Main Street, Morriston (Puslinch), Ontario
Proposed Residential Subdivision
Zoning By-law Amendment / Draft Plan of Subdivision Application

Wellington Hydrogeology Ltd. is pleased to provide hydrogeological comments on the above-noted submission for 11 Main Street (Lot 31, Concession 8) in the hamlet of Morriston, Township of Puslinch, Ontario (the site).

Previous hydrogeological review comments were provided by Harden Environmental Services Ltd. dated April 13, 2023 (1st Submission) and February 2, 2024 (2nd Submission).

Revised hydrogeological review comments are provided herein based on the 3rd submission responses and documents.

Wellington Hydrogeology Ltd.
Mailing Address: 4662 Sideroad 20N, Guelph, ON N1H 6J3
Phone 519-831-9696 **Email:** amason@wellingtonhydrogeology.com **Website:** www.wellingtonhydrogeology.com

Documents Reviewed

We reviewed the following documents as part of this hydrogeological review:

1. Englobe Corp. (Englobe). 2024. Hydrogeological Assessment, 11 Main Street, Puslinch, ON. Project No. T1220482.003, dated August 28, 2024, signed by Paul L. Raepple, P.Geo. and R. Baker Wohayeb, P.Eng.
2. Terraprobe Inc. (Terraprobe). 2023a. Hydrogeological Assessment, Proposed Residential Development, 11 Main Street, Puslinch, Ontario. File No. 1-22-0482-46, dated February 23, 2023, signed by Alaa Alborno, EIT and Narjes Alijani, P.Geo.
3. Terraprobe. 2023b. Addendum – Hydrogeological Assessment, Proposed Residential Development, 11 Main Street, Puslinch, Ontario. Project No. A1220482.002, dated December 21, 2023, signed by Paul L. Raepple, P.Geo.
4. Niagara Soil Solutions Ltd. 2022. Phase One Environmental Site Assessment, Vacant Lot, Northside Hwy 6, Morriston, ON. NSSL File No. NS2212-01, dated March 2022, signed by John Monkman, P.Eng. and Jodie Glasier, EP.
5. Niagara Soil Solutions Ltd. 2024. Phase One Environmental Site Assessment-rev, Vacant Lot, Northside Hwy 6, Morriston, ON. NSSL File No. 2212-01, dated August 2024, signed by Jodie Glasier, EP and Philip Adene, P.Geo.

Background – Site and Proposed Development

Based on our review, we understand that:

- The site is an irregularly shaped parcel with a total area of 23.1 ha (57.1 acres).
- Surrounding properties include residential subdivision developments to the north and west, vacant lands (wooded lots) to the south and agricultural/residential property to the east.
- The proposed subdivision on the site includes 21 single detached dwellings with lot sizes from 0.197 to 0.382 ha and one level of basement for each dwelling.
- The development will be serviced with individual private supply wells and septic systems.
- A stormwater management block will manage runoff from the site.

Hydrogeological Comments – Priority

Water supply: Englobe completed a desktop review of MECP water well records, identifying 228 wells within 500 m of the site (including 194 domestic/livestock supply wells and 6 commercial/public supply wells). While most wells were installed as drilled wells within the shallow or deep bedrock, 43 wells were installed within overburden and may be shallow dug wells, though this was not specifically discussed by Englobe.

The previous report by Terraprobe (2023a) indicated that test wells are to be installed as part of further investigations, which will also include a private well survey. Englobe (2024) report section 5.1 outlined the proposed water supply investigation, which includes drilling 3 test wells, conducting pumping tests, collecting groundwater quality samples for O.Reg.169/03 Schedule 1 and partial Schedule 2 (metals and inorganics), completing a private well survey within 250 m of the site and monitoring of groundwater levels and water quality in nearby private wells as part of the onsite pumping tests.

The pumping test must be conducted in accordance with MECP Guideline D-5-5. We are also requesting analysis of all parameters in Schedules 1 and 2 of Ontario Regulation 169/03 in at least one of the supply wells.

It is our recommendation to the Township that the water supply evaluation be completed prior to ZBA approval as the results will determine the feasibility of sustainable water supply (both quality and quantity) for the proposed number of lots, while also evaluating impacts to existing groundwater users in the vicinity of the site.

The remaining hydrogeological comments are to be addressed at the detailed design stage.

Hydrogeological Comments – Detailed Design Stage

Topography and drainage: Section 3.1 of the report indicates that "topography of the site is sloping downwards in a northwest direction. As such, it is anticipated that generated runoff (if not managed) will flow in a northwesterly direction." This interpretation is incorrect based on the Topography Map (Figure 5).

Please revise/clarify (at the detailed design submission stage).

High groundwater table: Groundwater monitoring was completed within the four onsite monitoring wells between August 24 and September 19, 2022. Additional groundwater monitoring was completed on July 18 and August 6, 2024. The highest groundwater elevation measured to date was 312.86 masl at BH3 on July 18, 2024. In the absence of spring freshet monitoring data, the project hydrogeologist interprets the July 2024 measurements as representative of the seasonal high groundwater table due to significant precipitation events preceding the July measurements.

The proponent should complete monthly groundwater level monitoring for at least 12 consecutive months, including the spring freshet, prior to detailed design submission. The design elevations of building foundations, septic leaching beds, SWM facilities and LIDs (e.g., infiltration facilities) must be evaluated in relation to the high water table (required at the detailed design submission stage).

Groundwater contribution to Bronte Creek: Terraprobe (2023a) indicated that further field investigations would be completed to assess the presence of groundwater seepage during seasonal high groundwater conditions. Englobe (2024) did not include details of groundwater seepage or vertical gradients within the updated report.

We recommend the installation of shallow piezometers to monitor baseline conditions and vertical gradients within Bronte Creek on the site, with monitoring completed at the same frequency to groundwater level monitoring on the site (i.e., monthly for at least one year, including the spring groundwater high) (required at the detailed design submission stage).

Groundwater flow direction: Englobe interpreted that a shallow groundwater flow divide was present with the highest groundwater elevation at BH3, with groundwater flow to both the west (toward Bronte Creek) and to the east (toward the tributary of Bronte Creek and associated wetlands). Englobe also noted that residential properties to the north were considered upgradient, suggesting local flow to the south (toward the site) toward surface water features.

We generally concur with this assessment of shallow groundwater flow. On a regional scale, deeper groundwater flow is typically to the south-southeast within Puslinch in the general vicinity

of the site – it is recommended that the project hydrogeologist confirm and interpret deeper/regional groundwater flow as well (at the detailed design submission stage).

Shallow groundwater quality: Groundwater quality samples were collected in 2022 from three shallow monitoring wells on the site as part of the nitrate impact assessment report, which were analyzed for nitrate, nitrite, phosphorus, ammonia/ammonium, and pH. Additional analysis was requested to characterize the shallow groundwater quality, including general chemistry, metals and nutrients, with comparison to the Ontario Drinking Water Quality Standards (ODWS).

Englobe collected additional groundwater quality samples from all four monitoring wells on August 6, 2024 for general groundwater chemistry characterization analysis including nutrients, dissolved metals and inorganic parameters, with the results compared to the ODWS. The results showed elevated hardness in all monitoring wells. The sample from BH3 also had elevated total dissolved solids (TDS), sodium, chloride and nitrate relative to the samples from other wells.

Can the project hydrogeologist provide an explanation for the elevated TDS, sodium, chloride and nitrate at BH3? (at the detailed design submission stage)

Surface water quality: Englobe collected a surface water quality sample from Bronte Creek on August 6, 2024, with the results compared to the ODWS. The surface water sample contained elevated concentrations of chloride, sodium, manganese, iron, hardness, TDS, turbidity and colour. The results are indicative of impacts from road deicing salt. We recommend that the surface water quality results also be compared to the Provincial Water Quality Objectives (at the detailed design submission stage) as they are more applicable for evaluating surface water quality.

Bronte Creek impact assessment: Englobe (2024) evaluated the impact of phosphorus and nitrate loading to Bronte Creek. Nitrate concentrations were quantified using a mass balance calculation and are expected to be below the CWQG limit of 2.93 mg/L. Impacts from total phosphorus were not quantified but were not expected to have significant impacts to surface water.

We recommend that the project hydrogeologist quantify the predicted phosphorus concentration at the surface water feature (e.g., using the Robertson attenuation method, dilution or equivalent) (at the detailed design submission stage).

Groundwater recharge facilities: The soakaway pits were designed by Crozier (December 2023) based on the hydraulic conductivity estimates determined by Terraprobe (2023). The infiltration estimates should be confirmed with soil infiltration testing at representative locations and appropriate depths based on the proposed septic beds and soakaway pits. Infiltration testing will confirm soil conditions and field saturated hydraulic conductivity/infiltration rates. The proposed depths/elevations of subsurface infiltration structures must also be evaluated alongside the annual

high groundwater table elevation across the site (required at the detailed design submission stage).

Construction dewatering: The project hydrogeologist must consider the high groundwater table in the assessment of construction dewatering requirements. If groundwater dewatering is required, management of discharge water quantity and quality must be discussed (required at the detailed design submission stage).

Phase One ESA: The Phase One Environmental Site Assessment (ESA) completed by Niagara Soils Solutions Ltd. (March 2022) was updated (August 2024) and the previous recommendation for a Phase Two ESA was changed. The previously identified Areas of Potential Environmental Concern (APEC) related to off-site Potentially Contaminating Activities (PCA) related to metal fabrication and commercial autobody shops was changed to remove the on-site APEC as the off-site welding activities were more than 30 m from the property boundary therefore not interpreted as an APEC. A Phase Two ESA is no longer recommended.

Excess soil management: Any import/export of fill/soil from the site must be conducted in accordance with O. Reg. 406/19: On-Site and Excess Soil Management, the Rules for Soil Management and Excess Soil Quality Standards (Soil Rules) and O. Reg. 153/04, as amended.

We appreciate the opportunity to provide these comments. Should you have any questions or concerns, please do not hesitate to contact the undersigned.

WELLINGTON HYDROGEOLOGY LTD.

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Ministry of Transportation

West Operations
Corridor Management Section West

659 Exeter Road
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Ministère des Transports

Opérations ouest
Section de la gestion des couloirs routiers de l'Ouest

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Ontario

Date: Sept 23, 2024

To: Lynne Banks, Township of Puslinch

Re: ZBA Third Submission – 11 Highway 6 - WDD Main Street (Morriston)

The Ministry of Transportation (MTO) has completed our review of the 3rd submission of the draft plan of subdivision prepared by Weston Consulting dated September 03, 2024, and associated package for 11 Highway 6, Morriston ON. The following outlines our comments:

The MTO does not oppose the proposed zoning amendments, however the following comments will need to be addressed as conditions of draft plan approval or MTO permit.

Blocks and Land Use:

MTO has no objections with the proposed block configuration and access as proposed from Ochs Street.

Stormwater Management:

- To ensure that stormwater runoff from this property does not adversely affect our highway drainage system or highway corridor, MTO requires the owner to submit a Storm Water Management Report (SWMR) along with the above-noted grading/drainage plans for the proposed development for our review and approval. MTO Stormwater Management Requirements for Land Development Proposals can be obtained from the following website: https://www.ontario.ca/page/resources-transportation-planners#section-5
  - The owner's drainage consultant should refer to the ministry website for applicable IDF curves and the ministry's Stormwater Management Requirements for Land Development Proposals. http://www.mto.gov.on.ca/IDF_Curves/terms.shtml
  - The owner's drainage consultant shall ensure that all return periods are assessed (2yr, 5yr, 10yr, 25yr, 50yr, 100yr and Regional).
- Stormwater Management Blocks are to be assumed and owned by the Township of Puslinch.

Traffic Impact Review

MTO has reviewed the revised Traffic Impact Study prepared by GHD, dated June 28, 2024, and confirm the report addresses the items MTO previously identified and have no further comments.

Proposed Conditions of Draft Plan Approval

The following are MTO's proposed Conditions of Draft Approval:

1. That prior to final approval, the owner(s) to submit to the Ministry of Transportation for review and approval, a copy of a Traffic Impact Study indicating the anticipated traffic volumes and their impact on Highway 6 and Badenoch St intersection. The Traffic Impact Study will be prepared in accordance with MTO's Traffic Impact Study Guidelines. The owner's transportation consultant shall be RAQS certified.

2. That prior to final approval, the owner shall submit a stormwater management report along with grading/drainage plans for the proposed development for review and approval.

3. That Prior to final approval, the owner shall submit to the Ministry of Transportation for review and approval a draft copy of the M-Plan for this subdivision.

4. That prior to final approval, the owners shall provide the Ministry of Transportation for review and approval, the Conditions of Draft Plan Approval and Draft Subdivision Agreement to ensure our requirements have been incorporated.

Notes to Draft Plan Approval - Conditions of MTO Permits:

The owner should be made aware that under the *Public Transportation and Highway Improvement Act* (PTHIA), MTO permits are required prior to development of the subject property. The owner shall submit site plans, site-servicing plans, grading plans, and drainage plans for the proposed development to MTO for review and approval.

1. MTO Building and Land Use permit(s) will be required prior to any bulk grading, and subdivision servicing.

2. MTO Building and Land Use permit(s) for all of the individual residential lots proposed, as all fall within the MTO Permit Control Area.

If any further clarification is required regarding the MTO comments or if any issues are encountered during the additional consultation or application phases, please feel free to contact Allan Hodgins at Allan.Hodgins@ontario.ca or (226) 973-8580 who will be more than happy to assist.

Regards,

[redacted]

Allan Hodgins
Corridor Management Planner

c. Maureen McIver, Corridor Management Officer, MTO

SALVINI CONSULTING
Transportation Engineering and Planning

Salvini Consulting Inc.
185 Deer Ridge Drive
Kitchener, ON · N2P 2K5
519-591-0426
julia@salviniconsulting.com

September 19, 2024

Lynne Banks
Development and Legislative Coordinator
Township of Puslinch
7404 Wellington Road 34
Puslinch, ON · N0B 2J0

Re: WDD Main Street Traffic Impact Study (TIS)
June 2024, GHD
Township Peer Review Comments

Dear Lynne,

I've reviewed the June 2024 TIS prepared by GHD for the proposed residential subdivision in Morriston. The study has addressed my previous comments as outlined below.

- Base traffic data, the background growth assumptions, the traffic generation and distribution, and the future total traffic volumes are all acceptable. I agree with the capacity analyses at the Badenoch/Ochs and Ochs/Back intersections.
- The updated sightline assessment exiting Ochs Street to Badenoch Street illustrates that appropriate sight distance is available for vehicles turning at the intersection under a variety of conditions, conditional on the realignment and reconstruction of the retaining wall on the southwest corner of the intersection. I agree with the sightline assessment.
- Crozier, the Civil Engineer for the project, has prepared a drawing illustrating how the retaining wall at the southwest corner of the Badenoch/Ochs intersection could be reconfigured to meet the sightline requirements at the intersection. This will be reviewed in more detail with GEI Consultants.
- Ochs Street is narrow and requires reconstruction to meet Township standards. It is also my understanding that it will be realigned slightly to the east.
- The proposed cross-section included in the study for new Street A has been updated to reflect the Township's 20 metre urban cross-section as requested.

Please let me know if there is anything further to discuss on this application or if you have any further questions.

Sincerely,

[redacted]

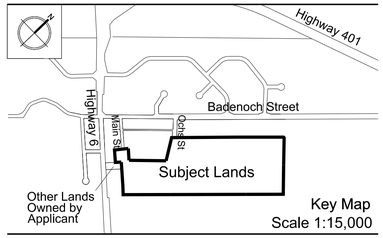
Julia Salvini, MEng, PEng, FITE
President

Cc: Mike Fowler, Township of Puslinch
Pasquale Costanzo, County of Wellington
Steve Conway, GEI Consultants
Parth Lad, GEI Consultants

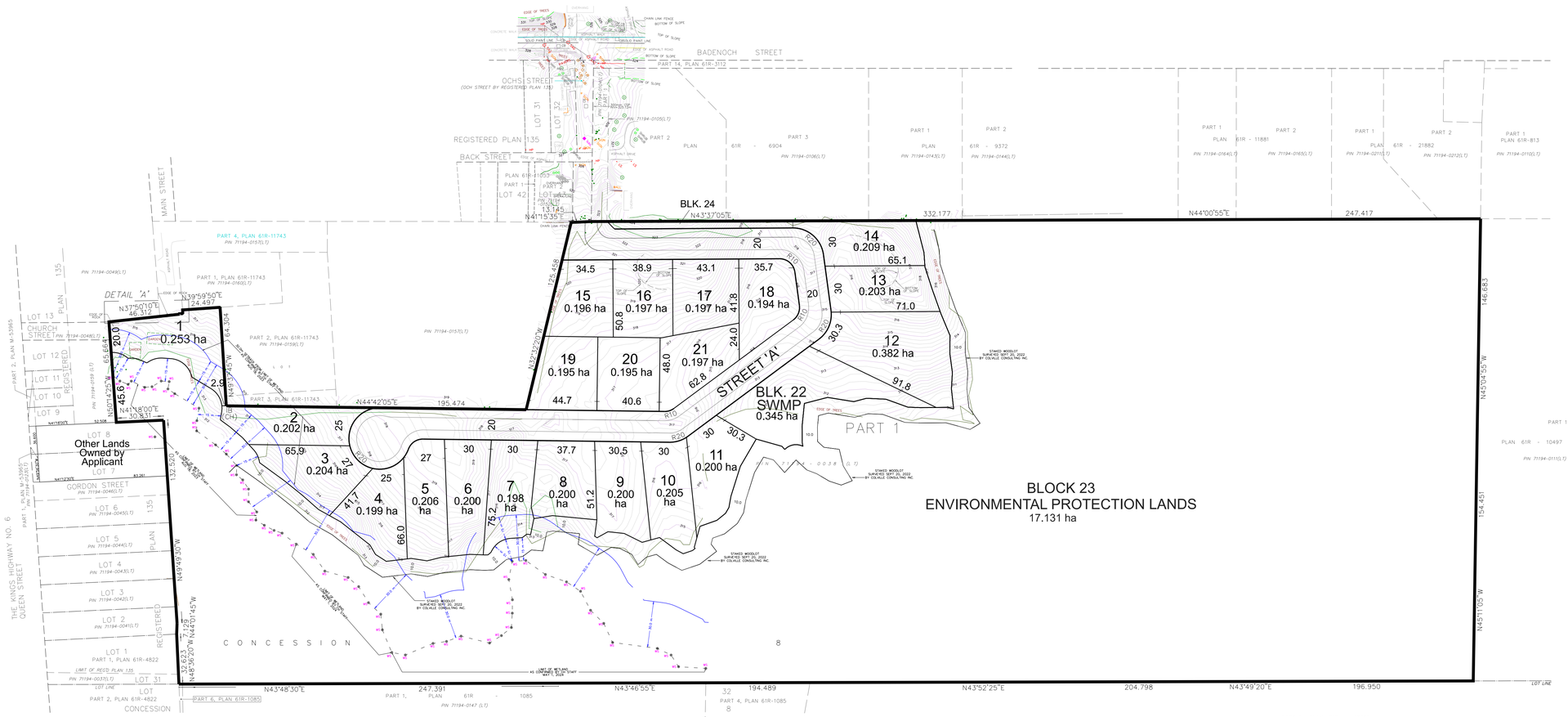
DRAFT PLAN OF SUBDIVISION

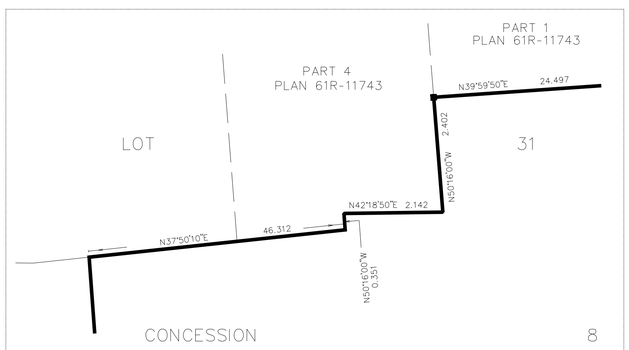
PART OF LOTS 7 & 8
NORTH OF QUEEN STREET
REGISTERED PLAN 135

AND PART OF LOT 31
CONCESSION 8
TOWNSHIP OF PUSLINCH
COUNTY OF WELLINGTON



Key Map
Scale 1:15,000





INTEGRATION DATA

OBSERVED REFERENCE POINTS (ORPs): UTM ZONE 17, NAD83 (CSRS) (2010.0).
COORDINATES TO URBAN ACCURACY PER SECTION 14 (2) OF O.REG 216/10.

POINT ID	EASTING	NORTHING
ORP (A)	571 819.11	4 810 772.76
ORP (B)	572 189.46	4 811 593.30

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

THE RESULTANT TIE BETWEEN ORP (A) AND ORP (B) IS 900.588 N24°17'31"E

OWNER'S CERTIFICATE:

I authorize Weston Consulting Group Inc. to prepare and submit this plan for draft approval.

Date: ___ ___ ___

WDD MAIN STREET Inc. c/o FAISAL HAMADI
499 BRANT STREET
BURLINGTON, ONTARIO L7R 2G5
PHONE: 905-453-7399
info@wddinternational.com

SURVEYOR'S CERTIFICATE:

I hereby certify that the boundaries of the lands being subdivided and their correct relationship to the adjacent lands are accurately and correctly shown on this plan.

Date: ___ ___ ___

RAYMOND J. SIBTHORP, OLS
J.D. BARNES LIMITED
257 WOODLAWN ROAD WEST, UNIT 101
GUELPH, ONTARIO N1H 8J1
PHONE: (519) 822-4031 www.jdarnes.com

ADDITIONAL INFORMATION:

[Section 51(17) of the Planning Act, R.S.O. 1990, c. P.13], as amended to August 26, 2024.
a), b), e), f), g), j) & l) - on plan.
c) - on key plan
d) - see statistics
h) - piped water to be installed by developer
i) - silty sand, sand and silt, and clayey silt
k) - all services to be made available by developer

DEVELOPMENT STATISTICS:

LOTS/BLOCKS	LOTS	AREA
Single Detached Lots (20 m+) [Lots 1-21]:	21	4.436 ha
SWMP [Blk. 22]:		0.345 ha
Environmental Protection Lands [Blk 23]:		17.131 ha
Additional lands [Blk. 24]:		0.059 ha
Roads:		1.133 ha
Total:	21	23.104 ha

SCALE
0 80m

WESTON CONSULTING
1-800.363.3558 westonconsulting.com
Vaughan: 201 Millway Ave, Suite 19 Vaughan, Ontario L4K 5K8 T. 905.738.8080 F. 905.738.6637
Toronto: 268 Berkeley St, Toronto, Ontario M5A 2X1 T. 416.640.9917 F. 905.738.6637

REVISIONS LIST

03 SEP 2024	Revise survey text and Detail 'A'.
09 JUN 2024	Modify Lots 1-3,7 per 15m wetland setback. Outline/measure enhanced buffer area
14 MAY 2024	Update using new topo survey with 30m wetland setback. Modify SWM & Lots 1-14.
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Drawing Number:

File Number:	10779
Drawn By:	SM
Planner:	PT
Scale:	1:1500
CAD:	10040 Draft Plan D14 2024-09-03.dgn

D14

DRAFT PLAN OF SUBDIVISION

PART OF LOTS 7 & 8
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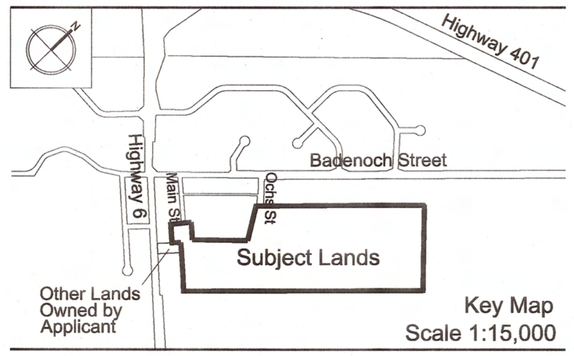
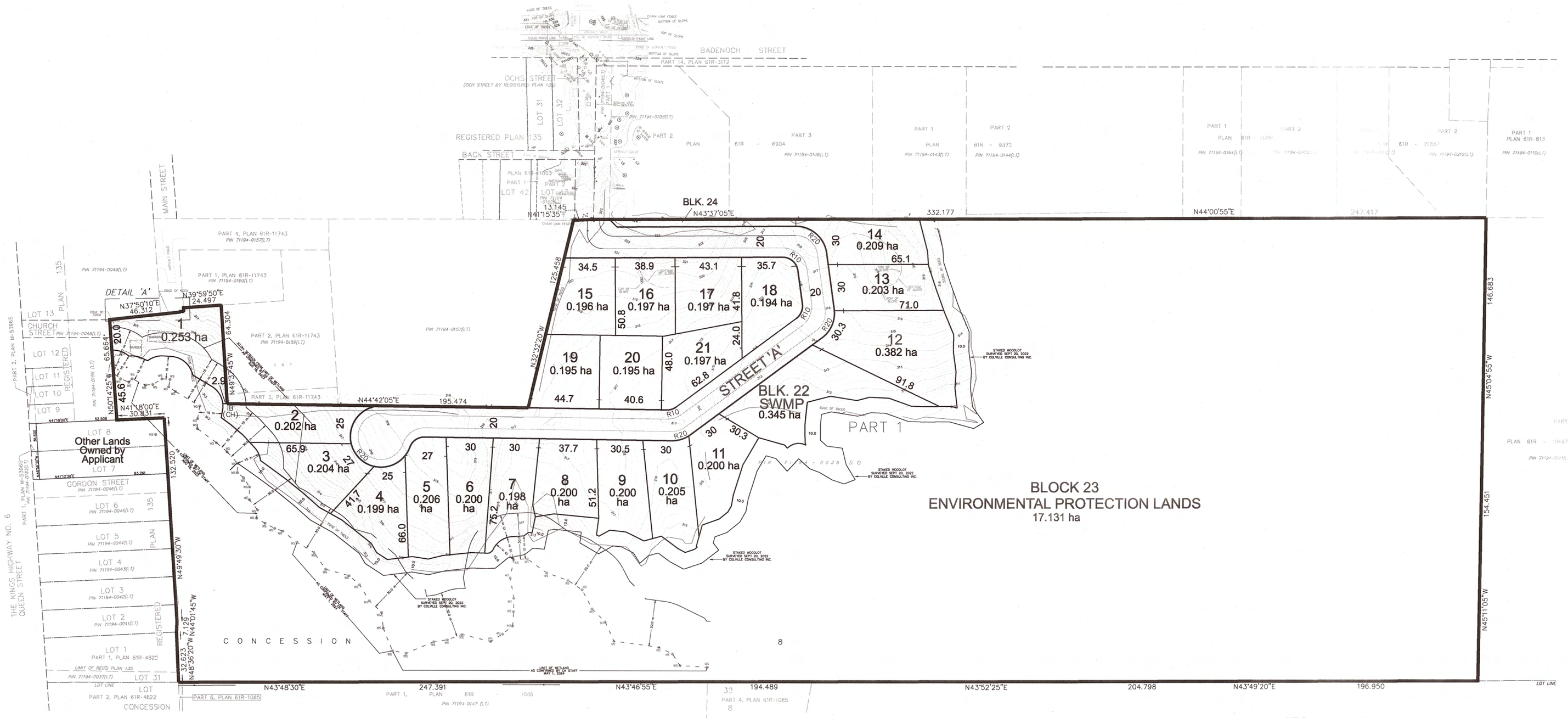
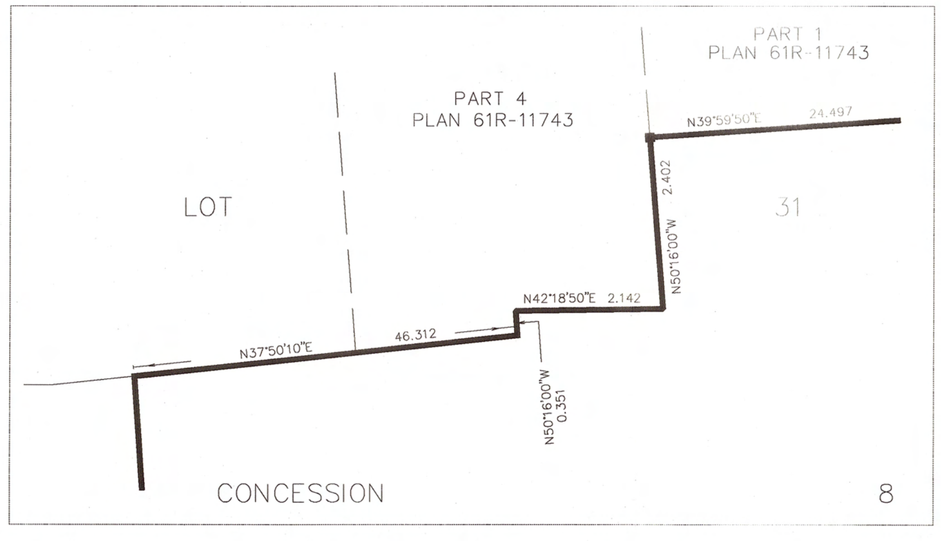




1	0.253 ha	14	0.209 ha
2	0.202 ha	15	0.196 ha
3	0.204 ha	16	0.197 ha
4	0.199 ha	17	0.197 ha
5	0.206 ha	18	0.194 ha
6	0.200 ha	19	0.195 ha
7	0.198 ha	20	0.195 ha
8	0.200 ha	21	0.197 ha
9	0.200 ha	12	0.382 ha
10	0.205 ha	13	0.203 ha
11	0.200 ha		

DETAIL 'A'
NOT TO SCALE



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I authorize Weston Consulting Group Inc. to prepare and submit this plan for draft approval.

Faisal Hamadi Date: Sept 5, 2024

WDD MAIN STREET Inc. c/o FAISAL HAMADI
469 BRANT STREET
BURLINGTON, ONTARIO L7R 2G5
PHONE: 905-483-7399
info@weldinternational.com

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Date: Sept 4, 2024

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257 WOODLAWN ROAD WEST, UNIT 101
GUELPH, ONTARIO N1H 8J1
PHONE: (519) 822-4031 www.jdarnes.com

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ZONING BY-LAW AMENDMENT to By-law 023/18

for

WDD Main Street Inc.
11 Main Street, Puslinch

Township Rezoning Application D14/___

THE CORPORATION OF THE TOWNSHIP OF PUSLINCH

BY-LAW NUMBER _____

A BY-LAW TO AMEND BY-LAW NUMBER 023/18, AS AMENDED, BEING THE ZONING BY-LAW OF THE TOWNSHIP OF PUSLINCH

WHEREAS, the Council of the Corporation of the Township of Puslinch deem it appropriate and in the public interest to amend By-Law Number 023/18 pursuant to Sections 34 of the Planning Act, R.S.O. 1990 as amended;

NOW THEREFORE THE COUNCIL OF THE CORPORATION OF THE TOWNSHIP OF PUSLINCH ENACTS AS FOLLOWS:

1. That Schedule "A" of By-law 023/18 is hereby amended by rezoning lands legally known as PT LOT 31, CONCESSION 8, TOWNSHIP OF PUSLINCH, AS IN RO722846 & MS8894; LOTS 7 & 8, PLAN 135, DONALD MCEDWARDS PORTION, NORTH OF QUEEN ST, SAVE AND EXCEPT MS53965; S/T THE RIGHTS OF OWNERS OF ADJOINING PARCELS, IF ANY, UNDER IS13908 & ROS585925; TOWNSHIP OF PUSLINCH, within the Township of Puslinch, and municipally referred to as 11 Main Street, from *Urban Residential (UR), Future Development 2 (FD2) and Natural Environment (NE)* zone to *Urban Residential Site-Specific Special Provisions XX (UR-XX)* ZONE and *Natural Environmental (NE) ZONE* with an "*Environmental Protection (EP)*" overlay as shown on Schedule "A" of this By-law.

2. That Section 14 Site-Specific Special Provisions is amended by adding the following site-specific provision:

No.	Zone Designation	Permitted Uses	Prohibited Uses	Site Specific Special Provision
1	Urban Residential (UR-XX)	Single Detached Dwellings Additional Residential Unit (Attached and Detached) Home Business	N/A	Minimum Required Lot Area = 0.19 ha

3. That the subject land as shown on Schedule "A" to this By-Law shall be subject to all applicable regulations of Zoning By-Law 023/18, as amended.

4. This By-law shall become effective from the date of passage by Council and come into force in accordance with the requirements of the Planning Act, R.S.O. 1990, as amended.

READ A FIRST AND SECOND TIME THIS _____ OF _____, 20__.

_____ _____

MAYOR CLERK

READ A THIRD TIME AND PASSED THIS_____OF_____20__.

_____ _____

MAYOR CLERK

THIS IS "SCHEDULE A"
TO ZONING BY-LAW AMENDMENT NO. _____

- Subject Lands
- Environmental Protection Overlay
- Natural Environment
- Site Specific Exemption
- Urban Residential (spxx)

0 125 250m

N

THE CORPORATION OF THE TOWNSHIP OF PUSLINCH

EXPLANATION OF BY-LAW NO. _____

By-law Number _____ amends the Township of Puslinch Zoning By-law 23/18 by rezoning PT LOT 31, CONCESSION 8 , TOWNSHIP OF PUSLINCH, AS IN RO722846 & MS88941 ; LOTS 7 & 8, PLAN 135 , DONALD MCEDWARDS PORTION, NORTH OF QUEEN ST, SAVE AND EXCEPT MS53965 ; S/T THE RIGHTS OF OWNERS OF ADJOINING PARCELS, IF ANY, UNDER IS13908 & ROS585925 ; TOWNSHIP OF PUSLINCH, within the Township of Puslinch, and municipally referred to as 11 Main Street from *Urban Residential (UR), Future Development 2 (FD2) and Natural Environment (NE)* zone to *Urban Residential Site-Specific Special Provisions XX (UR-XX)* zone and *Natural Environmental (NE) zone* with *Environmental Protection (EP) overlay* to permit a 21-lot residential subdivision and conserve the natural features.

The subject property is approximately 23.48 hectares (58.03 acres) in size and is currently vacant.

Within the County's Official Plan, the subject lands are designated as "Residential", "Greenlands" and "Core Greenlands" lands. The Residential designation permits a variety of housing types.

WESTON
CONSULTING

PLANNING JUSTIFICATION REPORT

11 MAIN STREET
TOWNSHIP OF PUSLINCH

SEPTEMBER 2024
FILE #10779

This Report has been prepared by:	Kayly Robbins MPL, MCIP, RPP Senior Planner Weston Consulting
Report Title:	Planning Justification Report, 11 Main Street, Puslinch, Ontario
Project Number:	10779
First Submission Date:	March 04, 2023

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

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WESTON
CONSULTING

1. INTRODUCTION

1.1 PURPOSE OF THE REPORT

Weston Consulting has been retained by WDD Main Street Inc., the registered owner of the lands municipally known as 11 Main Street (Lot 31, Concession 8) in the Township of Puslinch (herein referred to as the "subject lands") to provide planning assistance for a proposed residential subdivision. The purpose of this Report is to review and provide planning justification for a proposed development including a residential subdivision consisting of single-detached dwellings serviced with local roads.

This Report has been prepared in support of applications for Draft Plan of Subdivision and Zoning By-law Amendment, and provides planning analysis and justification in support of the proposed development.

The purpose of this report is to provide planning analysis and rationale in support of the proposed development and to evaluate the proposal in the context of the policies of the Provincial Policy Statement 2020 (the "PPS"), A Place to Grow: Growth Plan for the Greater Golden Horseshoe 2019 (the "Growth Plan"), Greenbelt Plan 2017, County of Wellington Official Plan (the "OP"), Township of Puslinch Zoning By-law (the "Zoning By-law") and Attainable Housing Strategy.

This Report provides planning analysis and justification for the proposal in accordance with good planning and urban design principles and provides a basis for the advancement of the planning applications through the planning process.

WESTON
CONSULTING

2. SITE DESCRIPTION AND CONTEXT

2.1 DESCRIPTION OF THE SUBJECT LANDS

The subject lands are located east of Highway 6 and south of Main Street in Morriston. The subject lands are currently vacant with boundary trees and a woodland in the southeast corner. The subject lands have an approximate area of 23.48 hectares (58.03 acres) and an approximate frontage of 36.00 metres along Highway 6, 20 metres at the current termins of Ochs Street and 12 metres at the terminus of Main Street. The lands along Highway 6, identified as Lots 7 and 8 are not part of the proposed Draft Plan of Subdivision.

The subject lands are legally described as:

PT LOT 31, CONCESSION 8, TOWNSHIP OF PUSLINCH, AS IN RO722846 & MS8894; LOTS 7 & 8, PLAN 135, DONALD MCEDWARDS PORTION, NORTH OF QUEEN ST, SAVE AND EXCEPT MS53965; S/T THE RIGHTS OF OWNERS OF ADJOINING PARCELS, IF ANY, UNDER IS13908 & ROS585925; TOWNSHIP OF PUSLINCH

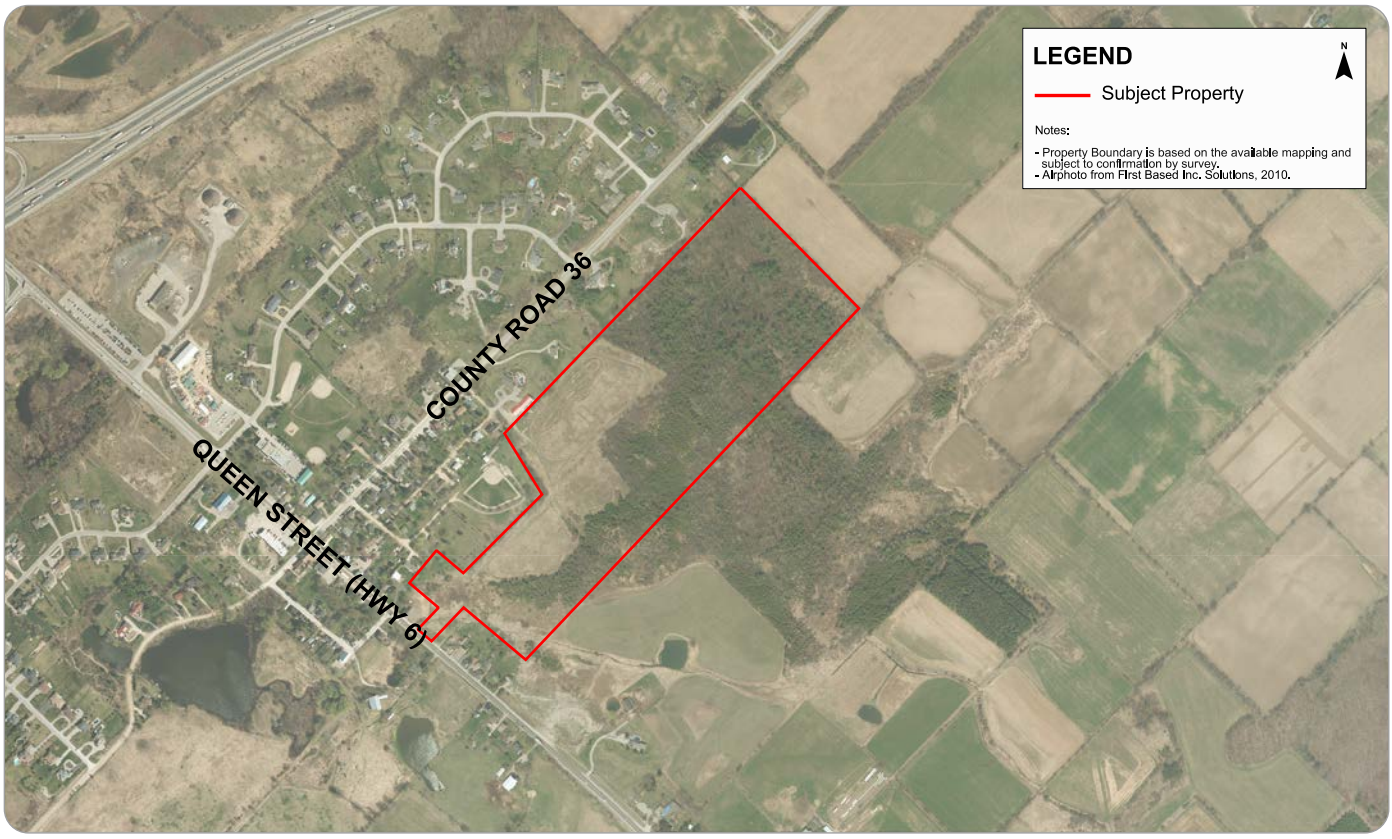

Figure 1: Aerial Photo

2.2 NEIGHBORHOOD CONTEXT

The subject lands are surrounded by open space and agricultural lands to the south and east. There are detached dwellings on the north side of the subject lands along with the Old Morriston Park. There are also detached dwellings to the west of the subject lands, along Highway 6.

The surrounding uses include:

- **North:** Immediately to the north of the subject lands, there is the Old Morriston Park which includes a baseball diamond. There are detached dwellings on the north side of the subject lands and further north there is Morriston Meadows Park and another baseball field surrounded by detached dwellings.
- **East:** The subject lands are adjacent to agricultural lands to the east and a cemetery to northeast.
- **South:** Immediately to the south, there are open space natural lands as part of the Greenbelt and agricultural lands.
- **West:** Detached dwellings are located immediately to the west of the subject lands. Across Highway 6 on the west, there are detached dwellings and further to the west, Morriston United Church is located along Victoria Street.

The subject lands are located within Morriston which is a designated Urban Centre in accordance with the County of Wellington Official Plan. Morriston is predominantly a residential community with commercial uses at the main intersection of the community, being Highway 6/Queen Street and Badenoch Street/County Road 36. Additional commercial uses are located along Highway 6 north of County Road 36. Recreational uses are located throughout the community, including Old Morriston Park which is adjacent to the subject lands, and Morriston Meadows Park which is located north of Badenoch Street and east of Highway 6. The subject lands are located approximately 1 kilometre from the Highway 401 to the north.

2.3 TRANSPORTATION

The subject lands are located in close proximity to Highway 6 which travels north-south between Port Dover to the south and McKerrow, near Sudbury, to the north. Highway 6 provides convenient connection to Highway 401 to the north and Highway 403 to the south in Hamilton. It is also accessible through Badenoch Street East, which is a County Road. Badenoch Street travels east-west between Highway 6 to Concession Road 11 providing connections to north-south travelling roads including Highway 6, Victoria Road, Watson Road and Concession Road 11. The subject lands are currently accessed through Main Street and Ochs Street, both are local streets.

2.4 NEARBY DEVELOPMENT APPLICATIONS

There are 5 active development applications within the Township of Puslinch which are located approximately 5-10 kilometres from the subject lands. One of the applications is a Consent Application. Which involves splitting the existing lot into two separate parcels, for a proposed Rural Residential Use.

There are also four minor variance applications within the Township of Puslinch. One application is requesting relief of the Township's Comprehensive Zoning By-law to reconstruct and enlarge a single-family dwelling. Three of the minor variance applications are requesting relief of the Township's Comprehensive Zoning By-law to facilitate lot severances.

Two of these applications are seeking a residential development in the Township of Puslinch which is consistent with the proposed residential subdivision.

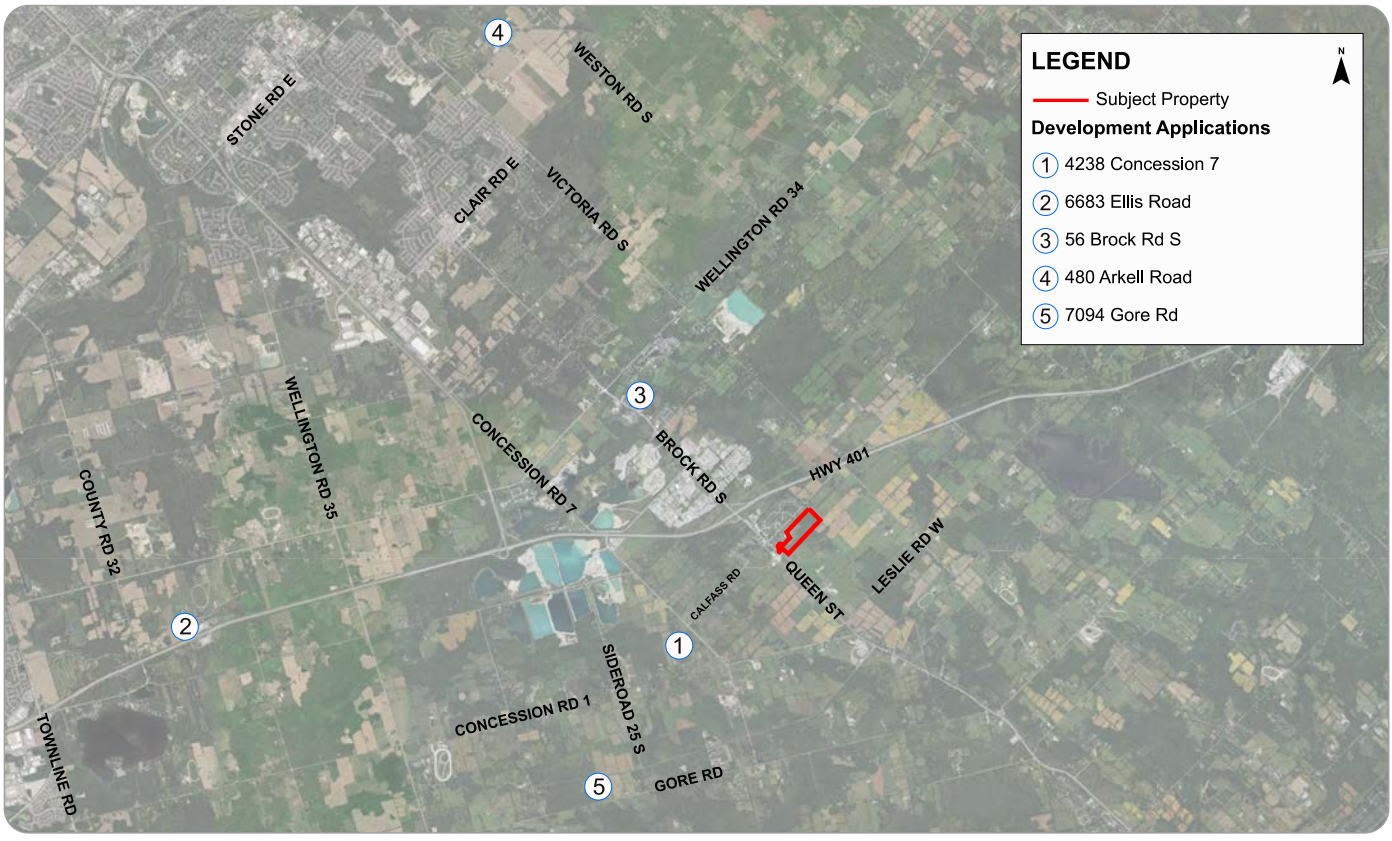

Figure 2: Surrounding Development Activity

WESTON
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3. PROPOSED DEVELOPMENT

3.1 PRE-CONSULTATION

A Preliminary Concept Plan was submitted to the Township of Puslinch to receive comments and a list of required technical reports and plans for a Complete Application for Draft Plan of Subdivision and Zoning By-law Amendment applications. The Township of Puslinch provided comments and a list of required materials to support the application dated February 1st, 2022. Township Staff, agencies and the County provided comments regarding the proposed development. The following summarizes comments provided:

1. A mix of housing should be incorporated into the plan.

   Response: The proposed subdivision includes single detached dwelling lots, which is compatible with the level of servicing available in Morriston and with the surrounding uses.

2. A minimum of 25% of new housing units in the County will be affordable.

   Response: The proposed development provides 21 single detached dwelling lots that will be market-based, secondary units may be considered at a future stage which would assist in improving affordability and providing additional housing options.

3. Trails, and trail connections should be provided to the satisfaction of the Township.

   Response: Trail connections will be discussed with the Township at the detailed design stage.

4. Setbacks from the woodlot should be assessed via the Environmental Impact Statement.

   Response: An Environmental Impact Study (EIS) has been prepared to assess the impacts of the proposed development to the natural heritage features. Furthermore, the EIS provides justification for the provided 10 metre setback to the woodland and a minimum of a 15-metre setback to the wetland.

5. The lot located on Highway 6 will require approval from the Ministry of Transportation (MTO) regarding access, this lot is also located in a Floodplain area (regulated by Conservation Halton) and may not be appropriate for development.

   Response: The MTO and Conservation Halton will be circulated the applications and supporting materials to review the proposed subdivision and provide comments.

6. Stormwater management (Ponds or Low Impact Developments) should be shown in subsequent site plans.

   Response: A Functional Servicing and Preliminary Stormwater Management Report has been prepared in support of the proposed development and identifies that water quantity control is to be provided via infiltration trenches along the internal roadways and water quality control will be accommodated with the use of grassed swales and roadside infiltration trenches complete with topsoil.

7. Applicant should discuss any Parkland or trail requirements with the Township.

   Response: Cash-in-lieu of parkland will be provided considering there is a municipal park adjacent to the subject lands. Possible trail connections will be discussed with the Township.

The above-mentioned comments were considered when developing the Draft Plan of Subdivision, Zoning By-law Amendment and technical reports, as detailed with the responses. The requirements for a Complete Application, as identified within the Pre-Consultation Comments are included with the submission and the Reports have been reviewed and summarized in Subsection 3.4.

3.2 DESCRIPTION OF DEVELOPMENT PROPOSAL

The proposed development includes a residential subdivision consisting of single-detached dwellings (Figure 3). The proposed development consists of 21 lots of approximately 0.2 hectares each and one public streets (Street A) with 20-metre right-of-way. The proposed lot fabric is consistent with the surrounding area, as there are similar single detached lots to the north and west of the subject lands with lot sizes that range from 0.05 - 0.1 hectare. Furthermore, the proposed lots are appropriately sized to accommodate private water and wastewater services (well and septic) as municipal services are not available.

The subject lands are located adjacent to and contain natural heritage features; however, the proposed development protects the features on-site and provides an appropriate buffer from the woodland and wetland. A block is provided to identify the environmentally protected lands.

Lastly, a stormwater management block is included in the Draft Plan of Subdivision, as detailed in the Functional Servicing Report.

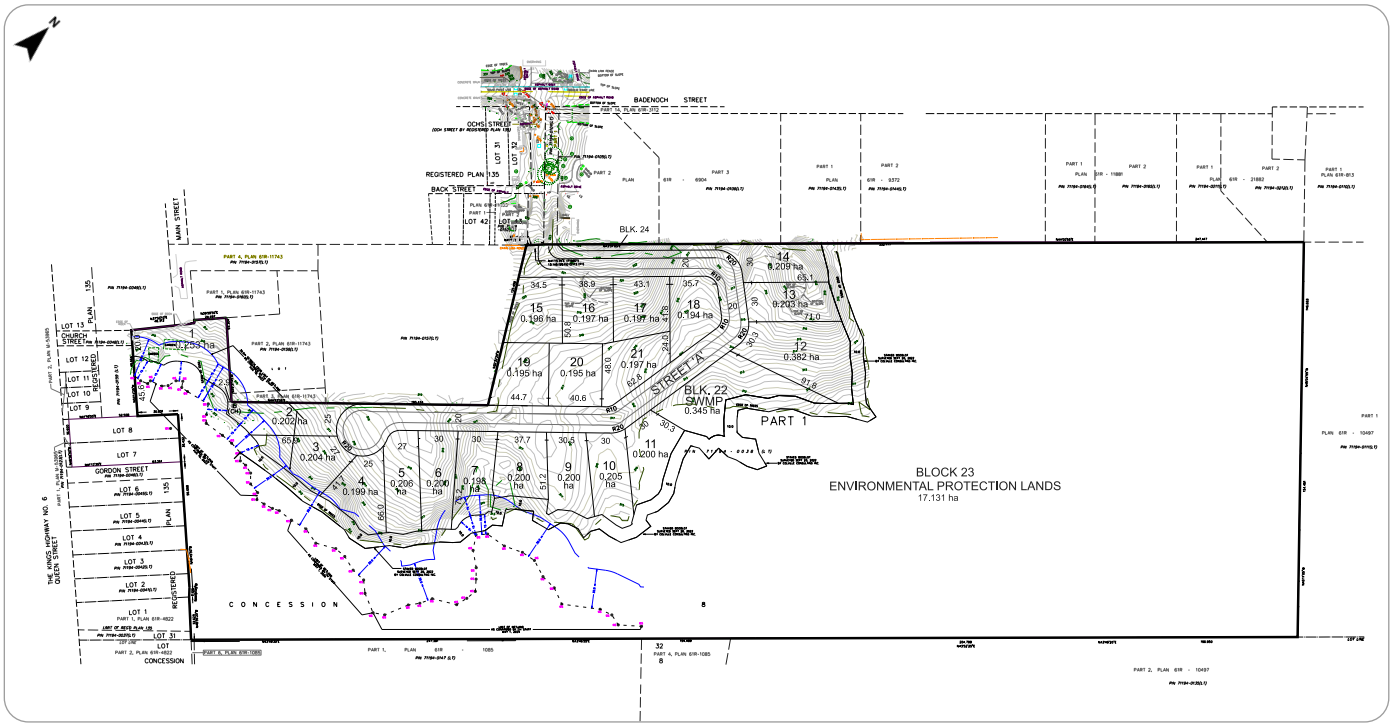

Figure 3: Draft Plan of Subdivision

3.3 DESCRIPTION OF PLANNING APPLICATIONS

Zoning By-law Amendment and a Draft Plan of Subdivision applications are being submitted concurrently to facilitate the proposed residential development.

Draft Plan of Subdivision

A Draft Plan of Subdivision is being submitted for 21 residential lots accessed by one proposed public road, including the extension Ochs Street. The proposed lots are approximately 0.2 hectare each to accommodate the future detached dwellings and associated private servicing infrastructure. The Draft Plan of Subdivision also includes a Block for the woodland and associated buffer, to be conveyed to the Township at the appropriate stage. A Stormwater Management Block is included in the Draft Plan of Subdivision, in accordance with the Functional Servicing and Stormwater Management Report.

Zoning By-law Amendment

The Zoning By-law Amendment is required to rezone the subject lands from *"Future Development 2 (FD2)"* to "Urban Residential - XX" as the current zoning does not permit the proposed residential subdivision. Furthermore, the existing *"Natural Environment (NE)"* zone is being adjusted to align with the features on site. The Urban Residential zone provides for and regulates all forms of housing (including single detached, semi-detached, duplex, and townhouse dwellings) in the Urban Centres of Aberfoyle and Morriston. A special provision is required for the size of the lots as the minimum lot area within the *Urban Residential* zone is 0.4 hectare while the proposed minimum lot areas are a minimum of 0.19 hectare.

The *Natural Environment* zone provides for the conservation of natural features, including but not limited to, woodland and wetlands. The zone boundaries also include the associated buffers. The *Environmental Protection* zone overlay also represents the natural heritage features on the subject lands.

3.4 SUPPORTING MATERIALS

This Planning Justification Report is intended to be read alongside the accompanying reports and drawings that have been submitted in support of the applications. The following reports and drawings have been prepared and are summarized here for reference. These items should be reviewed concurrently with this Report.

3.4.1 Hydrogeological Assessment

A Hydrogeological Assessment was prepared by Englobe to assess the hydrogeological conditions of the Site and to provide general information regarding the hydrogeological impact of the proposed development on the local groundwater regime. The Assessment included a review of background information including the Wellington County Official Plan, site inspection, groundwater level monitoring and hydraulic conductivity testing, review of the proposed development, construction dewatering flow rate estimate, and mitigation plans for dewatering.

The methodology consisted of five boreholes and four monitoring wells beneath the Site. The borehole findings include sand fill overlying silty sand and clayey silt. Groundwater elevations are noted highest at BH3 at an elevation of 312.8 m which forms a local groundwater divide with groundwater flow to the east of the site directed tot he tributary of Bronte Creek and associated wetlands, and flow to the west directed to Bronte Creek.

Please see the Hydrogeological Assessment for additional information.

3.4.2 Geotechnical Investigation

Terraprobe Inc. was retained to conduct a Geotechnical Investigation for the proposed residential development. The geotechnical investigation determined the prevailing subsurface soil and groundwater conditions to provide geotechnical engineering design advice and recommendations for the building foundations, earthquake and earth pressure design parameters, basement floor slab and drainage and pavement. In addition, comments are also included on pertinent construction aspects including excavation, backfill and ground water control.

The soil conditions encountered at the borehole locations include earth fill materials, silty sand to sand and silt deposits as well as clayey silt deposits. Further the monitoring wells established the ground water level to range from 6.2 mbgs to 7.7 mbgs as measured in August, and September 2022. Based on the findings, the following are the recommendations for the construction of the proposed dwellings:

- Earth fill soils are unsuitable to support the proposed foundations, as such, all foundations must be supported on the underlying component undisturbed native soils and engineering fill;
- Undisturbed silty sand to silt and sand were encountered at 0.8 m depth below grade, which is suitable to support the proposed building foundations; and,
- Where site grades are required to be raised, engineering fill can be used and should consist of clear earth fill or imported granular materials.

Please see the Geotechnical Investigation for additional information.

3.4.3 Traffic Impact Study

GHD Limited was retained to prepare a Traffic Impact Study in support of the proposed residential development. The Study determines the site related traffic and subsequent traffic related impacts on the adjacent road network during the weekday a.m. and p.m. peak hours. The proposed development is expected to generate a total of 20 new two-way trips during the weekday a.m. peak hour consisting of 5 inbound and 15 outbound trips and 25 new two-way trips during the weekday p.m. peak hour consisting of 16 inbound and 9 outbound trips. Under existing conditions, all study intersections are operating with acceptable ratios and delays.

The overall impact of the development generated traffic was found to be negligible to the operation of the study area intersections and traffic flow along Highway 6 and Badenoch Street. The site traffic does not result in any turning movements increasing to critical levels, all critical movements under the future traffic scenarios are a result of the assumed corridor growth rate.

3.4.4 Stage 2 Archaeological Property Assessment

Amick Consulting Limited was retained to prepare a Stage 2 Archeological Property Assessment in support of the proposed development. The Assessment included property inspection and photographic documentation as well as high intensity test pit methodology at a five-metre interval between individual tests pits and high intensity pedestrian survey at an interval of 5 metres between individual transects in October 2022.

As a result of the Stage 2 Property Assessment of the study area, no archaeological resources were encountered. Consequently, the following recommendations are made:

1. No further archaeological assessment of the study area is warranted.
2. The Provincial interest in archaeological resources with respect to the proposed undertaking has been addressed.
3. The proposed undertaking is clear of any archaeological concern.

3.4.5 Environmental Impact Study

An Environmental Impact Study was prepared by Colville Consulting Inc. to delineate the extent of the natural heritage features on the subject property and assess potential impacts associated with the proposed development. The Study also provides mitigation measures to avoid or minimize any potential impacts. As part of the Study, a site reconnaissance was conducted, as well as background review and field surveys. The Study found that three Endangered species (Butternut, Little Brown Myotis and Tri-colored Bat) were observed on the Subject Property and Threatened species observed on the property were limited to Eastern Meadowlark. Furthermore, the Study found the woodland on the subject property and adjacent is considered to be significant woodland. The Study also found a wetland is located on the Subject Property and the extent of same was verified with Conservation Haton. Lastly, there are two tributaries and four main types of Significant Wildlife Habitat identified on the Subject Property. Based on the identified features and the impact assessment, the proposed development will have no impact on significant habitat of Endangered or Threatened Species, the proposed development in the meadow will not impact significant habitat of this species. Furthermore, the recommended 10 metre buffer for the significant woodlands is sufficient to avoid impacts on the trees and species in the woodland area. Lastly, the proposed development provides a 15-metre buffer from the wetland on the west side of the property which is sufficient to maintain the ecological functions of the wetland. For the remainder of the wetland on the property, a setback of a minimum of 15 metres is provided and with consideration of future grading, there are no expected impacts to the ecological functions of the wetland. The Study provide for detailed mitigation measures to avoid any impacts associated within the proposed development.

Please refer to the Environmental Impact Study for additional information.

3.4.6 Functional Servicing and Stormwater Management Report

C.F. Crozier & Associates Inc. (Crozier) was retained to prepare a Functional Servicing and Preliminary Stormwater Management Report in support of the Zoning By-Law Amendment and Draft Plan of Subdivision Applications for the proposed development. The Report identifies that the proposed development will be serviced by individual on-site sewage systems and drilled wells. Regarding the sewage system, the preliminary design flows are expected to be approximately 3,600 L/d for each lot. Each onsite sewage system will consist of an advanced treatment unit discharging to a leaching bed constructed as a Type A dispersal bed with a footprint of approximately 368 m2. Individual lots will be serviced with private drilled wells in accordance with O. Reg. 903 for potable water supply.

The site's stormwater runoff from the developable area will be collected in the proposed roadside infiltration trenches for storm events up to and including the 100-year storm event. Erosion and Sediment controls will be implemented prior to construction and maintained to the satisfaction of the Township and Site Engineer until the site is stabilized.

3.4.7 Fluvial Geomorphological and Meander Belt Width Assessment

A Fluvial Geomorphological and Meander Belt Width Assessment was prepared by GEO Morphix to complete a meander belt assessment for two unnamed tributaries of Bronte Creek to support natural constraints delineation for the proposed development. As part of the Assessment, the scope included a review of applicable background reports and mapping, delineate watercourse reaches based on a desktop assessment, review recent and historical aerial photographs of the site, and complete rapid geomorphological field assessments. Field observations determined TBC-1 is located within the western portion of the subject site, commencing at Highway 6, with no flowing water but isolated pools of standing water and the channels are poorly defined. TB-2 is located within the eastern portion of the subject site, and contains no defined channel and is a swamp consisting of pools of water. TBC-3 is located within the eastern woodlot of the site with no defined channel or evidence of flow. Lastly, TBC-3a is a tributary of TBC-3 which flows through the wooded area located on the eastern portion of the site and has no channel definition of flow.

The Assessment concludes that the drainage features to the east of the subject site are low order streams that contain isolated and interspersed wetland pockets and no defined stream should be located, as such, there is no potential for erosion and a meander belt width is not applicable. For TCB-1, the watercourse flowing through the western portion of the subject site, a meander belt width of 38 metre is recommended, which is a conservative approach. In summary, the meander belt width for TBC-1 is not a limiting constraint on the proposed development.

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4. PLANNING POLICY FRAMEWORK

4.1 *THE PLANNING ACT R.S.O. 1990*

The following Sections analyze the relevant statutory and non-statutory policy documents to determine whether the proposed development is supported by the applicable planning framework, and whether the proposed development represents good planning. The following documents have been considered in this evaluation:

- The Planning Act R.S.O.C.P.13;
- Provincial Policy Statement;
- A Place to Grow – Growth Plan for the Greater Golden Horseshoe;
- Greenbelt Plan;
- County of Wellington Official Plan;
- Township of Puslinch Zoning By-law; and
- Attainable Housing Strategy

This Section of the Report provides an overview of the key policies pertaining to the subject lands and how the proposed development is consistent with or conforms to the applicable policies.

The *Planning Act* sets out the regulatory framework for all land use planning matters in the Province of Ontario. It provides the basis for the consideration of matters of Provincial Interest. Land use planning decisions must have regard for matters of Provincial Interest under Section 2 of the Planning Act, which states:

The Minister, the council of a municipality, a local board, a planning board and the Tribunal, in carrying out their responsibilities under this Act, shall have regard to, among other matters, matters of provincial interest such as,

a) the protection of ecological systems, including natural areas, features and functions;
b) the protection of the agricultural resources of the Province;
c) the conservation and management of natural resources and the mineral resource base;
d) the conservation of features of significant architectural, cultural, historical, archaeological or scientific interest;
e) the supply, efficient use and conservation of energy and water;
f) the adequate provision and efficient use of communication, transportation, sewage and water services and waste management systems;
g) the minimization of waste;
h) the orderly development of safe and healthy communities;
(h.1) the accessibility for persons with disabilities to all facilities, services and matters to which this Act applies;
j) the adequate provision of a full range of housing, including affordable housing;
l) the protection of the financial and economic well-being of the Province and its municipalities;
p) the appropriate location of growth and development;
r) the promotion of built form that,
i. is well-designed,

ii. *encourages a sense of place, and*
iii. *provides for public spaces that are of high quality, safe, accessible, attractive and vibrant;*

s) *the mitigation of greenhouse gas emissions and adaptation to a changing climate. 1994, c. 23, s. 5; 1996, c. 4, s. 2; 2001, c. 32, s. 31 (1); 2006, c. 23, s. 3; 2011, c. 6, Sched. 2, s. 1; 2015, c. 26, s. 12; 2017, c. 10, Sched. 4, s. 11 (1); 2017, c. 23, Sched. 5, s. 80.*

The regulations and direction of Section 2 of the Planning Act inform the Provincial Policy Statement, thereby ensuring that consistency with the Provincial Policy Statement demonstrates having appropriate regard for Section 2 of the Planning Act. The Provincial Policy Statement is given consideration in the following Section of this Report.

It is our opinion that the proposed development has regard for matters of provincial interest in terms of efficiently utilizing land and developing healthy and safe communities by proposing dwellings close to public amenities including parks. The proposed development will provide a well-designed built form by considering lots with efficient sizes and frontages. Each lot is approximately 0.2 hectares which is an appropriate size for detached dwellings and they have minimum of 20 metres of frontage which provides sufficient frontage. Furthermore, the proposed low-density subdivision is consistent with the surrounding area built form and lot sizes. The proposed development provides for the extension of municipal roads to be designed in accordance with municipal standards. Lastly, the Zoning By-law Amendment application provides for the preservation of the natural heritage features within the eastern portion of the subject lands.

4.2 PROVINCIAL POLICY STATEMENT

The current version of the Provincial Policy Statement (PPS) was issued under Section 3 of the Planning Act and came into effect on May 1, 2020 and provides policy direction on matters of provincial interest related to land use planning and development. The PPS aims to promote appropriate development while ensuring that resources of provincial interest, public health and safety, and the quality of the natural environment are protected. All decisions affecting planning matters in Ontario "shall be consistent with" the policy statements issued under the Planning Act.

The PPS encourages efficient land use planning and growth management to create and maintain strong communities and a healthy environment while encouraging economic growth over the long term. These land use patterns promote a mix of housing, including affordable housing, employment, recreation, parks and open spaces and transportation choices. The PPS also encourages the efficient use of existing infrastructure and public service facilities and requires that municipalities plan for an appropriate range and mix of land uses and built forms throughout the Province. The PPS supports intensification, infill and redevelopment where appropriate in order to promote the efficient use of land where infrastructure and public services. This would also result in a better use of infrastructure.

Building Strong Healthy Communities

Section 1.0 of the PPS provides direction related to "Building Strong Healthy Communities" and is applicable to the subject lands. It generally encourages a variety of land uses within communities and encourages the efficient use of land and infrastructure.

Managing and Directing Land Use

Section 1.1.1 contains requirements for managing and directing land use to achieve efficient and resilient development and land use patterns. The relevant policies are included below.

1.1.1 Healthy, liveable and safe communities are sustained by:

- *a) promoting efficient development and land use patterns which sustain the financial well-being of the Province and municipalities over the long term;*
- *b) accommodating an appropriate affordable and market-based range and mix of residential types (including single-detached, additional residential units, multi-unit housing, affordable housing and housing for older persons), employment (including industrial and commercial), institutional (including places of worship, cemeteries and long-term care homes), recreation, park and open space, and other uses to meet long-term needs;*
- *d) avoiding development and land use patterns that would prevent the efficient expansion of settlement areas in those areas which are adjacent or close to settlement areas;*
- *e) promoting the integration of land use planning, growth management, transit-supportive development, intensification and infrastructure planning to achieve cost-effective development patterns, optimization of transit investments, and standards to minimize land consumption and servicing costs;*
- *g) ensuring that necessary infrastructure and public service facilities are or will be available to meet current and projected needs;*

The proposed development is consistent with the above noted policies, as it provides for growth within a settlement area. This development would add to the current housing supply of the area for current and future residents and provides for the efficient expansion of existing local roads.

Settlement Areas

Section 1.1.3 of the PPS provides direction on future growth and development within Settlement Areas and recognizes Settlement Areas as critical to the long-term development and prosperity of Ontario's communities. The subject lands are located within the Settlement Area of Morriston. The PPS promotes efficient development patterns within settlement areas, which are locations where growth and development is to be focused. The following policies are relevant to the applications:

1.1.3.1 Settlement areas shall be the focus of growth and development.

1.1.3.2 Land use patterns within settlement areas shall be based on densities and a mix of land uses which:

- *a) efficiently use land and resources;*
- *b) are appropriate for, and efficiently use, the infrastructure and public service facilities which are planned or available, and avoid the need for their unjustified and/or uneconomical expansion;*
- *c) minimize negative impacts to air quality and climate change, and promote energy efficiency;*
- *d) prepare for the impacts of a changing climate;*
- *e) support active transportation;*

Land use patterns within settlement areas shall also be based on a range of uses and opportunities for intensification and redevelopment in accordance with the criteria in policy 1.1.3.3, where this can be accommodated.

1.1.3.3 Planning authorities shall identify appropriate locations and promote opportunities for transit-supportive development, accommodating a significant supply and range of housing options through intensification and redevelopment where this can be accommodated taking into account existing building stock or areas, including brownfield sites, and the availability of suitable existing or planned infrastructure and public service facilities required to accommodate projected needs.

1.1.3.4 Appropriate development standards should be promoted which facilitate intensification, redevelopment and compact form, while avoiding or mitigating risks to public health and safety.

The proposed development supports the policies of the PPS regarding the efficient use of land and resources by developing an underutilized parcel within a settlement area which is adjacent to similar low density uses and a municipal park. Furthermore, the proposed lot sizes are smaller than the Urban Residential zone permits, to increase the density and provide for appropriate compact built form while also respecting the limitations for lot sizes to accommodate private services.

Rural Area in Municipalities

Section 1.1.4 of the PPS provides policies related to rural areas which include rural settlement areas. It is our understanding the County of Wellington has adopted Official Plan Amendment 119 that identifies Morriston as a Rural Settlement Area, the Province has yet to make decision on OPA 119.

1.1.4.2 In rural areas, rural settlement areas shall be the focus of growth and development and their vitality and regeneration shall be promoted.

1.1.4.3 When directing development in rural settlement areas in accordance with policy 1.1.3, planning authorities shall give consideration to rural characteristics, the scale of development and the provision of appropriate service levels.

The proposed development provides for a low-density subdivision, in keeping with the existing character of Morriston and preserves the environmental features within the eastern portion of the subject lands. The proposed lot sizes are also responsive to the provision of private services required for development in Morriston.

Housing

Policies related to housing are found in Section 1.4 of the PPS. The PPS encourages a range and a mixture of housing types and densities in order to meet the current and projected needs of residents. The following policies are relevant:

1.4.3 Planning authorities shall provide for an appropriate range and mix of housing options and densities to meet projected market-based and affordable housing needs of current and future residents of the regional market area by:

a) establishing and implementing minimum targets for the provision of housing which is affordable to low- and moderate-income households and which aligns with applicable housing and homelessness plans. However, where planning is conducted by an upper-tier municipality, the upper-tier municipality in consultation with the lower-tier municipalities may identify a higher target(s) which shall represent the minimum target(s) for these lower-tier municipalities;
b) permitting and facilitating:

1. *all housing options required to meet the social, health, economic and well-being requirements of current and future residents, including special needs requirements and needs arising from demographic changes and employment opportunities; and*
2. *all types of residential intensification, including additional residential units, and redevelopment in accordance with policy 1.1.3.3;*

c) *directing the development of new housing towards locations where appropriate levels of infrastructure and public service facilities are or will be available to support current and projected needs;*

d) *promoting densities for new housing which efficiently use land, resources, infrastructure and public service facilities, and support the use of active transportation and transit in areas where it exists or is to be developed;*

f) *establishing development standards for residential intensification, redevelopment and new residential development which minimize the cost of housing and facilitate compact form, while maintaining appropriate levels of public health and safety.*

The PPS directs the development of new housing towards locations where an appropriate level of infrastructure and public service facilities exist. The subject lands have direct access to community services including an adjacent park, and restaurants at the intersection of Badenoch Street and Highway 6. The proposed lots and associated dwellings are reflective of the surrounding area context and private servicing requirement.

Infrastructure and Public Facilities

The infrastructure policies of the PPS are outlined in Section 1.6. Existing infrastructure and public service facilities are to be maximized, wherever possible, before developing new infrastructure and public service facilities. The following policies are relevant to the proposed development:

1.6.6.4 Where municipal sewage services and municipal water services or private communal sewage services and private communal water services are not available, planned or feasible, individual on-site sewage services and individual on-site water services may be used provided that site conditions are suitable for the long-term provision of such services with no negative impacts. In settlement areas, individual on-site sewage services and individual on-site water services may be used for infilling and minor rounding out of existing development.

1.6.6.7 Planning for stormwater management shall:

a) *be integrated with planning for sewage and wastewater services and ensure that systems are optimized, feasible and financially viable over the long term;*

b) *minimize, or where possible, prevent increases in contaminant loads;*

c) *minimize erosion and changes in water balance, and prepare for the impacts of a changing climate through the effective management of stormwater, including the use of green infrastructure;*

d) *mitigate risks to human health, safety, property and the environment;*

e) *maximize the extent and function of vegetative and pervious surfaces and*

f) *promote stormwater management best practices, including stormwater attenuation and re-use, water conservation and efficiency, and, low impact development.*

The proposed development will be provided with individual private sewage and water services in a manner consistent with the applicable policies and guidelines.

Furthermore, a Functional Servicing and Preliminary Stormwater Management Report has been prepared by Crozier which identifies the proposed development will provide for stormwater quality and quantity control via swales and infiltration trenches.

Transportation System

The relationship between transportation infrastructure and growth management is a primary consideration found throughout the PPS. The proposed development is in an area that is well serviced by public transit. The PPS encourages land use patterns that promote alternative modes of transportation. The following transportation policies are relevant to the proposed development:

1.6.7.1 Transportation systems should be provided which are safe, energy efficient, facilitate the movement of people and goods, and are appropriate to address projected needs.

1.6.7.3 As part of a multimodal transportation system, connectivity within and among transportation systems and modes should be maintained and, where possible, improved including connections which cross jurisdictional boundaries.

Access to the proposed development is planned to be provided through the extension of Ochs Street, a municipal local road and the introduction of one local road, both with right-of-ways of 18.0 metres. Currently, no public transit is available in the area.

Natural Heritage

Section 2.1 of the PPS provides policies related to natural heritage features and ensuring natural areas are protected for the long-term. Due to the natural features on the subject lands, the following policies are relevant:

2.1.1 Natural features and areas shall be protected for the long term.

2.1.2 The diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features.

2.1.3 Natural heritage systems shall be identified in Ecoregions 6E & 7E1, recognizing that natural heritage systems will vary in size and form in settlement areas, rural areas, and prime agricultural areas.

2.1.4 Development and site alteration shall not be permitted in:

a) significant wetlands in Ecoregions 5E, 6E and 7E1; and
b) significant coastal wetlands.

2.1.5 Development and site alteration shall not be permitted in:

a) significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E and 7E1;
b) significant woodlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River)1;
c) significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River)1;
d) significant wildlife habitat;
e) significant areas of natural and scientific interest; and
f) coastal wetlands in Ecoregions 5E, 6E and 7E1 that are not subject to policy 2.1.4(b)

unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.

2.1.6 Development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.

2.1.7 Development and site alteration shall not be permitted in habitat of endangered species and threatened species, except in accordance with provincial and federal requirements.

2.1.8 Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.4, 2.1.5, and 2.1.6 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.

2.1.9 Nothing in policy 2.1 is intended to limit the ability of agricultural uses to continue.

The subject lands contain a woodland and a wetland, both of which are proposed to be conserved. A buffer of 15.0 metres has been provided to the wetland and a buffer of 10.0 metres has been provided for the woodland.

The natural features and associated buffers will be protected via conveyance to the Township and with the rezoning of this portion of the subject lands to "Natural Environment" and the "Environmental Protection" overlay.

An Environmental Impact Study has been prepared which provides details regarding the features and buffers and concludes that the proposed subdivision is not expected to have a negative impact on the natural areas.

<u>Water</u>

Section 2.0 of the PPS includes policies regarding the protection and improvement of quality and quantity of water.

2.2.1 Planning authorities shall protect, improve or restore the quality and quantity of water by:

- *a) using the watershed as the ecologically meaningful scale for integrated and long-term planning, which can be a foundation for considering cumulative impacts of development;*
- *b) minimizing potential negative impacts, including cross-jurisdictional and cross-watershed impacts;*
- *c) evaluating and preparing for the impacts of a changing climate to water resource systems at the watershed level;*
- *d) identifying water resource systems consisting of ground water features, hydrologic functions, natural heritage features and areas, and surface water features including shoreline areas, which are necessary for the ecological and hydrological integrity of the watershed;*
- *e) maintaining linkages and related functions among ground water features, hydrologic functions, natural heritage features and areas, and surface water features including shoreline areas;*
- *f) implementing necessary restrictions on development and site alteration to:*
  1. *protect all municipal drinking water supplies and designated vulnerable areas; and*
  2. *protect, improve or restore vulnerable surface and ground water, sensitive surface water features and sensitive ground water features, and their hydrologic functions;*
- *g) planning for efficient and sustainable use of water resources, through practices for water conservation and sustaining water quality;*
- *h) ensuring consideration of environmental lake capacity, where applicable; and*
- *i) ensuring stormwater management practices minimize stormwater volumes and contaminant loads, and maintain or increase the extent of vegetative and pervious surfaces.*

2.2.2 Development and site alteration shall be restricted in or near sensitive surface water features and sensitive ground water features such that these features and their related hydrologic functions will be protected, improved or restored. Mitigative measures and/or alternative development approaches may be required in order to protect, improve or restore sensitive surface water features, sensitive ground water features, and their hydrologic functions.

The subject lands consist of proposed lots that are appropriately sized to accommodate private water and wastewater services (well and septic) as municipal services are not available. The depth, size, and locations of the wells will be determined during the detailed design of each individual lot. It should be noted that the groundwater in the area is mostly by privately drilled groundwater wells.

Prior to the start of testing a private well survey will be completed to determine locations, construction details, and operational history of private domestic supply wells within a 250 m radius of the site. As part of the well survey permission to monitoring private domestic supply wells will be requested over the duration of well testing. Based on a review of well records we expect adequate groundwater (quality and quantity) will be available to support proposed residential uses.

Privately owned individual on-site sewage systems are proposed for this development. This servicing approach is consistent with the greater community and is suitable for rural estate subdivisions. Privately owned sewage systems are owned and operated by the property owner and there is no requirement for additional maintenance or review from the municipality. It is our opinion that the proposal is consistent with the PPS and we trust that the above is sufficient in addressing the above-noted comment.

Summary

The proposed development is consistent with the Provincial Policy Statement as it demonstrates efficient development within an existing settlement area, provides for increased housing opportunities, protects natural heritage features, and appropriately expands existing transportation networks. The proposed development provides for 23 detached dwelling lots that can accommodate private individual services and are compatible with the surrounding built form.

Furthermore, the proposed development provides for the protection of the natural heritage features in the eastern portion of the site with the appropriate rezoning to an Environmental Protection zone and providing a 10-metre buffer to development. Lastly, stormwater management is to be provided via infiltration trenches and swales in accordance with the submitted Functional Servicing and Stormwater Management Report. In summary, it is our opinion that the proposed development is consistent with the Provincial Policy Statement.

4.3 A PLACE TO GROW – GROWTH PLAN FOR THE GREATER GOLDEN HORSESHOE

A Place to Grow: Growth Plan for the Greater Golden Horseshoe (Growth Plan) was prepared and approved under the Places to Grow Act, 2005 and provides a framework for implementing the Provincial Government's vision for building stronger and more prosperous communities by better managing growth in the Greater Golden Horseshoe. The current Growth Plan took effect on August 28, 2020 as Amendment No. 1 to the 2019 Growth Plan.

Guiding Principles

The Growth Plan provides policy direction regarding how land is developed, resources are managed and protected and public dollars are invested based on the guiding principles of Section 1.2.1 of the Growth Plan. Some of the guiding principles include the following:

- Support the achievement of complete communities that are designed to support healthy and active living and meet people's needs for daily living throughout an entire lifetime.
- Support a range and mix of housing options, including second units and affordable housing, to serve all sizes, incomes, and ages of households.
- Protect and enhance natural heritage, hydrologic, and landform systems, features and functions.

The proposed development has regard to the above-mentioned guiding principles of the Growth Plan as the proposal adds to the housing supply of the area, protects natural heritage features and provides development that is more compact which can assist in meeting the Growth Plans objective of creating complete communities.

Managing Growth

Section 2.2.1 of the Growth Plan provides policies regarding growth. The following policies have regards to the proposed development:

2.2.1.2. Forecasted growth to the horizon of this Plan will be allocated based on the following:

a) the vast majority of growth will be directed to settlement areas that:
  i. have a delineated built boundary;
  ii. have existing or planned municipal water and wastewater systems; and
  iii. can support the achievement of complete communities;

b) growth will be limited in settlement areas that:
  i. are rural settlements;
  ii. are not serviced by existing or planned municipal water and wastewater systems; or
  iii. are in the Greenbelt Area;

c) within settlement areas, growth will be focused in:
  i. delineated built-up areas;
  ii. strategic growth areas;
  iii. locations with existing or planned transit, with a priority on higher order transit where it exists or is planned; and
  iv. areas with existing or planned public service facilities;

d) development will be directed to settlement areas, except where the policies of this Plan permit otherwise;

2.2.1.3. Upper- and single-tier municipalities will undertake integrated planning to manage forecasted growth to the horizon of this Plan, which will:

a) establish a hierarchy of settlement areas, and of areas within settlement areas, in accordance with policy 2.2.1.2;

2.2.1.4. Applying the policies of this Plan will support the achievement of complete communities that:

a) feature a diverse mix of land uses, including residential and employment uses, and convenient access to local stores, services, and public service facilities;

The proposed development is located within a settlement area without access to municipal services, therefore the proposed development is limited to a built form that can be accommodated by private services. The proposed development is within a Secondary Urban Centre. The proposed development is a low-density residential subdivision which considers sufficient buffer from the natural features on the south side of the subject lands. Furthermore, the proposed development has access to land uses such as parks and nearby limited commercial uses, which support the achievement of a complete community.

Housing

Section 2.2.6 of the Growth Plan provides policies related to Housing. The following policies are relevant to the proposed development:

1. Upper- and single-tier municipalities, in consultation with lower-tier municipalities, the Province, and other appropriate stakeholders, will:

- *a) support housing choice through the achievement of the minimum intensification and density targets in this Plan, as well as the other policies of this Plan by:*
  - *i. identifying a diverse range and mix of housing options and densities, including additional residential units and affordable housing to meet projected needs of current and future residents; and*

2. Notwithstanding policy 1.4.1 of the PPS, 2020, in implementing policy 2.2.6.1, municipalities will support the achievement of complete communities by:

- *a) planning to accommodate forecasted growth to the horizon of this Plan;*
- *b) planning to achieve the minimum intensification and density targets in this Plan;*
- *c) considering the range and mix of housing options and densities of the existing housing stock; and*
- *d) planning to diversify their overall housing stock across the municipality.*

The proposed development adds to the housing supply of the area in order to accommodate the forecasted population. The proposed development also intensifies the use of the land with a more compact form of development.

Transportation

Section 3.2.2 contains policies regarding Transportation and the following policies are relevant to the proposed development:

3.2.2.2. The transportation system within the GGH will be planned and managed to:

- *a) provide connectivity among transportation modes for moving people and for moving goods;*
- *b) offer a balance of transportation choices that reduces reliance upon the automobile and promotes transit and active transportation;*

The proposed development provides a network of streets which provides access to the detached dwellings and expands the current network. The proximity to nearby parks, including the one adjacent to the subject lands, will assist in promoting active transportation.

Stormwater Management

Section 3.2.7 provided policies regarding Stormwater Management. In accordance with the policies of this section:

3.2.7.2. Proposals for large-scale development proceeding by way of a secondary plan, plan of subdivision, vacant land plan of condominium or site plan will be supported by a stormwater management plan or equivalent, that:

- *a) is informed by a subwatershed plan or equivalent;*

b) *incorporates an integrated treatment approach to minimize stormwater flows and reliance on stormwater ponds, which includes appropriate low impact development and green infrastructure;*
c) *establishes planning, design, and construction practices to minimize vegetation removal, grading and soil compaction, sediment erosion, and impervious surfaces; and*
d) *aligns with the stormwater master plan or equivalent for the settlement area, where applicable.*

The proposed development is supported by a Functional Servicing and Preliminary Stormwater Management Report which identifies stormwater will be accommodated via infiltration trenches and swales. For further details please refer to the Report provided by Crozier Consulting Engineers.

Natural Heritage System

Natural Heritage System policies are found within Section 4.2.2 of the Growth Plan, which states:

4.2.2.1. A Natural Heritage System for the Growth Plan has been mapped by the Province to support a comprehensive, integrated, and long-term approach to planning for the protection of the region's natural heritage and biodiversity. The Natural Heritage System for the Growth Plan excludes lands within settlement area boundaries that were approved and in effect as of July 1, 2017.

The subject lands are located within the settlement area as, such, the policies of the Natural Heritage System do not apply to the proposed development. The features have still been evaluated and are proposed for protection.

Summary

It is our opinion the proposed development conforms to the Growth Plan as it adds to the existing housing supply in Morriston and Puslinch with a built form that is contextually appropriate for the area and servicing availability. The reduced lot sizes promote a more compact form of development. Furthermore, the proposed development provides for the appropriate extension of the municipal road network with the expansion of Ochs Street and the introduction of a new municipal road to service the detached dwellings. Lastly, the proposed development protects the natural heritage features by zoning the features and associated buffer to a conservation zone, prohibiting development in these areas.

4.4 GREENBELT PLAN

The Greenbelt Plan was prepared and approved under the Greenbelt Act, 2005 and took effect on December 16, 2004. The Greenbelt Plan, together with the Growth Plan, the Niagara Escarpment Plan (NEP) and the Oak Ridges Moraine Conservation Plan (ORMCP), builds on the Provincial Policy Statement (PPS) to establish a land use planning framework for the GGH that supports a thriving economy, a clean and healthy environment and social equity.

The subject lands are located within the Town/Village designation of the Protected Countryside (Figure 4). Settlement areas, identified as Towns/Villages and Hamlets, vary in size, diversity and intensity of uses and are found throughout the Protected Countryside.

The policies for these settlement areas support the achievement of complete communities that are healthier, safer, more equitable and more resilient to the impacts of climate change.

Towns/Villages have the largest concentrations of population, employment and development within the Protected Countryside and tend to be the central settlement area(s) for their respective municipalities. Although most have full municipal water and sewer services, some only have a municipal water service and/or a combination of private and municipal water services. Towns/Villages are the focus of development and related economic and social activity.

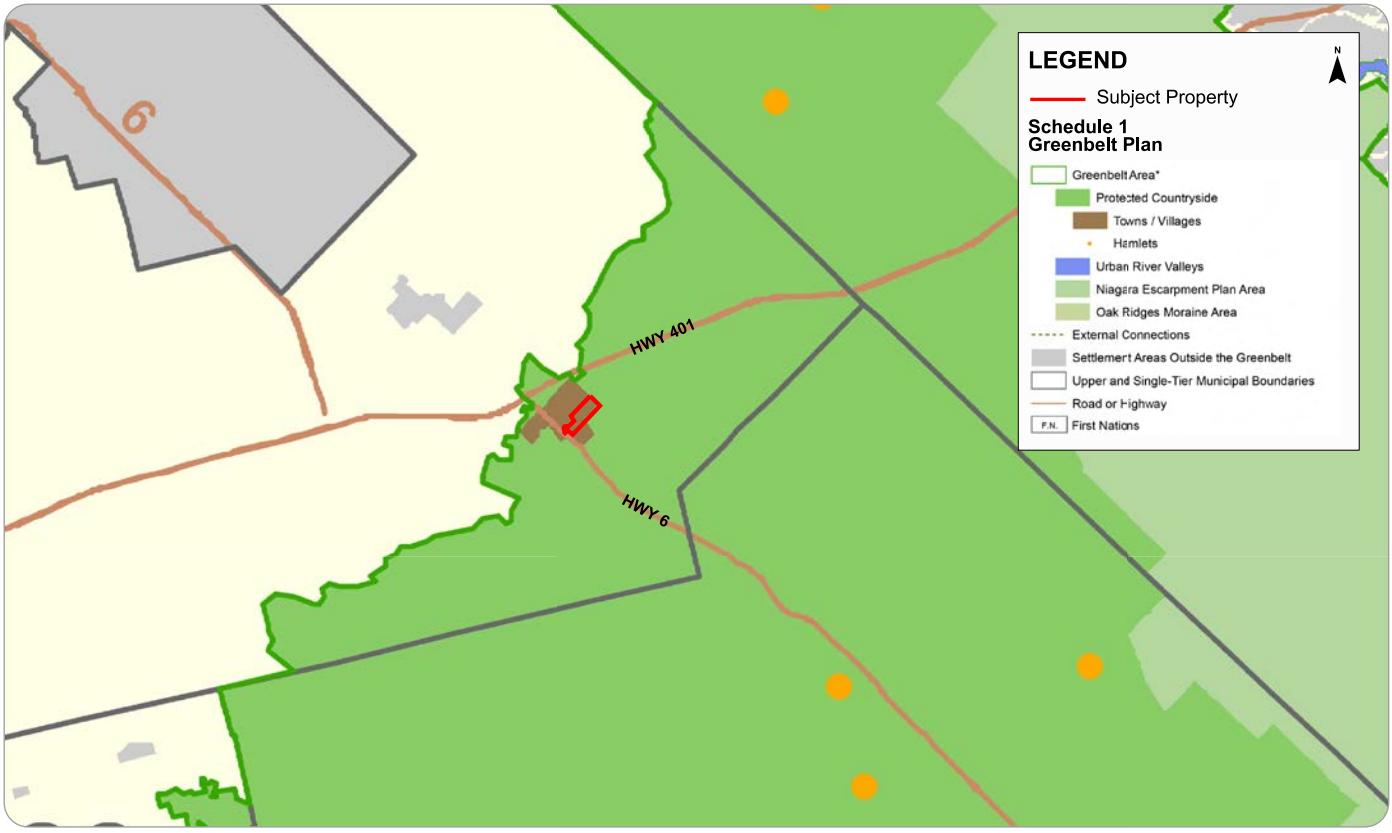

Figure 4: Greenbelt Plan

The following policies have regard to the proposed development:

1.1.2.4. Settlement Areas

a) *Support for a strong rural economy by allowing for the social, economic and service functions through the residential, institutional and commercial/industrial uses needed by the current and future population within the Greenbelt, particularly within settlement areas;*
b) *Sustaining the character of the countryside and rural communities;*
c) *Support for the achievement of complete communities that promote and enhance human health and social well-being, are economically and environmentally sustainable, moving towards low-carbon communities, with the long-term goal of net-zero communities; and*

The proposed development sustains the existing character of Morriston by proposing development that is similar to the existing built form and uses. Furthermore, the introduction of 21 detached lots will assist in supporting the current and future population of Puslinch. Lastly, the proposed development includes smaller lot sizes than contemplated in the Official Plan to provide for a more compact community to efficiently utilize the land, nearby services, and road network.

3.4.3. Town/Village Policies

For lands within Towns/Villages in the Protected Countryside, the following policies shall apply:

Towns/Villages are subject to the policies of the Growth Plan and continue to be governed by official plans and related programs or initiatives and are not subject to the policies of this Plan, save for the policies of sections 3.1.5, 3.2.3, 3.2.6, 3.3 and 3.4.2.

The County of Wellington Official Plan governs the Morriston settlement area, the Official Plan is reviewed in the following Section.

According to Section 3.1.5, development should support the agricultural system and should not have any impact on the agri-food system and also provide access and infrastructure. It is not anticipated that the proposed development with impact the agri-food system, as the proposed subdivision is located within an existing settlement area.

Section 3.2.3 provides policies about Water Resource System. The proposed development is to be serviced with individual water and wastewater servicing and the proposed stormwater infrastructure is detailed in the Functional Servicing and Preliminary Stormwater Report.

Section 3.2.6 contains policies regarding external connections of the Natural Heritage System which do not apply to the proposed development. However, the proposed natural features on the subject lands are proposed for conservation.

Section 3.3 provides policies relating to Parkland, Open Space and Trails policies and how the development should use parklands, open spaces, water bodies and trails across the Greenbelt for recreation. As mentioned earlier, the proposed development is adjacent to natural features and parkland which provides an opportunity for recreation. Potential trail networks will be discussed with the Township.

Section 3.4.2 provides direction for the municipalities about the developments within the lands on Protected Countryside.

It is our opinion the proposed development conforms to the Greenbelt Plan as it proposes development within a Town/Village. Towns/Villages have the largest concentrations of population, employment and development within the Protected Countryside and tend to be the central settlement area(s) for their respective municipalities. The proposed residential subdivision provides an opportunity to accommodate the future population and contribute to developing the settlement area of Morriston in the Township of Puslinch.

4.5 COUNTY OF WELLINGTON OFFICIAL PLAN

This County of Wellington Official Plan is intended to give direction to the physical development of the County, its local municipalities and to the long-term protection of County resources. This Official Plan was approved by the Ministry of Municipal Affairs on April 13, 1999 and came into effect on May 6, 1999.

In accordance with Section 3.1 of the County Official Plan, Wellington County will grow from approximately 96,000 people in 2016 to approximately 140,000 in 2041. Wellington will plan for new housing, commerce, employment and services for about 46,000 new residents. The Official Plan is currently under review and Wellington County is expected to grow to approximately 160,000 people and 70,000 jobs over the next 30 years.

As a general strategy, Wellington will encourage development patterns which:

- are cost efficient;
- are environmentally sound;
- are compatible with existing uses;
- maintain small town character;
- maintain resource land; and,
- provide access to community services and facilities.

To achieve the general growth strategy Wellington will encourage a greater share of the County's growth to locate in the urban system than has been the norm. New multiple lots and units for residential development will be directed to Urban Centres and Hamlets, and may be allowed in site-specific locations with existing approved zoning or designation that permits this type of development. The priorities for directing growth will be as follows:

1. *The majority of growth will be directed to urban centres that offer municipal water and sewage services.*
2. *Growth will be limited in urban centres and hamlets that offer partial, private communal or individual on-site services.*
3. *To a lesser extent, growth will also be directed to secondary agricultural areas.*

Per Section 3 of the County's Official Plan, the following table shows the projected growth in the Township of Puslinch and Morrison.

Table 1: Projected Growth in the Township of Puslinch

	2016	2036	2041
Puslinch			
Total Population	7,815	9,565	9,655
Households	2,685	3,295	3,335
Morrison			
Total Population	480	590	620
Households	185	225	235

According to Schedule 7 – Puslinch Land Use, the subject lands are designated as "Urban Centre". Urban Centres are expected to provide a full range of land use opportunities. Residential uses of various types and densities, commercial, industrial and institutional uses as well as parks and open space uses will be permitted where compatible and where services are available. Per Section 7.5.5 of the County Official Plan:

> *"Urban centres shall provide a broad range of residential uses to provide a diverse supply of housing, including affordable housing. In Wellington, the single-family residence will continue to be the dominant use of urban lands. Other forms of housing at densities appropriate to the servicing and the nature of the community will also be developed including semi-detached, duplex townhouse and apartment units."*

In accordance with Schedule A7-2 – Morrison Land Use, the subject lands are designated as "*Residential*", "*Greenlands*" and "*Core Greenlands*" (Figure 5). According to Section 8.3, the Official Plan attempts to provide for urban centres with populations as set out in Section 3. To accomplish this growth, it is essential to provide adequate opportunities for housing in each urban centre. The single-detached home is currently the dominant housing type in urban centres and this situation is expected to continue. However, new housing types are needed to provide a greater variety of residential accommodation as well as a more affordable housing supply. The Official Plan anticipates that semi-detached, townhouse and apartment dwellings will be developed to respond to this need and that these units may eventually account for at least one quarter of all housing units in most urban centres.

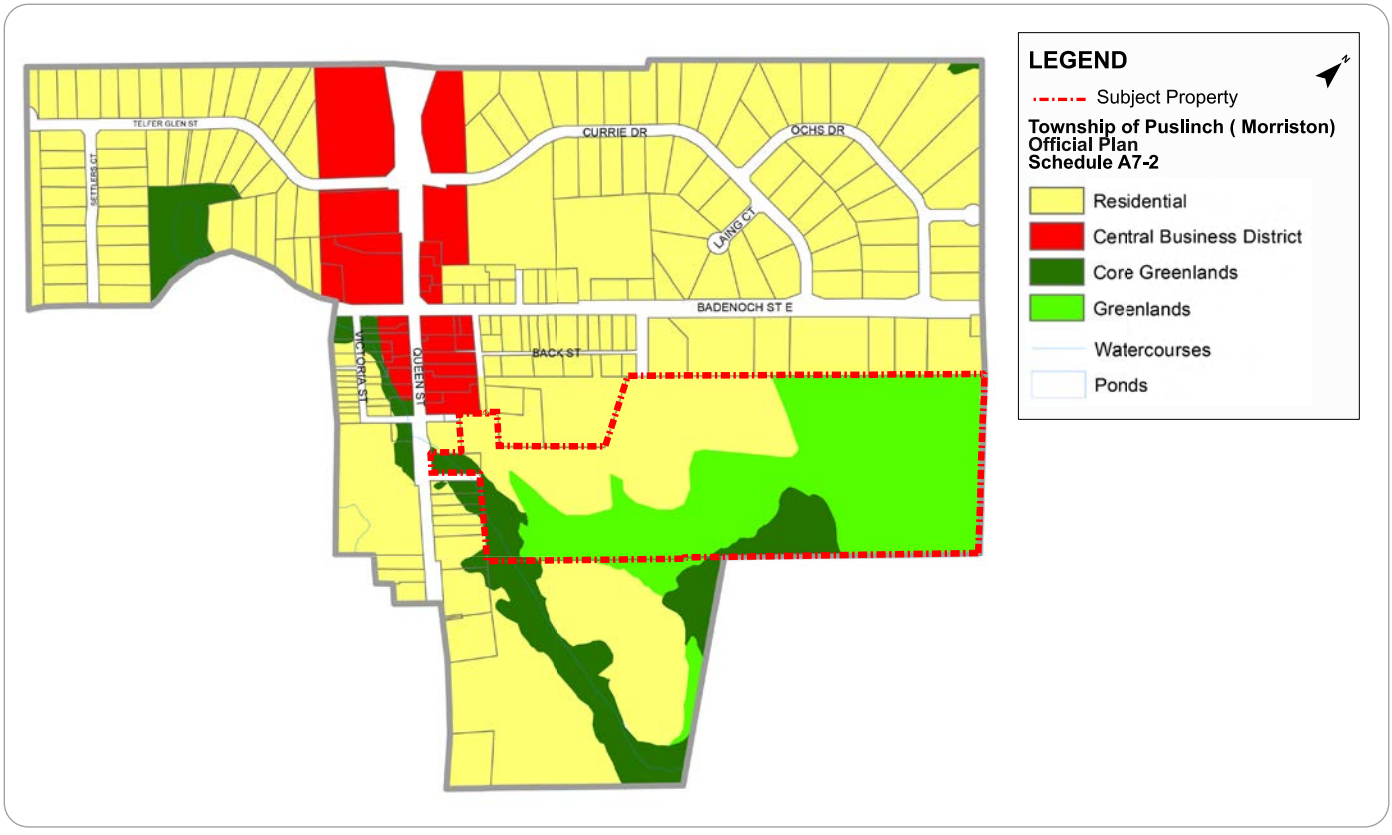

Figure 5: Schedule A7-2 – Morriston Land Use

Housing

Section 4.4 of the County Official Plan outlines the policies regarding housing. The following policies are applicable to the proposed development:

4.4.1 Supply

The County will ensure that residential growth can be accommodated for a minimum of 10 years through residential intensification, redevelopment and if necessary, lands which are designated and available for new residential development.

The County will maintain at all times where new development is to occur, land with servicing capacity sufficient to provide at least a 3 year supply of residential units available through lands suitably zoned to facilitate residential intensification and redevelopment, and land in draft approved and registered plans.

4.4.2 Variety

The County will provide for a variety of housing types to satisfy the present and future social, health and well-being requirements of residents of the regional market area. New residential developments will be promoted at densities which efficiently use available servicing and are appropriate to site conditions and existing patterns of development.

4.4.3 Residential Intensification

This Plan contains policies encouraging intensification primarily in urban centres but also, to a much lesser extent in hamlets. The strategic approach to intensification intends to retain small town character and revitalize downtown areas which includes:

e) encouraging modest intensification in stable residential areas respecting the character of the area. Stable residential areas are considered to be established areas generally consisting of predominantly low-density housing on local roads with the built boundary;
h) encouraging small scale intensification in hamlets consistent with their character and servicing including accessory or second residences, limited severances and conversions; and
i) encouraging the development of appropriate standards for residential intensification, redevelopment and new residential development which are cost effective, environmentally sound and compatible with existing uses, small town scale and character;
j) ensuring that adequate infrastructure is, or will be, established to serve the anticipated development.

The proposed development provides an opportunity for modest intensification which is consistent with the surrounding context and private servicing. The proposed development would add to the housing supply of the area with appropriate compact form that respects the servicing limitations and adjacent built form.

Planning Impact Assessment

According to section 4.6.2 of the County Official Plan, planning impact assessments may be required to evaluate:

a) the need for the proposed use other than for aggregate operations, taking into account other available lands or buildings in the area;
b) the appropriateness of the proposed site for the use proposed taking into consideration the size and shape of the land and its ability to accommodate the intensity of use proposed;
c) the adequacy of the proposed method of servicing the site;
d) the compatibility of the proposed use with consideration given to the height, location, proximity and spacing of buildings; the separation between various land uses; impacts from noise, odor, dust or other emissions from the proposed use and from adjacent land uses; loss of privacy, shadowing or impact on cultural heritage resources and

landscapes;

e) *the impact on natural resources such as agricultural land and mineral aggregate deposits;*
f) *the impact on biodiversity and connectivity of natural features and areas;*
g) *the exterior design in terms of bulk, scale and layout of buildings and other design elements;*
h) *the possibility that site contamination has occurred or the site may contain historic petroleum wells or associated works, and if so, demonstrate compliance with provincial regulations;*
i) *methods of reducing or eliminating negative impacts;*
j) *other planning matters considered important by a Council.*

The proposed development is compatible with the surrounding context in terms of use, density, height, separation of buildings. Further, a compatibility study and noise study were not required as part of the applications therefore it is anticipated that the proposed development will not result in negative impacts to the surrounding area. The proposed development provides a 10-metre buffer to the natural heritage features to mitigate any potential impacts from development, which is further supported in the Environmental Impact Study. Lastly, the proposed subdivision is planned to be serviced with private individual water and wastewater services which can be appropriately accommodated with the lot sizes.

Public Spaces, Parks and Open Spaces

According to Section 4.11, Wellington is fortunate to have a number of publicly-accessible rail trails, agreement forest trails, rivers, lakes and reservoirs, conservation areas, and municipal parks and recreation complexes. Equally important is the involvement of community groups who provide support and stewardship for a number of these facilities.

The County will promote healthy, active communities by:

a) *planning public roads, streets and facilities to be safe, meet the needs of pedestrians, and facilitate pedestrian and non-motorized movement, including but not limited to, walking and cycling;*
b) *providing for a full range and equitable distribution of publicly-accessible built and natural settings for recreation, including facilities, parklands, open space areas, trails, and, where practical and appropriate, water-based resources;*
d) *considering the impacts of planning decisions on parks, agreement forests and conservation areas.*

The proposed development provides for the expansion of Ochs Street as well as a new public road, which will be designed in accordance with the applicable Township standards. Furthermore, the proposed subdivision is adjacent to an existing municipal park providing for convenient access to the facilities for future residents. Lastly, the applications provide for the protection of the natural heritage features on the subject lands.

Urban System

In accordance with Section 7, the Urban System includes the larger urban places in Wellington, which are expected to accommodate the majority of growth over the planning period. The Urban System includes:

- Hamlets; and,
- Urban Centres.

The subject lands are located within the Morriston Urban Centre. Section 7.5 provides policies regarding Urban centres:

7.5.1 Permitted Uses

Urban Centres are expected to provide a full range of land use opportunities. Residential uses of various types and densities, commercial, industrial and institutional uses as well as parks and open space uses will be permitted where compatible and where services are available. More detailed official plan designations and policies as well as zoning regulations will identify the location and nature of various permitted uses in urban centres.

7.5.2 Services

Sewage and water services will be provided in accordance with Section 11.2 of this Plan. Road access will be via internal roads where possible, then via local roads where possible and then via County Roads or Provincial Highways where there is no other alternative. In all cases, appropriate sighting standards must be met and road functions maintained.

7.5.3 Land Use Compatibility

More detailed planning policies and zoning regulations shall be developed for Urban Centres to ensure that existing and proposed uses are compatible and that adverse impacts are kept to a minimum and that appropriate mitigation is provided where practical.

7.5.5 Residential Use

Urban centres shall provide a broad range of residential uses to provide a diverse supply of housing, including affordable housing. In Wellington, the single-family residence will continue to be the dominant use of urban lands. Other forms of housing at densities appropriate to the servicing and the nature of the community will also be developed including semi-detached, duplex townhouse and apartment units. An Additional Residential Unit may be allowed subject to the provisions of Section 4.4.6 of this Plan.

The proposed subdivision provides the opportunity to develop single detached dwellings which is the dominant form of housing in the area and it will also add to the housing supply of Morriston and Puslinch. The proposed development is compatible with the surrounding context and considers a buffer from the existing natural heritage to mitigate potential adverse impact. The proposed development is planned to be privately serviced and will include the expansion of Ochs Street as well as introduce a new public street to service the proposed subdivision.

Detailed Urban Centre Policies

The intention of Section 8 is to provide detailed land use policies for all Urban Centres identified with separate land use schedules in this Plan.

In accordance with Section 8.1.3 Vision Statement, by the end of the planning period, it is expected that the Urban Centres in Wellington County will have the following characteristics:

a) *that traditional community values will be maintained and the small-town character will be enhanced;*
b) *that the single-detached home will continue to be the dominant form of housing but a greater variety of housing types will also be available;*
e) *that the quality of life for the residents will be enhanced by the protection of natural and cultural environment, the enhancement of new recreational opportunities, and the preservation of heritage resources;*
f) *that infrastructure such as roads, water, utilities, fire protection and administration will be improved and, where feasible, expanded to meet the needs of a growing community;*
g) *that the greenland system and rivers will remain dominant natural features in urban centres providing aesthetic and recreational opportunities for both residents and visitors alike;*

h) that the elements of the natural environment including rivers, hills, wetland, groundwater and forest resources will be protected, enhanced and well managed.

The applications propose a residential subdivision consisting of detached dwellings which is the dominant form of housing within the area and maintains the small-town character of the area. Further, the proposed development considers a sufficient buffer to the natural heritage feature to the south and east of the property to preserve the natural features. The required infrastructure will be privately provided for future residents and a network of public streets are designed to create access to the detached dwellings.

In accordance with Section 8.1.4, the major objectives of all Urban Centres are:

a) to ensure that adequate lands, infrastructure and community facilities are available to serve the existing and future needs of the community;
b) to provide opportunities for an adequate supply and diversity of housing to satisfy the varied needs of a growing community;
d) to ensure that development and development-related activity proceeds in an environmentally responsible manner;
g) to utilize urban design principles that ensure public safety and security for local residents and visitors;
h) to maintain appropriate standards for development and redevelopment which encourage controlled growth and represent a long-term benefit to the community;
i) to ensure that adequate parkland, open space, and recreational opportunities are available to meet the recreational needs of every citizen;
j) to protect, preserve and where practical enhance, the unique natural and cultural heritage resources of the community; and
k) to provide for a safe and efficient vehicular and pedestrian transportation system in the community.

The proposed development will be serviced with private water and wastewater infrastructure based on the level of services in Morriston. There are nearby municipal parks that will be optimized by way of increased usership with new residents in the proposed subdivision. Furthermore, the proposed housing typology is single detached dwellings due to servicing limitations and compatibility with the surrounding context. The proposed development will provide an opportunity for controlled growth by introducing a subdivision for low-density residential development in an existing urban centre and it also provides a network of streets to enhance the vehicular and pedestrian movement. Lastly, the proposed development provides for the protection of the natural heritage features on the subject lands.

Residential

Per Section 8.3.2. Wellington has set the following objectives for residential development:

a) to ensure that an adequate supply of land is available to accommodate anticipated population growth over the planning period;
b) to provide a variety of dwelling types to satisfy a broad range of residential requirements and ensure that affordable housing is available;
c) to manage the rate of growth and the amount of residential development within the urban centre in order to maintain and enhance the small-town character;
d) to support the development, at appropriate locations and densities, of residential facilities that meet the housing needs of persons requiring specialized care;
e) to ensure that adequate infrastructure will be available to all residential areas;
f) to minimize potential compatibility issues between residential and other land uses;
g) to encourage intensification, development

proposals provided they maintain the stability and character of existing neighbourhoods;

h) *to support the establishment of certain non-residential uses in appropriate locations of the municipality;*

i) *to encourage residential developments which incorporate innovative and appropriate design principles which contribute to public safety, affordability, energy conservation and that protect, enhance and properly manage the natural environment;*

j) *to monitor the housing supply by reviewing new development, demolitions, intensification, and the number of affordable housing units brought on stream.*

The proposed development would add to the housing supply of the area to accommodate anticipated population growth and will provide a housing form that is compatible with the surrounding area and servicing capabilities. Furthermore, compatibility issues are not anticipated with the proposed development considering the surrounding land uses include residential uses, a municipal park, and natural areas. The proposed development is consistent with the surrounding context in terms of density, built form and use. It also promotes the efficient use of the land by intensifying the subject lands with smaller lot sizes than the zoning permits.

Section 8.3.3 provides a list of permitted uses with Residential designation. The predominant use of land in those areas designated *Residential* on Schedule "A" of the Plan shall be residential development. A variety of housing types shall be allowed, but low rise and low-density housing forms such as single-detached and semi-detached dwelling units shall continue to predominate.

Low-Density Development

In accordance with Section 8.3.4, the County Official Plan considers single-detached, semi-detached and duplex dwellings to be low density housing forms. The character of existing low density residential neighbourhoods should generally be protected and land uses which would cause significant loss of privacy, loss of view, or loss of sunlight due to shadowing or which would be incompatible due to their nature shall be discouraged.

According to Section 8.3.11, Wellington will encourage the development of vacant or under-utilized properties for residential uses which are compatible with surrounding uses in terms of dwelling type, building form, site coverage and setbacks.

The proposed development consists of a residential subdivision with single detached dwellings on vacant land. The proposed subdivision is compatible with the surrounding context in terms of dwelling type, building form, site coverage and setback.

Greenlands System

Section 8.9 of the Official Plan contains policies related to the Greenlands Systems. The *Greenland* designation within Urban Centres consist mainly of *Core Greenland*, as illustrated on Schedule "A" of the Plan. The primary purpose is to identify hazardous areas which pose a threat to property or human life or have inherent limitations to development.

The main Greenland features identified are rivers, their adjacent flood prone land and valley slopes. Also included are wetlands, significant woodlands, smaller watercourses and other areas with physical constraints such as poor drainage, steep or unstable slopes. These areas serve as plant and animal habitat, forest areas and fishery resource areas in urban centres.

In accordance with Section 5.5, other significant natural heritage features including habitat, areas of natural and scientific interest, streams and valleylands, woodlands, environmentally sensitive areas, ponds, lakes and reservoirs and natural links are also intended to be afforded protection from development or site alteration which would have negative impacts. These areas are often found within Core Greenlands. Where they are outside Core Greenlands they are identified as Greenlands.

The objectives of the Greenland Systems are:

a) *to provide protection to those aspects of the natural environment which can be harmed by urban development;*
b) *to protect the community from those aspects of the natural environment which can pose a threat to public health and safety;*
c) *to ensure that natural areas are protected and their natural beauty retained for future generations;*
d) *to improve public access to natural areas where appropriate; and*
e) *to encourage stewardship and enhancement of the local natural environment.*

5.5.4 Woodlands

In the Urban System, woodlands over 1 hectare are considered to be significant by the County and are included in the Greenlands System. Woodlands of this size are important due to their economic, visual and environmental contributions to the urban landscape. Detailed studies such as environmental impact assessments may be used to identify, delineate and evaluate the significance of woodlands based on other criteria such as: proximity to watercourses, wetlands, or other woodlands; linkage functions; age of the stand or individual trees; presence of endangered or threatened species; or overall species composition.

5.6.2 Development Impacts

Where development is proposed in the Greenland system or on adjacent lands, the County or local municipality shall require the developer to:

a) *identify the nature of the features potentially impacted by the development;*
b) *prepare, where required, an environmental impact assessment to ensure that the requirements of this Plan will be met, and consider enhancement of the natural area where appropriate and reasonable.*
c) *address any other relevant requirements set out in Section 4.6.3 Environmental Impact Assessment.*

No development will be approved unless the County is satisfied that the Greenland and Environmental Impact Assessment policies are met.

Natural Heritage Systems

The County will encourage the restoration or enhancement of the natural heritage system in accordance with the following:

- *In areas undergoing significant development, particularly in urban areas, an assessment of opportunities to link or connect natural features may be required to demonstrate how the development will maintain, restore or, where possible, improve linkages and connectivity;*
- *In areas not undergoing significant development, particularly agricultural and rural areas, stewardship initiatives will be the main means to maintain, restore or, where possible, improve linkages and connectivity.*

In accordance with the above policies, the Environmental Impact Study identifies the features on the subject lands, as staked with Conservation Halton. Furthermore, the EIS recommends protection of the features and inclusion of an appropriate buffer, as well as enhancements and restoration in certain areas. Furthermore, based on the staked woodland and wetland, it is recommended that the Greenlands System in the County of Wellington Official Plan be refined to be in accordance with the physical features on the subject lands. A refinement will ensure the protection of the feature

Summary

It is our opinion the proposed development conforms to the County of Wellington Official Plan as it provides more housing options and supports the projected population and housing needs within the Township. Furthermore, the proposed development is considered within the *Residential* designation of the subject lands and provides a 10-metre buffer from the natural features. The proposed development conforms to the policies of the Residential designation. The proposed development provides an opportunity to develop single-detached dwellings which is the dominant form of housing in the area. Further, the proposed development is consistent with the surrounding context in terms of density, built form and use and is serviced by private infrastructure. There are parks and public facilities within the surrounding area, providing an opportunity to create a complete community and the proposed network of streets within the site would enhance the access and transportation.

4.6 COUNTY OF WELLINGTON OFFICIAL PLAN REVIEW

The County of Wellington is currently reviewing its Official Plan (OP) as part of the Municipal Comprehensive Review (MCR) as specified under Section 26 of the Planning Act. The updated Official Plan will establish a long-term vision and planning framework for the County that fosters a sustainable approach to future growth and economic development. This process allows the County to prepare for additional population and employment growth and ensure that the updated OP supports healthy, compact, and complete communities in Wellington as directed through A Place to Growth: Growth Plan for the Greater Golden Horseshoe.

Over the next 30 years, Wellington County is expected to grow to approximately 160,000 people and 70,000 jobs by 2051 in accordance with the A Place to Grow: Growth Plan of the Greater Golden Horseshoe.

A Progress Report dated June 13, 2024 was presented at the County of Wellington Planning Committee Meeting to provide an update on the status of the Official Plan Review. In accordance with the Progress Report, the following matters have occured:

- The Province approved the final version of Official Plan Amendment 119 (County Growth Structure)
- The Province has not made a decision on Official Plan Amendment 120 (County Growth Forecast)
- The County has revised and re-circulated Official Plan Amendment 123 which implements the County Lands Assessment for lands within the Future Development land use designation within current urban boundaries.

Due to OPA 119 being approved by the Province, it is not in full force and effect and as such, has been reviewed below. Since the Progress Report, OPA 120 was approved by the Province on July 11, 2024 and is now in-effect.

Official Plan Amendment 119

The components of Official Plan Amendment 119 includes the growth strategy for the County which conforms with the Growth Plan. The County Growth Structure outlines where growth and development are to occur within Wellington to achieve the objectives, forecasts and targets required by Provincial policy.

The Amendment is comprised of the following:

- Adding policies to support "Complete Communities";
- Creating a County Growth Structure including Primary Urban Centres, Secondary Urban Centres, Hamlets;
- Mapping Updates; and
- Technical and Housekeeping Changes.

In accordance with Schedule A7 – County Growth Structure – Puslinch and Schedule B7 – Puslinch Land Use, the subject lands are designated as a "*Secondary Urban Centre*" (Figure 6 and 7). The following policies are applicable to the proposed development and subject lands. The *Secondary Urban Centres* are considered to be part of the rural system, as opposed to the urban system.

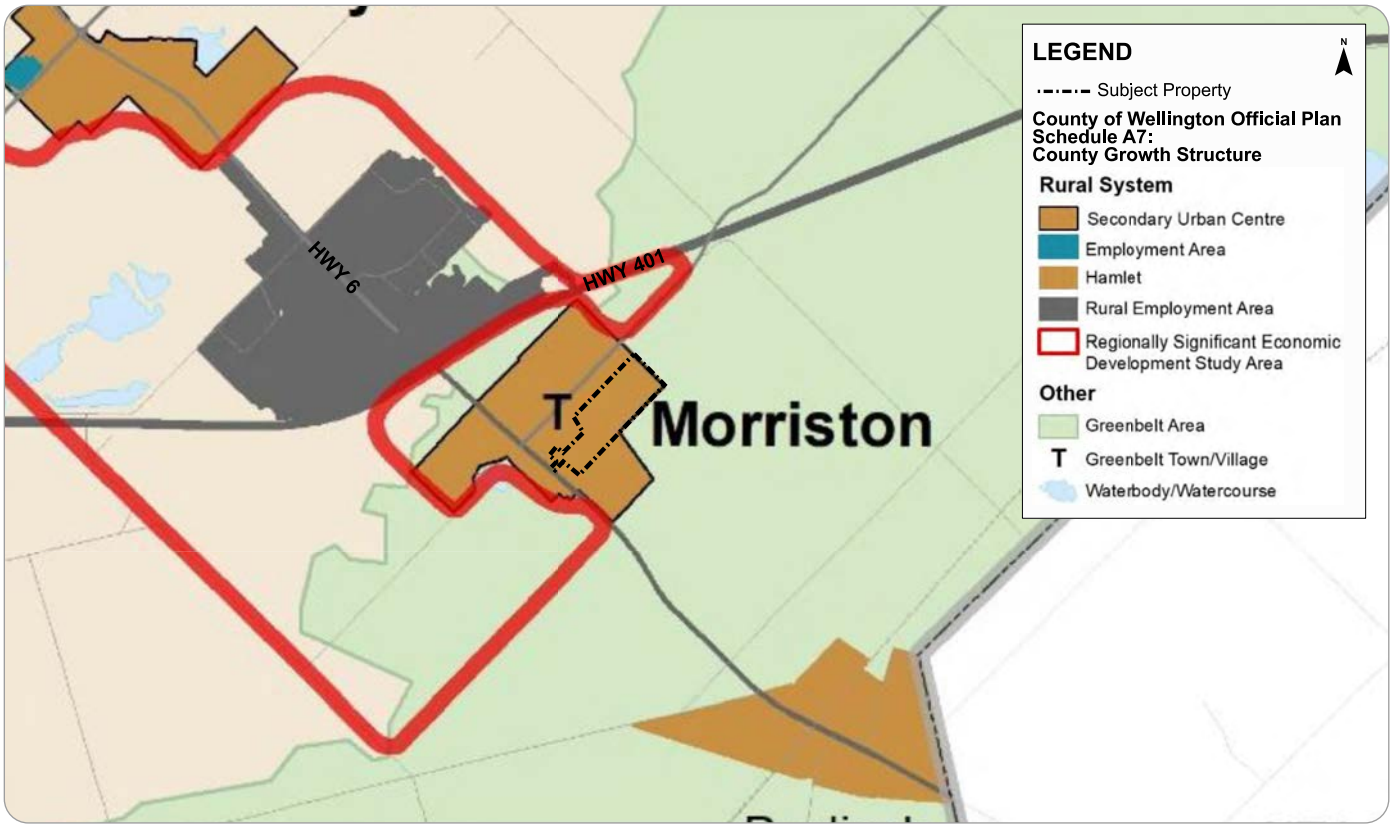

Figure 6: Schedule A7 - County Growth Structure – Puslinch

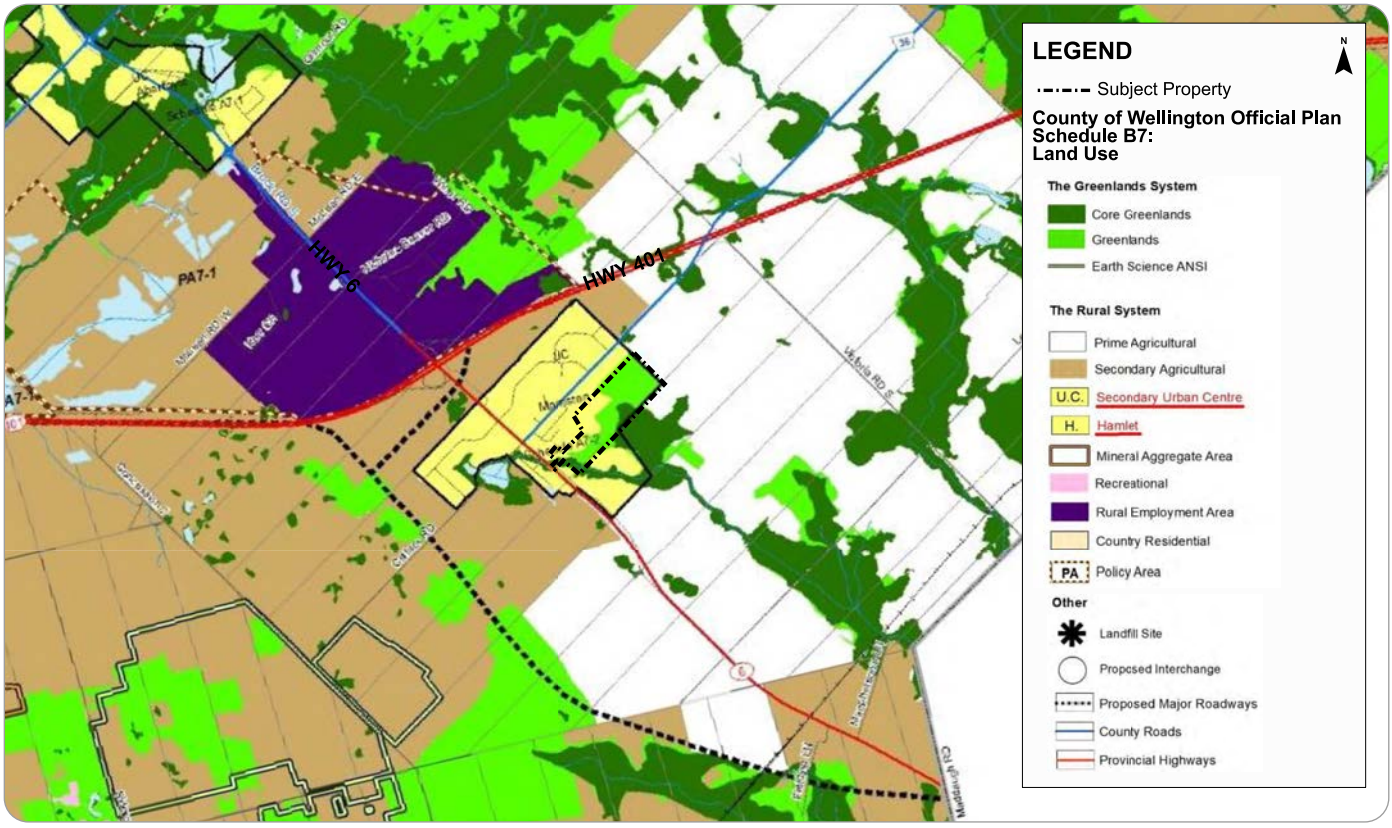

Figure 7: Schedule B7 – Land Use

Complete Communities

In accordance with Section 2.1.5 complete communities of OPA 119 are those which:

- *provide a diverse mix of land uses;*
- *provide a diverse range and mix of housing options;*
- *expand convenient access to a range of transportation options, public service facilities, open spaces, recreational facilities, and healthy, local, and affordable food options;*
- *provide for more compact built form and a vibrant public realm;*
- *are age friendly."*

The proposed development contributes to assisting in creating a complete community as it is located within an area which is serviced by public facilities, open spaces and parks. Further, the reduced lot sizes provide an opportunity for a more compact built form.

Secondary Urban Centres

Section 6.10 of OPA 119 provides policies regarding Secondary Urban Centres. The following policies are applicable to the proposed development:

6.10.1 Defined

Settlement areas without municipal sewage services and municipal water services may be recognized as secondary urban centres due to the prominent role they play as a focus for a mix of land uses, growth and community functions in their municipalities.

6.10.2 Permitted Uses

Secondary urban centres are expected to provide a range of land use opportunities. Residential uses of various types and densities, commercial, industrial and institutional uses as well as parks and open space uses will be permitted where compatible and where appropriate services are provided. More detailed official plan designations and policies as well as zoning regulations will identify the location and nature of various permitted uses in secondary urban centres.

6.10.3 Services

Sewage and water services will be provided in accordance with Section 11.2 of this Plan. Road access will be via internal roads where possible, then via local roads where possible and then via County Roads or Provincial Highways where there is no other alternative. In all cases, appropriate sighting standards must be met and road functions maintained.

6.10.4 Land Use Compatibility

More detailed planning policies and zoning regulations shall be developed for secondary urban centres to ensure that existing and proposed uses are compatible and that adverse impacts are kept to a minimum and that appropriate mitigation is provided where practical.

6.10.5 Impact Assessment

Where a Council is concerned about the impact a proposed development may have on a secondary urban centre, it may require an impact assessment as set out in the general policy section of this Plan.

6.10.6 Residential Uses

Secondary urban centres shall provide a broad range of residential uses to provide a diverse supply of housing, including affordable housing.

In Wellington, the single detached residence will continue to be the dominant use of urban lands however, other forms of housing at densities appropriate to the servicing and the nature of the community may also be encouraged.

An Additional Residential Unit may be allowed subject to the provisions of Section 4.4.6 of this Plan.

Additionally, bed and breakfast establishments will be encouraged within single detached dwellings where adequate services and parking are available.

6.10.12 Parks and Open Space

Secondary urban centres shall provide adequate parks and open space areas to serve their population and may provide recreational opportunities for a larger regional population.

Parks and open space areas may be located in or adjacent to greenland areas depending on impacts and opportunities.

6.10.13 Greenlands System

The Greenland System policies established in this Plan apply within secondary urban centres. More detailed policies may be developed for secondary urban centres, particularly where urban development is adjacent to Greenland System areas or where existing development has already occurred in or near Greenland System areas.

The proposed development conforms to the policies of this Section as it introduces a residential subdivision comprised of single detached dwellings and adds to the residential supply of the area. The proposed development will be serviced privately and a network of streets is considered to provide access. Furthermore, the proposed development considers a sufficient buffer from the natural heritage features on the south and east portion of the subject lands.

It is our opinion that based on the analysis contained herein, the proposed development conforms to OPA 119.

Official Plan Amendment 120

The purpose of the proposed Official Plan Amendment 120 is to revise the Wellington Growth Forecast by updating the population, household and employment forecasts to extend to 2051 and revise related text and schedules.

The main changes to the overall County growth forecasts, relative to the current Official Plan are:

- The forecast extends to 2051 (current time horizon is 2041);
- Time intervals before 2041 are no longer shown, except to include 2021 as a base (this is being done because the Growth Plan no longer shows time intervals before 2051, and to provide flexibility for short- and medium-term work); and
- A higher percentage of population growth in Wellington will take place in urban centres (89% in 2051 versus and 82% in 2041).

In accordance with Table 7 of the OPA the projected growth in the Township of Puslinch is as shown in Table 2 Below. It is our opinion the proposed development conforms to OPA 120 by providing additional residential dwellings to accommodate the foretasted population.

Table 2: Projected Growth in the Township of Puslinch to 2051

	2021	2051
Total Population	7,900	10,000
Households	2,850	3,560
Total Employment	5,800	7,900

4.7 TOWNSHIP OF PUSLINCH ZONING BY-LAW 023-18

In accordance with Schedule A7 of the Township of Puslinch Zoning By-law, the subject lands are zoned as *"Urban Residential (UR)"*, *"Future Development 2 (FD2)"* and *"Natural Environment (NE)"* with an *"Environmental Protection"* overlay (Figure 8). This zone does not permit residential development, as such, a Zoning By-law Amendment is required to facilitate the proposed development.

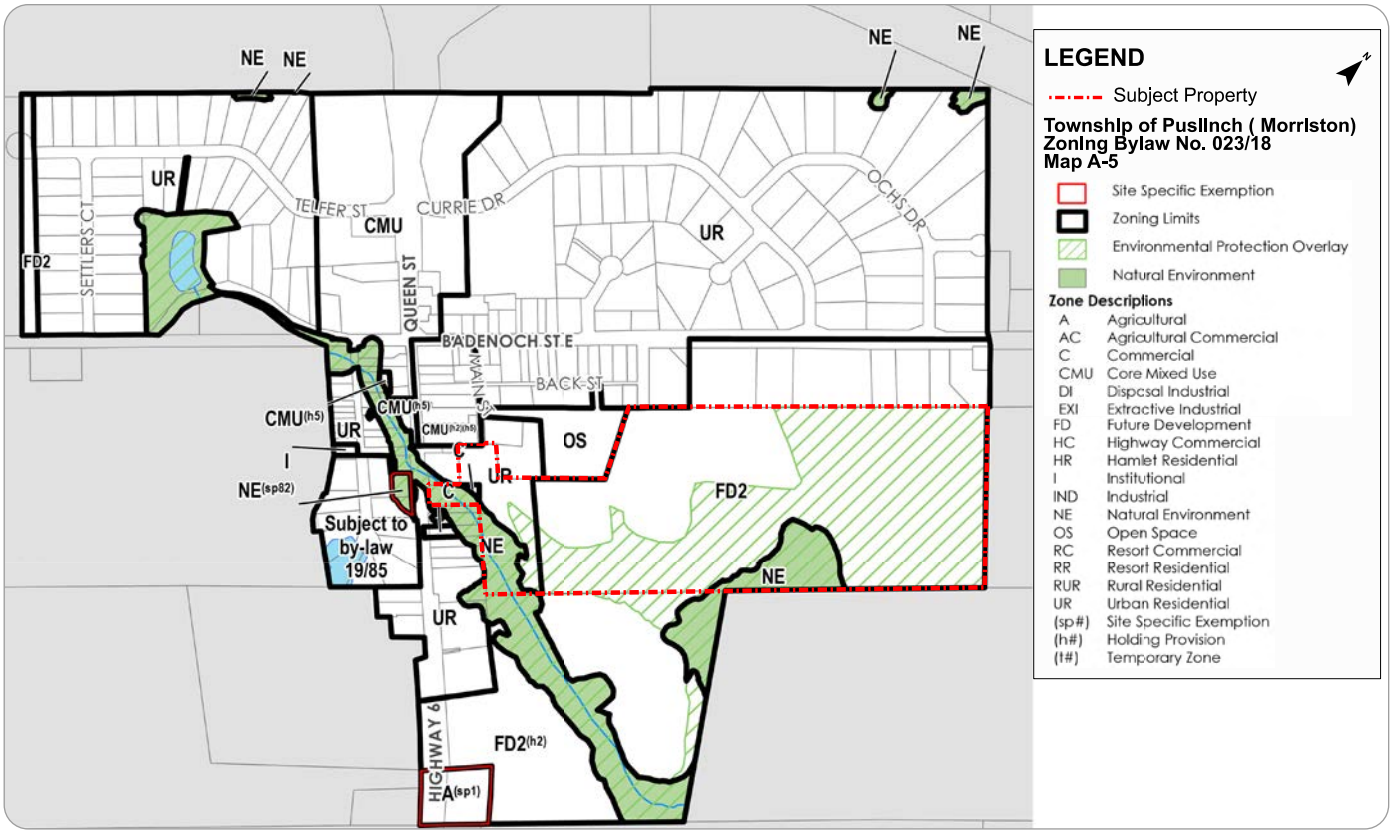

Figure 8: Map A-5 – Township of Puslinch Zoning By-law

4.8 ATTAINABLE HOUSING STRATEGY

The purpose of the Attainable Housing Strategy Report is to provide recommendations to assist the County of Wellington with its attainable housing shortage. The scale of this issue is significant, especially for the County's workforce. The lack of attainable housing is making it difficult for local employers to attract and retain workers, with some employers incurring costs in order to house or transport their workers. This problem is further influenced by the County's geographic location, which is in close proximity to major economic centres in the City of Guelph, Waterloo Region and the Greater Toronto and Hamilton Area. It is anticipated that this economic pressure will attract residential activity from outside the County, increasing the development of low-rise housing forms, which are not attainable.

Provincial policy plays a role in the delivery of attainable housing as it creates a framework for managing growth and provides policy direction to guide land development. As part of the Attainable Housing Strategy Report, the Growth Plan [2019] and the Province's Housing Supply Action Plan [2019] were reviewed. Through the review, it was uncovered that recent changes being implemented by the Province's Bill 108, More Homes, More Choice Act, 2019 [Bill 108] are aimed at increasing housing affordability. Bill 108 introduces beneficial amendments related to second units such as allowing two second units on one property, by permitting two residential units in a main residence [single detached, semi-detached or rowhouse] and one in an ancillary structure.

The Attainable Housing Strategy Report provides the following policy-based recommendations:

IV. Second Units

Second units are permanent residences commonly referred to as basement apartments, secondary suites or in-law suites.

The County OP does maintain policies in Section 4.4.6 which allows for one second unit per property in single detached, semi-detached or rowhouse dwellings and within an ancillary building or structure to a main residence. Second units are self-contained residential units which contain a separate bathroom, kitchen and sleeping facilities from the main residence. Provisions related to specific requirements for these units, such as off-street parking, minimum and maximum unit sizes and road access, are to be addressed through Zoning By-laws.

VI. Diverse Mix of Housing Forms

The County OP is in reasonably good shape in terms of the permissive policies which are in place to support a mix of housing types. The implementation of these policies is the issue as single detached housing continues to be the dominant form of housing in the County. The following amendments to the County OP are proposed to support greater diversity for the existing housing stock:

- *The County OP residential and urban centre policies make several references suggesting that "the single-detached home will continue to be the dominant form of housing [8.1.3.b]." This language should be removed from the County OP as it is counterintuitive to supporting a range of residential building typologies.*
- *Introduce policies into the County OP which support a mix of housing types which are currently absent such as back-to-back townhouses and stacked townhouses.*
- *Amend policies in the County OP which recognize and support innovative forms of housing which do not currently exist and contemporary construction methods such as modular construction. Modular construction includes a degree of pre-fabrication which supports timely build-out, reducing the overall construction costs. This method of construction would increase the attainability of housing which could help address the*

immediate housing shortage employers are facing. In advance of an amendment to the County OP, a Temporary Use By-law could be passed by a local council to permit a range of transitional and temporary dwellings such as container homes. The Options for Attainable Housing Portfolio in Appendix II provides further details on attainable housing building typologies, constructions methods and ownership models.

The proposed development provides an opportunity to add to the housing supply of the area to accommodate the future population. Further, the proposed subdivision provides an opportunity to develop single-detached dwellings which may have the option to contain secondary units as attainable housing units. Due to the servicing constraints in Morriston and the surrounding built form, the proposed housing typology is limited to single detached dwellings.

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5. PROPOSED ZONING BY-LAW AMENDMENT

The subject lands are currently zoned as *"Urban Residential (UR)"*, "*Future Development 2 (FD2)*" and "*Natural Environment (NE)*" with an "*Environmental Protection Overlay*" per Schedule A5 of Zoning By-Law No. 023-18. A Zoning By-law Amendment is being submitted to rezone the subject lands from "*Future Development 2 – FD2*" and "*Natural Environment – NE*" to "*Urban Residential - XX (UR - XX)*" and "*Natural Environment (NE)*" with "*Environmental Protection (EP)*" overlay to facilitate the proposed development. The following table provides the UR Zone requirements and the proposed special provision for the proposed development:

Table 3: Proposed Zoning By-law

Zone Designation	Permitted Uses	Prohibited Uses	Site Specific Special Provision
Urban Residential (UR-XX)	Single Detached Dwellings Additional Residential Unit (Attached and Detached) Home Business	N/A	Minimum Required Lot Area = 0.19 ha

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6. PUBLIC CONSULTATION STRATEGY

A strategy for consulting with the public is required to be submitted by the proponent of an Official Plan Amendment, Plan of Subdivision or Condominium application before it can be deemed "complete" as defined by the *Planning Act.*

The *Planning Act* requires that an application be circulated to property owners within 120 metres of the subject lands, a notice sign be posted on the property and a public meeting be held regarding the proposal.

The proposed public consultation strategy is outlined below:

1. Following the formal submission of the application, a sign will be posted on the subject lands, in a visible and informative way per Township standards;
2. A Notice of Complete Application will be mailed to residents within 120 metres of the subject lands;
3. A Statutory Public Meeting will be held with the appropriate Committee of Council;
4. Residents within 120 metres of the subject lands will be notified via mail of the Public Meeting date and details;
5. Notice of a Statutory Public Meeting shall include, information regarding the power of the Ontario Land Tribunal to dismiss an appeal if an appellant has not provided Council with oral submissions or written submissions before a decision is made on the development application; and,
6. Following the Statutory Public Meeting, the public will be notified of future Council meetings regarding the recommended decision.

We trust that the above Public Consultation Strategy is satisfactory and in compliance with Provincial legislation. Weston Consulting and WDD Main Street Inc., remain committed to facilitating public engagement and will assist in engaging the public through the process outlined in this Report.

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7. PLANNING ANALYSIS AND JUSTIFICATION

7.1 BUILT FORM AND COMPATIBILITY

The following provides a summary of our planning analysis and justification in support of the proposed development.

The applications seek to permit and develop a residential subdivision consisting of 21 single detached dwelling lots with lot areas of approximately 0.20 hectares and frontages ranging from 25 metres to 62.8 metres. All proposed lots have access to existing or planning municipal local roads and will contain a detached dwelling with individual garages. The proposed built form and density is compatible with the surrounding area which consists of detached dwellings with varying lot sizes, both smaller and larger than the proposed lots. It is our opinion the proposed residential subdivision is compatible with the surrounding neighbourhood and is not anticipated to result in any adverse impacts to the Morriston settlement area.

7.2 SERVICING AND TRANSPORTATION

The proposed detached dwelling lots will be serviced with individual private services as municipal services are not available in Morriston. The lots have been sized to accommodate private drilled wells and septic systems. The depth, size and locations of the wells will be determined during the detailed design of each individual lot. The proposed individual sanitary servicing strategy will be provided through class 4 onsite sewage systems consisting of an advanced treatment unit discharging to a leaching bed constructed as a Type A dispersal bed. Furthermore, stormwater management is proposed to be provided via infiltration trenches and grassed swales.

With regards to transportation infrastructure, the proposed development provides for the extension of Ochs Street into the subdivision as well the addition of one new public road both with an 18.0 metre right-of-way. The subject lands do not have access to public transit in Morriston.

7.3 NATURAL AREAS

The subject lands contain a woodland and a wetland, both of which are proposed to be conserved. A buffer of 15.0 metres has been provided to the wetland and a buffer of 10.0 metres has been provided for the woodland. The natural features and associated buffers will be protected via conveyance to the Township and with the rezoning of this portion of the subject lands to "*Natural Environment*" and the "Environmental Protection" overlay. An Environmental Impact Study has been prepared which provides details regarding the features and buffers, and concludes that the proposed subdivision is not expected to have a negative impact on the natural areas.

7.4 PROVINCIAL AND MUNICIPAL PLANNING POLICY

The subject lands are located within an existing settlement area in accordance with Provincial and Municipal planning policy but without access to municipal services, therefore growth is encouraged but is to be consistent with the available servicing. The proposed low-density residential subdivision respects the servicing limitations and provides for lot areas that can accommodate private services. Furthermore, applicable planning policies support compact development, greater intensification, diversity in housing and access to a range of uses. The proposed subdivision provides for lot sizes that are more compact than the zoning permits thereby supporting greater intensification. Additionally, there is a local park adjacent to the subject lands and limited commercial uses at the main intersection in Morriston. Lastly, the proposed development includes only single detached dwellings to ensure compatibility with the area and respect the servicing requirements; however, during the detailed design stage, second suites or additional residential units may be explored to assist in improving housing supply in Morriston and Puslinch.

Based on the fulsome review in Section 4.0, it is our opinion the applications are consistent with the PPS, and conform to the Growth Plan and County of Wellington Official Plan.

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8. CONCLUSION

Based on our review of the site context, planning policy and supporting materials, it is our opinion the proposed development and associated applications for Zoning By-law Amendment and Draft Plan of Subdivision are based on good planning and urban design principles. The proposed development of the subject lands will intensify an underutilized parcel of land within an existing settlement area. The proposed development of 21 lots with lot areas of approximately 0.2 hectare will increase the housing supply in the area while demonstrating appropriate compact intensified development that is contextually appropriate and respects the servicing limitations of Morriston. The applications demonstrate and support applicable provincial and municipal planning policies regarding growth within settlement area and development that efficiently utilizes land. It is our opinion that the proposed development and associated planning applications should proceed through the process prescribed by the Planning Act.


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CONSULTING

SCHEDULE			
PART	LOT	CON/PLAN	ALL OF PIN
1	PART OF 31	CONCESSION 8	PIN 71194-0038(LT)
	PART OF 7 NORTH OF QUEEN STREET	REGISTERED PLAN 135	
	PART OF 8 NORTH OF QUEEN STREET		

I REQUIRE THIS PLAN TO BE DEPOSITED UNDER THE LAND TITLES ACT.

DATE _____

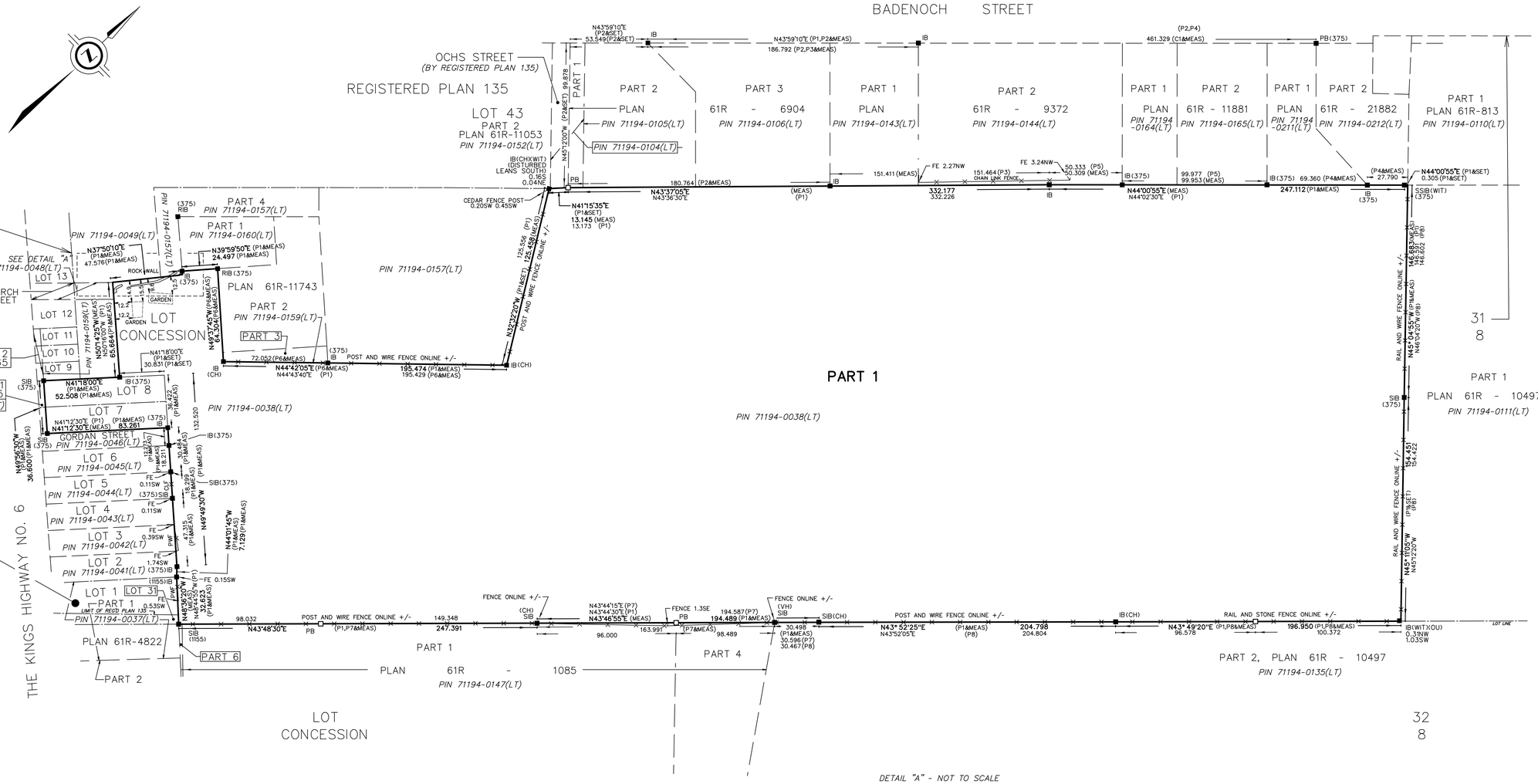
_____
RAYMOND J. SIBTHORP
ONTARIO LAND SURVEYOR

PLAN 61R-

RECEIVED AND DEPOSITED

DATE _____

_____
REPRESENTATIVE FOR THE LAND REGISTRAR FOR THE LAND TITLES DIVISION OF WELLINGTON (No 61)



PLAN OF SURVEY OF

PART OF LOT 31 CONCESSION 8 AND PART OF LOTS 7 AND 8, NORTH OF QUEEN STREET

(DONALD McEDWARD'S PORTION)

REGISTERED PLAN 135

TOWNSHIP OF PUSLINCH

COUNTY OF WELLINGTON

SCALE 1 : 1500

0 30 60 90 metres

THE INTENDED PLOT SIZE OF THIS PLAN IS 915mm IN WIDTH BY 609mm IN HEIGHT WHEN PLOTTED AT A SCALE OF 1:1500

J.D. BARNES LIMITED

METRIC DISTANCES AND/OR COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

NOTES

BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE POINTS A AND B, BY REAL TIME NETWORK (RTN) OBSERVATIONS, UTM ZONE 17, NAD83 (CSRS) (2010.0).

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999620.

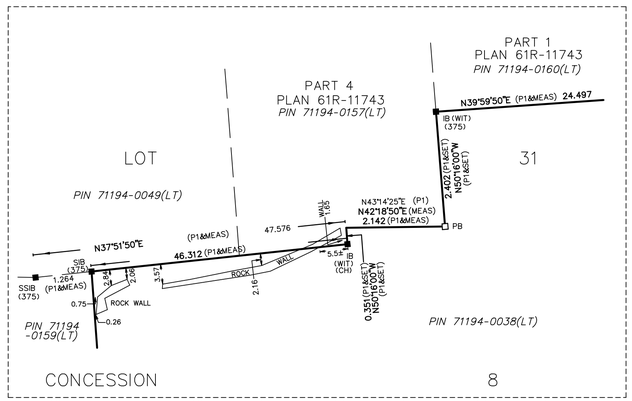
FOR BEARING COMPARISONS, A ROTATION OF 1°02'00" COUNTER-CLOCKWISE WAS APPLIED TO BEARINGS ON P1, A ROTATION OF 0°38'45" COUNTER-CLOCKWISE WAS APPLIED TO BEARINGS ON P7, A ROTATION OF 1°02'10" COUNTER-CLOCKWISE WAS APPLIED TO BEARINGS ON P8.

LEGEND

■	DENOTES	SURVEY MONUMENT FOUND (C&H UNLESS SHOWN OTHERWISE)
□	DENOTES	SURVEY MONUMENT SET
SIB	DENOTES	STANDARD IRON BAR
SSIB	DENOTES	SHORT STANDARD IRON BAR
IB	DENOTES	IRON BAR
PB	DENOTES	PLASTIC BAR
WIT	DENOTES	WITNESS
MEAS	DENOTES	MEASURED
375	DENOTES	BLACK SHOEMAKER ROBINSON & DONALDSON
CH	DENOTES	CARTER AND HORWOOD
VH	DENOTES	VAN HARTEN SURVEYING
OU	DENOTES	ORIGIN UNKNOWN
P1	DENOTES	PLAN BY 375 DATED FEBRUARY 18, 1992, PROJECT No. 90-7090
P2	DENOTES	DEPOSITED PLAN 61R-6904
P3	DENOTES	DEPOSITED PLAN 61R-9372
P4	DENOTES	DEPOSITED PLAN 61R-21882
P5	DENOTES	DEPOSITED PLAN 61R-11881
P6	DENOTES	DEPOSITED PLAN 61R-11743
P7	DENOTES	DEPOSITED PLAN 61R-1085
P8	DENOTES	DEPOSITED PLAN 61R-10497
FE	DENOTES	FENCE END
PWF	DENOTES	POST AND WIRE FENCE

ALL SET SSIB AND PB MONUMENTS WERE USED DUE TO LACK OF OVERBURDEN AND/OR PROXIMITY OF UNDERGROUND UTILITIES IN ACCORDANCE WITH SECTION 11 (4) OF O.REG. 525/91.

DETAIL "A" - NOT TO SCALE



SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON AUGUST 8, 2022.

SEPTEMBER 20, 2022
DATE

[redacted]
ONTARIO LAND SURVEYOR

THIS PLAN OF SURVEY RELATES TO AOLS PLAN SUBMISSION FORM NUMBER 2196345

INTEGRATION DATA

OBSERVED REFERENCE POINTS (ORPs): UTM ZONE 17, NAD83 (CSRS) (2010.0).

COORDINATES TO URBAN ACCURACY PER SECTION 14 (2) OF O.REG 216/10.

POINT ID	EASTING	NORTHING
ORP (A)	571 819.11	4 810 772.76
ORP (B)	572 189.46	4 811 593.30

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

THE RESULTANT TIE BETWEEN ORP (A) AND ORP (B) IS 900.588 N24°17'31"E

J.D.BARNES LIMITED
SURVEYING MAPPING GIS
LAND INFORMATION SPECIALISTS
257 WOODLAWN ROAD WEST, UNIT 101, GUELPH, ON N1H 8J1
T: (519) 822-4031 F: (519) 822-1220 www.jdbarnes.com

DRAWN BY:	CHECKED BY:	REFERENCE NO.:
RJS	RJS	22-14-718-00
PLOTTED: 9/20/2022		DATED: SEPTEMBER 20, 2022

FILE: G:\22-14-718\00\Drawing\22-14-718-00.dgn

Hydrogeological Assessment
Proposed Residential Development
11 Main Street

Puslinch, Ontario

WDD Main Street Inc.
499 Brant Street
Burlington, Ontario
L7R 2G5

August 28, 2024
T1220482.003

ENGLOBE

Prepared by:

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Reviewed by:

R. Baker Wohayeb, M.A.Sc., P.Eng., QP_{RA}
Technical Director
Environmental, GTA office

Revisions and publications log.

REVISION No.	DATE	DESCRIPTION
0A	August 28, 2024	Final Report

Distribution

1 digital copy	WDD Main Street Inc.
1 digital copy	Englobe

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APPENDICES

1 Introduction

Englobe was retained by WDD Main Street Inc. to conduct a Hydrogeological Assessment for the proposed residential subdivision development at 11 Main Street, in the Town of Puslinch, Ontario (the 'Site').

The Site is bounded by vacant lands (wooded lots) to the south, Residential properties and Badenoch Street to the north, residential buildings to the west and a mixed residential and agricultural property to the east. The Site is irregular in shape with a total area of approximately 231,040 m^2 (57.1 acres). A Site location plan is provided in **Figure 1**.

Based on a review of the Draft Plan of Subdivision, drawing D14 dated June 9, 2024, prepared by Weston Consulting, it is understood that the proposed development would include a residential subdivision proposed within the north portion of the Site. The proposed subdivision consists of 21 single detached dwellings, a storm water management block, and internal roadways. Plan review indicates that residential lots will range in size from 0.197 ha to 0.382 ha. It is understood that each proposed dwelling will rest on a single basement level extending to the footprint of the proposed building.

The study was undertaken to assess the hydrogeological conditions of the Site and to provide general information regarding the hydrogeological impact of the proposed development on the local groundwater regime. The report addresses the following areas:

- Identifying the geological and hydrogeological setting of the Site;
- Confirming groundwater level(s) and flow direction(s) beneath the Site;
- Evaluating the pre- and post-development water balance for the Site;
- Completion of a servicing assessment including a review of well records to assess aquifer characteristics and the feasibility of individual private water supply wells, and a nitrate impact assessment to evaluate the feasibility of subsurface sewage disposal, and potential sewage treatment requirements.
- Identifying potential impacts to the nearby groundwater receptors including water supply wells and natural heritage features as a result of site servicing;
- Providing a mitigation plan for the potential impacts to the groundwater receptors and/or natural heritage features, if applicable;

The Township of Puslinch requires that a hydrogeological assessment be completed as below (Township of Puslinch, 2019):

- A hydrogeological study will be required for most new development applications to demonstrate the suitability of the site for development of private services.
- The hydrogeological study report will be prepared by a qualified professional (i.e. professional hydrogeologist or engineer) and will generally include details regarding the site setting, desktop geological and hydrogeological information, and results from a field investigation program established by the qualified professional to support the development including results from test pits, boreholes, sampling, pumping tests, monitoring wells and well surveys, as required.

- The hydrogeological study report will review the availability and sustainability of adequate groundwater supplies with respect to both quantity and quality, including any potential interference to existing water users or sensitive receptors (e.g., wetlands, watercourses).

2 Scope of Work

The following tasks were undertaken to address the requirements of the hydrogeological investigation:

- *Review of available background information*. A review of available geotechnical and hydrogeologic information for the site was conducted, including topographic mapping, geologic mapping, a search of the Ministry of the Environment Conservation and Parks online water well record database, applicable regulations including source water protection, Township of Puslinch official plans, areas regulated by the local conservation authority, and results of previous hydrogeological and geotechnical investigations completed at the site.

- *Groundwater Monitoring and Sampling*. Groundwater monitoring was completed in July 2024 following significant rainfall events to assess seasonal fluctuations in groundwater in comparison with groundwater levels obtained in August/September 2022. Groundwater quality sampling was completed to assess the general water quality for completed monitoring wells within the unconfined shallow groundwater and for surface water within Bronte Creek crossing the western extent of the Site. Groundwater/surface water analysis was competed for general inorganics and metals parameters wit results compared to O. Reg. 169/03.

- *Water Balance Assessment*. A water balance assessment was completed for the proposed development to compare the pre and post development conditions at the site given the proposed increase in impervious cover across the site following development. Recommendations were provided for the implementation of Low Impact Development techniques given the observed shallow soil and groundwater conditions at the site to maintain pre-development rates of infiltration under a Best Management Practice approach.

- *Preliminary Well Servicing Study*. A preliminary well servicing feasibility review was competed based on the results of shallow groundwater sampling, the likelihood for groundwater impacts due to land use was assessed. Aquifer yield was evaluated through a review of MECP well records. Recommendations for further study were provided to meet requirements of MOE Procedure D-5-5, and requirements from the local municipality.

- *Septic Impact Assessment*. A septic impact assessment was completed to evaluate the expected impact of subsurface sewage disposal on shallow groundwater in accordance with MOE Procedure D-5-4, as provided in the predictive assessment calculations for both on-site and off-site impacts.

3 Site Description

3.1 Site Description and Physiography

The site is located within the County of Wellington, and the Township of Puslinch at the municipal address of 11 Main Street in Morriston, Ontario. The site is located immediately south of Main Street extending east to south of Ochs Street and immediately south of residential dwellings fronting to Badennoch Street as indicated in the attached **Figure 1**. Land uses in the vicinity of the site consist of residential dwellings within the urban limits of Morriston. Residential dwellings fall to the north and west of the Site, with lands to the east and south consisting of undeveloped woodlot. The Site and surrounding vicinity are serviced with private water supply wells and private subsurface sewage disposal.

The Site is located within physiographic regions of Southern Ontario known as the Horseshoe Moraines (within the north, central, and west portions) and partially in Flamborough Plain (within the southeast and east portions). The Horseshoe Moraines within the vicinity of the Site comprises a Till Moraines, and Flamborough Plain consists of Limestone Plains physiographic feature.

The Horseshoe Moraines consist of the largest concentration of sand and gravel in Southern Ontario. Structurally, within the southwestern portion of the region, the Horseshoe Moraines consist of two to three morainic ridges composed of pale brown, hard, calcareous, fine-textured till, with moderate degrees of stoniness. (Chapman and Putnam, 1984). **Figure 4** shows the location of the Site within the regional physiography map.

The ground surface elevation was measured between 319.2 and 313.0 masl at the borehole locations drilled within the footprint to the proposed subdivision area. A review of a surface topography map for the Site and surrounding area indicates that the topography of the Site is sloping downwards in a northwest direction. As such, it is anticipated that generated runoff (if it is not managed) will flow in a northwesterly direction. **Figure 5** illustrates the topography of the Site and surrounding area.

3.2 Site Geology and Hydrogeology

The current understanding of the surficial geological setting of the Site is based on scientific work conducted by the OGS (OGS, 2003). The Site and surrounding area are mapped within Till consisting of stone-poor, sandy silt to silty sand-textured till. **Figure 3** illustrates the mapped surficial geology for the Site and the surrounding area.

Bedrock was not contacted over the current subsurface investigation. However, a review of the nearby MECP well records (MECP Well ID 6709771) indicates that the bedrock can be contacted approximately 24 m below ground surface. Bedrock within the vicinity of the Site is mapped within the Guelph Formation comprising dolostone (OGS, 2007).

The major underlying geologic units consist of grey coloured limestone/dolostone of the Guelph Formation followed by brown to black limestone/dolostone of the Amabel Formation, white and gray sandstones and shale of the Clinton and Cataract Groups and red shale of the Queenston Formation. The Guelph formation is characterized with a relatively massive dolostone cap rock, followed by fractures water bearing limestones.

The Guelph formation is expected to provide a confined to semi-confined groundwater aquifer. The underlying Amabel Formation also provides a water bearing aquifer for local residential and agricultural uses. It is expected that the contact between the Guelph and Amabel Formations consists of a highly fractured contact providing adequate water quantity and quality for residential use. Underlying sandstones of the Clinton/Cataract Group and shale of the Queenston Formation are not used for water supply.

The Site is located within Bronte Creek Watershed within the jurisdiction of Conservation Halton. The headwaters of the Bronte Creek are generated to the northwest of the Site and flows southeasterly direction crossing the southwest portion of the Site. The Bronte Creek Watershed is about 300 km^2 of mostly rural land that includes parts of Burlington, Oakville, Milton, Hamilton and Wellington County. The main branch of Bronte Creek is 48 kilometres long and there are 12 tributaries that feed into the creek. Many of the people who live and work in the Bronte Creek watershed are dependent on groundwater sources for drinking water and agricultural purposes (Conservation Halton Website, 2022).

The MNRF's database was reviewed for any natural heritage features including, watercourses, bodies of water, wetland features, Area of Natural and Scientific Interest (ANSI) and wooded areas. **Figure 6** shows the location of the Site within the surrounding Natural Heritage Features.

Record review indicates that there are wetland features and wooded areas near the Site. Records of wetland features, evaluated provincial as per Ontario Wetland Evaluation System (OWES), are scattered around the Site with a closest record (Beverly Swamp Wetland Complex) mapped near the southwest limits of the Site (approximately 260 m away from the Site boundary). A record of wetland feature evaluated as Other is mapped within the central potion of the Site extending to the south. Additionally, two records of unevaluated wetland feature are located within the west and southwest portions of the Site. Furthermore, records for wooded areas are scattered around and within the Site.

3.3 Review of Planning Policies

The Wellington County's Official Plan sets up policies that deal with legislative and administrative concerns, guides physical growth, and addresses social, economic, and environmental concerns. The Official Plan provides land use planning designations and identifies areas of environmental significance where more stringent policies may apply for development applications.

Schedule A7 (Puslinch) of the Wellington County Official Plans were reviewed on August 21, 2024 for the current study. A review of the draft plan of subdivision dated June 6, 2024, indicates that the Site is located within the secondary urban centre of Morriston, identified as a Greenbelt Town/Village. Schedule B7 (Puslinch) indicates the Site land use as a secondary urban centre, with areas to the south of the site designated as greenlands, and core greenlands (associated with Bronte Creek). Schedue C7 (Puslinch) indicates the Site does not fall within a wellhead protection area. The Paris Galt Moraine policy area falls immediately north of the Site.

Conservation Halton Regulated Area online mapping was reviewed on August 21, 2024. The Site is partially located within a Conservation Halton Regulated Area (along the south limit of the Site boundary). As such, it is anticipated that a permit from the Conservation Halton under O. Reg. 162/06 will be required for the proposed development.

3.4 Private Well Review

MECP well record database was reviewed for records located within a radius of 500 m from the approximate Site boundary (Study Area). The location of the well records is presented on **Figure 7**. A total of two hundred and twenty-eight (228) wells were located within the Study Area. A summary of data obtained from record review is presented in **Table 3-1** and **Appendix B**.

Table 3-1- MECP Well Record Summary

Number of the Well Records	228
Well Type	
Drilled Well	184 (81%)
Other method	24 (11%)
Unknown	20 (8%)
Target Aquifer	
Overburden	43 (19%)
Shallow Bedrock (Depth less than 36.5 m)	76 (33%)
Deep Bedrock (Depth greater than 36.5 m)	31 (14%)
No Data	78 (34%)
Depth Ranges	
Less than 10.7 m (Less than 35 ft)	16 (7%)
10.7 m to 30.5 m (35 ft to 100 ft)	61 (26%)
Greater than 30.5 m (Greater than 100 ft)	79 (35%)
No Data	72 (32%)
Water Use (Final Status)	
Observation Well/Test Hole/Monitoring	14 (6%)
Domestic/Livestock	194 (85%)
Alteration	7 (3%)
Abandoned - Quality	1 (0%)
Abandoned - Other	6 (3%)
Commercial/Public	6 (3%)
Pumping Rate	
18.9 L/min or less (5.0 G/min of less)	6 (3%)
22.9 L/min - 56.7 L/min (6.0 G/min - 15 G/min)	70 (31%)
60.5 L/min - 113.4 L/min (16 G/min - 30 G/min)	56 (25%)
Greater than 113.4 L/min (Greater than 30 G/min)	3 (1%)
No Data	93 (40%)
Reported Static Water Level	
Less than 6.1 m (20 ft)	23 (10%)
6.1 m to 11.0 m (20 ft to 36 ft)	47 (21%)
Greater than 11.0 m (36 ft)	132 (58%)
Unknown	26 (11%)

The above summary indicates that most local wells are drilled wells registered as domestic supply wells. Four (4) records of water supply wells are also listed within the Site (Record nos. 177, 178, 185 and 186 on **Figure 7** and **Appendix B**). These wells are situated along the central northern property limit and are wells for properties adjacent to the Site.

Based on a review of local well records, the primary water supply aquifer consists of overburden deposits expected at the contact between overburden and bedrock, or within the Guelph Formation at depths less than 30.5 m below existing grades. Wells were also noted within deep bedrock understood to be the Amabel

Formation at depths typically greater than 35.1 m below existing grades. Reported flow rates are typically greater than 18.9 L/min and are expected to range from 37.8 L/min to 75.6 L/min, considered suitable for residential supply.

3.5 Climate Conditions

The following general climate data was obtained from historical climate data available online through Environment Canada. Annual precipitation data was used from the Guelph Turf Grass Institute Weather Station located approximately 14 kilometers north from the site. Average precipitation values were used over the period of 1998 to 2024. Climate conditions expected for the site are summarized as follows:

- Precipitation 958 mm/a
- Evapotranspiration 611 mm/a
- Water Surplus 347 mm/a

Infiltration of precipitation at the site is expected to be controlled by soil type at the site which consists of silty sand overlying clayey silt till. Infiltration rates were determined based on typical ground water recharge rates for various soil textures provided within the "MOEE Hydrogeological Technical Information Requirements for Land Development Application", (MOEE, 1995), Table 3 (page 4-63). Based on an annual water surplus of 347 mm per year the annual rates for infiltration and runoff at the site were estimated a 208 mm and 139 mm respectively.

Potential evapotranspiration (611 mm/a) was calculated following the Thornthwaite method as below:

$$\text{PET (cm/month)} = 1.6\,(L/12)\,(10T_a/I)^a$$

Where: L is the average day length

T_a is the average daily temperature

$I = \Sigma\,(T_a/5)^{1.5}$

$a = (6.75\times10^{-7})\,I^3 - (7.71\times10^{-5})\,I^2 + (1.792\times10^{-2})\,I + 0.49$

Values for average day length and average daily temperature were obtained online from the Environment Canada climate normals for 1994 – 2022 for the Guelph Turf Grass Institute Weather Station. The climate reported above is typical for Southern Ontario with annual total precipitation exceeding the mean annual evapotranspiration.

It is noted that the above are average values, which are representative in a regional context. There will be seasonal and annual variations in these values. However, the average values will govern long-term ground water recharge and discharge rates at the site. Therefore, average values are considered appropriate for the assessment of the hydrogeological conditions at the site.

3.6 Summary of Subsurface Investigation

Borehole drilling and monitoring well installation were conducted in conjunction with a geotechnical investigation on August 16, 2022. The program consisted of the drilling of five boreholes and the installation of four monitoring wells across the Site. The approximate locations of boreholes are shown on **Figure 2**.

The following Site stratigraphy is based on encountered stratigraphy within completed boreholes and noted findings in the field. It should be noted that the subsurface conditions are confirmed at borehole locations only, and may vary at other locations. The boundaries between the various strata represent an inferred transition rather than a precise plane of geological change. This summary is intended to correlate the data to assist in the interpretation of the subsurface conditions at the Site. For more specific subsurface details, refer to the enclosed Borehole Logs and a geological cross-section in **Appendix A**.

Boreholes were completed to various depths between 6.6 m to 8.1 m below grade (elevations ranging from 313.3 m to 306.4 m). The subsurface conditions encountered at the Site generally consisted of sand fill overlying silty sand and clayey silt (within BH1) to the completed depth of investigation. The following is a general description of the major stratigraphic units and ground water conditions observed in the boreholes completed at the Site.

3.7 Earth Fill

Earth fill materials, consisting of sand, with some gravel and trace amounts of rootlets were encountered at the surface layer in each borehole and extended to a depth of 0.8 mbgs (elevations ranging from 319.1 m to 312.2 m).

Fill material is loose to dense in consistency and brown in color. The in-situ moisture contents of the fill samples ranged from 2 to 7 percent by mass, indicating a moist condition.

3.8 Silty Sand to Sand and Silt

Silty sand to Sand and Silt deposits, with trace amounts of clay and gravel was encountered beneath the earth fill zone in each borehole and extended to the depths ranging from 6.1 m to the full depth of investigation except for BH1 where silty sand deposits extended to a depth of 6.1 mbgs, or an elevation of 306.9 m.

Silty sand to sand and silt is loose to very dense in consistency and brown in color. The in-situ moisture contents of the silt soil samples ranged from 0 to 22 percent by mass, indicating a moist to wet condition.

3.9 Clayey Silt

Stratum of clayey Silt deposits, with trace amount of sand was encountered beneath the silty sand to sand and silt deposits in Borehole 1 approximately 6.1 mbgs, (elevation of 306.9 m) and extended to the depth of 6.6 mbgs (306.4 m).

It is very stiff in consistency and brown in color. The in-situ moisture content of the clayey silt sample was 15 percent by weight, indicating a moist condition.

3.10 Ground Water Conditions

A groundwater monitoring program was completed between August 24th, 2022 extending to September 19th, 2022 as a part of the hydrogeological assessment. Four (4) monitoring wells installed for the hydrogeological assessment were considered for monitoring program.

Monitoring wells were developed on August 24th, 2022 and the groundwater levels were measured using an interface probe (Solinst Interface Metre, Model 122).

Additional groundwater monitoring was completed in 2024 following significant rainfall events to evaluate seasonal fluctuations in groundwater and expected seasonal high groundwater elevations for the Site. High groundwater conditions were monitored on July 18, 2024, which were measured following significant precipitation on July 10, 2024, of 59 mm, and July 16, 2024, of 56.7 mm, with monthly precipitation for July 2024 of 166.2 mm (average monthly rainfall of 80 mm). Precipitation was recorded at the Guelph Turf Grass Institute Weather Station, located approximately 14 km northwest of the site and obtained online through the Environment Canada website.

While groundwater monitoring is not taken within the period of seasonal high groundwater conditions, given the high intensity precipitation over the month of July 2024, monitoring results are considered representative of seasonal high conditions.

The measured groundwater levels, along with other monitoring wells details and findings, are presented in **Appendix C**. A summary of the groundwater observations is provided in **Table 3-2**:

Table 3-2- Static Groundwater Level Monitoring

Well ID		Screen Interval	24-Aug-22	7-Sep-22	19-Sep-22	18-Jul-24	06-Aug-24
BH1	mbgs	3.6-6.6	Dry	Dry	Dry	3.93	3.98
	masl	309.4-306.4	Dry	Dry	Dry	309.04	308.99
BH2	mbgs	6.1-7.6	6.64	6.72	6.76	5.61	5.64
	masl	312.1-310.6	311.54	311.46	311.42	312.57	312.54
BH3	mbgs	4.6-7.6	5.22	5.33	5.42	4.29	4.35
	masl	312.5-309.5	311.93	311.82	311.73	312.86	312.80
BH5	mbgs	4.6-6.1	5.13	5.21	5.21	4.40	4.44
	masl	312.2-310.7	311.67	311.59	311.59	312.40	312.36

Notes: mbgs: metres below ground surface
masl: metres above sea level

As shown in **Table 6-1**, the highest and lowest stabilized shallow groundwater levels were measured at elevations of 312.57 m and 312.86 m at monitoring wells BH3 and BH2, respectively.

3.11 Groundwater Flow Pattern

Groundwater flow pattern was interpreted using groundwater levels measured in the monitoring wells on July 18, 2024. **Figure 8** presents the interpreted groundwater flow pattern. Groundwater elevations are noted highest at BH3 at an elevation of 312.8 m which forms a local groundwater divide with groundwater flow to the east of the site directed to the tributary of Bronte Creek and associated wetlands, and flow to the west directed to Bronte Creek. Local groundwater flow will be influenced by topography and surface water features. Residential properties along Badenoch Street north of the site are considered as upgradient of the site, with Bronte Creek, and associated tributaries and wetlands located downgradient.

3.12 In-Situ Hydraulic Conductivity Testing

Hydraulic conductivity of the screen native subgrade was assessed at each of the completed monitoring well locations. Hydraulic conductivity analysis was determined based on falling and rising head single well response test (SWRT) tests. The results of the SWRT and rising head tests were analysed using the Bouwer and Rice method (1976). The results of the analysis are presented in **Appendix D**, with a summary of the findings provided in **Table 3-3** below:

Table 3-3 – Hydraulic Conductivity Based on In-Situ Hydraulic Conductivity Tests

Monitoring Well	Well Screen Elevation (masl)	Screened Geological Unit	Hydraulic Conductivity (m/s)	Test Method
BH2	312.1 to 310.6	Silty Sand to Silt and Sand	1.21×10^{-6}	Rising Head Test
BH3	312.5 to 309.5	Silty Sand to Silt and Sand	1.18×10^{-6}	Falling Head Test

A review of the findings suggests a moderate to low hydraulic conductivity for the silty sand to silt and sand layer within the screened intervals.

3.13 Summary of Water Quality Analysis

Groundwater quality sampling was completed within monitoring wells BH1, BH2, BH3, and BH5 and surface water sampling was competed from Bronte Creek at the southwest extent of the site. Analysis was completed for general inorganic parameters and dissolved metals (total metals for surface water analysis), with results compared to the Ontario Drinking Water Standards and Operational Objectives (O.Reg. 169/04).

Groundwater and surface water samples were submitted to Agat Laboratories of Mississauga, a CALA accredited third party laboratory, for analysis. All samples were collected in laboratory supplied bottles appropriate for the analysis completed. Collected samples were stored on ice in suppled coolers for transport to the laboratory. Sample temperatures were confirmed between 5.3 to 6.1 ^{o}C upon arrival. A summary of the results of groundwater and surface water sampling and laboratory certificates of analysis are provided in the attached **Appendix E**, with **Table 1** provided a summary of analysis in comparison with O.Reg. 169/03.

Groundwater quality analysis indicated elevated hardness levels within all collected samples, considered representative given the limestone bedrock and high calcium carbonate content of soils and bedrock. Samples from BH3 were observed to have elevated levels of sodium (117 mg/L), chloride (202 mg/L), total dissolved solids (824 mg/L) and nitrate (6.01 mg/L) relative to other obtained groundwater samples, not in exceedance of drinking water standards. Surface water sampling indicated elevated concentrations of sodium (309 mg/L), chloride (476 mg/L), and total dissolved solids (1,200 mg/L).

Shallow groundwater quality was observed to be within drinking water standards and is not considered to represent a potential source of contamination for the underlying bedrock aquifer. Further soils across the site were noted to consist of silty sand to sand and silt overlying clayey silt with bedrock depth reported through well records at depths of approximately 24 m (80 feet). It is expected that the underlying bedrock aquifer is geologically isolated from surrounding land use impacts including subsurface sewage disposal and agricultural uses.

4 Water Balance Assessment

Based on a review of the Draft Plan of Subdivision, drawing D14 dated June 9, 2024, prepared by Weston Consulting, it is understood that the proposed development would include a residential subdivision proposed within the north portion of the Site. The proposed subdivision consists of 21 single detached dwellings, a storm water management block, and internal roadways. Plan review indicates that residential lots will range in size from 0.197 ha to 0.382 ha. It is understood that each proposed dwelling will rest on a single basement level extending to the footprint of the proposed building.

The pre-development site is considered undeveloped. The following area breakdown for the Site is expected given the current draft plan of subdivision:

- Single Detached Residential 4.436 ha
- Storm Water Management 0.345 ha
- Environmental Protection Lands 17.131 ha
- Additional Lands 0.059 ha
- Roads 1.133 ha
    - **TOTAL 23.104 ha**

The total developable area of the site is considered at 5.973 hectares, given the coverage of Environmental Protection Lands which are to be maintained following site development.

Soil conditions for the site were evaluated based on a series of five boreholes completed by Englobe in August 2022 as summarized in Section 3.6 above. Regional climate conditions were based on historical weather records accessed online from Environment Canada and are summarized in Section 3.5 above.

Based on the proposed development plan it is expected that an increase in impervious areas at the site following development will result in an overall increase in the rate of runoff of precipitation at the site with a corresponding decrease in both infiltration and evapotranspiration. The following **Table 4-1** provides a summary of the calculated water balance given the site conditions and the proposed plan of development:

Table 4-1 - Summary of Site Water Balance

	Precipitation (m^3/a)	Evapotranspiration (m^3/a)	Infiltration (m^3/a)	Runoff (m^3/a)
Pre-Development	221,336	141,165	48,103	32,068
Post-Development	221,336	119,838	39,484	62,014

An infiltration deficit of approximately 8,619 m^3 is expected following site development. It is expected that the pre-development water balance at the site can be maintained following a Best Management Practice approach utilizing proposed site grading and through directing rooftop runoff to infiltration where feasible. It is understood that an infiltration gallery is proposed within the SWP block, near the headwall structure HW3. It is expected that the gallery will be sufficiently sized to meet the pre-development infiltration targets following site development. It is expected that the mitigated water balance will be further assessed as part of detailed design, once storm water management designs for the developed Site are finalized. The detailed water balance for the site is provided in the attached **Table 2**.

4.1 Water Balance Targets

Under the pre-development scenario the site is considered largely impervious. The predicted annual groundwater infiltration volume, providing recharge for shallow groundwater at the site under current pre-development land use is estimated at 48,103 m^3. Under the post-development scenario rates of evapotranspiration and infiltration are expected to decrease and the rate of runoff of precipitation will increase due to the increase in impermeable surface across the project area. Under the current plan of development, the un-mitigated infiltration across the site is anticipated at 39,484 m^3 following site development with a post development annual infiltration deficit estimated at 8,619 m^3.

It is expected that roof leaders for residential lots will discharge overland for infiltration. For the purposes of consideration of the mitigated water balance it was considered that the discharge of roof runoff to the rear yard area would account for half of the discharge from 50% of rooftop coverage (total of 25% runoff reduction), It is expected that front yards draining 50% of rooftop runoff would drain to the ROW and would be directed to the SWP block. It is expected that through discharging roof runoff to overland flow that an additional 4,781 m^3 of runoff would be directed to infiltration.

The remaining pre-development infiltration deficit of approximately 3,838 m^3 would be directed to infiltration through the implementation of an infiltration gallery within the SWMP block at the proposed headwall HW3 structure. It is understood that the infiltration gallery design will be provided as part of detailed design. Infiltration testing within the area proposed for an infiltration gallery will be required once the location and design have been finalized.

Given the hydrogeological function of the site to provide recharge for shallow groundwater, with groundwater discharge expected to Bronte Creek, and associated tributaries and wetland areas. The primary water balance consideration following site development for underlying ground water would be for the maintenance of the pre-development rates of infiltration across the site following a Best Management Practice approach. We are of the understanding that an infiltration galley has been proposed for the development to meet the development target for maintaining rates of per-development infiltration across the Site following development. Details of the infiltration gallery are provided in the FSR prepared by Crozier.

5 Servicing Assessment

5.1 Private Water Supply Considerations

Confirmation of potable water for the purpose of water servicing for residential demand is proposed to be completed as part of detailed design under a condition of draft plan approval. For the purposes of obtaining approvals for the draft plan of sub-division the feasibility of water servicing was assessed through a review of well yield provided within surrounding well records as summarized in Section 3.4 above.

Under Procedure D-5-5 the minimum well yield required for residential supply would be based on the per-person requirement of 450 L/day, with peak demand based on a rate of 3.75 L/min over a period of 120 minutes. Based on the expected design of 4-bedroom dwellings with five residents the expected daily water demand would be 18.75 L/day, with a daily volume of 2,250 L/day.

Domestic potable supply wells are reported to be completed within overburden deposits expected to consist of sand and gravel to gravel directly overlying limestone bedrock at depths ranging from 22 to 25 m below grade, or within the shallow bedrock at depths less than 30.5 m. It is anticipated that overburden deposits will provide for flow rates of at least 18.9 L/day (approximately 3% of 228 well records provided for flows of 18.9 L/min or less). Bedrock has expected yields of 37.8 L/min or greater (upwards of 113.4 L/min).

Given that daily residential demand requirements are expected below the expected yield for shallow bedrock it is expected that water taking would not result in significant drawdown, and as such, interference effects between wells competed for proposed lots and for existing private water supply wells is expected to be minimal. Further confirmation of water servicing will be competed through the completion of a well survey, test well drilling, monitoring, and completion of pumping tests and groundwater sampling.

The following scope of work will be required for confirmation of private water servicing for the proposed residential lots, which will be completed and reported under separate reporting, proposed to be submitted as part of the detailed design submission for the proposed development:

- *Private Well Survey*: A private well survey would be completed for properties completed within a 250 m radius of the Site. The private well survey will be completed to verify locations of private water supply wells and to interview residents regarding the construction details and operation history for installed private water supply wells. As part of the well survey permission for well monitoring will be requested during the test well program detailed below.
- *Establish On-Site and Off-Site Well Montoring Program*: A network of both on-site and off-site monitoring wells will be established prior to the start of pumping tests for on-site test wells. Shallow monitoring well locations on-site would be monitored, including off-site private wells where permission to monitor is provided by the property owner. Water levels would be monitored the week prior, during, and one week following completion of well testing. Consideration would be provided for the installation of datalogging pressure transducers within selected wells over the duration of monitoring.

- *Completion of Test Wells*: Three test wells will be completed on-site, in compliance with guidelines within Procedure D-5-5 given the developable area of 5.973 ha (three test wells for sites of 15 ha or less). Test wells will be located such that they can be used for the proposed development. The target depth for test wells will depend primarily on the conditions encountered. It is expected to drill test wells to the top of bedrock. If yields are not expected to meet residential demand wells will be extended within bedrock deposits. It is expected that well depth will not extend past depths of 30.5 m, however, it is expected that deeper bedrock deposits will provide for suitable residential supply if necessary. If adequate yields are not encountered within shallow bedrock well casing will be extended into deep bedrock to maintain separation between shallow and deep bedrock aquifers.
- *Completion of Pumping Tests*: Pumping tests for each of the three completed test wells will be completed simultaneously to confirm suitable yield and groundwater quality for residential supply. Pumping tests will be completed over the duration of six-hours or extended to withdrawal twice the daily residential demand (4,500 L) at the expected sustainable yield determined during test well drilling/well development.
- *Groundwater Sampling Program*: Groundwater sampling would be competed for each test well over three sampling events to confirm potability for residential use and to assess the for the potential degradation of groundwater quality wit taking. Groundwater quality would be analyzed for O.Reg. 169/03 including Schedule 1 and partial Schedule 2 (metals and inorganics) parameters. Groundwater sampling would be completed for private monitoring wells prior to and following completion of testing for potential parameters of concern including microbiology, nitrate, sodium, and chloride.

5.2 Sewage System Design for Proposed Development

The highest stabilized groundwater level was recorded at an elevation of 312.86 m, or 4.29 m below existing grades, in monitoring well BH3 on July 18, 2024. The highest groundwater level should be considered for designing the base of the proposed septic bed.

The percolation rate of the subsoil profile beneath the Site was confirmed by T-Time testing completed on three available soil samples as summarized in the **Table 5-1**:

Table 5-1 - Percolation Rate using T-Time Test

BH ID	Sample ID	Depth (mbgs)	Elevation (masl)	Soil Media	Percolation Time (min/cm)	Estimated Percolation Rate(mm/h)
1	7	6.10	306.9	Clayey Silt, trace sand	58	10.3
3	7	2.30	314.8	Silt and Sand, trace clay	45	13.3
5	3	1.54	315.3	Silty Sand, trace clay	11	54.5

mbgs- metres below ground surface
masl- metres above sea level

Shallow native soils underlying tile beds consist of silty sand with expected percolation rates (T-times) of 11 min/cm. Preliminary tile bed design is proposed to consist of a conventional Class IV in-ground leaching bed with advance tertiary treatment (with standard tertiary treatment for lots 1 and 12), for subsurface discharge of sewage effluent. Preliminary design parameters are provided for the construction of Class IV

leaching beds with tertiary treatment to service residential lots. It is anticipated that maximum peak sewage flows from the new septic systems will be approximately 3,600 L/day based the proposed servicing design prepared by Crozier. The length of distribution pipe, given that tertiary treatment units are proposed for residential lots are based on the following equation:

$$L=QT/300$$

Where: L is the length of distribution pipe in metres
Q is the design sewage flows (3,600 L/day)
T is the percolation rate of the underlying native subgrade (11 min/cm)

Given the sanitary design flows and the expected percolation rate for the shallow native subgrade leaching beds are expected to be comprised of 132 m of distribution pipe, which is expected to consist of 11 runs or 12 m pipe. With 1.6 m between runs of pie leaching bed dimensions are expected at 16 m by 12 m.

Based on the review of the sewage needs estimates provided for the proposed residential development, being below 10,000 litres per day, no approval for a proposed sewage works from the MECP is anticipated. An approval for the proposed on-site septic sewage system can likely be obtained through the Ontario Building Code through the local municipality.

Given the prevalent soil conditions (silty sand) it is expected that the tile bed will be constructed as an in-ground bed. Setbacks from the tile bed and sewage treatment facility will be required as follows:

Table 5-2 - Summary of Setback Clearances

	Distribution Pipe Clearances (m)
Structure	5
Well with a watertight casing to a depth of 6 m	15
Any other well	30
Surface water	15
Spring not used as a source of potable water	15
Property line	3

6 Nitrate Loading Impact Assessment

A nitrate loading impact assessment was conducted for nitrate to determine the anticipated concentration that can be predicted at the hydraulically down-gradient Site boundary based on the establishment of individual on-site septic sewage system to service each proposed residential lot. The assessment is based on The Ministry of the Environment Conservation and Parks (MECP) guideline D-5-4 for individual on-site sewage systems. The assessment assumes natural attenuation for nitrate in shallow groundwater through dilution from infiltration of precipitation and from sewage system loading due to the proposed residential dwellings.

A monthly water balance model (the Thornthwaithe water-balance program) provided by the U.S. Geological Survey (USGS, 2007) was used to determine the average infiltration rate at the Site. The long-term precipitation data were collected from the Canadian Climate Normal between 1981 and 2010 from the Government of Canada website for the Guelph Turfgrass Institute weather station located approximately 14 km to the north of the Site.

The approximate infiltration rate for the Site was determined, based on the 30-year climate normal for precipitation. A mass balance calculation was completed for nitrate at the Site, which was assessed based on use of both conventional and tertiary treatment for sewage effluent input to septic leaching beds, with the concentration of nitrate loading to groundwater set at 40 mg/L for use of conventional effluent treatment, at 20 mg/L for tertiary effluent treatment, and at 15 mg/L for advanced tertiary effluent treatment, respectively.

Background nitrate concentration was measured at monitoring wells BH2, BH3 and BH5. Groundwater samples were collected on February 7, 2023. Upon sampling, bottles were placed in ice and packed in a cooler at about 4.0° C for shipment to the analytical laboratory. Sample analysis was performed by SGS, a third-party laboratory accredited by the Canadian Association for Laboratory Accreditation (CALA). The samples were compared to confirm nitrite, nitrate, Total Phosphorous (TP), ammonia and pH of the groundwater beneath the Site. Nitrate concentrations in shallow groundwater were assessed based on sampling completed on August 6, 2024, with nitrate concentrations in groundwater measured at 0.37, 1.54, 6.10, and 1.66 mg/L within BH1, BH2, BH3, and BH5 respectively.

A total of 21 residential lots are proposed with lot size ranging from 1,940 m^2 to 3,820 m^2. Septic leaching beds are proposed with approximate dimensions of 16 m by 23 m. As such, an area of 368 m^2 was considered as the septic bed area for the current assessment. The average flow rate of 1,000 L/day per residence was considered for the nitrate loading impact assessment.

Nitrate loading was assessed on a single lot basis based on the expected infiltration rate, given the proposed lot area. Nitrate loading calculations were assessed as follows:

$$C_{pb} = [(Ci \times Vi) + (Cs \times Vs)]/[Vi + Vs]$$

Where:

Ci = concentration of nitrate in precipitation, taken at 0.1 mg/L.

Vi= Annual volume of recharge (i.e. lot area less impervious surfaces x annual infiltration rate (liters)).

Cs = Nitrate concentration in sewage set at 40 mg/L for conventional septic systems, at 20 mg/L for septic systems having tertiary treatment, and at 15 mg/L for advanced tertiary treatment system.

Vs = Volume of sewage where 1,000 L/day of sewage has been considered for each lot.

Cpb = Concentration of nitrate modeled for the Site boundary based on the mass balance approach

Based on the mass balance calculation, the predicted nitrate concentration assessed for the down-gradient lot boundary for each lot is calculated without considering background nitrate in groundwater. Details are presented in the following **Table 6-1:**

Table 6-1 - Predicted Nitrate Concentration at Down-Gradient Property Limit (Without Background)

Lot Size (m^2)	Lot No	Conventional Treatment (40 mg/L)	Tertiary Treatment (20 mg/L)	Advanced Tertiary Treatment (15 mg/L)
1,940	18	17.57 mg/L	8.81 mg/L	6.62 mg/L
1,950	19, 20	17.52 mg/L	8.79 mg/L	6.60 mg/L
1,960	15	17.47 mg/L	8.76 mg/L	6.59 mg/L
1,970	16, 17, 21	17.42 mg/L	8.74 mg/L	6.57 mg/L
1,980	7	17.37 mg/L	8.71 mg/L	6.55 mg/L
1,990	4	17.32 mg/L	8.69 mg/L	6.53 mg/L
2,000	6, 8, 9, 11	17.27 mg/L	8.66 mg/L	6.51 mg/L
2,020	2	17.17 mg/L	8.62 mg/L	6.48 mg/L
2,030	13	17.12 mg/L	8.59 mg/L	6.46 mg/L
2,040	3	17.08 mg/L	8.57 mg/L	6.44 mg/L
2,050	10	17.03 mg/L	8.54 mg/L	6.42 mg/L
2,060	5	16.98 mg/L	8.52 mg/L	6.40 mg/L
2,090	14	16.84 mg/L	8.45 mg/L	6.35 mg/L
2,530	1	15.02 mg/L	7.54 mg/L	5.67 mg/L
3,820	12	11.41 mg/L	5.74 mg/L	4.32 mg/L

The total predicted nitrate concentration was assessed for the down-gradient lot boundary for each lot including the geometric mean of background nitrate. The geomean of the nitrate concentration in groundwater was calculated at 1.55 mg/L based on nitrate concentrations measured in August 2024. Total anticipated nitrate concentration for the down-gradient of the lots is summarized in the following **Table 6-2**:

Table 6-2 – Total Predicted Nitrate Concentration at Down-Gradient Property Limit

Lot Size (m^2)	Lot No	Conventional Treatment (40 mg/L)	Tertiary Treatment (20 mg/L)	Advanced Tertiary Treatment (15 mg/L)
1,940	18	19.12 mg/L	10.36 mg/L	8.17 mg/L
1,950	19, 20	19.07 mg/L	10.34 mg/L	8.15 mg/L
1,960	15	19.02 mg/L	10.31 mg/L	8.14 mg/L
1,970	16, 17, 21	18.97 mg/L	10.29 mg/L	8.12 mg/L
1,980	7	18.92 mg/L	10.26 mg/L	8.10 mg/L
1,990	4	18.87 mg/L	10.24 mg/L	8.08 mg/L
2,000	6, 8, 9, 11	18.82 mg/L	10.21 mg/L	8.06 mg/L
2,020	2	18.72 mg/L	10.17 mg/L	8.03 mg/L
2,030	13	18.67 mg/L	10.14 mg/L	8.01 mg/L

Lot Size (m^2)	Lot No	Conventional Treatment (40 mg/L)	Tertiary Treatment (20 mg/L)	Advanced Tertiary Treatment (15 mg/L)
2,040	3	18.63 mg/L	10.12 mg/L	7.99 mg/L
2,050	10	18.58 mg/L	10.09 mg/L	7.97 mg/L
2,060	5	18.53 mg/L	10.07 mg/L	7.95 mg/L
2,090	14	18.39 mg/L	10.00 mg/L	7.90 mg/L
2,530	1	16.57 mg/L	9.09 mg/L	7.22 mg/L
3,820	12	12.96 mg/L	7.29 mg/L	5.87 mg/L

Example calculations are provided in the attached **Appendix F**. Based on the completed nitrate impact calculations it is expected that standard tertiary treatment (20 mg/L of nitrate) would be acceptable to meet a concentration of 10 mg/L at the downgradient property boundary for lots 1 and 12, and advanced tertiary treatment (15 mg/L of nitrate) would be required for the remainder of lots (0.194 ha to 0.209 ha).

It should be noted that additional dilution from assessed groundwater underflow beneath the Site has not been considered for the assessment (all above mentioned scenarios), so the results are considered a conservative evaluation.

7 Environmental Impact Analysis

Environmental impacts for sewage disposal at the Site were assessed given the requirements for tertiary treatment as discussed in Section 6.0 above. Bronte Creek south of the site was considered as the primary effluent receiver for septic effluent. The primary parameters of concern for surface water were considered as nitrate and total phosphorus. The target criteria for nitrate to surface water considered is the nitrate limit of 2.93 mg/L based on the Canadian Water Quality Guidelines (CWQG) and total phosphorus concentrations of 0.03 mg/L for rivers and streams from the Provincial Water Quality Objectives (PWQO).

Surface water sampling was completed for Bronte Creek south of the site on August 6, 2024. Concentrations of nitrate in surface water were measured at 1.92 mg/L, and total phosphorus concentrations were non detectable (i.e., <0.02 mg/L). Nitrate impacts to surface water were evaluated based on a site wide mass balance approach as determined by the following equation:

$$C_{PB} = (V_s \times L \times C_s)/[(I \times A) + (Vs \times L)]$$

Where: C_{PB} is the concentration of nitrate at the property boundary (mg/L);
V_s is the average annual sewage flow per lot (365 m^3/yr);
L is the number of proposed lots (21);
C_s is the effluent nitrate concentration (15 mg/L);
I is the infiltration rate for the native subgrade consisting of silty sand (0.175 m/yr); and,
A is the site area (231,040 m^2).

Based on the above equation the nitrate concentration expected towards Bronte Creek flowing immediately south of the Site is expected at 2.39 mg/L provided advanced tertiary treatment systems are utilized for residential lots as recommended under Section 5.0 above. Nitrate impacts to surface water in exceedance of the CWQG limit of 2.93 mg/L are not expected due to the proposed development.

Potential impacts to surface water because of total phosphorus were evaluated through the assessment of potential travel times for sewage effluent given the measured hydraulic conductivity of 1.2 x 10^{-6} m/s for silty sand deposits as measured at BH2 and BH3. It is expected that separation distances from proposed residential lots to Bronte Creek range from approximately 30 m for lots backing to buffers surrounding Bronte Creek (i.e., Lots 1, 2, and 7) to approximately 150 m for lots towards the norther property limit (i.e., Lots 15, 16, and 17). The expected travel time for sewage effluent is expected to range from 0.8 years to 4 years based on the separation distances from proposed lots to Bronte Creek. It is expected that soils will have attenuative capacity to allow for dilution of total phosphorus such that significant impacts to surface water is not expected.

Potential impacts to groundwater because of microbial pathogens from the sewage effluent were also considered. A risk of contamination from microbial pathogens exists within areas where high rates of groundwater flow are expected including coarsely textured soils or fractured or karstic bedrock environments. Given the prevalent soil conditions of silty sand overlying clayey silt, and the depth to bedrock impacts to groundwater due to microbial pathogens is not expected.

8 Summary and Conclusions

Based on the results of the investigation, the following summary and conclusions are provided:

i. The Site is located within physiographic regions of Southern Ontario known as the Horseshoe Moraines (within the north, central, and west portions) and partially in Flamborough Plain (within the southeast and east portions). The Horseshoe Moraines within the vicinity of the Site comprises a Till Moraines, and Flamborough Plain consists of Limestone Plains physiographic feature. The Site is located within Bronte Creek Watershed within the jurisdiction of Conservation Halton. The headwaters of the Bronte Creek are generated to the northwest of the Site and flows southeasterly direction crossing the southwest portion of the Site.

ii. Based on a review of local well records, the primary water supply aquifer consists of overburden deposits expected at the contact between overburden and bedrock, or within the Guelph Formation at depths less than 30.5 m below existing grades. Wells were also noted within deep bedrock understood to be the Amabel Formation at depths typically greater than 35.1 m below existing grades. Reported flow rates are typically greater than 18.9 L/min and are expected to range from 37.8 L/min to 75.6 L/min, considered suitable for residential supply.

iii. Boreholes were completed to various depths between 6.6 m to 8.1 m below grade (elevations ranging from 313.3 m to 306.4 m). The subsurface conditions encountered at the Site generally consisted of sand fill overlying silty sand and clayey silt (within BH1) to the completed depth of investigation.

iv. Groundwater elevations are noted highest at BH3 at an elevation of 312.8 m which forms a local groundwater divide with groundwater flow to the east of the site directed to the tributary of Bronte Creek and associated wetlands, and flow to the west directed to Bronte Creek. Local groundwater flow will be influenced by topography and surface water features. Residential properties along Badenoch Street north of the site are considered as upgradient of the site, with Bronte Creek, and associated tributaries and wetlands located downgradient.

v. Hydraulic conductivity testing was carried out within monitoring wells installed at BH2 and BH3, screened within silty sand. Hydraulic conductivity of the shallow native subgrade was measures at 1.2×10^{-6} m/s.

vi. Shallow groundwater quality was observed to be within drinking water standards and is not considered to represent a potential source of contamination for the underlying bedrock aquifer. Further soils across the site were noted to consist of silty sand to sand and silt overlying clayey silt with bedrock depth reported through well records at depths of approximately 24 m (80 feet). It is expected that the underlying bedrock aquifer is geologically isolated from surrounding land use impacts including subsurface sewage disposal and agricultural uses.

vii. An infiltration deficit of approximately 8,619 m^3 is expected following site development. It is expected that the pre-development water balance at the site can be maintained following a Best Management Practice approach utilizing proposed site grading and through directing rooftop runoff to infiltration where feasible. It is understood that an infiltration gallery is proposed within the SWP block, near the headwall structure HW3.

viii. Based on a review of well records groundwater yields typically range from 37.8 L/min to 94.5 L/min, with the expected water demand of 18.9 L/min to meet peak demand. Given that daily residential demand requirements are expected below the expected yield for shallow bedrock it is expected that water taking would not result in significant drawdown, and as such, interference effects between wells competed for proposed lots and for existing private water supply wells is expected to be minimal. Further confirmation of water servicing will be competed through the completion of a well survey, test well drilling, monitoring, and completion of pumping tests and groundwater sampling.

ix. Given the sanitary design flows of 3,600 L/day, with use of tertiary treatment units, and the expected percolation rate for the shallow native subgrade of 11 min/cm for silty sand soils, leaching beds are expected to be comprised of 132 m of distribution pipe, which is expected to consist of 11 runs of 12 m pipe. With 1.6 m between runs of pie leaching bed dimensions are expected at 16 m by 12 m.

x. Based on the completed nitrate impact calculations it is expected that standard tertiary treatment (20 mg/L of nitrate) would be acceptable to meet a concentration of 10 mg/L at the downgradient property boundary for lots 1 and 12, and advanced tertiary treatment (15 mg/L of nitrate) would be required for the remainder of lots (0.194 ha to 0.209 ha).

xi. Surface water sampling was completed for Bronte Creek south of the site on August 6, 2024. Concentrations of nitrate in surface water were measured at 1.92 mg/L, and total phosphorus concentrations were non detectable (i.e., <0.02 mg/L).

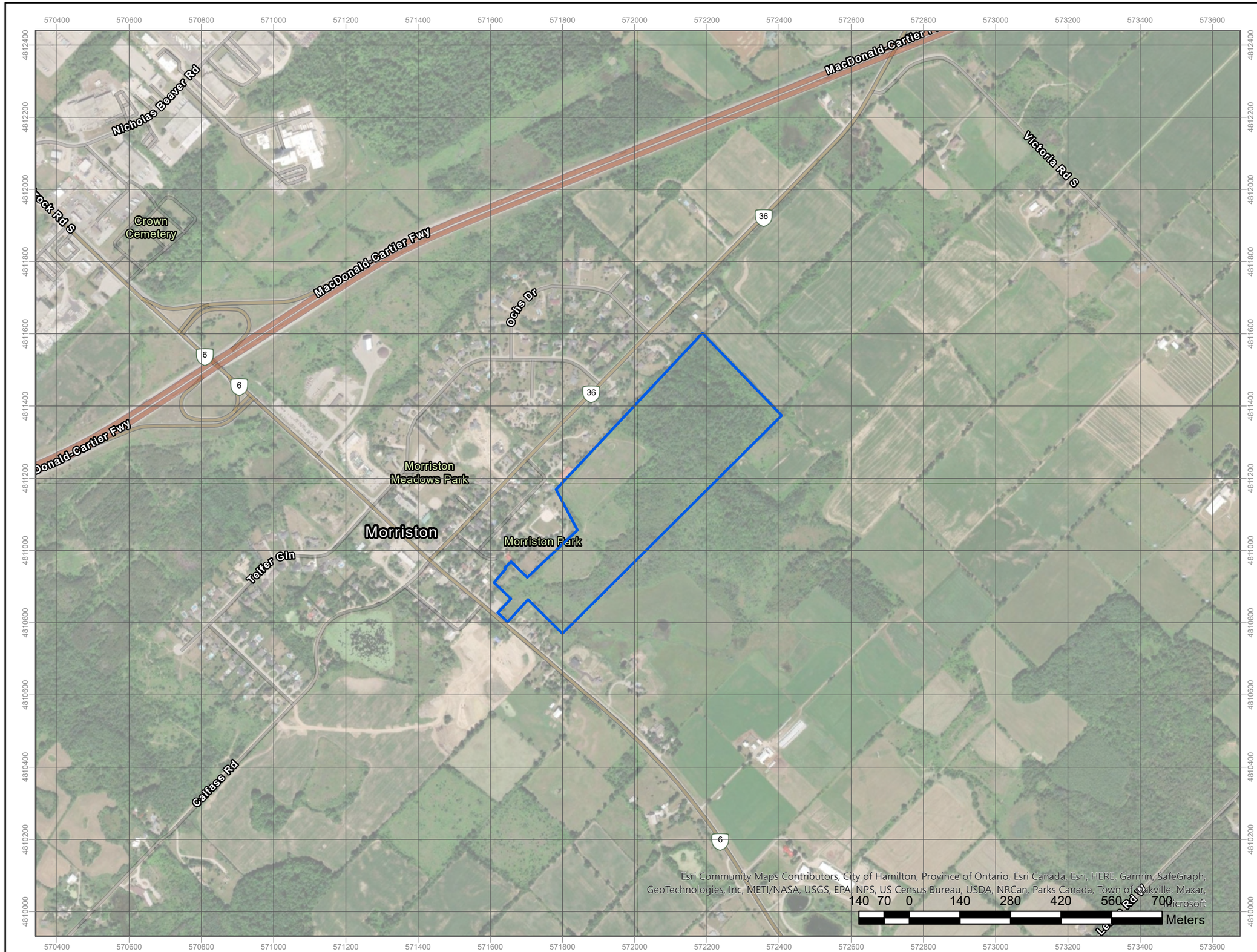
xii. Based on completion of a mass balance analysis given the site area of 23.104 ha the nitrate concentration expected towards Bronte Creek flowing immediately south of the Site is expected at 2.39 mg/L provided advanced tertiary treatment systems are utilized capable of reducing nitrate concentrations in sewage effluent to 15 mg/L. Nitrate impacts to surface water in exceedance of the CWQG limit of 2.93 mg/L are not expected due to the proposed development.

xiii. The expected travel time for sewage effluent is expected to range from 0.8 years to 4 years based on the separation distances from proposed lots to Bronte Creek. It is expected that soils will have attenuative capacity to allow for dilution of total phosphorus such that significant impacts to surface water is not expected.

xiv. Potential impacts to groundwater because of microbial pathogens from the sewage effluent were also considered. A risk of contamination from microbial pathogens exists within areas where high rates of groundwater flow are expected including coarsely textured soils or fractured or karstic bedrock environments. Given the prevalent soil conditions of silty sand overlying clayey silt, and the depth to bedrock impacts to groundwater due to microbial pathogens is not expected.

Figures and Tables

ENGLOBE



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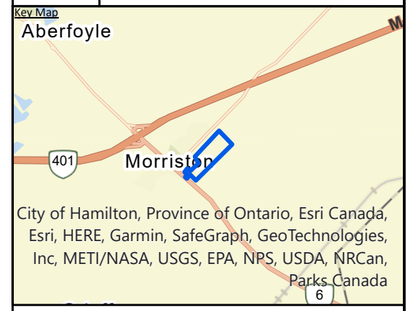
Construction Materials, Inspection & Testing

References:

ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/ Airbus Ds, USDA, USGS, AeroGRID, IGN, and the GIS User Community.Basemaps

Key Map



Notes:

Legend:

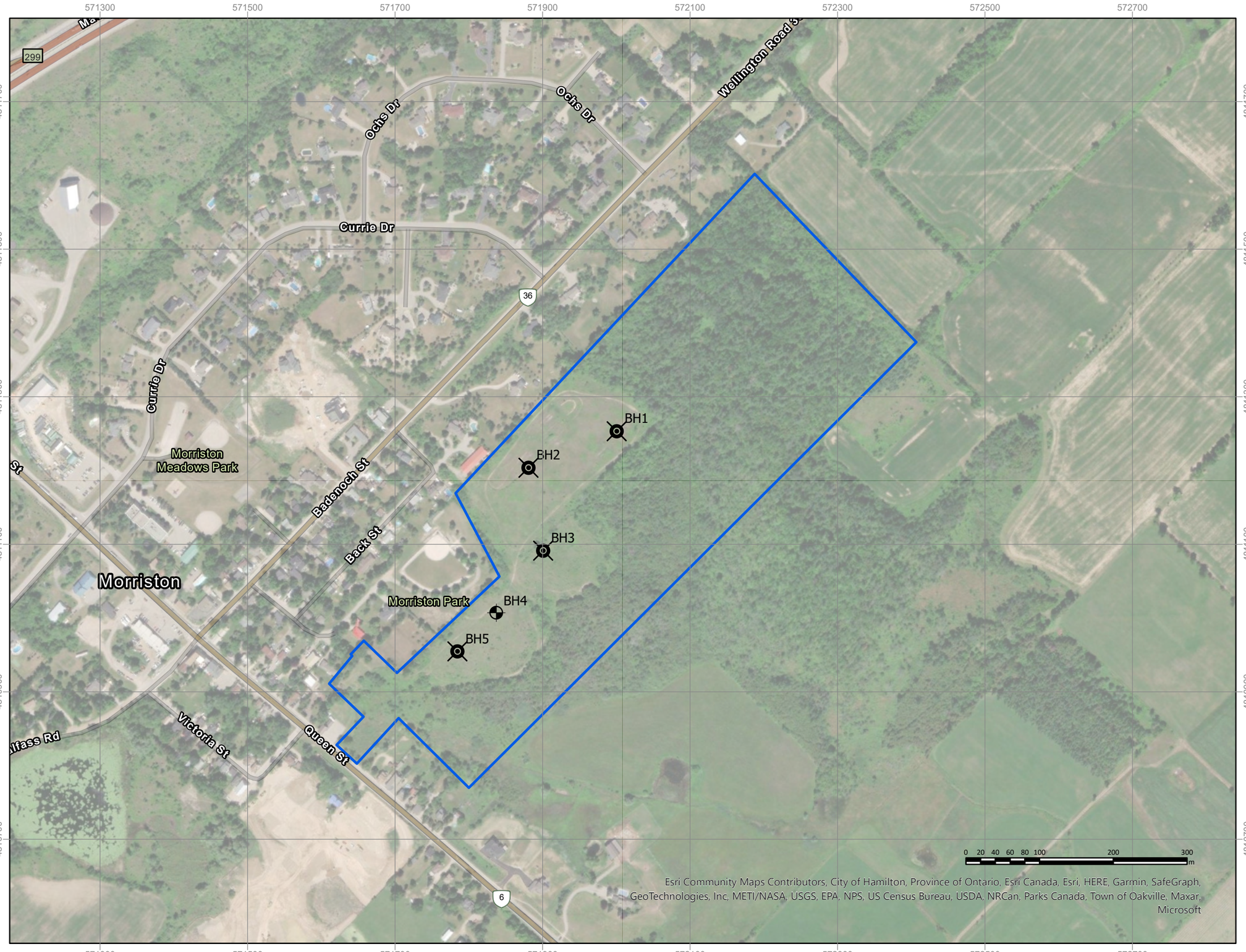
Approximate Site Boundary

Project Title:
Hydrogeological Assessment

Site Location:
11 Main Street, Puslinch, Ontario

Figure Title:
Site Location Plan

Designed By: RG	*File No.:* 1-22-0482-46
Drawn By: SSK	*Scale:* As Shown
Reviewed By: BW	*Figure No.:* 1
Date: October 2022	



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References:

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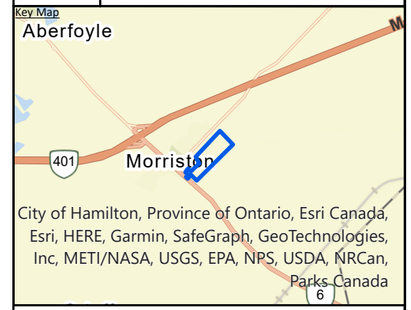
Key Map



Notes:

Legend:

- Approximate Site Location
- Approximate Borehole Location
- Approximate Monitoring Well Location

Project Title:
Hydrogeological Assessment

Site Location:
11 Main Street, Puslinch, Ontario

Figure Title:
Borehole and Monitoring Well Plan

Designed By: RG	*File No.:* 1-22-0482-46
Drawn By: SSK	*Scale:* As Shown
Reviewed By: BW	*Figure No.:* 2
Date: October 2022	

570500 571000 571500 572000 572500 573000 573500

4812000 4811500 4811000 4810500 4810000

NICHOLAS BEAVER RD
401 HWY
WELLINGTON 46 RD
HWY 401
OCHS DR
WINER CRT
WELLINGTON 36 RD
VICTORIA RD S
CURRIE DR
LAING CRT
BACK ST
QUEEN ST
TELFER GLEN ST
VICTORIA ST
CHURCH ST
SETTLERS CRT
CALFASS RD
HWY 6
LESLIE RD W

6
5b
20

0 50 100 200 300 400 m

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References:

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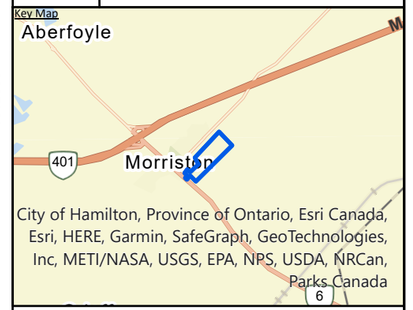
Key Map



Notes:

Legend:

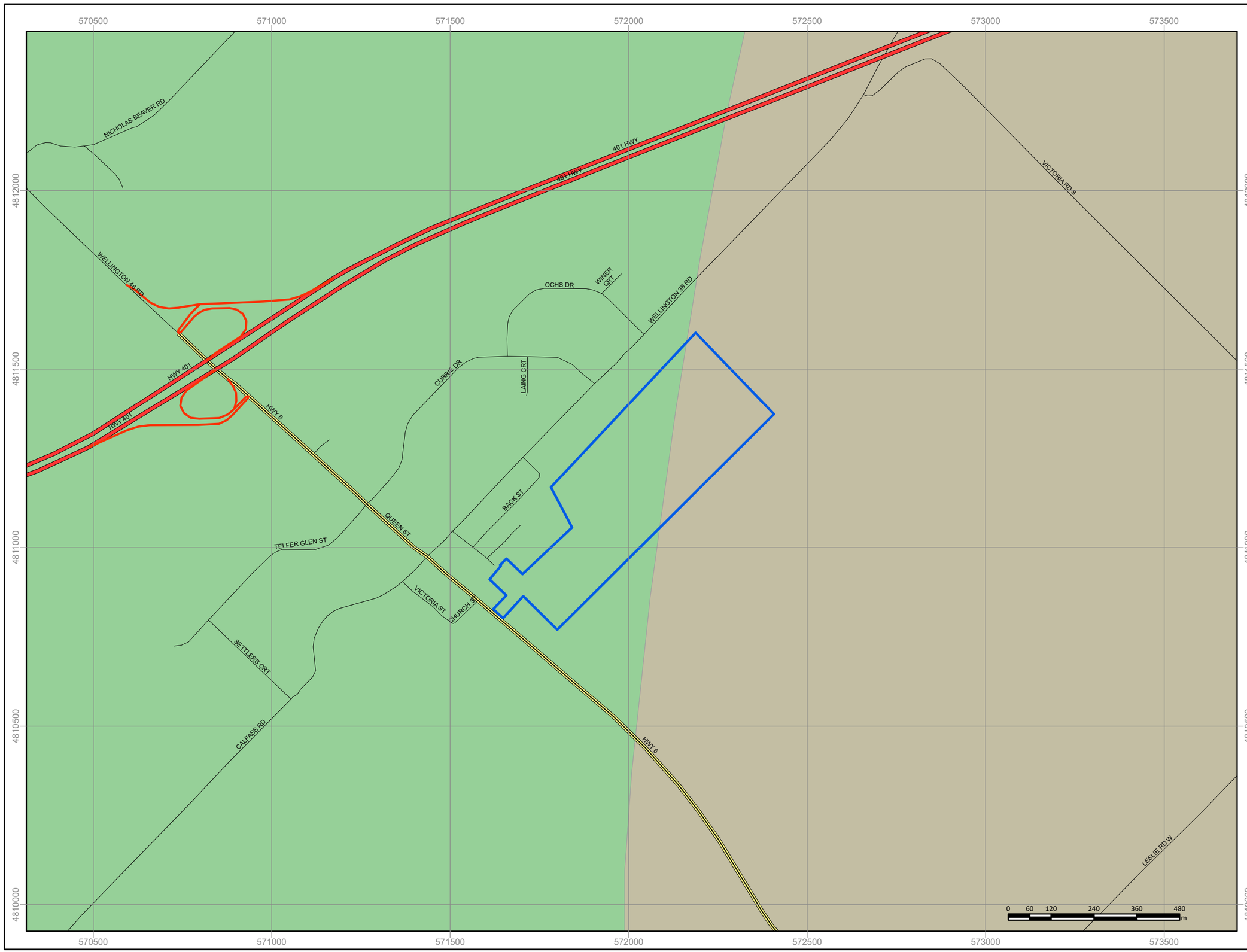
- Approximate Site Location
- 5b: Stone-poor, carbonate-derived silty to sandy till
- 6: Ice-contact stratified deposits
- 20: Organic deposits
- Collector
- Expressway / Highway
- Freeway
- Local / Street
- Ramp

Project Title:
Hydrogeological Assessment

Site Location:
11 Main Street, Puslinch, Ontario

Figure Title:
Surficial Geology Map

Designed By: RG	**File No.:** 1-22-0482-46
Drawn By: SSK	**Scale:** As Shown
Reviewed By: BW	**Figure No.:** 3
Date: October 2022	



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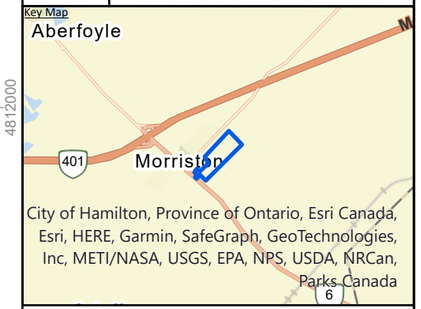
Key Map



Notes:

Legend:

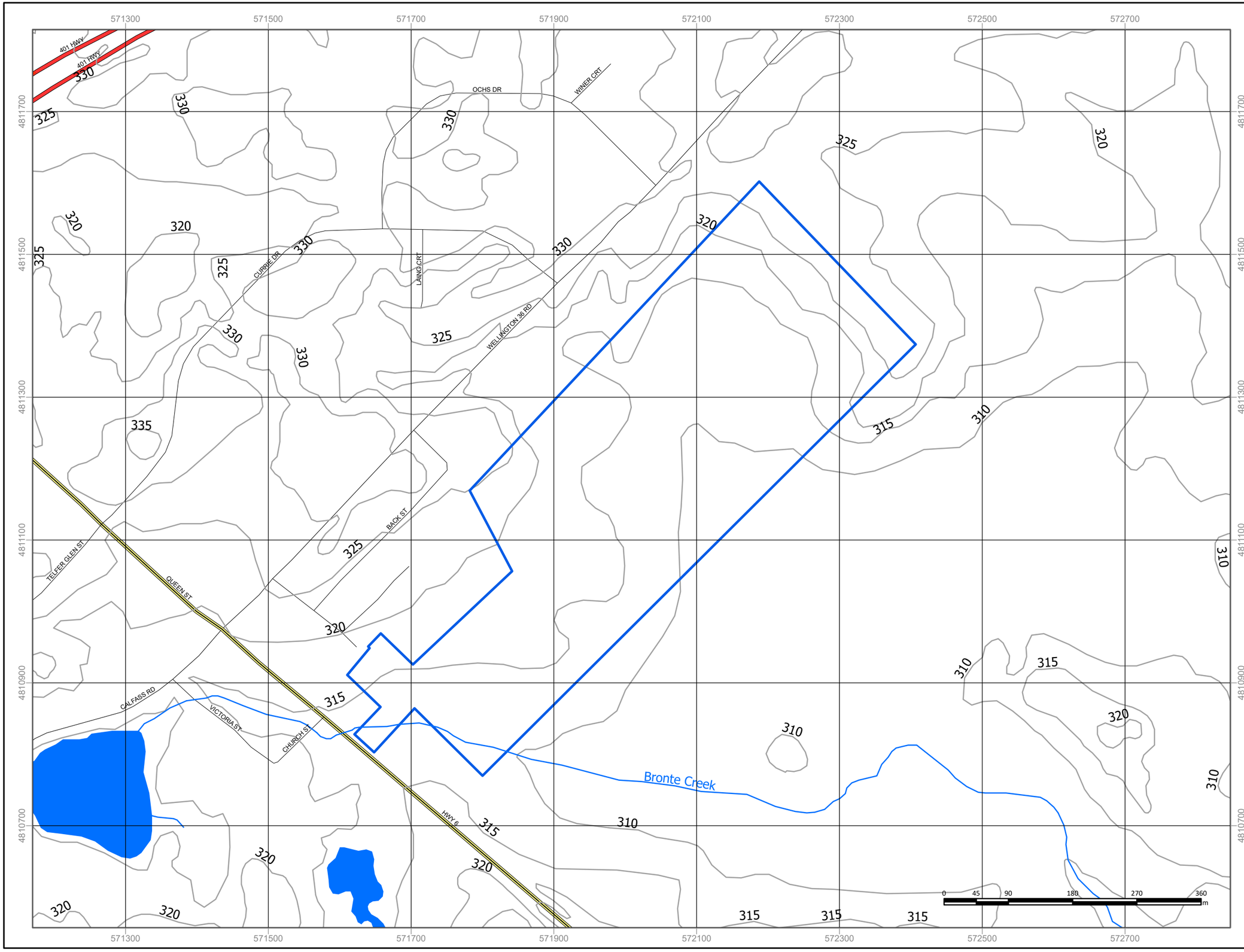
- Approximate Site Location
- Collector
- Expressway / Highway
- Freeway
- Local / Street
- Ramp
- 5, Horseshoe Moraines
- 6, Flamborough Plain

Project Title:
Hydrogeological Assessment

Site Location:
11 Main Street, Puslinch, Ontario

Figure Title:
Physiography Map

Designed By: RG	*File No.:* 1-22-0482-46
Drawn By: SSK	*Scale:* As Shown
Reviewed By: BW	*Figure No.:* 4
Date: October 2022	



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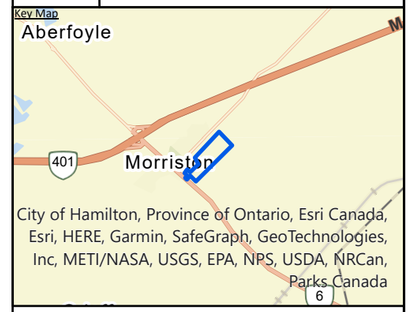
Key Map



Notes:

Legend:

- Approximate Site Location
- City of Brantford; Topographic Contours
- Collector
- Expressway / Highway
- Freeway
- Local / Street
- Ramp
- Watercourse

Project Title:
Hydrogeological Assessment

Site Location:
11 Main Street, Puslinch, Ontario

Figure Title:
Topography Map

Designed By: RG	*File No.:* 1-22-0482-46
Drawn By: SSK	*Scale:* As Shown
Reviewed By: BW	*Figure No.:* 5
Date: October 2022	

570500 571000 571500 572000 572500 573000 573500

4812000 4811500 4811000 4810500 4810000

NICHOLAS BEAVER RD
401 HWY
401 HWY
VICTORIA RD S
WELLINGTON 46 RD
OCHS DR
WINER CRT
WELLINGTON 36 RD
HWY 401
HWY 401
HWY 6
CURRIE DR
LAING CRT
QUEEN ST
BACK ST
TELFER GLEN ST
VICTORIA ST
CHURCH ST
SETTLERS CRT
CALFASS RD
HWY 6
Bronte Creek
Bronte Creek
LESLIE RD W

0 50 100 200 300 400 500 m

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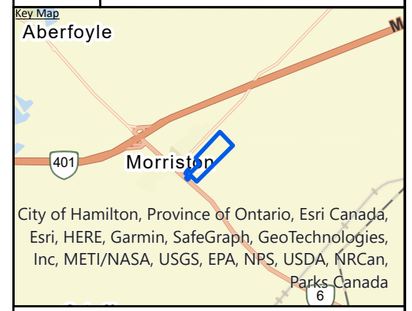
Key Map



Notes:

Legend:

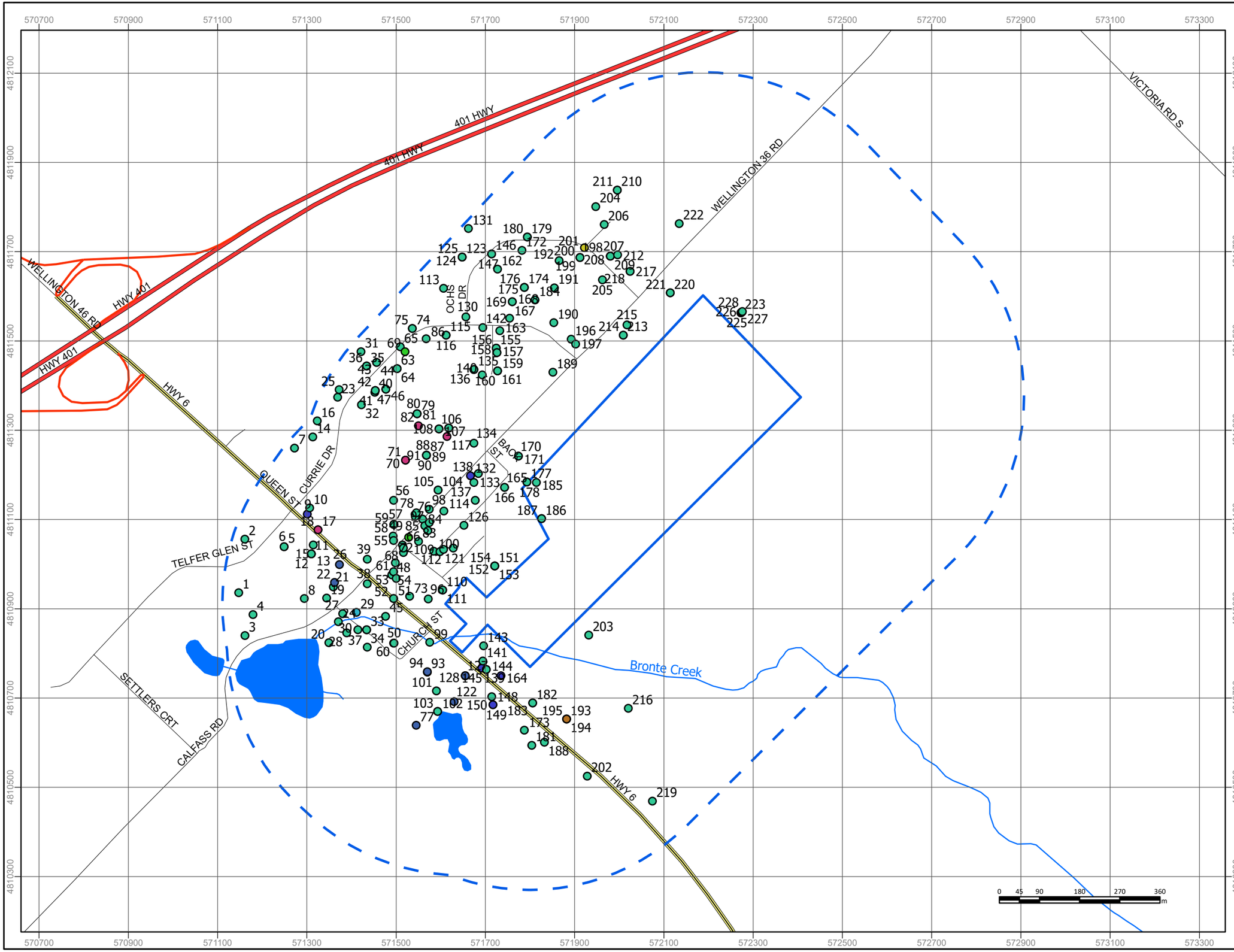
- Approximate Site Location
- Collector
- Expressway / Highway
- Freeway
- Local / Street
- Ramp
- Water Body
- Watercourse
- Wetland Features-Evaluated-Other
- Wetland Features-Evaluated-Provincial
- Wetland Features-Not evaluated
- Wooded Area

Project Title:
Hydrogeological Assessment

Site Location:
11 Main Street, Puslinch, Ontario

Figure Title:
Natural Heritage Feature Map

Designed By: RG	*File No.:* 1-22-0482-46
Drawn By: SSK	*Scale:* As Shown
Reviewed By: BW	*Figure No.:* 6
Date: October 2022	



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References:

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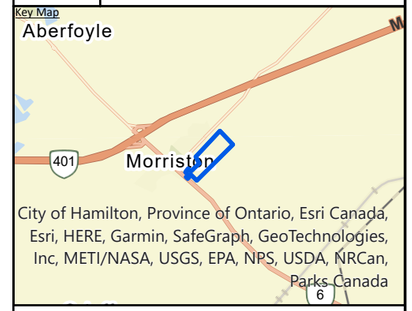
Key Map



Notes:

Legend:

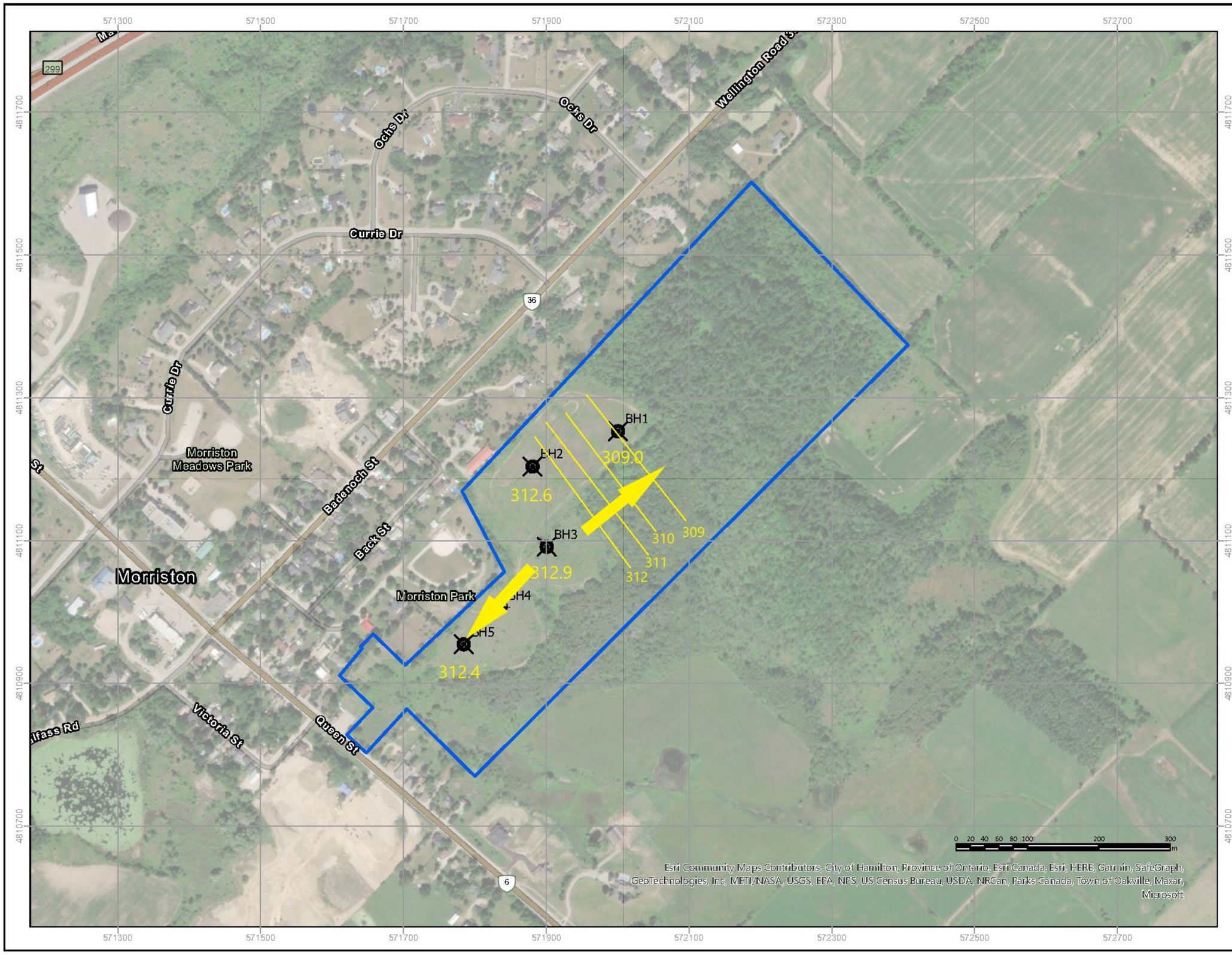
- Approximate Site Location
- Approximate Study Area; 500m
- Unknown
- Abandoned-Other
- Abandoned-Quality
- Alteration
- Observation Wells
- Other Status
- Test Hole
- Water Supply
- Watercourse
- Collector
- Expressway / Highway
- Freeway
- Local / Street
- Ramp

Project Title:
Hydrogeological Assessment

Site Location:
11 Main Street, Puslinch, Ontario

Figure Title:
MECP Well Records Map

Designed By: RG	*File No.:* 1-22-0482-46
Drawn By: SSK	*Scale:* As Shown
Reviewed By: BW	*Figure No.:* 7
Date: October 2022	



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References:

ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/ Airbus Ds, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Basemaps

Key Map

Notes:

Legend:

- Approximate Site Location
- Approximate Borehole Location
- Approximate Monitoring Well Location
- 309.0 - Groundwater Elevation July 18, 2024
- Groundwater Contour (1.0 m Interval)
- Inferred Groundwater Flow Direction

Project Title:
Hydrogeological Assessment

Site Location:
11 Main Street, Puslinch, Ontario

Figure Title:
Groundwater Flow Direction Plan

Designed By: RG	*File No.:* 1-22-0482-46
Drawn By: SSK	*Scale:* As Shown
Reviewed By: BW	*Figure No.:* 8
Date: August 2024	

Table 1: Results of Groundwater/Surface Water Quality Analysis
Proposed Residential Development
11 Main Street
Puslinch, Ontario

Sampling Date/Time								
Well Location				BH1	BH2	BH3	BH5	BC Surface
	ODWS	AO/OG	Units					
INORGANICS								
Ammonia as N			mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Electrical Conductivity			µS/cm	588	567	1,310	524	2,490
Total Organic Carbon			mg/L	1.0	0.7	1.0	0.8	8.8
Ortho Phosphate as P			mg/L	<0.10	<0.10	<0.10	<0.10	<0.26
Total Phosphorus			mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
pH		6.5-8.5	pH	7.76	7.82	7.68	7.80	8.00
Sulphate		500	mg/L	6.89	14.4	26.9	3.35	22.8
Fluoride	1.0		mg/L	0.08	0.08	<0.05	0.08	<0.05
Bromide	1.5		mg/L	<0.05	<0.05	<0.05	<0.05	<0.11
Alkalinity (as CaCO3)		30-500	mg/L	257	281	347	281	357
Chloride		250	mg/L	34.4	17.3	202	4.70	476
Nitrite as N	1.0		mg/L	<0.05	<0.05	<0.05	<0.05	<0.11
Nitrate as N	10.0		mg/L	0.37	1.54	6.10	1.66	1.92
True Colour		5	TCU	<2.50	<2.50	<2.50	<2.50	15.5
Turbidity		5	NTU	0.7	0.8	<0.5	1.0	8.2
Ammonia-Un-ionized (Calculated)			mg/L	n/a	n/a	n/a	n/a	<0.000002
Bicarbonate (as CaCO3)			mg/L	257	281	347	281	357
Total Dissolved Solids		500	mg/L	362	354	824	290	1,200
Carbonate (as CaCO3)			mg/L	<5	<5	<5	<5	<5
Hydroxide (as CaCO3)			me/L	<5	<5	<5	<5	<5
Hardness (as CaCO3) (Calculated)		80-100	mg/L	306	321	452	301	412
Langelier Index (Calculated)			N/A	0.796	0.915	0.976	0.897	1.27
Saturation pH (Calculated)			N/A	6.96	6.90	6.70	6.90	6.73
Dissolved Aluminum		0.1	mg/L	<0.004	0.007	0.004	0.009	0.004
Dissolved Antimony	0.006		mg/L	<0.001	<0.001	<0.001	<0.001	<0.003
Dissolved Arsenic	0.025		mg/L	<0.001	<0.001	<0.001	<0.001	<0.003
Dissolved Barium	1		mg/L	0.016	0.054	0.071	0.010	0.090
Dissolved Beryllium			mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
Dissolved Boron			mg/L	0.137	0.166	0.169	0.144	0.193
Dissolved Cadmium	0.005		mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Calcium			mg/L	76.5	74.1	112	70.0	109
Dissolved Chromium	0.05		mg/L	<0.002	<0.002	<0.002	<0.002	<0.003
Dissolved Cobalt			mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Copper		1	mg/L	<0.001	<0.001	<0.001	<0.001	0.006
Dissolved Iron		0.3	mg/L	<0.020	<0.020	<0.020	<0.020	1.29
Dissolved Lead	0.01		mg/L	<0.0005	<0.0005	<0.0005	<0.0005	0.0034
Dissolved Magnesium			mg/L	27.9	33.0	41.9	30.6	34.0
Dissolved Manganese		0.05	mg/L	<0.002	<0.002	0.005	<0.002	0.294
Dissolved Mercury			mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Molybdenum			mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Nickel			mg/L	<0.001	0.001	0.001	<0.001	<0.003
Dissolved Potassium			mg/L	<0.50	0.93	2.75	<0.50	5.68
Dissolved Selenium	0.01		mg/L	<0.001	<0.001	0.001	<0.001	<0.002
Dissolved Silver			mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Sodium		20/200	mg/L	12.2	10.4	117	3.99	309
Dissolved Strontium			mg/L	0.062	0.074	0.123	0.052	0.282
Dissolved Thallium			mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Dissolved Tin			mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Titanium			mg/L	<0.003	<0.003	<0.003	<0.003	<0.010
Dissolved Tungsten			mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Dissolved Uranium	0.02		mg/L	<0.0005	0.0012	<0.0005	<0.0005	<0.0005
Dissolved Vanadium			mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Zinc		5	mg/L	0.006	<0.005	0.048	0.018	0.050
Dissolved Zirconium			mg/L	<0.004	<0.004	<0.004	<0.004	<0.004

NTU - Nephelometric Turbidity Unit
TCU - True Colour Unit
ODWS - Ontario Drinking Water Standards
AO/OG - Aesthetic Objectives/ Operational Guidelines

TABLE 2: DETAILED WATER BALANCE - 11 MAIN STREET, PUSLINCH, ONTARIO

1. Climate Information

Precipitation	958	mm/a
Evapotranspiration	611	mm/a
Water Surplus	347	mm/a

2. Infiltration Rates

Table 2 Approach - Infiltration Factors	
Flat and Rolling Land	0.15
Open Sandy Loam and Clay and Loam	0.3
Cover-Cultivated and Wooded Areas	0.15
TOTAL	0.6

Infiltration (0.6 x 347)	208	mm/a
Run-off (347 - 208)	139	mm/a

3. Property Statistics

Single Detached Residential	4.44	ha	44,360	m^2
Storm Water Management	0.35	ha	3,450	m^2
Environmental Protection Lands	17.13	ha	171,310	m^2
Additional Lands	0.06	ha	590	m^2
Roads	1.13	ha	11,330	m^2
TOTAL	23.10	ha	231,040	m^2

4. Lot Coverage

Single Detached Residential

Roof Coverage (50% of 44,360 m^2)	2.22	ha	22,180	m^2
Driveway Coverage (10% of 44,360 m^2)	0.44	ha	4,436	m^2
Landscape (40% of 44,360 m^2)	1.77	ha	17,744	m^2
TOTAL	4.44	ha	44,360	m^2

TABLE 2: DETAILED WATER BALANCE - 11 MAIN STREET, PUSLINCH, ONTARIO

5. Annual Pre-Development Water Balance

Land Use	Area (m^2)	Precipitation (m^3)	Evapotranspiration (m^3)	Infiltration (m^3)	Run-Off (m^3)
Undeveloped	231,040	221,336	141,165	48,103	32,068

6. Annual Post-Development Water Balance (Un-Mitigated)

Land Use	Area (m^2)	Precipitation (m^3)	Evapotranspiration (m^3)	Infiltration (m^3)	Run-Off (m^3)
Building Coverage (Residential)	22,180	21,248	2,125	nil	19,124
Hard surfaces (Roads, Driveways, SWM)	19,216	18,409	1,841	nil	16,568
Pervious Areas (Environmental Protection Lands, Additional Lands)	189,644	181,679	115,872	39,484	26,323
TOTAL	231,040	221,336	119,838	39,484	62,014

Evaporation from impervious areas assumed at 10%

7. Comparison of Pre-Development and Post-Development

	Precipitation (m^3)	Evapotranspiration (m^3)	Infiltration (m^3)	Run-Off (m^3)
Pre-Development	221,336	141,165	48,103	32,068
Unmitigated Post-Development	221,336	119,838	39,484	62,014

8. Estimated Post-Development Infiltration Deficit

Volume of post-development infiltration	39,484
Volume of pre-development Infiltration	48,103
Deficit from pre to post-development infiltration	8,619

9. Mitigation Measures

Additional infiltration due to roof downspouts to grade (25% of rooftop runoff)	4,781

	Precipitation (m^3)	Evapotranspiration (m^3)	Infiltration (m^3)	Run-Off (m^3)
Pre-Development	221,336	141,165	48,103	32,068
Mitigated Post-Development	221,336	119,838	44,265	27,287

TABLE 2: DETAILED WATER BALANCE - 11 MAIN STREET, PUSLINCH, ONTARIO

Evapotranspiration Calculations*

PET (cm/month) = $1.6\ (L/12)\ (10T_a/I)^{a}$

L average day length (Waterloo Airport Weather Station)*

T_a average daily temperature (Waterloo Airport Weather Station)*

I $\Sigma\ (T_a/5)^{1.5}$

a $(6.75 \times 10^{-7})\ I^3 - (7.71 \times 10^{-5})\ I^2 + (1.792 \times 10^{-2})\ I + 0.49$

	L (hrs)	Ta (°C)	$(T_a/5)^{1.5}$	PET
January	9.2	-6.0		0
February	10.4	-5		0
March	11.9	-1		0
April	13.4	6	1.3	2.8
May	14.7	13	4.2	7.4
June	15.4	19	7.4	11.9
July	15.1	22.0	9.2	13.7
August	13.9	20	8.0	11.4
September	12.5	17	6.3	8.5
October	11.0	10	2.8	4.1
November	9.7	4	0.7	1.3
December	9.0	-2		0

I = 39.95725

a = 1.125999

PET = 611.4 mm/a

*Potential Evapotranspiration follows the Thornthwaite Equation as published in:
Thornthwaite, C. W. (1948). "An Approach Toward a Rational Classification of Climate". Geographical Review 38 (1): 55-94.
*Average day length data for Collingwood Area obtained online from timeanddate.com
*Average monthly temperature obtained online from Environment Canada (monthly averages from 1994-2022)

Appendix A
Borehole Logs

ENGLOBE

Terraprobe

ABBREVIATIONS AND TERMINOLOGY

SAMPLING METHODS

AS	auger sample
CORE	cored sample
DP	direct push
FV	field vane
GS	grab sample
SS	split spoon
ST	shelby tube
WS	wash sample

PENETRATION RESISTANCE

Standard Penetration Test (SPT) resistance ('N' values) is defined as the number of blows by a hammer weighing 63.6 kg (140 lb.) falling freely for a distance of 0.76 m (30 in.) required to advance a standard 50 mm (2 in.) diameter split spoon sampler for a distance of 0.3 m (12 in.).

Dynamic Cone Test (DCT) resistance is defined as the number of blows by a hammer weighing 63.6 kg (140 lb.) falling freely for a distance of 0.76 m (30 in.) required to advance a conical steel point of 50 mm (2 in.) diameter and with 60° sides on 'A' size drill rods for a distance of 0.3 m (12 in.)."

COHESIONLESS SOILS

Compactness	'N' value
very loose	< 4
loose	4 – 10
compact	10 – 30
dense	30 – 50
very dense	> 50

COHESIVE SOILS

Consistency	'N' value	Undrained Shear Strength (kPa)
very soft	< 2	< 12
soft	2 – 4	12 – 25
firm	4 – 8	25 – 50
stiff	8 – 15	50 – 100
very stiff	15 – 30	100 – 200
hard	> 30	> 200

COMPOSITION

Term (e.g)	% by weight
trace silt	< 10
some silt	10 – 20
silty	20 – 35
sand *and* silt	> 35

TESTS AND SYMBOLS

MH	mechanical sieve and hydrometer analysis
w, w_c	water content
w_L, LL	liquid limit
w_P, PL	plastic limit
I_P, PI	plasticity index
k	coefficient of permeability
γ	soil unit weight, bulk
G_s	specific gravity
φ'	internal friction angle
c'	effective cohesion
c_u	undrained shear strength

▽	Unstabilized water level
▼	1st water level measurement
▼	2nd water level measurement
▼	Most recent water level measurement
3.0+	Undrained shear strength from field vane (with sensitivity)
C_c	compression index
c_v	coefficient of consolidation
m_v	coefficient of compressibility
e	void ratio
PID	photoionization detector
FID	flame ionization detector

FIELD MOISTURE DESCRIPTIONS

Damp	refers to a soil sample that does not exhibit any observable pore water from field/hand inspection.
Moist	refers to a soil sample that exhibits evidence of existing pore water (e.g. sample feels cool, cohesive soil is at plastic limit) but does not have visible pore water
Wet	refers to a soil sample that has visible pore water

LOG OF BOREHOLE 1

Terraprobe

Project No.	: 1-22-0482-01	Client	: Wdd Main Street	Originated by	: AA
Date started	: August 16, 2022	Project	: 11 Main Street	Compiled by	: FM
Sheet No.	: 1 of 1	Location	: Puslinch, Ontario	Checked by	: SZ

Position : E: 572000, N: 4811253 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value	Elevation Scale (m)
0	313.0	**GROUND SURFACE**					313
		FILL, sand, some gravel, trace rootlets, dense, brown, moist		1	SS	35	
	312.2						
1	0.8	**SILTY SAND**, trace clay, trace gravel, compact, brown, moist		2	SS	24	312
				3	SS	21	
2				4	SS	17	311
3				5	SS	19	310
4							309
5				6	SS	25	308
6	306.9						307
	6.1	**CLAYEY SILT**, trace sand, very stiff, brown, moist		7	SS	27	
	306.4						
	6.6	**END OF BOREHOLE**					

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10 20 30 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40 80 120 160

Moisture / Plasticity — Plastic Limit (PL), Natural Water Content (MC), Liquid Limit (LL): 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)

GR SA SI CL

0 3 72 25

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Aug 24, 2022	dry	n/a
Sep 7, 2022	dry	n/a
Sep 19, 2022	dry	n/a

file: 1-22-0482-01 bh logs.gpj

LOG OF BOREHOLE 2

Terraprobe

Project No.	: 1-22-0482-01	Client	: Wdd Main Street	Originated by	: AA
Date started	: August 16, 2022	Project	: 11 Main Street	Compiled by	: FM
Sheet No.	: 1 of 1	Location	: Puslinch, Ontario	Checked by	: SZ

Position : E: 571881, N: 4811204 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
0	318.2	**GROUND SURFACE**				
		FILL, sand, some gravel, trace rootlets, loose, brown, moist		1	SS	8
	317.4					
	0.8	**SILTY SAND to SILT AND SAND**, trace clay, trace gravel, compact to very dense, brown, moist		2	SS	32
1				3	SS	53
2				4	SS	23
3				5	SS	50 / 150mm
4				6	SS	69
5						
6		...wet below		7	SS	60
7						
8	310.1			8	SS	57
	8.1	**END OF BOREHOLE**				

Elevation Scale (m): 318, 317, 316, 315, 314, 313, 312, 311

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) Natural Water Content (MC) Liquid Limit (LL) 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Aug 24, 2022	7.6	310.6
Sep 7, 2022	7.7	310.5
Sep 19, 2022	7.7	310.5

file: 1-22-0482-01 bh logs.gpj

LOG OF BOREHOLE 3

Terraprobe

Project No.	: 1-22-0482-01	Client	: Wdd Main Street	Originated by	: AA
Date started	: August 16, 2022	Project	: 11 Main Street	Compiled by	: FM
Sheet No.	: 1 of 1	Location	: Puslinch, Ontario	Checked by	: SZ

Position : E: 571901, N: 4811091 (UTM 17T)
Elevation Datum : Geodetic
Rig type : Track-mounted
Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value	Elevation Scale (m)	Lab Data and Comments
0	317.1	**GROUND SURFACE**					317	
		FILL, sand, some gravel, trace rootlets, compact, brown, moist		1	SS	11		
	316.3							
	0.8	**SILTY SAND to SILT AND SAND**, trace clay, trace gravel, compact to very dense, brown, moist		2	SS	28	316	
1				3	SS	16		
2				4	SS	43	315	
3				5	SS	56	314	
4				6	SS	76	313	
5							312	
6		...wet below		7	SS	53	311	0 36 59 5
7							310	
	309.3			8	SS	50 / 150mm		
	7.8							

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10 20 30 40
Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40 80 120 160
Moisture / Plasticity — Plastic Limit, Natural Water Content, Liquid Limit: PL MC LL; 10 20 30
Headspace Vapour (ppm)
Instrument Details
Unstabilized Water Level
Lab Data and Comments — GRAIN SIZE DISTRIBUTION (%) (MIT): GR SA SI CL

END OF BOREHOLE

Borehole was dry and caved to 7.2 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Aug 24, 2022	6.2	310.9
Sep 7, 2022	6.3	310.8
Sep 19, 2022	6.4	310.7

file: 1-22-0482-01 bh logs.gpj

LOG OF BOREHOLE 4

Terraprobe

Project No.	: 1-22-0482-01	Client	: Wdd Main Street	Originated by	: AA
Date started	: August 16, 2022	Project	: 11 Main Street	Compiled by	: FM
Sheet No.	: 1 of 1	Location	: Puslinch, Ontario	Checked by	: SZ

Position : E: 571837, N: 4811007 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)
0	319.9	**GROUND SURFACE**					
		FILL, sand, some gravel, trace rootlets, compact, brown, moist		1	SS	12	
	319.1						
	0.8	**SILTY SAND**, trace clay, trace gravel, loose to compact, brown, moist		2	SS	10	319
1				3	SS	11	
2				4	SS	8	318
				5	AS		
3							317
				6	AS		316
4							
5							315
				7	AS		
6							314
	313.3						
	6.6	**END OF BOREHOLE**					

Penetration Test Values (Blows / 0.3m)
Dynamic Cone: 10 20 30 40

Undrained Shear Strength (kPa)
Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40 80 120 160

Moisture / Plasticity
Plastic Limit, Natural Water Content, Liquid Limit
PL MC LL: 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Borehole was dry and open upon completion of drilling.

file: 1-22-0482-01 bh logs.gpj

LOG OF BOREHOLE 5

Terraprobe

Project No.	: 1-22-0482-01	Client	: Wdd Main Street	Originated by	: AA
Date started	: August 16, 2022	Project	: 11 Main Street	Compiled by	: FM
Sheet No.	: 1 of 1	Location	: Puslinch, Ontario	Checked by	: SZ

Position : E: 571785, N: 4810955 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity (PL MC LL)	Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
0	**316.8**	**GROUND SURFACE**										
		FILL, sand, some gravel, trace rootlets, compact, brown, moist		1	SS	19						
	316.0											
	0.8	**SILTY SAND**, trace clay, trace gravel, compact to dense, brown, moist		2	SS	26	316					
1												
				3	SS	29	315					0 73 26 1
2												
				4	SS	31	314					
3		...gravelly sand										
				5	SS	32						
4							313					
		...wet below										
				6	SS	42	312					
5												
							311					
6				7	SS	24						
	310.2											
	6.6	**END OF BOREHOLE**										

Penetration Test Values (Blows / 0.3m): Dynamic Cone; scale 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane; scale 40 80 120 160

Moisture / Plasticity: Plastic Limit, Natural Water Content, Liquid Limit; PL MC LL; scale 10 20 30

Unstabilized Water Level

Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Borehole was dry and caved to 6.1 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Aug 24, 2022	6.3	310.5
Sep 7, 2022	6.4	310.4
Sep 19, 2022	6.4	310.4

file: 1-22-0482-01 bh logs.gpj

Alignment: From E:571779, N:4810959,
to E:572011, N:4811284

Elevation (m)

BH 5

BH 4

BH 3

BH 2

BH 1

50 mm dia. monitoring well

'N'

19 26 29 31 32

0 - 73 - 26 - 1

24

12 10 11 8

11 28 16 43 56 76

0 - 36 - 59 - 5

53

50 / 150mm

8 32 53 23 50 / 150mm 69 60

57

35 24 21 17 19 25

0 - 3 - 72 - 25

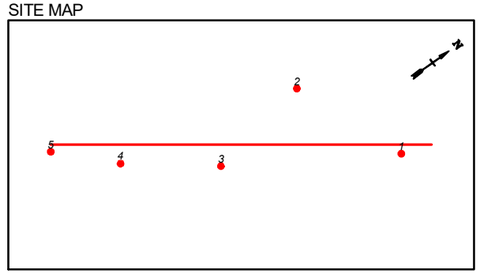
27

320 318 316 314 312 310 308 306

0 50 100 150 200 250 300 350 400

Distance Along Baseline (m)

SITE MAP



LITHOLOGY GRAPHIC LEGEND

- Fill
- Silty Sand
- Clayey Silt

INTERPRETIVE LEGEND

- WL on completion of drilling
- Stabilized WL, most recent

- *FILL*
- *GRAVELS (gravel to gravelly sand)*
- *SILT TO SAND (not till)*
- *COHESIONLESS TILLS*
- *COHESIVE SOILS (clayey silt to clay, incl. tills)*
- *DISTURBED/REWORKED SOILS*

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title: **SUBSURFACE PROFILE**

File No.: **1-22-0482-46**

Report: !SECTION - TABLOID - ELEV

Terraprobe

T-TIME ANALYSIS
TEST REPORT

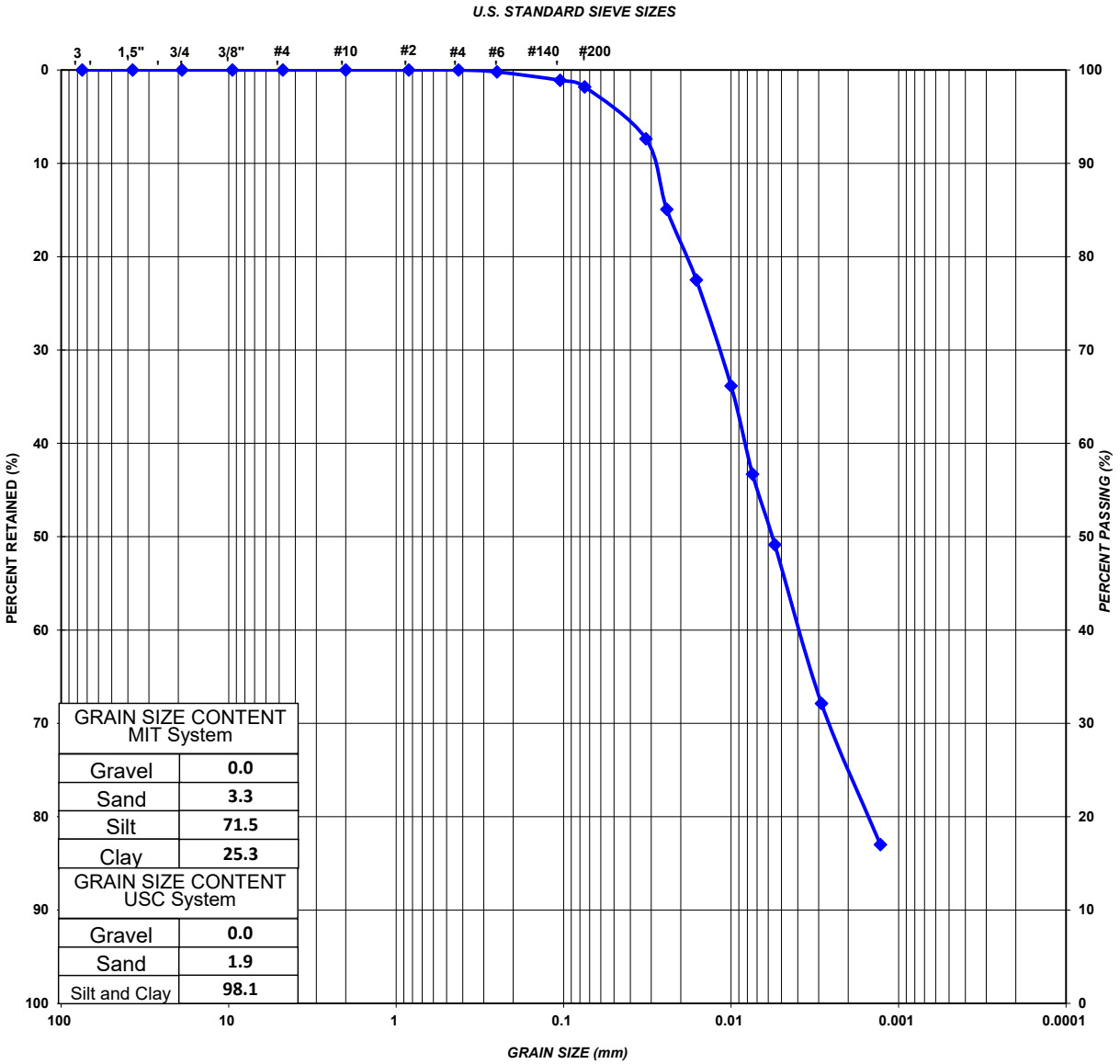
PROJECT: **11 Main Street, Puslinch, Ontario**
LOCATION: **Greater Toronto Area, On.**
CLIENT: **Wdd Main Street**
CONTACT: **Narjes**
SOIL SAMPLE: **1-7**
20' - 21'6"
MIT DESCRIPTION: **CLAYEY SILT, trace sand**
USC SYMBOL: **CH**

FILE NO.: **1-22-0482**
LAB NO.: **1259**
SAMPLE DATE: **16-Aug-22**
SAMPLED BY: **A.A.**

**** To be read in conjunction with cover letter only ****

Estimated rate of Percolation = 58 min/cm

GRAIN SIZE DISTRIBUTION



GRAIN SIZE CONTENT MIT System	
Gravel	0.0
Sand	3.3
Silt	71.5
Clay	25.3
GRAIN SIZE CONTENT USC System	
Gravel	0.0
Sand	1.9
Silt and Clay	98.1

MIT SYSTEM	GRAVEL		COARSE	MEDIUM	FINE	SILT	CLAY
			SAND				
UNIFIED SYSTEM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY	
	GRAVEL		SAND				

Terraprobe

T-TIME ANALYSIS
TEST REPORT

PROJECT: **11 Main Street, Puslinch, Ontario**
LOCATION: **Greater Toronto Area, On.**
CLIENT: **Wdd Main Street**
CONTACT: **Narjes**
SOIL SAMPLE: **3-7**
20' - 21'6"
MIT DESCRIPTION: **SILT AND SAND, trace clay**
USC SYMBOL: **ML**

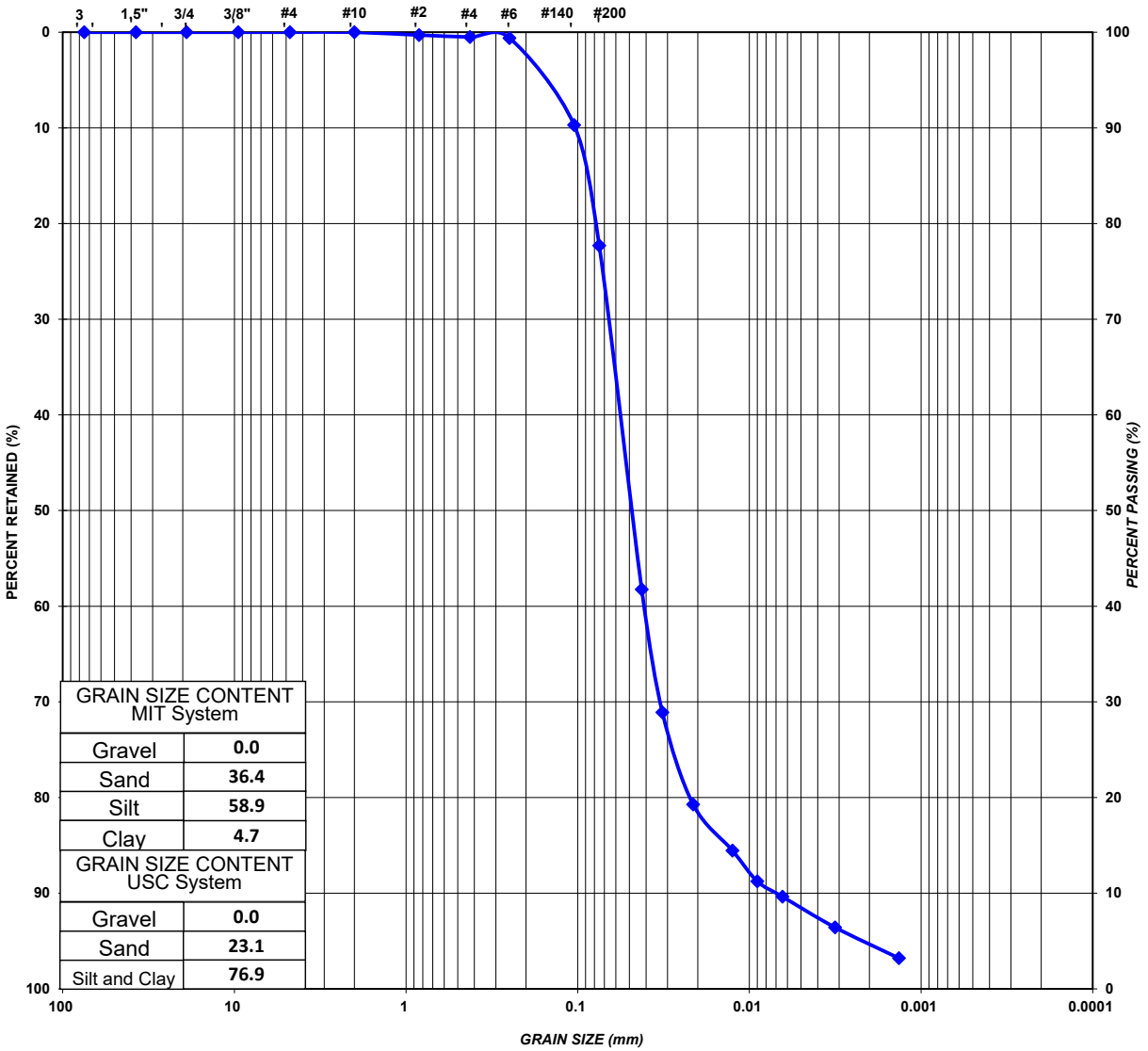
FILE NO.: **1-22-0482**
LAB NO.: **1259**
SAMPLE DATE: **16-Aug-22**
SAMPLED BY: **A.A.**

**** To be read in conjunction with cover letter only ****

Estimated rate of Percolation = 45 min/cm

GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES



GRAIN SIZE CONTENT MIT System	
Gravel	0.0
Sand	36.4
Silt	58.9
Clay	4.7
GRAIN SIZE CONTENT USC System	
Gravel	0.0
Sand	23.1
Silt and Clay	76.9

MIT SYSTEM	GRAVEL		COARSE	MEDIUM	FINE	SILT	CLAY
			SAND				
UNIFIED SYSTEM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY	
	GRAVEL		SAND				

Terraprobe

T-TIME ANALYSIS
TEST REPORT

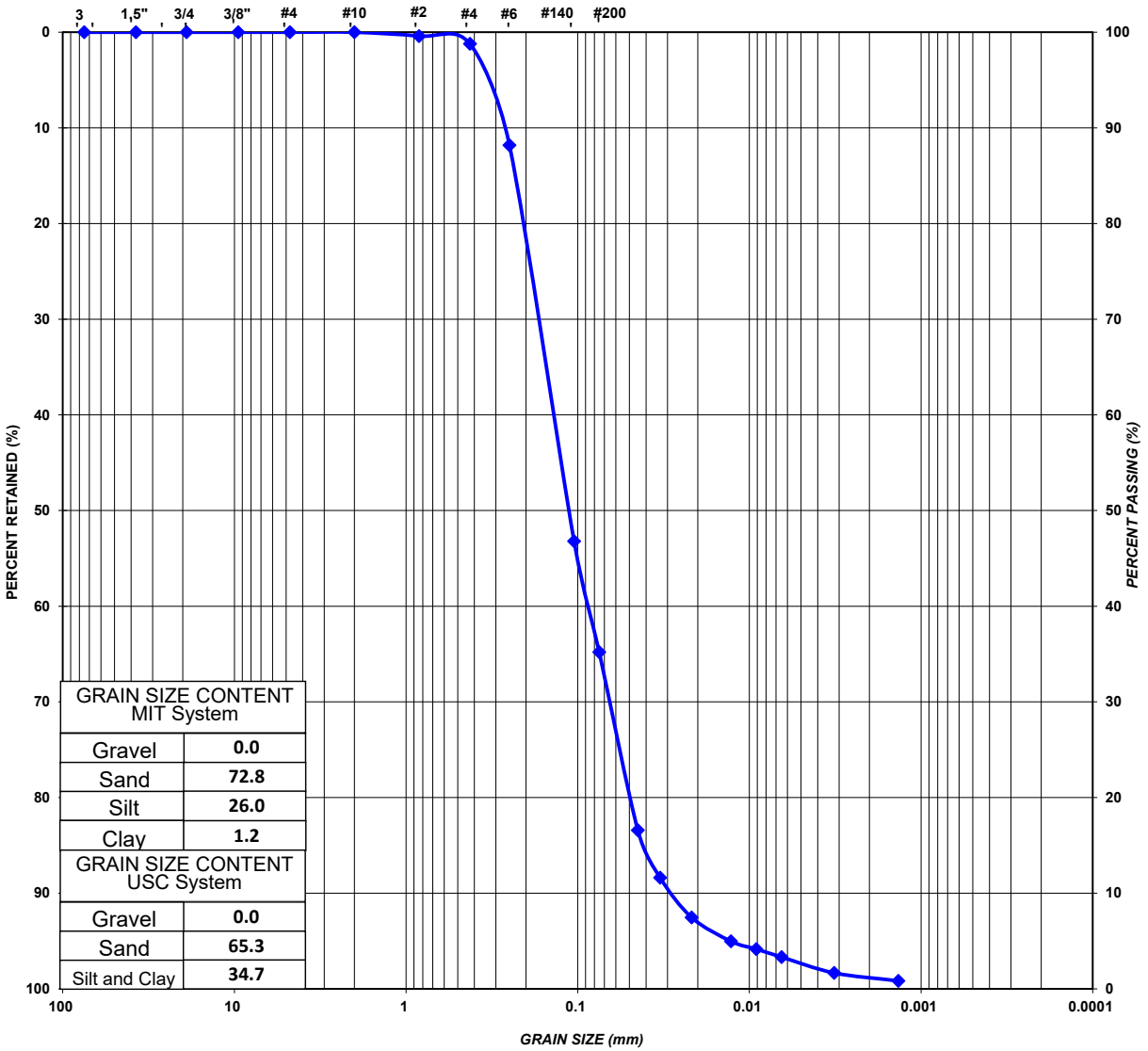
PROJECT: **11 Main Street, Puslinch, Ontario**
LOCATION: **Greater Toronto Area, On.**
CLIENT: **Wdd Main Street**
CONTACT: **Narjes**
SOIL SAMPLE: **5-3**
5' - 6'6"
MIT DESCRIPTION: **SILTY SAND, trace clay**
USC SYMBOL: **SM**

FILE NO.: **1-22-0482**
LAB NO.: **1259**
SAMPLE DATE: **16-Aug-22**
SAMPLED BY: **A.A.**

**** To be read in conjunction with cover letter only ****
Estimated rate of Percolation = 11 min/cm

GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES



GRAIN SIZE CONTENT MIT System	
Gravel	0.0
Sand	72.8
Silt	26.0
Clay	1.2
GRAIN SIZE CONTENT USC System	
Gravel	0.0
Sand	65.3
Silt and Clay	34.7

MIT SYSTEM	GRAVEL		COARSE	MEDIUM	FINE	SILT	CLAY
			SAND				
UNIFIED SYSTEM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY	
	GRAVEL		SAND				

Appendix B
Well Record Summary

ENGLOBE

MECP Well Records Summary

WELL ID	MECP* WWR ID	Construction Method	Well Depth (m)**	Date Completed	Well Use	Static Water Level (m)**	Pumping Rate (L/min)	Stratigraphy (Depth in m)
1	6709780	Rotary (Air)	33.5	5/17/1989	Domestic	13.4	113.4	Clay/Sand (3.0) Sand/Gravel 12.2) Clay/Sand (29.6) Sand/Gravel (32.0) Rock (32.5)
2	6713657	Rotary (Air)	25.0	3/14/2001	Domestic	16.2	75.6	Clay/Stones (17.7) Sand (18.9) Clay/Gravel 24.4) Gravel (25.0)
3	6711904	Rotary (Air)	20.1	6/13/1995	Domestic	6.1	75.6	Clay/Stones (19.5) Gravel (20.1)
4	6702532	Cable Tool	25.9	9/11/1965	Domestic	7.3	37.8	Clay/Gravel (25.3) Rock (25.9)
5	7355755	Other Method	32.9	2/7/2020	Domestic	13.9	113.4	Gravel (12.2) Clay (27.4) Sand/Gravel (32.9)
6	7355755	Other Method	-	2/7/2020	Domestic	13.9	-	-
7	6710042	Rotary (Air)	26.2	8/3/1989	Domestic	16.8	56.7	Clay/Stones (15.2) Sand/Gravel (25.0) Gravel (26.2)
8	6704402	Cable Tool	32.6	8/17/1972	Domestic	7.6	37.8	Clay/Stones (29.6) Limestone (32.6)
9	6713746	Not Known	-	4/20/2001	Abandoned-Other	-	-	-
10	6705095	Cable Tool	31.1	2/22/1974	Domestic	13.7	75.6	Clay/Stones (30.2) Limestone (31.1)
11	7266806	Rotary (Air)	-	6/9/2016	Domestic	9.2	-	-
12	7266806	Rotary (Air)	-	6/9/2016	Domestic	9.2	-	-
13	7266806	Rotary (Air)	30.5	6/9/2016	Domestic	9.2	56.7	Clay/Stones (22.9) Clay/Sand (25.9) Rock (30.5)
14	6710043	Rotary (Air)	31.7	8/3/1989	Domestic	18.9	75.6	Clay/Stones (9.1) Sand 13.7) Clay (29.0) Gravel (31.7)
15	6707386	Rotary (Air)	35.1	5/7/1980	Commerical	12.2	37.8	Sand (3.0) Clay/Gravel (31.4) Limestone (35.1)
16	6711008	Rotary (Air)	32.3	9/4/1992	Domestic	18.0	94.5	Sand/Gravel (6.1) Clay/Gravel (16.8) Sand (31.7) Gravel (32.3)
17	7039012	-	-	11/24/2006	Abandoned-Other	-	-	-
18	6715891	Other Method	5.2	8/10/2006	Observation Wells	-	-	Sand/Silt (5.2)
19	6704817	Cable Tool	24.1	10/18/1973	Domestic	6.7	37.8	Clay/Stones (9.1) Clay/Sand (21.3) Sand/Gravel (24.1)
20	6702538	Cable Tool	17.7	8/6/1958	Domestic	8.2	31.5	Clay/Gravel (15.2) Gravel (17.7)
21	6709646	Cable Tool	29.0	3/13/1989	Commerical	8.5	75.6	Sand/Gravel (9.1) Clay/Sand (20.7) Sand/Gravel (25.9) Limestone (29.0)
22	7122871	Other Method	3.1	4/24/2009	Test Hole	-	-	Clay/Silt (3.1)
23	6714059	Rotary (Air)	31.1	4/19/2002	Domestic	14.9	75.6	Clay/Stones (12.2) Sand (19.8) Clay/Gravel (26.8) Limestone (31.1)
24	6714286	Air Percussion	24.7	11/14/2002	Domestic	10.4	45.4	Clay/Sand (9.1) Sand/Gravel (12.8) Clay/Sand (24.1) Sand/Gravel (24.7)
25	6711101	Rotary (Air)	32.0	1/7/1993	Domestic	14.9	94.5	Sand/Gravel (31.4) Limestone (32.0)
26	7122870	Other Method	4.3	4/24/2009	Test Hole	-	-	Clay/Silt (4.3)
27	6702537	Cable Tool	11.0	5/5/1959	Domestic	3.7	11.3	Clay/Gravel (9.1) Sand/Gravel (10.4) Gravel (11.0)
28	6702541	Cable Tool	42.1	5/26/1956	Domestic	5.8	30.2	Clay/Stones (22.9) Gravel (28.0) Limestone (42.1)
29	7190638	-	-	8/18/2012	Abandoned-Quality	-	-	-
30	6703703	Cable Tool	40.2	6/26/1970	Domestic	5.5	37.8	Sand (2.1) Clay/Stones (14.3) Gravel (15.8) Clay/Sand (29.0) Brown Rock (35.0) Black Rock (40.2)
31	6711087	Rotary (Air)	32.6	7/20/1992	Public	18.3	75.6	Clay/Stones (32.0) Limestone (32.6)
32	6710084	Rotary (Air)	43.0	11/1/1989	Domestic	16.8	56.7	Clay/Stones (27.1) Brown Rock (36.6) Dark Brown Rock (43.0)
33	7190634	Rotary (Convent.)	29.3	8/16/2012	Domestic	4.8	113.4	Clay/Silt (4.0) Sand/Gravel (22.9) Limestone (29.3)

WELL ID	MECP* WWR ID	Construction Method	Well Depth (m)**	Date Completed	Well Use	Static Water Level (m)**	Pumping Rate (L/min)	Stratigraphy (Depth in m)
34	7190634	Rotary (Convent.)	6.1	8/16/2012	Domestic	4.8	-	-
35	6713656	Rotary (Air)	-	3/22/2001	Domestic	14.3	-	-
36	6713656	Rotary (Air)	37.2	3/22/2001	Domestic	14.3	113.4	Clay/Stones (26.2) Red-Brown Limestone (29.0) Brown Limestone (37.2)
37	6709991	Cable Tool	26.2	9/16/1989	Domestic	9.2	37.8	Sand/Gravel (18.3) Gravel (25.3) Limestone (26.2)
38	6702539	Cable Tool	25.6	8/3/1958	Domestic	7.6	56.7	Clay/Gravel (21.3) Sand/Gravel (22.9) Limestone (25.6)
39	6702661	Cable Tool	31.7	9/15/1951	Domestic	7.6	-	Clay (6.1) Silt/Sand (24.4) Rock (31.7)
40	6712162	Rotary (Air)	29.3	9/30/1996	Domestic	16.2	56.7	Clay/Stones (27.7) Limestone (29.3)
41	6710177	Rotary (Air)	-	12/8/1989	Domestic	16.8	-	-
42	6710177	Rotary (Air)	43.0	12/8/1989	Domestic	16.8	56.7	Clay/Stones (30.8) Brown Rock (38.1) Dark Brown Rock (43.0)
43	6711440	Rotary (Air)	-	6/7/1994	Domestic	14.6	-	-
44	6711440	Rotary (Air)	31.4	6/7/1994	Domestic	14.6	94.5	Clay/Gravel (27.7) Limestone (31.4)
45	6709858	Rotary (Air)	18.9	6/23/1989	Domestic	5.8	56.7	Clay/Stones (9.1) Sand/Gravel (18.9)
46	6713367	Rotary (Air)	-	6/8/2000	Domestic	15.3		
47	6713367	Rotary (Air)	43.6	6/8/2000	Domestic	15.3	94.5	Sand (6.7) Clay (29.9) Gravel (30.8) Limestone (43.6)
48	6702667	Cable Tool	24.7	8/25/1951	Domestic	0.0	-	Clay (6.1) Silt/Sand (24.4) Gravel (24.7)
49	6702662	Cable Tool	32.0	7/19/1961	Domestic	16.8	26.5	Clay/Gravel (30.5) Gravel (32.0)
50	6708055	Cable Tool	15.2	10/11/1983	Domestic	6.4	37.8	Clay/Stones (14.6) Sand (14.9) Gravel (15.2)
51	6703313	Cable Tool	-	10/7/1968	Domestic	4.0	-	-
52	6703313	Cable Tool	30.8	10/7/1968	Domestic	4.0	75.6	Clay (18.3) Sand/Gravel (21.3) Clay/Gravel (25.6) Rock (30.8)
53	6706778	Rotary (Air)	-	8/8/1978	Domestic	6.4	-	-
54	6706778	Rotary (Air)	31.4	8/8/1978	Domestic	6.4	75.6	Clay/Gravel (22.6) Sand (25.3) Limestone (31.4)
55	6704136	Cable Tool	28.0	11/17/1971	Domestic	12.2	37.8	Clay/Stones (26.8) Limestone (28.0)
56	6703850	Cable Tool	32.0	7/9/1970	Domestic	14.3	26.5	Sand (6.1) Clay/Sand (24.4) Samd (25.9) Clay/Gravel (27.7) Limestone (32.0)
57	7320421	Rotary (Air)	-	8/8/2018	Domestic	14.6	-	-
58	7320421	Rotary (Air)	-	8/8/2018	Domestic	14.6	-	-
59	7320421	Rotary (Air)	28.4	8/8/2018	Domestic	14.6	56.7	Clay/Stones (28.0) Rock (28.4)
60	6702540	Cable Tool	42.7	9/4/1953	Domestic	7.0	25.5	Clay/Gravel (16.5) Sand (18.9) Gravel (23.2) Clay (27.1) Gravel (27.7) Brown Rock (40.8) Black Rock (42.7)
61	6702665	Cable Tool	32.0	12/28/1966	Domestic	10.7	75.6	Clay/Gravel (28.3) Rock (32.0)
62	6702674	Cable Tool	26.5	3/9/1964	Domestic	16.8	30.2	Clay/Sand (18.3) Sand/Gravel (25.9) Gravel (26.5)
63	6711149	Rotary (Air)	-	3/11/1993	Domestic	15.9	-	-
64	6711149	Rotary (Air)	32.0	3/11/1993	Domestic	15.9	75.6	Clay/Sand/Stones (26.2) Rock (32.0)
65	6711006	Rotary (Air)	32.3	8/31/1992	Domestic	14.6	94.5	Clay/Sand/Gravel (28.7) Limestone (32.3)
66	6708057	Cable Tool	30.5	10/19/1983	Domestic	12.2	94.5	Sand/Gravel (5.5) Clay (21.9) Sand/Gravel (27.4) Limestone (30.5)
67	6702671	Cable Tool	34.7	8/11/1959	Domestic	11.3	11.3	Clay/Gravel (32.9) Limestone (34.7)

WELL ID	MECP* WWR ID	Construction Method	Well Depth (m)**	Date Completed	Well Use	Static Water Level (m)**	Pumping Rate (L/min)	Stratigraphy (Depth in m)
68	6702672	Cable Tool	26.8	9/1/1960	Domestic	7.6	56.7	Clay/Stones (2.8) Limestone (26.8)
69	7297218	-	-	10/4/2017	Alteration	-	-	-
70	7271832	-	10.7	6/15/2016	Abandoned-Other	-	-	-
71	7155300	Other Method	10.7	11/3/2010	Monitoring	-	-	Sand/Silt (10.7)
72	7311547	-	-	4/10/2018	Alteration	-	-	-
73	6702666	Cable Tool	27.4	8/19/1951	Domestic	7.6	-	Clay (6.1) Sand/Silt (24.4) Gravel (27.4)
74	6712401	Rotary (Air)	-	10/29/1997	Domestic	13.7	-	-
75	6712401	Rotary (Air)	36.6	10/29/1997	Domestic	13.7	94.5	Clay/Stones (19.8) Sand/Gravel (29.0) Clay/Gravel (32.0) Limestone (36.6)
76	7342709	-	-	9/10/2019	Alteration	-	-	-
77	7133961	-	3.0	9/10/2009	Monitoring	-	-	Gravel (1.5) Silt/Stones (3.0)
78	6709100	Rotary (Air)	32.0	11/26/1987	Domestic	15.6	56.7	Gravel (9.1) Clay/Gravel (27.4) Rock (32.0)
79	7323682	Other Method	31.1	10/29/2018	Domestic	19.5	75.6	Clay/Gravel (21.3) Sand/Gravel (28.3) Limestone (31.1)
80	7323682	Other Method	-	10/29/2018	Domestic	-	-	-
81	7323682	Other Method	-	10/29/2018	Domestic	-	-	-
82	7155301	Other Method	10.7	11/3/2010	Monitoring	-	-	Fill (2.4) Sand/Gravel (10.7)
83	6711667	Air Percussion	28.3	12/8/1994	Domestic	15.9	37.8	Sand/Gravel (4.6) Clay/Sand (24.9) Sand/Gravel 27.7) Limestone (28.3)
84	6702668	Cable Tool	18.3	9/25/1951	Domestic	9.2	18.9	Clay/Gravel (8.5) Sand/Gravel (12.2) Clay/Stones (15.2) Sand (17.1) Gravel (18.3)
85	6702673	Cable Tool	32.0	9/8/1962	Domestic	18.3	15.1	Clay/Stones (29.0) Limestone (32.0)
86	6711129	Rotary (Air)	32.0	2/25/1993	Domestic	4.6	94.5	Sand/Gravel (20.1) Clay (26.8) Sand/Gravel (28.6) Limestone (32.0)
87	7119802	Rotary (Air)	-	1/3/2009	Domestic	-	-	-
88	7119802	Rotary (Air)	-	1/3/2009	Domestic	-	-	-
89	7119802	Rotary (Air)	-	1/3/2009	Domestic	-	-	-
90	7119802	Rotary (Air)	-	1/3/2009	Domestic	-	-	-
91	7119802	Rotary (Air)	-	1/3/2009	Domestic	-	-	-
92	7119802	Rotary (Air)	50.3	1/3/2009	Domestic	20.6	75.6	Clay/Stones (33.5) Sand (34.7) Light Brown Limestone (43.3) Dark Brown Limestone (50.3)
93	7314681	-	3.0	7/4/2018	Monitoring	-	-	Sand/Gravel (1.5) Silt/Stones (3.0)
94	7133961	-	3.0	9/10/2009	Monitoring	-	-	Sand/Gravel (1.5) Silt/Stones (3.0)
95		Cable Tool	-	8/27/1987	Domestic	16.8	-	-
96	6710612	Cable Tool	23.5	5/2/1991	Domestic	0.6	181.4	Clay/Gravel (13.7) Sand/Gravel (21.9) Limestone (23.5)
97	6706256	Cable Tool	36.6	12/24/1976	Domestic	17.7	37.8	Clay/Gravel (32.2) Limestone (36.6)
98	6707588	Cable Tool	32.9	2/26/1981	Domestic	16.5	37.8	Prevoiusly Dug (8.2) Clay (32.3) Limestone (32.9)
99	6702536	Cable Tool	12.5	6/16/1961	Domestic	3.1	18.9	Clay/Gravel (10.7) Gravel (12.5)
100	6711879	Rotary (Air)	30.8	11/9/1995	Domestic	13.4	94.5	Clay/Stones (24.1) Limestone (30.8)
101	6705423	Cable Tool	20.4	1/20/1975	Domestic	6.7	37.8	Clay/Sand (6.7) Sand/Gravel (20.1) Gravel (20.4)

WELL ID	MECP* WWR ID	Construction Method	Well Depth (m)**	Date Completed	Well Use	Static Water Level (m)**	Pumping Rate (L/min)	Stratigraphy (Depth in m)
102	7362434	Rotary (Air)	-	6/24/2020	Domestic	4.9	-	-
103	7362434	Rotary (Air)	32.9	6/24/2020	Domestic	4.9	45.4	Clay/Gravel (31.1) Rock (32.9)
104	6715529	Rotary (Convent.)	-	5/9/2005	Domestic	18.8		-
105	6715529	Rotary (Convent.)	33.0	5/9/2005	Domestic	18.8	45.0	Sand (9.1) Silt/Clay (27.4) Clay/Stones (32.3) Sand/Gravel (33.2)
106	7299228	Other Method	-	10/23/2017	Domestic	-	-	-
107	7299228	Other Method	-	10/23/2017	Domestic	-	-	-
108	7299228	Other Method	31.4	10/23/2017	Domestic	18.3	113.4	Clay/Gravel (27.4) Sand/Gravel (28.6) Limestone (31.4)
109	6702670	Cable Tool	36.0	5/1/1958	Domestic	10.7	22.1	Clay/Stones (18.3) Sand/Gravel 35.1) Limestone (36.0)
110	6709771	Cable Tool	-	6/8/1989	Domestic	-	-	-
111	6709771	Cable Tool	27.4	6/8/1989	Domestic	7.3	37.8	Sand/Gravel (4.3) Clay/Sand (16.5) Sand/Gravel (24.1) Limestone (27.4)
112	6702669	Cable Tool	36.6	12/6/1951	Domestic	7.0	37.8	Clay (18.3) Gravel (24.4) Rock (36.6)
113	6710040	Rotary (Air)	27.4	11/11/1989	Domestic	16.5	75.6	Clay/Gravel (26.8) Limestone (27.4)
114	7166392	-	35.7	7/12/2011	Alteration	16.8	-	-
115	6713223	Rotary (Air)	-	12/21/1999	Domestic	-	-	-
116	6713223	Rotary (Air)	43.3	12/21/1999	Domestic	21.4	56.7	Clay/Gravel (9.1) Sand/Gravel (16.8) Clay/Gravel (28.3) Light Brown Limestone (33.5) Dark Brown Limestone (43.3)
117	7154838	Other Method	7.6	11/3/2010	Observation Wells	-	-	Silt/Sand 7.6)
118	7353621	Other Method	-	1/27/2020	Domestic	-	-	-
119	7353621	Other Method	-	1/27/2020	Domestic	-	-	-
120	7353621	Other Method	34.1	1/27/2020	Domestic	18.9	86.9	Clay/Stones (9.1) Sand/Gravel (12.1) Clay (22.9) Gravel (28.0) Limestone (34.1)
121	7114627	Other Method	24.3	10/22/2008	Domestic	10.4	45.4	Clay/Stones (21.3) Rock (24.3)
122	7133961	-	3.0	9/10/2009	Monitoring	-	-	Sand/Gravel (1.5) Silt/Stones (3.0)
123	6713365	Rotary (Air)	-	6/9/2000	Domestic	-	-	-
124	6713365	Rotary (Air)	-	6/9/2000	Domestic	-	-	-
125	6713365	Rotary (Air)	37.2	6/9/2000	Domestic	16.8	94.5	Clay/Stones (29.3) Limestone (37.2)
126	7114629	Other Method	27.1	10/21/2008	Domestic	11.6	56.7	Clay/Stones (24.4) Rock (27.1)
127	7314679	-	3.0	7/4/2018	Monitoring	-	-	-
128	7133961	-	-	9/10/2009	Monitoring	-	-	-
129	7133961	Auger	3.0	9/10/2009	Monitoring	-	-	Sand/Gravel (1.5) Silt/Stones (3.0)
130	6711985	Rotary (Air)	30.5	6/15/1996	Domestic	18.3	75.6	Clay/Gravel (29.6) Limestone (30.5)
131	6713863	Rotary (Air)	31.1	9/26/2001	Domestic	18.0	94.5	Clay Stones (27.7) Limestone (31.1)
132	6714294	-	-	10/21/2002	Alteration	-	-	-
133	6707595	Rotary (Air)	31.7	10/6/1981	Domestic	16.8	75.6	Clay/Gravel 7.6) Gravel (12.2) Clay (30.8) Gravel (31.7)
134	6710473	Air Percussion	36.6	11/13/1990	Domestic	19.2	37.8	Sand/Gravel 18.9) Clay (25.3) Sand/Gravel (33.8) Limestone (36.6)
135	6710111	Rotary (Air)	-	11/16/1989	Domestic	-	-	-

WELL ID	MECP* WWR ID	Construction Method	Well Depth (m)**	Date Completed	Well Use	Static Water Level (m)**	Pumping Rate (L/min)	Stratigraphy (Depth in m)
136	6710111	Rotary (Air)	43.3	11/16/1989	Domestic	14.9	56.7	Clay/Gravel (25.6) Ligh Brown Rock (33.5) Dark Brown Rock (43.3)
137	6712163	Rotary (Air)	25.9	10/2/1996	Domestic	12.5	56.7	Silt/Stones 6.1) Clay/Gravel (24.4) Limestone (25.9)
138	6703544	Rotary (Convent.)	38.1	7/30/1969	Domestic	16.5	37.8	Sand/Gravel (14.6) Clay/Stones (30.8) Limestone (38.1)
139	6715615	-	-	12/15/2005	Abandoned-Other	-	-	-
140	6713456	Rotary (Air)	21.3	8/14/2000	Domestic	14.0	75.6	Clay/Stones (18.3) Gravel (21.3)
141	6708111	Rotary (Air)	23.8	6/18/1984	Domestic	0.6	75.6	Clay/Sand (21.3) Limestone (23.8)
142	6710485	Rotary (Air)	43.0	10/3/1990	Domestic	16.5	37.8	Clay/Gravel (22.9) Sand (25.9) Cly/Gravel (27.1) Light Brown Rock (35.1) Dark Brown Rock (43.0)
143	6710046	Rotary (Air)	28.6	9/18/1989	Domestic	4.6	75.6	Clay/Gravel (18.3) Silt/Gravel (28.3) Limestone (28.6)
144	7114630	Other Method	-	10/20/2008	Domestic	1.8		
145	7114630	Other Method	23.8	10/20/2008	Domestic	1.8	56.7	Clay/Stones (3.0) Sand/Gravel (9.1) Clay/Gravel (23.2) Rock (23.8)
146	6712564	Rotary (Air)	-	1/1/1998	Domestic	-	-	-
147	6712564	Rotary (Air)	43.0	1/1/1998	Domestic	17.4	56.7	Clay/Gravel (25.9) Sand/Gravel (29.9) Light Brown Limestone (36.6) Dark Brown Limestone (43.0)
148	6707594	Rotary (Air)	29.9	9/23/1981	Domestic	6.7	283.5	Clay/Sand (27.7) Limestone (29.9)
149	7133961	-	3.0	9/10/2009	Monitoring	-	-	Sand/Gravel (1.5) Silt/Stones (3.0)
150	7314680	-	4.5	7/4/2018	Abandoned-Other	-	-	-
151	7204352	Rotary (Convent.)	-	6/15/2013	Domestic	-	-	-
152	7204352	Rotary (Convent.)	-	6/15/2013	Domestic	-	-	-
153	7204352	Rotary (Convent.)	-	6/15/2013	Domestic	-	-	-
154	7204352	Rotary (Convent.)	32.6	6/15/2013	Domestic	7.6	56.7	Clay/Stones 24.1) Limestone (32.6)
155	6712259	Rotary (Air)	-	6/10/1997	Domestic	-	-	-
156	6712259	Rotary (Air)	36.6	6/10/1997	Domestic	14.6	113.4	Sand (1.5) Clay/Sand (26.5) Limestone (36.6)
157	6713196	Rotary (Air)	-	11/25/1999	Domestic	-	-	-
158	6713196	Rotary (Air)	37.5	11/25/1999	Domestic	18.3	75.6	Clay/Gravel 16.8) Sand/Gravel 28.3) Light Brown Limestone (35.1) Dark Brown Limestone (37.5)
159	6711486	Rotary (Air)	-	8/2/1994	Domestic	16.2	-	-
160	6711486	Rotary (Air)	-	8/2/1994	Domestic	16.2	-	-
161	6711486	Rotary (Air)	42.1	8/2/1994	Domestic	16.2	56.7	Clay/Gravel 28.3) Sand/Gravel (29.6) Limestone (42.1)
162	6710494	Rotary (Air)	22.3	7/20/1990	Domestic	12.8	75.6	Clay/Stones (18.3) Gravel (22.3)
163	6712255	Rotary (Air)	29.0	5/27/1997	Domestic	16.5	94.5	Clay/Sand (24.4) Sand/Gravel (27.1) Limestone (29.0)
164	7274863	Other Method	-	11/7/2016	Abandoned-Other	-	-	-
165	7138233	Other Method	-	12/10/2009	Domestic	-	-	-
166	7138233	Other Method	36.0	12/10/2009	Domestic	16.5	75.6	Clay/Stones (3.7) Sand/Gravel (12.2) Clay (24.4) Sand/Gravel (29.6) Rock (36.0)
167	6710415	Rotary (Air)	29.9	5/28/1990	Domestic	18.0	56.7	Clay/Gravel (28.6) Limestone (29.9)
168	6709785	Rotary (Air)	-	6/12/1989	Domestic	-	-	-
169	6709785	Rotary (Air)	43.0	6/12/1989	Domestic	15.9	56.7	Clay/Stones (18.3) Gravel (29.6) Light Brown Rock (35.1) Dark Brown Rock (43.0)

WELL ID	MECP* WWR ID	Construction Method	Well Depth (m)**	Date Completed	Well Use	Static Water Level (m)**	Pumping Rate (L/min)	Stratigraphy (Depth in m)
170	6714759	Rotary (Air)	-	11/17/2003	Domestic	-	-	-
171	6714759	Rotary (Air)	30.5	11/17/2003	Domestic	17.0	61.0	Clay/Stones (6.1) Sand/Gravel (15.0) Clay/Gravel (27.0) Rock (30.5)
172	6712723	Rotary (Air)	30.8	9/28/1998	Domestic	18.9	56.7	Clay/Stones 13.7) Sand/Gravel (22.9) Clay/Gravel (28.7) Gravel (30.8)
173	6702546	Cable Tool	30.5	9/9/1966	Livestock	10.7	75.6	Previously Dug (13.7) Clay/Sand 19.3) Rock (30.5)
174	6712370	Rotary (Air)	-	10/28/1997	Domestic	12.2	-	-
175	6712370	Rotary (Air)	-	10/28/1997	Domestic	12.2	-	-
176	6712370	Rotary (Air)	42.7	10/28/1997	Domestic	12.2	75.6	Clay/Gravel (29.3) Light Brown Limestone (35.1) Dark Brown Limestone (42.7)
177	7112768	Rotary (Air)	-	9/24/2008	Commerical	-	-	-
178	7112768	Rotary (Air)	30.5	9/24/2008	Commerical	12.5	37.8	Clay/Stones (4.6) Sand/Gravel (11.6) Clay (22.9) Sand/Gravel (25.9) Rock (30.5)
179	6713015	Rotary (Air)	-	6/29/1999	Domestic	-	-	-
180	6713015	Rotary (Air)	43.6	6/29/1999	Domestic	19.2	75.6	Clay/Gravel (22.9) Sand/Gravel (30.2) Light Brown Limestone (35.1) Dark Brown Limestone (43.6)
181	7319287	-	22.6	9/18/2018	Alteration	10.1	30.2	-
182	7285591	Air Percussion	-	12/20/2016	Domestic	-	-	-
183	7285591	Air Percussion	26.2	12/20/2016	Domestic	4.9	94.5	Clay/Sand (25.3) Limestone (26.2)
184	6708415	Cable Tool	39.6	4/30/1986	Domestic	16.2	37.8	Clay/Stones (29.3) Ligh Brown Rock (37.5) Dark Brown Rock (39.6)
185	6707089	Cable Tool	27.1	9/24/1979	Commerical	10.7	37.8	Clay/Sand (22.3) Rock (27.1)
186	6714637	Rotary (Air)	-	9/30/2003	Domestic	6.4		
187	6714637	Rotary (Air)	25.0	9/30/2003	Domestic	6.4	94.5	Clay/Stones (16.5) Limestone (25.0)
188	6702545	Cable Tool	27.4	6/23/1964	Domestic	9.2	18.9	Sand/Gravel (9.1) Gravel (18.2) Clay/Sand (26.8) Rock (27.4)
189	6702663	Cable Tool	27.4	11/10/1964	Domestic	12.2	37.8	Clay/Stones (24.4) Rock (27.4)
190	6709927	Rotary (Air)	32.3	9/1/1989	Domestic	21.4	56.7	Fill (1.5) Clay/Gravel (30.2) Rock (32.3)
191	6714293	Rotary (Air)	29.0	11/12/2002	Domestic	19.5	68.0	Clay/Stones (26.8) Gravel (29.0)
192	6712487	Rotary (Air)	32.0	2/3/1998	Domestic	13.7	56.7	Clay/Stones (29.0) Gravel (32.0)
193	7254633	Rotary (Convent.)	-	9/18/2015	Domestic	-	-	-
194	7254633	Rotary (Convent.)	-	9/18/2015	Domestic	-	-	-
195	7254633	Rotary (Convent.)	31.4	9/18/2015	Domestic	6.7	151.2	Fill (2.7) Clay/Stones (28.7) Limestone (31.4)
196	6710440	Air Percussion	33.5	9/11/1990	Domestic	20.1	56.7	Clay/Gravel (11.3) Sand/Gravel 31.7) Limestone (33.5)
197	6710353	Air Percussion	34.1	5/8/1990	Domestic	6.7	113.4	Sand/Gravel (7.3) Clay/Gravel (24.1) Sand/Gravel 32.6) Limestone (34.1)
198	6712610	Rotary (Air)	-	7/29/1998	Domestic	20.1		
199	6712610	Rotary (Air)	-	7/29/1998	Domestic	20.1		
200	6712610	Rotary (Air)	43.0	7/29/1998	Domestic	20.1	94.5	Clay/Stones (27.4) Sand/Gravel 30.5) Clay/Gravel (33.2) Light Brown Limestone (36.6) Dark Brown Limestone (43.0)
201	7332571	-	-	3/25/2019	Alteration	-	-	-
202	6705869	Rotary (Convent.)	19.8	7/24/1975	Livestock	5.2	75.6	Clay/Stones (17.4) Limestone (19.8)
203	6707677	Cable Tool	46.6	6/29/1982	Domestic	9.2	37.8	Clay/Gravel (27.1) Rock (46.6)

WELL ID	MECP* WWR ID	Construction Method	Well Depth (m)**	Date Completed	Well Use	Static Water Level (m)**	Pumping Rate (L/min)	Stratigraphy (Depth in m)
204	6710281	Rotary (Air)	36.9	4/24/1990	Domestic	13.4	56.7	Clay/Stones (12.2) Sand/Gravel (27.4) Clay/Sand (29.9) Light Brown Rock (35.1) Dark Brown Rock (36.9)
205	6711984	Rotary (Reverse)	31.5	6/18/1996	Domestic	13.4	56.7	Clay/Sand (19.8) Clay/Gravel (31.4) Gravel (31.5)
206	6710282	Rotary (Air)	36.3	4/23/1990	Domestic	12.2	75.6	Clay/Stones (13.7) Sand/Gravel (30.8) Light Brown Rock (33.5) Dark Brown Rock (36.3)
207	6712612	Rotary (Air)	-	7/24/1998	Domestic	-	-	-
208	6712612	Rotary (Air)	-	7/24/1998	Domestic	-	-	-
209	6712612	Rotary (Air)	73.5	7/24/1998	Domestic	25.9	75.6	Clay/Stones (21.3) Sand/Gravel (25.9) Clay/Gravel (32.3) Light Brown Limestone (33.5) Dark Brown Limestone (73.5)
210	6713827	Air Percussion	-	9/6/2001	Domestic	-	-	-
211	6713827	Air Percussion	31.1	9/6/2001	Domestic	14.9	94.5	Clay/Sand (17.7) Sand/Gravel (28.0) Limestone (31.1)
212	6711290	Rotary (Air)	31.4	9/7/1993	Domestic	12.8	75.6	Clay/Stones (10.7) Sand/Gravel (30.5) Gravel (31.4)
213	7199020	Rotary (Convent.)	-	3/6/2013	Domestic	-	-	-
214	7199020	Rotary (Convent.)	43.0	3/6/2013	Domestic	15.9	45.4	Clay/Stones (7.0) Sand/Stones (20.4) Clay/Stones (42.7) Limestone (43.0)
215	6711803	Rotary (Air)	48.8	8/17/1995	Domestic	18.3	56.7	Clay/Stones (15.2) Sand/Gravel (29.0) Light Brown Rock (38.1) Dark Brown Rock (48.8)
216	6704652	Cable Tool	24.4	6/27/1973	Domestic	7.0	37.8	Clay/Stones (23.5) Gravel (24.4)
217	6710441	Air Percussion	-	9/10/1990	Domestic	-	-	-
218	6710441	Air Percussion	37.8	9/10/1990	Domestic	21.0	56.7	Clay/Gravel (25.0) Sand/Gravel (34.7) Limestone (37.8)
219	6702675	Cable Tool	22.9	6/4/1965	Domestic	9.2	30.2	Clay (10.7) Silty Sand (20.1) Rock (22.9)
220	6712182	Rotary (Convent.)	-	1/7/1997	Domestic	-	-	-
221	6712182	Rotary (Convent.)	51.8	1/7/1997	Domestic	12.8	37.8	Sand/Gravel (4.9) Clay/Gravel (26.8) Brown Limestone (46.9) Grey Limestone (51.8)
222	6703857	Cable Tool	24.4	7/22/1970	Domestic	8.5	37.8	Clay/Stones (18.3) Silt/Sand (21.3) Clay/Gravel (24.1) Gravel (24.4)
223	6714525	Rotary (Air)	-	4/7/2003	Domestic	-	-	-
224	6714525	Rotary (Air)	27.7	4/7/2003	Domestic	11.9	56.7	Clay/Stones (22.3) Limestone (27.7)
225	6713406	Rotary (Air)	25.6	7/18/2000	Domestic	10.4	37.8	Clay/Stones (22.9) Sand/Gravel (25.6)
226	6712999	Rotary (Air)	30.5	6/15/1999	Domestic	9.2	56.7	Clay/Stones (26.8) Rock (30.5)
227	6709990	Cable Tool	27.7	10/19/1989	Domestic	3.1	37.8	Sand/Gravel (7.3) Gravel (13.1) Clay/Gravel (21.3) Gravel (26.5) Limestone (27.7)
228	6713220	Rotary (Air)	24.4	12/2/1999	Domestic	11.3	75.6	Clay/Stones (11.6) Sand/Gravel (18.9) Rock (24.4)

*MECP WWID: Ministry of the Environment , Conservation and Parks Water Well Records Identification

**metres below ground surface

Appendix C
Results of Groundwater Monitoring

ENGLOBE

11 Main Street, Puslinch

Groundwater Depths (m below ground surface)

Monitoring Well ID	Ground Elevation (m asl)	Well Depth (m bgs)	Well Screen Top Depth (m bgs)	1st GW Monitoring Event*	2nd GW Monitoring Event	3rd GW Monitoring Event	4th GW Monitoring Event	5th GW Monitoring Event
				Water Depth Aug 24, 2022 (m bgs)	Water Depth Sept 7, 2022 (m bgs)	Water Depth Sept 19, 2022 (m bgs)	Water Depth July 18, 2024 (m bgs)	Water Depth August 6, 2024 (m bgs)
BH1	313.0	6.6	3.6	Dry	Dry	Dry	3.93	3.98
BH2	318.2	7.6	6.1	6.64	6.72	6.76	5.61	5.64
BH3	317.1	7.6	4.6	5.22	5.33	5.42	4.29	4.35
BH5	316.8	6.1	4.6	5.13	5.21	5.21	4.40	4.44

Groundwater Elevations (m above sea level)

Monitoring Well ID	Ground Elevation (m asl)	Well Screen Bottom Elevation (m asl)	Well Screen Top Elevation (m asl)	1st GW Monitoring Event*	2nd GW Monitoring Event	3rd GW Monitoring Event	4th GW Monitoring Event	5th GW Monitoring Event
				Groundwater Level Elevation Aug 24, 2022 (m asl)	Groundwater Level Elevation Sept 7, 2022 (m asl)	Groundwater Level Elevation Sept 19, 2022 (m asl)	Groundwater Level Elevation July 18, 2024 (m asl)	Groundwater Level Elevation August 6, 2024 (m asl)
BH1	313.0	306.4	309.4	Dry	Dry	Dry	309.04	308.99
BH2	318.2	310.6	312.1	311.54	311.46	311.42	312.57	312.54
BH3	317.1	309.5	312.5	311.93	311.82	311.73	312.86	312.80
BH5	316.8	310.7	312.2	311.67	311.59	311.59	312.40	312.36

mbgs - meters below ground surface

masl - meters above sea level

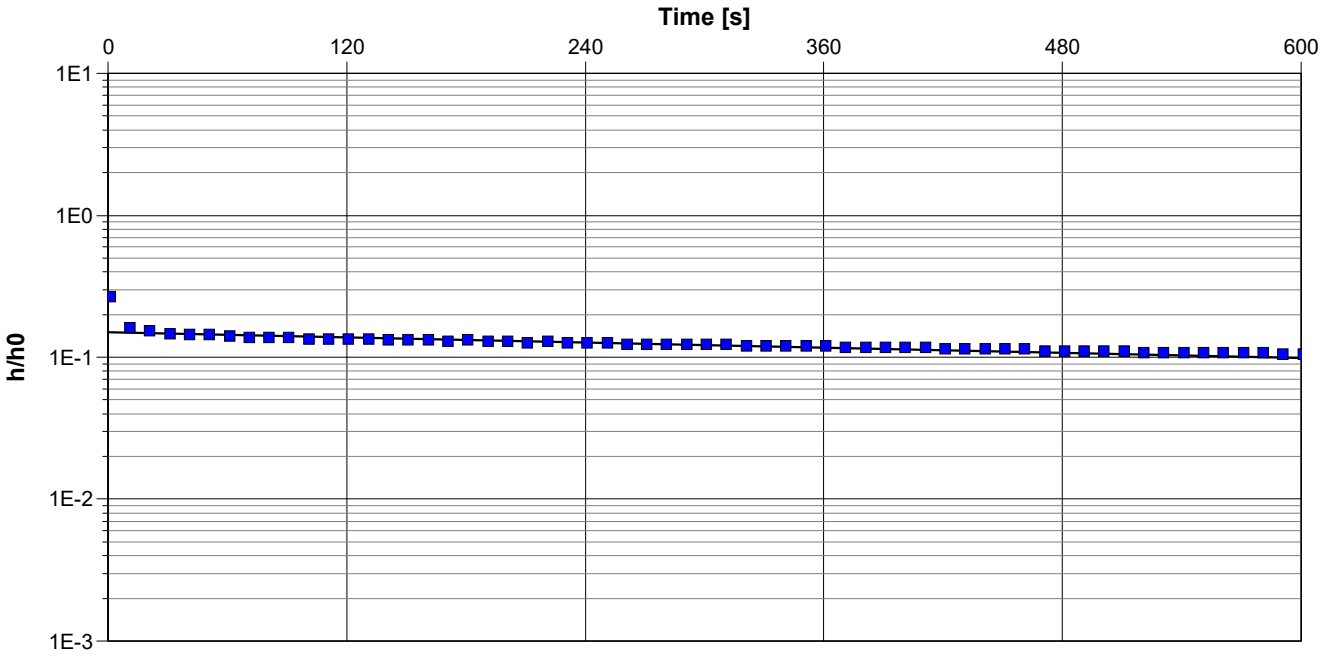
*Indicates that the groundwater has not been stabilized yet

Appendix D
Results of Hydraulic Conductivity Testing

ENGLOBE

	Slug Test Analysis Report	Appendix D
	Project: 11 Main Street	
	Number: 1-22-0482-46	
	Client:	

Location: 11 Main street	Slug Test: BH2	Test Well: BH2
Test Conducted by: AA		Test Date: 10/17/2022
Analysis Performed by: RG	RHT - BH2	Analysis Date: 10/17/2022
Aquifer Thickness: 2.00 m		

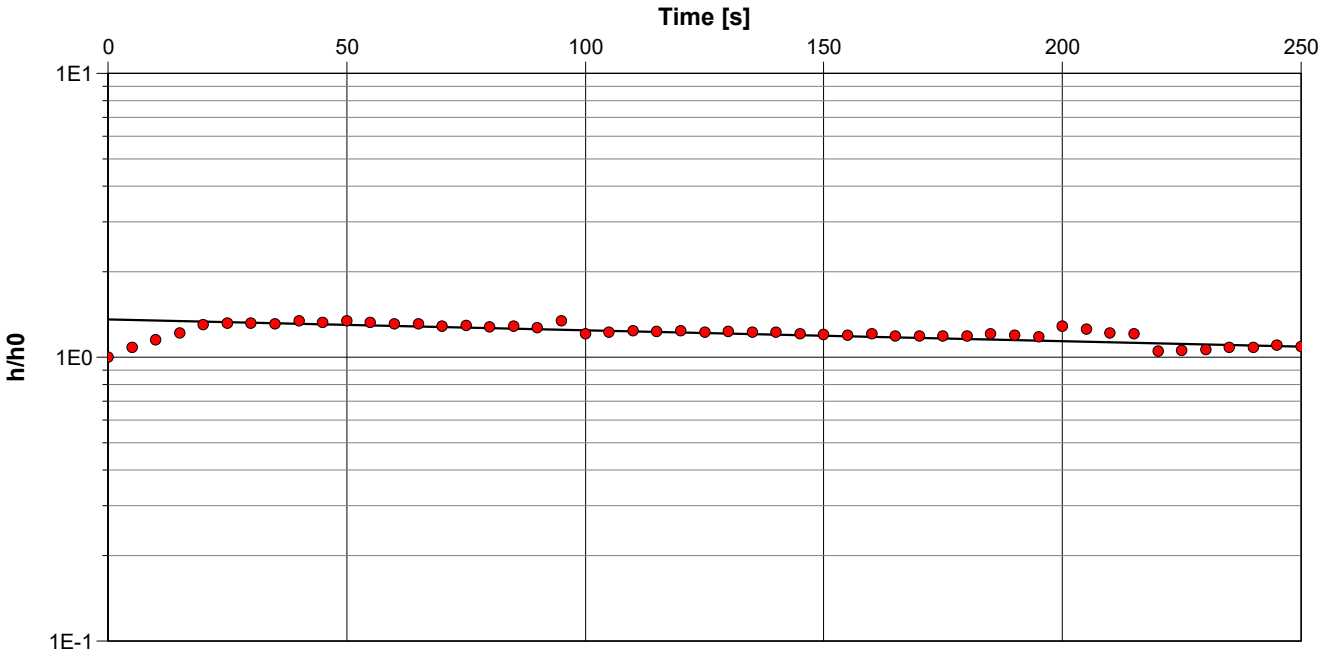


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH2	1.21×10^{-6}	

	Slug Test Analysis Report	Appendix D
	Project: 11 Main Street	
	Number: 1-22-0482-46	
	Client:	

Location: 11 Main street	Slug Test: BH3	Test Well: BH3
Test Conducted by: AA		Test Date: 10/17/2022
Analysis Performed by: RG	FHT - BH3	Analysis Date: 11/11/2022
Aquifer Thickness: 7.00 m		



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH3	1.18×10^{-6}	

Appendix E
Laboratory Certificates of Analysis

ENGLOBE

AGAT Laboratories

5835 COOPERS AVENUE
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CLIENT NAME: ENGLOBE CORP.
20, CARLSON COURT
ETOBICOKE, ON M9W 7K6
416 301-5909
ATTENTION TO: Paul Raepple
PROJECT: T1220482.003
AGAT WORK ORDER: 24T182195
WATER ANALYSIS REVIEWED BY: Yris Verastegui, Inorganic Team Lead
DATE REPORTED: Aug 12, 2024
PAGES (INCLUDING COVER): 15
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
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- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information is available on request from AGAT Laboratories, in accordance with ISO/IEC 17025:2017, ISO/IEC 17025:2005 (Quebec), DR-12-PALA and/or NELAP Standards.*
- *This document is signed by an authorized signatory who meets the requirements of the MELCCFP, CALA, CCN and NELAP.*
- *For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.*

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Certificate of Analysis

AGAT WORK ORDER: 24T182195

PROJECT: T1220482.003

CLIENT NAME: ENGLOBE CORP.

ATTENTION TO: Paul Raepple

SAMPLING SITE:11 Main St, Puslinch ON

SAMPLED BY:MG, SF

TOC

DATE RECEIVED: 2024-08-06 **DATE REPORTED: 2024-08-12**

		SAMPLE DESCRIPTION:		BH1	BH2	BH3	BH5	BC Surface
		SAMPLE TYPE:		Water	Water	Water	Water	Water
		DATE SAMPLED:		2024-08-06	2024-08-06	2024-08-06	2024-08-06	2024-08-06
Parameter	Unit	G / S	RDL	6055636	6055693	6055694	6055695	6055696
Total Organic Carbon	mg/L		0.5	1.0	0.7	1.0	0.8	8.8

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 24T182195

PROJECT: T1220482.003

CLIENT NAME: ENGLOBE CORP.

SAMPLING SITE:11 Main St, Puslinch ON

ATTENTION TO: Paul Raepple

SAMPLED BY:MG, SF

Water Quality Assessment (mg/L) Groundwater

DATE RECEIVED: 2024-08-06 **DATE REPORTED: 2024-08-12**

		SAMPLE DESCRIPTION:		BH1	BH2		BH3		BH5
		SAMPLE TYPE:		Water	Water		Water		Water
		DATE SAMPLED:		2024-08-06	2024-08-06		2024-08-06		2024-08-06
Parameter	Unit	G / S	RDL	6055636	6055693	RDL	6055694	RDL	6055695
Electrical Conductivity	µS/cm		2	588	567	2	1310	2	524
pH	pH Units		NA	7.76	7.82	NA	7.68	NA	7.80
Saturation pH (Calculated)				6.96	6.90		6.70		6.90
Langelier Index (Calculated)				0.796	0.915		0.976		0.897
Hardness (as CaCO3) (Calculated)	mg/L		0.5	306	321	0.5	452	0.5	301
Total Dissolved Solids	mg/L		10	362	354	10	824	10	290
Alkalinity (as CaCO3)	mg/L		5	257	281	5	347	5	281
Bicarbonate (as CaCO3)	mg/L		5	257	281	5	347	5	281
Carbonate (as CaCO3)	mg/L		5	<5	<5	5	<5	5	<5
Hydroxide (as CaCO3)	mg/L		5	<5	<5	5	<5	5	<5
Fluoride	mg/L		0.05	0.08	0.08	0.05	<0.05	0.05	0.08
Chloride	mg/L		0.10	34.4	17.3	0.12	202	0.10	4.70
Nitrate as N	mg/L		0.05	0.37	1.54	0.05	6.10	0.05	1.66
Nitrite as N	mg/L		0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05
Bromide	mg/L		0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05
Sulphate	mg/L		0.10	6.89	14.4	0.10	26.9	0.10	3.35
Ortho Phosphate as P	mg/L		0.10	<0.10	<0.10	0.10	<0.10	0.10	<0.10
Ammonia as N	mg/L		0.02	<0.02	<0.02	0.02	<0.02	0.02	<0.02
Total Phosphorus	mg/L		0.02	<0.02	<0.02	0.02	<0.02	0.02	<0.02
True Colour	TCU		2.50	<2.50	<2.50	2.50	<2.50	2.50	<2.50
Turbidity	NTU		0.5	0.7	0.8	0.5	<0.5	0.5	1.0
Dissolved Calcium	mg/L		0.05	76.5	74.1	0.05	112	0.05	70.0
Dissolved Magnesium	mg/L		0.05	27.9	33.0	0.05	41.9	0.05	30.6
Dissolved Potassium	mg/L		0.50	<0.50	0.93	0.50	2.75	0.50	<0.50
Dissolved Sodium	mg/L		0.05	12.2	10.4	0.05	117	0.05	3.99
Dissolved Aluminum	mg/L		0.004	<0.004	0.007	0.004	0.004	0.004	0.009
Dissolved Antimony	mg/L		0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001
Dissolved Arsenic	mg/L		0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001
Dissolved Barium	mg/L		0.002	0.016	0.054	0.002	0.071	0.002	0.010
Dissolved Beryllium	mg/L		0.0005	<0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24T182195

PROJECT: T1220482.003

CLIENT NAME: ENGLOBE CORP.

ATTENTION TO: Paul Raepple

SAMPLING SITE:11 Main St, Puslinch ON

SAMPLED BY:MG, SF

Water Quality Assessment (mg/L) Groundwater

DATE RECEIVED: 2024-08-06 **DATE REPORTED: 2024-08-12**

		SAMPLE DESCRIPTION:		BH1	BH2		BH3		BH5
		SAMPLE TYPE:		Water	Water		Water		Water
		DATE SAMPLED:		2024-08-06	2024-08-06		2024-08-06		2024-08-06
Parameter	Unit	G / S	RDL	6055636	6055693	RDL	6055694	RDL	6055695
Dissolved Boron	mg/L		0.010	0.137	0.166	0.010	0.169	0.010	0.144
Dissolved Cadmium	mg/L		0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Dissolved Chromium	mg/L		0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Cobalt	mg/L		0.0005	<0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005
Dissolved Copper	mg/L		0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001
Dissolved Iron	mg/L		0.020	<0.020	<0.020	0.020	<0.020	0.020	<0.020
Dissolved Lead	mg/L		0.0005	<0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005
Dissolved Manganese	mg/L		0.002	<0.002	<0.002	0.002	0.005	0.002	<0.002
Dissolved Mercury	mg/L		0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Dissolved Molybdenum	mg/L		0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Nickel	mg/L		0.001	<0.001	0.001	0.001	0.001	0.001	<0.001
Dissolved Selenium	mg/L		0.001	<0.001	<0.001	0.001	0.001	0.001	<0.001
Dissolved Silver	mg/L		0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Dissolved Strontium	mg/L		0.005	0.062	0.074	0.005	0.123	0.005	0.052
Dissolved Thallium	mg/L		0.0003	<0.0003	<0.0003	0.0003	<0.0003	0.0003	<0.0003
Dissolved Tin	mg/L		0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Titanium	mg/L		0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003
Dissolved Tungsten	mg/L		0.010	<0.010	<0.010	0.010	<0.010	0.010	<0.010
Dissolved Uranium	mg/L		0.0005	<0.0005	0.0012	0.0005	<0.0005	0.0005	<0.0005
Dissolved Vanadium	mg/L		0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Zinc	mg/L		0.005	0.006	<0.005	0.005	0.048	0.005	0.018
Dissolved Zirconium	mg/L		0.004	<0.004	<0.004	0.004	<0.004	0.004	<0.004

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

6055636-6055695 Metals analysis completed on a filtered sample.
Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 24T182195

PROJECT: T1220482.003

CLIENT NAME: ENGLOBE CORP.

SAMPLING SITE:11 Main St, Puslinch ON

ATTENTION TO: Paul Raepple

SAMPLED BY:MG, SF

Water Quality Assessment - PWQO (mg/L)

DATE RECEIVED: 2024-08-06

DATE REPORTED: 2024-08-12

		SAMPLE DESCRIPTION:		BC Surface
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2024-08-06
Parameter	Unit	G / S	RDL	6055696
Electrical Conductivity	µS/cm		2	2490
pH	pH Units	6.5-8.5	NA	8.00
Saturation pH (Calculated)				6.73
Langelier Index (Calculated)				1.27
Hardness (as CaCO3) (Calculated)	mg/L		0.5	412
Total Dissolved Solids	mg/L		10	1200
Alkalinity (as CaCO3)	mg/L		5	357
Bicarbonate (as CaCO3)	mg/L		5	357
Carbonate (as CaCO3)	mg/L		5	<5
Hydroxide (as CaCO3)	mg/L		5	<5
Fluoride	mg/L		0.05	<0.05
Chloride	mg/L		0.49	476
Nitrate as N	mg/L		0.14	1.92
Nitrite as N	mg/L		0.11	<0.11
Bromide	mg/L		0.11	<0.11
Sulphate	mg/L		0.38	22.8
Ortho Phosphate as P	mg/L		0.26	<0.26
Ammonia as N	mg/L		0.02	<0.02
Ammonia-Un-ionized (Calculated)	mg/L	0.02	0.000002	<0.000002
Total Phosphorus	mg/L	*	0.02	<0.02
True Colour	TCU		2.50	15.5
Turbidity	NTU		0.5	8.2
Total Calcium	mg/L		0.20	109
Total Magnesium	mg/L		0.10	34.0
Total Potassium	mg/L		0.50	5.68
Total Sodium	mg/L		0.10	309
Aluminum-dissolved	mg/L	*	0.004	0.004
Total Antimony	mg/L	0.020	0.003	<0.003
Total Arsenic	mg/L	0.1	0.003	<0.003
Total Barium	mg/L		0.002	0.090

Certified By: [redacted]

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AGAT WORK ORDER: 24T182195

PROJECT: T1220482.003

CLIENT NAME: ENGLOBE CORP.

ATTENTION TO: Paul Raepple

SAMPLING SITE:11 Main St, Puslinch ON

SAMPLED BY:MG, SF

Water Quality Assessment - PWQO (mg/L)

DATE RECEIVED: 2024-08-06

DATE REPORTED: 2024-08-12

		SAMPLE DESCRIPTION:		BC Surface
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2024-08-06
Parameter	Unit	G / S	RDL	6055696
Total Beryllium	mg/L	*	0.001	<0.001
Total Boron	mg/L	0.2	0.010	0.193
Total Cadmium	mg/L	0.0002	0.0001	<0.0001
Total Chromium	mg/L		0.003	<0.003
Total Cobalt	mg/L	0.0009	0.0005	<0.0005
Total Copper	mg/L	0.005	0.002	**0.006**
Total Iron	mg/L	0.3	0.050	**1.29**
Total Lead	mg/L	*	0.0005	0.0034
Total Manganese	mg/L		0.002	0.294
Total Mercury	mg/L		0.0001	<0.0001
Total Molybdenum	mg/L	0.040	0.002	<0.002
Total Nickel	mg/L	0.025	0.003	<0.003
Total Selenium	mg/L	0.1	0.002	<0.002
Total Silver	mg/L	0.0001	0.0001	<0.0001
Total Strontium	mg/L		0.005	0.282
Total Thallium	mg/L	0.0003	0.0003	<0.0003
Total Tin	mg/L		0.002	<0.002
Total Titanium	mg/L		0.010	<0.010
Total Tungsten	mg/L	0.030	0.010	<0.010
Total Uranium	mg/L	0.005	0.0005	<0.0005
Total Vanadium	mg/L	0.006	0.002	<0.002
Total Zinc	mg/L	0.030	0.020	**0.050**
Total Zirconium	mg/L	0.004	0.004	<0.004
Lab Filtration Aluminum Dissolved				1

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24T182195

PROJECT: T1220482.003

CLIENT NAME: ENGLOBE CORP.

ATTENTION TO: Paul Raepple

SAMPLING SITE:11 Main St, Puslinch ON

SAMPLED BY:MG, SF

Water Quality Assessment - PWQO (mg/L)

DATE RECEIVED: 2024-08-06 **DATE REPORTED: 2024-08-12**

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to PWQO * Variable - refer to guideline reference document
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

6055696 Dissolved Aluminum analysis performed on a lab filtered container.
Dilution required, RDL has been increased accordingly.
Un-ionized Ammonia detection limit is a calculated RDL. The calculation of Un-ionized Ammonia is based on lab measured parameters (ammonia as N, pH and temperature).Values are reported as calculated.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

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Exceedance Summary

AGAT WORK ORDER: 24T182195

PROJECT: T1220482.003

CLIENT NAME: ENGLOBE CORP.

ATTENTION TO: Paul Raepple

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
6055696	BC Surface	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Copper	mg/L	0.005	0.006
6055696	BC Surface	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Iron	mg/L	0.3	1.29
6055696	BC Surface	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Zinc	mg/L	0.030	0.050

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Quality Assurance

CLIENT NAME: ENGLOBE CORP.

AGAT WORK ORDER: 24T182195

PROJECT: T1220482.003

ATTENTION TO: Paul Raepple

SAMPLING SITE:11 Main St, Puslinch ON

SAMPLED BY:MG, SF

Water Analysis

RPT Date: Aug 12, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Water Quality Assessment (mg/L) Groundwater															
Electrical Conductivity	6055350		488	499	2.2%	< 2	106%	90%	110%						
pH	6055350		7.70	7.87	2.2%	NA	100%	90%	110%						
Total Dissolved Solids	6056576		1460	1470	0.7%	< 10	102%	80%	120%						
Alkalinity (as CaCO3)	6055350		150	151	0.7%	< 5	97%	80%	120%						
Bicarbonate (as CaCO3)	6055350		150	151	0.7%	< 5	NA								
Carbonate (as CaCO3)	6055350		<5	<5	NA	< 5	NA								
Hydroxide (as CaCO3)	6055350		<5	<5	NA	< 5	NA								
Fluoride	6049956		<0.05	<0.05	NA	< 0.05	104%	70%	130%	103%	80%	120%	105%	70%	130%
Chloride	6049956		25.2	25.4	0.8%	< 0.10	95%	70%	130%	103%	80%	120%	102%	70%	130%
Nitrate as N	6049956		<0.05	<0.05	NA	< 0.05	97%	70%	130%	99%	80%	120%	96%	70%	130%
Nitrite as N	6049956		<0.05	<0.05	NA	< 0.05	94%	70%	130%	98%	80%	120%	95%	70%	130%
Bromide	6049956		<0.05	<0.05	NA	< 0.05	99%	70%	130%	100%	80%	120%	98%	70%	130%
Sulphate	6049956		9.75	9.80	0.5%	< 0.10	95%	70%	130%	100%	80%	120%	96%	70%	130%
Ortho Phosphate as P	6049956		<0.10	<0.10	NA	< 0.10	94%	70%	130%	99%	80%	120%	92%	70%	130%
Ammonia as N	6053504		<0.02	<0.02	NA	< 0.02	109%	70%	130%	100%	80%	120%	102%	70%	130%
Total Phosphorus	6048025		0.03	0.03	NA	< 0.02	101%	70%	130%	99%	80%	120%	84%	70%	130%
True Colour	6043561		33.5	34.8	3.8%	< 2.5	103%	90%	110%						
Turbidity	6055350		34.4	36.8	6.7%	< 0.5	113%	80%	120%						
Dissolved Calcium	6055636	6055636	76.5	75.5	1.3%	< 0.05	101%	70%	130%	100%	80%	120%	105%	70%	130%
Dissolved Magnesium	6055636	6055636	27.9	27.8	0.4%	< 0.05	104%	70%	130%	105%	80%	120%	104%	70%	130%
Dissolved Potassium	6055636	6055636	<0.50	0.56	NA	< 0.50	101%	70%	130%	100%	80%	120%	103%	70%	130%
Dissolved Sodium	6055636	6055636	12.2	12.0	1.7%	< 0.05	101%	70%	130%	106%	80%	120%	104%	70%	130%
Dissolved Aluminum	6055636	6055636	<0.004	<0.004	NA	< 0.004	98%	70%	130%	107%	80%	120%	113%	70%	130%
Dissolved Antimony	6055636	6055636	<0.001	<0.001	NA	< 0.001	103%	70%	130%	104%	80%	120%	107%	70%	130%
Dissolved Arsenic	6055636	6055636	<0.001	<0.001	NA	< 0.001	97%	70%	130%	98%	80%	120%	106%	70%	130%
Dissolved Barium	6055636	6055636	0.016	0.017	6.1%	< 0.002	101%	70%	130%	103%	80%	120%	103%	70%	130%
Dissolved Beryllium	6055636	6055636	<0.0005	<0.0005	NA	< 0.0005	99%	70%	130%	104%	80%	120%	113%	70%	130%
Dissolved Boron	6055636	6055636	0.137	0.139	1.4%	< 0.010	101%	70%	130%	108%	80%	120%	110%	70%	130%
Dissolved Cadmium	6055636	6055636	<0.0001	<0.0001	NA	< 0.0001	101%	70%	130%	100%	80%	120%	105%	70%	130%
Dissolved Chromium	6055636	6055636	<0.002	<0.002	NA	< 0.002	96%	70%	130%	100%	80%	120%	102%	70%	130%
Dissolved Cobalt	6055636	6055636	<0.0005	<0.0005	NA	< 0.0005	96%	70%	130%	101%	80%	120%	100%	70%	130%
Dissolved Copper	6055636	6055636	<0.001	<0.001	NA	< 0.001	99%	70%	130%	99%	80%	120%	99%	70%	130%
Dissolved Iron	6055636	6055636	<0.020	<0.020	NA	< 0.010	101%	70%	130%	103%	80%	120%	108%	70%	130%
Dissolved Lead	6055636	6055636	<0.0005	<0.0005	NA	< 0.0005	97%	70%	130%	99%	80%	120%	98%	70%	130%
Dissolved Manganese	6055636	6055636	<0.002	<0.002	NA	< 0.002	99%	70%	130%	102%	80%	120%	105%	70%	130%
Dissolved Mercury	6055636	6055636	<0.0001	<0.0001	NA	< 0.0001	99%	70%	130%	103%	80%	120%	95%	70%	130%
Dissolved Molybdenum	6055636	6055636	<0.002	<0.002	NA	< 0.002	102%	70%	130%	106%	80%	120%	107%	70%	130%
Dissolved Nickel	6055636	6055636	<0.001	<0.001	NA	< 0.001	96%	70%	130%	99%	80%	120%	100%	70%	130%
Dissolved Selenium	6055636	6055636	<0.001	<0.001	NA	< 0.001	106%	70%	130%	98%	80%	120%	109%	70%	130%

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Quality Assurance

CLIENT NAME: ENGLOBE CORP.

AGAT WORK ORDER: 24T182195

PROJECT: T1220482.003

ATTENTION TO: Paul Raepple

SAMPLING SITE:11 Main St, Puslinch ON

SAMPLED BY:MG, SF

Water Analysis (Continued)

RPT Date: Aug 12, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Dissolved Silver	6055636	6055636	<0.0001	<0.0001	NA	< 0.0001	98%	70%	130%	100%	80%	120%	99%	70%	130%
Dissolved Strontium	6055636	6055636	0.062	0.065	4.7%	< 0.005	98%	70%	130%	104%	80%	120%	105%	70%	130%
Dissolved Thallium	6055636	6055636	<0.0003	<0.0003	NA	< 0.0003	98%	70%	130%	101%	80%	120%	100%	70%	130%
Dissolved Tin	6055636	6055636	<0.002	<0.002	NA	< 0.002	103%	70%	130%	105%	80%	120%	104%	70%	130%
Dissolved Titanium	6055636	6055636	<0.003	<0.003	NA	< 0.002	98%	70%	130%	107%	80%	120%	106%	70%	130%
Dissolved Tungsten	6055636	6055636	<0.010	<0.010	NA	< 0.010	97%	70%	130%	97%	80%	120%	99%	70%	130%
Dissolved Uranium	6055636	6055636	<0.0005	<0.0005	NA	< 0.0005	93%	70%	130%	96%	80%	120%	97%	70%	130%
Dissolved Vanadium	6055636	6055636	<0.002	<0.002	NA	< 0.002	97%	70%	130%	106%	80%	120%	107%	70%	130%
Dissolved Zinc	6055636	6055636	0.006	0.008	NA	< 0.005	99%	70%	130%	99%	80%	120%	103%	70%	130%
Dissolved Zirconium	6055636	6055636	<0.004	<0.004	NA	< 0.004	97%	70%	130%	100%	80%	120%	99%	70%	130%
Water Quality Assessment - PWQO (mg/L)															
Electrical Conductivity	6055350		488	499	2.2%	< 2	106%	90%	110%						
pH	6055350		7.70	7.87	2.2%	NA	100%	90%	110%						
Total Dissolved Solids	6056576		1460	1470	0.7%	< 10	102%	80%	120%						
Alkalinity (as CaCO3)	6055350		150	151	0.7%	< 5	97%	80%	120%						
Bicarbonate (as CaCO3)	6055350		150	151	0.7%	< 5	NA								
Carbonate (as CaCO3)	6055350		<5	<5	NA	< 5	NA								
Hydroxide (as CaCO3)	6055350		<5	<5	NA	< 5	NA								
Fluoride	6049956		<0.05	<0.05	NA	< 0.05	104%	70%	130%	103%	80%	120%	105%	70%	130%
Chloride	6049956		25.2	25.4	0.8%	< 0.10	95%	70%	130%	103%	80%	120%	102%	70%	130%
Nitrate as N	6049956		<0.05	<0.05	NA	< 0.05	97%	70%	130%	99%	80%	120%	96%	70%	130%
Nitrite as N	6049956		<0.05	<0.05	NA	< 0.05	94%	70%	130%	98%	80%	120%	95%	70%	130%
Bromide	6049956		<0.05	<0.05	NA	< 0.05	99%	70%	130%	100%	80%	120%	98%	70%	130%
Sulphate	6049956		9.75	9.80	0.5%	< 0.10	95%	70%	130%	100%	80%	120%	96%	70%	130%
Ortho Phosphate as P	6049956		<0.10	<0.10	NA	< 0.10	94%	70%	130%	99%	80%	120%	92%	70%	130%
Ammonia as N	6053504		<0.02	<0.02	NA	< 0.02	109%	70%	130%	100%	80%	120%	102%	70%	130%
Total Phosphorus	6046590		0.04	0.04	NA	< 0.02	95%	70%	130%	101%	80%	120%	105%	70%	130%
True Colour	6043561		33.5	34.8	3.8%	< 2.5	103%	90%	110%						
Turbidity	6055350		34.4	36.8	6.7%	< 0.5	113%	80%	120%						
Total Calcium	6055350		45.0	38.7	15.1%	< 0.20	89%	70%	130%	94%	80%	120%	110%	70%	130%
Total Magnesium	6055350		21.2	19.7	7.3%	< 0.10	106%	70%	130%	109%	80%	120%	95%	70%	130%
Total Potassium	6055350		0.90	0.83	NA	< 0.50	102%	70%	130%	105%	80%	120%	98%	70%	130%
Total Sodium	6055350		37.3	34.8	6.9%	< 0.10	102%	70%	130%	109%	80%	120%	115%	70%	130%
Aluminum-dissolved	6055696	6055696	0.004	<0.004	NA	< 0.004	102%	70%	130%	108%	80%	120%	114%	70%	130%
Total Antimony	6055350		<0.003	<0.003	NA	< 0.003	103%	70%	130%	107%	80%	120%	109%	70%	130%
Total Arsenic	6055350		0.005	0.005	NA	< 0.003	99%	70%	130%	104%	80%	120%	107%	70%	130%
Total Barium	6055350		0.066	0.063	4.7%	< 0.002	99%	70%	130%	103%	80%	120%	105%	70%	130%
Total Beryllium	6055350		<0.001	<0.001	NA	< 0.001	102%	70%	130%	112%	80%	120%	104%	70%	130%
Total Boron	6055350		0.173	0.169	2.3%	< 0.010	101%	70%	130%	116%	80%	120%	102%	70%	130%

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Quality Assurance

CLIENT NAME: ENGLOBE CORP.
AGAT WORK ORDER: 24T182195
PROJECT: T1220482.003
ATTENTION TO: Paul Raepple
SAMPLING SITE:11 Main St, Puslinch ON
SAMPLED BY:MG, SF

Water Analysis (Continued)

RPT Date: Aug 12, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Cadmium	6055350		<0.0001	<0.0001	NA	< 0.0001	97%	70%	130%	100%	80%	120%	99%	70%	130%
Total Chromium	6055350		<0.003	<0.003	NA	< 0.003	99%	70%	130%	101%	80%	120%	101%	70%	130%
Total Cobalt	6055350		<0.0005	<0.0005	NA	< 0.0005	98%	70%	130%	101%	80%	120%	98%	70%	130%
Total Copper	6055350		0.183	0.186	1.6%	< 0.002	98%	70%	130%	100%	80%	120%	94%	70%	130%
Total Iron	6055350		5.17	5.19	0.4%	< 0.050	100%	70%	130%	103%	80%	120%	102%	70%	130%
Total Lead	6055350		0.0091	0.0089	2.2%	< 0.0005	97%	70%	130%	99%	80%	120%	97%	70%	130%
Total Manganese	6055350		0.031	0.031	0.0%	< 0.002	101%	70%	130%	104%	80%	120%	106%	70%	130%
Total Mercury	6055350		<0.0001	<0.0001	NA	< 0.0001	99%	70%	130%	103%	80%	120%	96%	70%	130%
Total Molybdenum	6055350		0.008	0.008	NA	< 0.002	102%	70%	130%	106%	80%	120%	106%	70%	130%
Total Nickel	6055350		<0.003	0.003	NA	< 0.003	98%	70%	130%	100%	80%	120%	99%	70%	130%
Total Selenium	6055350		<0.002	<0.002	NA	< 0.002	97%	70%	130%	104%	80%	120%	107%	70%	130%
Total Silver	6055350		<0.0001	<0.0001	NA	< 0.0001	99%	70%	130%	99%	80%	120%	98%	70%	130%
Total Strontium	6055350		1.33	1.28	3.8%	< 0.005	101%	70%	130%	105%	80%	120%	100%	70%	130%
Total Thallium	6055350		<0.0003	<0.0003	NA	< 0.0003	100%	70%	130%	102%	80%	120%	101%	70%	130%
Total Tin	6055350		0.003	0.003	NA	< 0.002	105%	70%	130%	105%	80%	120%	105%	70%	130%
Total Titanium	6055350		<0.010	<0.010	NA	< 0.010	99%	70%	130%	93%	80%	120%	100%	70%	130%
Total Tungsten	6055350		<0.010	<0.010	NA	< 0.010	97%	70%	130%	98%	80%	120%	96%	70%	130%
Total Uranium	6055350		<0.0005	<0.0005	NA	< 0.0005	93%	70%	130%	97%	80%	120%	99%	70%	130%
Total Vanadium	6055350		<0.010	<0.010	NA	< 0.002	100%	70%	130%	104%	80%	120%	106%	70%	130%
Total Zinc	6055350		0.264	0.256	3.1%	< 0.020	100%	70%	130%	100%	80%	120%	111%	70%	130%
Total Zirconium	6055350		<0.004	<0.004	NA	< 0.004	95%	70%	130%	98%	80%	120%	98%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

TOC

Total Organic Carbon	6056775		<0.5	<0.5	NA	< 0.5	99%	80%	120%	NA	80%	120%	98%	80%	120%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By: [redacted]

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Method Summary

CLIENT NAME: ENGLOBE CORP.

AGAT WORK ORDER: 24T182195

PROJECT: T1220482.003

ATTENTION TO: Paul Raepple

SAMPLING SITE:11 Main St, Puslinch ON

SAMPLED BY:MG, SF

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Total Organic Carbon	INOR-121-6026	SM 5310 B	TOC ANALYZER
Electrical Conductivity	INOR-93-6000	modified from SM 2510 B	PC TITRATE
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Saturation pH (Calculated)		SM 2320 B	CALCULATION
Langelier Index (Calculated)		SM 2330B	CALCULATION
Hardness (as CaCO3) (Calculated)	MET-93-6105	modified from EPA SW-846 6010C & 200.7 & SM 2340 B	CALCULATION
Total Dissolved Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	Modified from SM 2320 B	PC TITRATE
Bicarbonate (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Carbonate (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Hydroxide (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	modified from SM 4500-NH3 H	LACHAT FIA
Total Phosphorus	INOR-93-6057	modified from LACHAT 10-115-01-3A	LACHAT FIA
True Colour	INOR-93-6074	modified from SM 2120 B	LACHAT FIA
Turbidity	INOR-93-6000	modified from SM 2130 B	PC TITRATE
Dissolved Calcium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP/MS
Dissolved Magnesium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Dissolved Potassium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP/MS
Dissolved Sodium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP/MS
Dissolved Aluminum	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Antimony	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Arsenic	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Barium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Beryllium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Boron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cadmium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Chromium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cobalt	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Copper	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS

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Method Summary

CLIENT NAME: ENGLOBE CORP.

AGAT WORK ORDER: 24T182195

PROJECT: T1220482.003

ATTENTION TO: Paul Raepple

SAMPLING SITE:11 Main St, Puslinch ON

SAMPLED BY:MG, SF

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Dissolved Iron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Lead	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Manganese	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Dissolved Molybdenum	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Nickel	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Selenium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Silver	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Strontium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Thallium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Tin	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Titanium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Tungsten	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Uranium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Vanadium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Zinc	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Zirconium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Ammonia-Un-ionized (Calculated)		MOE REFERENCE, PWQOs Tab 2	CALCULATION
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Total Calcium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Total Magnesium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Total Potassium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Total Sodium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Aluminum-dissolved	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Total Antimony	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Arsenic	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Barium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Beryllium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

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Method Summary

CLIENT NAME: ENGLOBE CORP.

AGAT WORK ORDER: 24T182195

PROJECT: T1220482.003

ATTENTION TO: Paul Raepple

SAMPLING SITE:11 Main St, Puslinch ON

SAMPLED BY:MG, SF

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Boron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cadmium	MET -93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Chromium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cobalt	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Copper	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Iron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Lead	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Manganese	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Total Molybdenum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Nickel	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Selenium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silver	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Strontium	INOR-93-6003	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Thallium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tin	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Titanium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tungsten	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Uranium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Vanadium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zinc	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zirconium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Lab Filtration Aluminum Dissolved	SR-78-9001		FILTRATION

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AGAT Laboratories

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Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 24T182195

Cooler Quantity: 1 large

Arrival Temperatures: 5.5 | 5.3 | 6.1

Depot Temperatures: | |

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes: Bagged Ice

Report Information:

Company:
Contact:
Address:
Phone: Fax:
Reports to be sent to:
1. Email:
2. Email:

Regulatory Requirements:

(Please check all applicable boxes)

☐ Regulation 153/04
Table (Indicate One) ☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Regulation 406
Table (Indicate One) ☐ Ind/Com ☐ Res/Park ☐ Agriculture

☐ Regulation 558
☐ CCME

☐ Sewer Use ☐ Sanitary ☐ Storm
Region
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
(Indicate One)

Is this submission for a **Record of Site Condition (RSC)?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☐ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☑ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
*TAT is exclusive of weekends and statutory holidays

For 'Same Day' analysis, please contact your AGAT CSR

Project Information:

Project: T1220482.003
Site Location: 11 Main St Puslinch, ON
Sampled By: MG + SF
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☐ No ☐

Company: Englobe
Contact: Paul Raepple
Address: 20 Carlson Ct Etobicoke
Email: Paul.Raepple@englobecorp.com

Legal Sample ☐

Sample Matrix Legend

GW	Ground Water	SD	Sediment
O	Oil	SW	Surface Water
P	Paint	R	Rock/Shale
S	Soil		

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC (Y/N)	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs	O. Reg 153: VOC	O. Reg 153: PAHs	O. Reg 153: PCBs; Arochlors ☐	O. Reg 406: Regulation 406 Characterization Package pH, Metals, BTEX, F1-F4	O. Reg 406: EC, SAR	O. Reg 406: Regulation 406 SPLP Rainwater Leach mSPLP: ☐ Metals ☐ VOCs ☐ SVOCs ☐ OC	O. Reg 558: Landfill Disposal Characterization TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Corrosivity: ☐ Moisture ☐ Sulphide	Potentially hazardous or High Concentration (Y/N)
1. BH1	Aug 6/24	AM PM		GW		Y											✓	N/A
2. BH2	Aug 6/24	AM PM		GW		Y											✓	
3. BH3	Aug 6/24	AM PM		GW		Y											✓	
4. BH5	Aug 6/24	AM PM		GW		Y											✓	
5. BC-surface	Aug 6/24	AM PM		SW		N											✓	
6.		AM PM																
7.		AM PM																
8.		AM PM																
9.		AM PM																
10.		AM PM																
11.		AM PM																

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Susha Fountain [redacted]	Aug 6/24		[redacted]		
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

'24 AUG 6 5:40PM

Page ____ of ____

N°: T-160876

Pink Copy - Client: Yellow Copy - AGAT | White Copy - AGAT

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FINAL REPORT

CA40056-FEB23 R---

T1220482.002, 11 Main St. Pushinch

Prepared for

Terraprobe Inc

FINAL REPORT

CA40056-FEB23 R---

First Page

CLIENT DETAILS		LABORATORY DETAILS	
Client	Terraprobe Inc	Project Specialist	Maarit Wolfe, Hon.B.Sc
		Laboratory	SGS Canada Inc.
Address	11 Indell Lane Brampton, ON L6T 3Y3. Canada	Address	185 Concession St., Lakefield ON, K0L 2H0
Contact	Rachel Geddam	Telephone	705-652-2000
Telephone	(905) 796-2650	Facsimile	705-652-6365
Facsimile	(905) 796-2250	Email	Maarit.Wolfe@sgs.com
Email	rgeddam@terraprobe.ca	SGS Reference	CA40056-FEB23
Project	T1220482.002, 11 Main St. Pushinch	Received	02/07/2023
Order Number		Approved	02/13/2023
Samples	Ground Water (3)	Report Number	CA40056-FEB23 R---
		Date Reported	02/13/2023

COMMENTS

Temperature of Sample upon Receipt: 4 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: 028748

SIGNATORIES

Maarit Wolfe , Hon.B.Sc

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FINAL REPORT

CA40056-FEB23 R---

Client: Terraprobe Inc
Project: T1220482.002, 11 Main St. Pushinch
Project Manager: Rachel Geddam
Samplers: Saiyajit Manami

MATRIX: WATER

Sample Number				5	6	7	
Sample Name				BH2	BH3	BH5	
Sample Matrix				Ground Water	Ground Water	Ground Water	
Sample Date				07/02/2023	07/02/2023	07/02/2023	
Parameter	**Units**	**RL**		**Result**	**Result**	**Result**	
General Chemistry							
Ammonia+Ammonium (N)	as N mg/L	0.1		< 0.1	0.4	0.1	
Metals and Inorganics							
Phosphorus (total)	mg/L	0.03		0.36	< 0.03	0.44	
Nitrite (as N)	as N mg/L	0.03		< 0.03	< 0.03	< 0.03	
Nitrate (as N)	as N mg/L	0.06		2.54	6.01	0.31	
Nitrate + Nitrite (as N)	as N mg/L	0.06		2.54	6.01	0.31	
Other (ORP)							
pH	No unit	0.05		7.74	7.77	7.88	

QC SUMMARY

Ammonia by SFA

Method: SM 4500 | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0082-FEB23	as N mg/L	0.1	<0.1	0	10	101	90	110	98	75	125
Ammonia+Ammonium (N)	SKA0108-FEB23	as N mg/L	0.1	<0.1	0	10	97	90	110	90	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENV]IC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrate + Nitrite (as N)	DIO0160-FEB23	mg/L	0.06	<0.06	NA		NA			NA		
Nitrite (as N)	DIO0160-FEB23	mg/L	0.03	<0.03	ND	20	96	90	110	92	75	125
Nitrate (as N)	DIO0160-FEB23	mg/L	0.06	<0.06	0	20	99	90	110	99	75	125

QC SUMMARY

pH

Method: SM 4500 I Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
pH	EWL0122-FEB23	No unit	0.05	NA	0		100			NA		

Phosphorus by SFA

Method: SM 4500-P J I Internal ref.: ME-CA-[ENV]SFA-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
Phosphorus (total)	SKA0080-FEB23	mg/L	0.03	<0.03	1	10	100	90	110	80	75	125

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS Insufficient sample for analysis.
RL Reporting Limit.
↑ Reporting limit raised.
↓ Reporting limit lowered.
NA The sample was not analysed for this analyte
ND Non Detect

Results relate only to the sample tested.
Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.
"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

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This report supersedes all previous versions.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

SGS Industries & Environment - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

No: 028748
Page 1 of 1

Laboratory Information Section - Lab use only

Received By: Nicole Brigant
Received Date: Feb / 7 / 23 (mm/dd/yy)
Received Time: 11 : 45 (hr : min)
Received By (signature):
Custody Seal Present: Yes ☑ No ☐
Custody Seal Intact: Yes ☑ No ☐
Cooling Agent Present: Yes ☑ No ☐ Type: Ice
Temperature Upon Receipt (°C) 4.4.4
LAB LIMS #: CA40056-Feb23

REPORT INFORMATION

Company: Terraprobe Inc
Contact: Rachel Geddam
Address: 11 Indell Lane
Brampton
Phone: 905 796 2650
Fax: 905 796 2250
Email: rgeddam@terraprobe.ca

INVOICE INFORMATION

☐ (same as Report Information)
Company:
Contact:
Address:
Phone:
Email:

Quotation #:
P.O. #:
Project #: T122004482.002
Site Location/ID: 11 main St. Puslinch

TURNAROUND TIME (TAT) REQUIRED

☑ Regular TAT (5-7days)
TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day

RUSH TAT (Additional Charges May Apply): ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days
PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date:
*NOTE: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS

☐ O.Reg 153/04 ☐ O.Reg 406/19
☐ Table 1 ☐ Res/Park Soil Texture: ☐ Coarse
☐ Table 2 ☐ Ind/Com ☐ Medium/Fine
☐ Table 3 ☐ Agri/Other
☐ Table _____ Appx. _____
Soil Volume ☐ <350m3 ☐ >350m3

Other Regulations:
☐ Reg 347/558 (3 Day min TAT)
☐ PWQO ☐ MMER
☐ CCME ☐ Other:
☐ MISA
☐ ODWS Not Reportable *See note

Sewer By-Law:
☐ Sanitary
☐ Storm
Municipality:

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX
1	BH2	Feb 07/23	10:45	3	water
2	BH3	"	9:00	3	
3	BH5	"	8:00	3	
4					
5					
6					
7					
8					
9					
10					
11					
12					

	M & I				SVOC		PCB	PHC		VOC		Pest	Other (please specify)					SPLP	TCLP	
	Field Filtered (Y/N)	Metals & Inorganics incl CrVI, CN, Hg pH,(B(HWS),EC,SAR–soil) (Cl, Na–water)	Full Metals Suite ICP metals plus B(HWS-soil only) Hg, CrVI	ICP Metals only Sb,As,Ba,Be,B,Cd, Cr,Co,Cu,Pb,Mo,Ni,Se,Ag,Tl,U,V,Zn	PAHs only	SVOCs all incl PAHs, ABNs, CPs	PCBs Total ☐ Aroclor ☐	F1-F4 + BTEX	F1-F4 only no BTEX	VOCs all incl BTEX	BTEX only	Pesticides Organochlorine or specify other	Nitrates	NH3	phos	pH	Sewer Use: Specify pkg:	Water Characterization Pkg General ☐ Extended ☐	Specify tests ☐Metals ☐VOC ☐1,4-Dioxane ☐OCP ☐ABN	Specify tests ☐M&I ☐VOC ☐PCB ☐B(a)P ☐ABN ☐Ignit.	COMMENTS:
1													✓	✓	✓					
2													✓	✓	✓					
3													✓	✓	✓					

Observations/Comments/Special Instructions

Sampled By (NAME): Satpajit Manani
Signature: [redacted]
Date: 02 / 07 / 2023 (mm/dd/yy)

Relinquished by (NAME): Satpajit Manani
Signature:
Date: 02 / 07 / 2023 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.6
Date of Issue: 02 May 2022

Note: Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Appendix F
Nitrate Mass Balance Calculations

ENGLOBE

CONVENTIONAL EFFLUENT TREATMENT (40 mg/L)

Subject Site Information

Proposed Development: Residential Lot 18			
Total Site Area	1,940.00	m^2	(Draft Plan of Subdivision-Weston Consulting, June 9, 2024)
Net Area for recharge (Assuming impervious surfaces will be managed on site)	1,940.00	m^2	

Calculation of Infiltration Rate

Annual Water Surplus (after interception)	402.65	mm/yr	**Infiltr Factors:**	
former MOE infiltration factor (total)	0.60		Slope	Rolling Land (0.2)
Weighted infiltration to soil	241.59	mm/yr	cover	Cultivated Land (0.1)
			soil	Silty Sand (0.3)

Nitrate going into the system

Concentration of nitrate in precipitation	0.1	mg/L	Source: G.K.Rutherford
Net Area for recharge (Assuming impervious surfaces will be managed on site)	1,940.00	m^2	Considers Entire Site Recharges Groundwater
Infiltration of soil	0.24159	m/yr	
Annual Infiltration to site (volume)	468.68	m^3/yr	
volume of recharge to soil/groundwater table	**468,684.60**	L/yr	

Nitrate exiting leaching bed system

Concentration of nitrate in septic bed effluent	**40**	mg/L	Assumed Conventional Loading System
Proposed Area for septic bed	368.00	m^2	23x16 m as per email received from Crozier on Feb. 13, 2023
	1000	L/day	Average sewage flow
Assumed loading rate of sewage system	365.00	m^3/yr	
assuming residential development	**365,000.00**	L/yr	

Calculated Concentration at Site Boundary based on conventional sewage systems	**17.57**	mg/L	**>10 mg/L** (Maximum Permitted Concentration of Nitrate at Property Boundary, based on ODWS)

Geomean background nitrate in groundwater	1.55	mg/L	
Alernate calculation considering geomean background nitrate in groundwater (@1.68 mg/L)	**19.12**	mg/L	**>10 mg/L** (Maximum Permitted Concentration of Nitrate at Property Boundary, based on ODWS)

results assume no dilution resulting from groundwater underflow

*Source: G.K. Rutherford, A Preliminary Study of the Composition of Precipitation in Southern Ontario, Department of Geography, Queen's University, Kingston, Ontario, Canada. Received April 14, 1967.

TERTIARY EFFLUENT TREATMENT (20 mg/L)

Subject Site Information

Proposed Development: Residential Lot 18			
Total Site Area	1,940.00	m^2	(Draft Plan of Subdivision-Weston Consulting, June 9, 2024)
Net Area for recharge (Assuming impervious surfaces will be managed on site)	1,940.00	m^2	

Calculation of Infiltration Rate

Annual Water Surplus (after interception)	402.65	mm/yr	**Infiltr Factors:**	
former MOE infiltration factor (total)	0.60		Slope	Rolling Land (0.2)
Weighted infiltration to soil	241.59	mm/yr	cover	Cultivated Land (0.1)
			soil	Silty Sand (0.3)

Nitrate going into the system

Concentration of nitrate in precipitation	0.1	mg/L	Source: G.K.Rutherford
Net Area for recharge (Assuming impervious surfaces will be managed on site)	1,940.00	m^2	Considers Entire Site Recharges Groundwater
Infiltration of soil	0.24159	m/yr	
Annual Infiltration to site (volume)	468.68	m^3/yr	
volume of recharge to soil/groundwater table	**468,684.60**	L/yr	

Nitrate exiting leaching bed system

Concentration of nitrate in septic bed effluent	**20**	mg/L	Assumed Tertiary Loading System
Proposed Area for septic bed	368.00	m^2	23x16 m as per email received from Crozier on Feb. 13, 2023
	1000.00	L/day	1000 L/day Average flow as per email received on February 16, 2023.
Assumed loading rate of sewage system	365.00	m^3/yr	
assuming commercial development	**365,000.00**	L/yr	

Calculated Concentration at Site Boundary based on conventional sewage systems	**8.81**	mg/L	**<10 mg/L** (Maximum Permitted Concentration of Nitrate at Property Boundary, based on ODWS)

Geomean background nitrate in groundwater	1.55	mg/L	
Alernate calculation considering average background nitrate in groundwater (@1.68 mg/L)	**10.36**	mg/L	**>10 mg/L** (Maximum Permitted Concentration of Nitrate at Property Boundary, based on ODWS)

results assume no dilution resulting from groundwater underflow

*Source: G.K. Rutherford, A Preliminary Study of the Composition of Precipitation in Southern Ontario, Department of Geography, Queen's University, Kingston, Ontario, Canada. Received April 14, 1967.

ADVIANCED TERTIARY EFFLUENT TREATMENT (15 mg/L)

Subject Site Information

Proposed Development: Residential Lot 18

Total Site Area	1,940.00	m^2	(Draft Plan of Subdivision-Weston Consulting, June 9, 2024)
Net Area for recharge (Assuming impervious surfaces will be managed on site)	1,940.00	m^2	

Calculation of Infiltration Rate

Annual Water Surplus (after interception)	402.65	mm/yr	**Infiltr Factors:**	
former MOE infiltration factor (total)	0.60		Slope	Rolling Land (0.2)
Weighted infiltration to soil	241.59	mm/yr	cover	Cultivated Land (0.1)
			soil	Silty Sand (0.3)

Nitrate going into the system

Concentration of nitrate in precipitation	0.1	mg/L	Source: G.K.Rutherford
Net Area for recharge (Assuming impervious surfaces will be managed on site)	1,940.00	m^2	Considers Entire Site Recharges Groundwater
Infiltration of soil	0.24159	m/yr	
Annual Infiltration to site (volume)	468.68	m^3/yr	
volume of recharge to soil/groundwater table	**468,684.60**	L/yr	

Nitrate exiting leaching bed system

Concentration of nitrate in septic bed effluent	**15**	mg/L	Assumed Advanced Tertiary Loading System
Proposed Area for septic bed	368.00	m^2	23x16 m as per email received from Crozier on Feb. 13, 2023
	1000.00	L/day	Average sewage flow
Assumed loading rate of sewage system	365.00	m^3/yr	
assuming commercial development	**365,000.00**	L/yr	

Calculated Concentration at Site Boundary based on conventional sewage systems	**6.62** mg/L	**<10 mg/L** (Maximum Permitted Concentration of Nitrate at Property Boundary, based on ODWS)

Geomean background nitrate in groundwater	1.55 mg/L	
Alernate calculation considering geomean background nitrate in groundwater (@1.68 mg/L)	**8.17** mg/L	**<10 mg/L** (Maximum Permitted Concentration of Nitrate at Property Boundary, based on ODWS)

results assume no dilution resulting from groundwater underflow

*Source: G.K. Rutherford, A Preliminary Study of the Composition of Precipitation in Southern Ontario, Department of Geography, Queen's University, Kingston, Ontario, Canada. Received April 14, 1967.

August 28, 2024

Project T1220482.003

Weston Consulting
Millway Avenue, Unit 19
Concord, ON L4K 5K8

Attention: Kayly Robbins, Senior Planner, MPL, MCIP, RPP

Subject: **Response to Township of Puslinch Comments**
Proposed Residential Development – 11 Main Street
Puslinch, Ontario

Dear Ms. Robbins:

The purpose of this letter is to address comments raised by the Township of Puslinch regarding the above noted proposed residential development. The comment from the Township reads as follows:

"It is understood that the applicant's comment matrix included comments regarding Section 11.2.3 of the Official Plan, which related to a Servicing Options Assessment. A separate letter from a Hydrogeologist regarding this policy is requested."

Section 11.2.3 is as follows:

Site specific multi-lot or multi-unit development applications relying on private communal or individual on-site servicing may be required to:

- assess site and soil suitability and the viability of all reasonable servicing options;
- recommend the type of sewage disposal system and establish appropriate lot, unit and/or block sizes, acceptable to the local municipality which demonstrate suitability for the onsite services;
- assess the impact of the proposed means of servicing on: ground and surface water and associated ecological functions; potential interference with other wells; potential adverse impacts to natural features.

Englobe Response

The proposed development consists of 21 single detached residential lots proposed to be privately serviced with individual groundwater supply wells subsurface sewage disposal systems.

Septic servicing requirements were evaluated based on analysis of the shallow native subgrade, which consisted of silty sand to depths of 5.3 m or greater with percolation rates of approximately 11 min/cm, based in completed percolation testing. Groundwater elevations were measured up to 3.9 m below existing grades (elevation of 312.9 m). It is expected that Class IV in-ground leaching beds, with tertiary treatment units, will be feasible for the site. Based on daily design sewage flows of 3,600 L/day per lot it is expected that leaching beds will consist of 132 m of linear distribution consisting of 11 runs of 12 m pipe covering an area of approximately 192 m^2 (16 m x 12 m).

A septic impact assessment was completed to assess impacts of sewage disposal on both shallow groundwater and surface water features, primarily Bronte Creek crossing the southern extent of the property. Based on the proposed lot sizes ranging from 1,940 m^2 to 3,820 m^2 it is expected that advanced tertiary treatment systems will be required capable of treating effluent to nitrate concentrations of 15 mg/L (untreated nitrate concentrations of 40 mg/L). It is expected that through the use of advance tertiary treatment nitrate concentration in shallow groundwater will not exceed the Ontario Drinking Water health related standard for nitrate of 10 mg/L, and impacts to surface water will not exceed the Canadian Water Quality Guideline for nitrate of 2.93 mg/L.

Individual groundwater supply wells are proposed to provide potable water for proposed residential lots. Peak groundwater demand for residential lots was based on Procedure D-5-5 requirements which require 450 L/day/person with peak demand of 3.75 L/min/person over a period of 120 minutes. Given four-bedroom dwellings with a occupancy of five people peak flows of 18.8 L/day are expected for each lot.

Groundwater resources were assessed based on a review of surrounding well records totaling more than 200 records within a 500 m radius of the site. Well yields reported within well records typically ranged from 37.8 L/min to 94.5 L/min with wells reported to consist of drilled wells completed within sand and gravel deposits overlying bedrock at depths typically ranging from 22 to 25 m below grade, within shallow bedrock at depths of 25 to 30 m below grade, or within deep bedrock at depths exceeding 35 m.

It is expected that underlying groundwater will be capable of meeting peak residential demand, with aquifer yields much greater than residential demand. Since underlying aquifer yield is expected higher than demand it is expected that drawdown due to water taking for the proposed development will be limited, and the potential for interference effects with existing water supply wells will be minimal.

Shallow groundwater quality from within completed monitoring wells to depths ranging from 6 to 8 m below existing grades was completed and confirmed the potability of shallow groundwater. Elevated concentrations of hardness were noted within collected groundwater samples, which represents an aesthetic objective and is considered reasonably treatable. Potential sources of groundwater contamination were not noted on-site, and it is expected that underlying groundwater would be suitable for potable use.

Given the above evaluation it is expected that the proposed residential development can be serviced through the use of individual groundwater supply wells and subsurface sewage disposal systems without negatively impacts surrounding groundwater supply wells and uses and natural features. Further analysis including completion of test well drilling, pumping tests, groundwater quality sampling and monitoring will be completed as part of detailed design and can be addressed through conditions of draft plan approval.

If you require additional information, please do not hesitate to contact the undersigned.

Yours very truly,

Englobe Corp.

[redacted]

Paul L. Raepple, P.Geo.
Senior Hydrogeologist

ENGLOBE

Terraprobe

Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
11 MAIN STREET
PUSLINCH, ONTARIO

Prepared for: Mr. Varun Gupta
2060 Lakeshore Road, Unit 301
Burlington, ON
N0B 2C0

Attention: Ms. Mina Rahimi

©Terraprobe Inc.

File No. 1-22-0482-01
Issued: October 3, 2022

Distribution

1 Electronic Copy	-	Mr. Varun Gupta
1 Copy	-	Terraprobe Inc., Brampton

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ENCLOSURES

Figures

Appendices

1 INTRODUCTION

Terraprobe Inc. (Terraprobe) was retained by Mr. Varun Gupta to conduct a geotechnical investigation for a proposed residential development at 11 Main Street, in the Town of Puslinch, Ontario. The general location of the site is presented on Figure 1.

This report encompasses the results of the geotechnical investigation conducted for the proposed development site to determine the prevailing subsurface soil and ground water conditions, and on this basis, provides geotechnical engineering design advice and recommendations for the building foundations, earthquake and earth pressure design parameters, basement floor slab and drainage and pavement. In addition, comments are also included on pertinent construction aspects including excavation, backfill and ground water control.

Terraprobe has also conducted hydrogeological studies for this site. The findings of the studies are reported under a separate cover.

2 SITE AND PROJECT DESCRIPTION

The subject site is located in the southeast quadrant of the intersection of Highway 6 and Badenoch Street, in the Town of Puslinch. The legal description of the site is PT LOT 31 CON 8, Township of Puslinch, County of Wellington. The property is an irregular shape parcel of vacant land.

The proposed development would include a residential subdivision, consisting of single detached dwellings and internal roadways. The site is generally undulated and has a significant topographic relief (about 5 m) from west to east at the north portion of the site and a significant topographic relief (about 3 m) from west to east at the south portion of the site. It is understood that the proposed single detached dwelling would include a basement.

Terraprobe was provided with the following site plan for review in preparation of this report,

- *10779 Concept C2_2022-03-16, dated on March 16, 2022, by Western Consulting.*

The above preliminary sit plan does not indicate the finished floor elevation (FFE) for the proposed basement. However, the basement FFE is generally set at about 3 m below grade.

3 INVESTIGATION PROCEDURE

The field investigation was conducted on August 16, 2022 and consisted of drilling and sampling a total of five (5) boreholes within the close proximity of proposed building footprint. Boreholes were advanced between 6.6 m to 8.1 m depth below grade. The approximate locations of the boreholes are shown on the enclosed Borehole Location Plan (Figures 2, 2A and 2B).

All the boreholes were drilled by a specialist drilling contractor using continuous flight solid stem augers and were sampled at 0.75 m (up to 3.0 m depth) and 1.5 m (below 3.0 m depth) intervals with a conventional 50 mm diameter split barrel sampler when the Standard Penetration Test (SPT) was carried out (ASTM D1586). The field work (drilling, sampling and testing) was observed and recorded by a member of our field engineering staff, who logged the borings and examined the samples as they were obtained.

All samples obtained during the investigation were sealed into clean plastic jars, and transported to our geotechnical testing laboratory for detailed inspection and testing. All borehole samples were examined (tactile) in detail by a geotechnical engineer, and classified according to visual and index properties. Laboratory tests consisted of water content determination on all samples; and a Sieve and Hydrometer analysis test on selected native soil samples. The measured natural water contents of individual samples and the results of the Sieve and Hydrometer analysis are plotted on the enclosed Borehole Logs at respective sampling depths. The results of Sieve and Hydrometer analysis tests are also summarized in Section 4.4 of this report and appended.

Water levels were measured in open boreholes upon completion of drilling. Monitoring well comprising 50 mm diameter PVC pipe was installed in four (4) borehole to facilitate ground water monitoring and for the purpose of the Hydrogeological Study. The PVC tubing was fitted with a bentonite clay seal as shown on the accompanying Borehole Logs. Water levels in the monitoring wells were measured on August 24, September 7 and 19, 2022. The results of ground water monitoring are presented in Section 4.5 of this report.

The borehole ground surface elevations were surveyed by Terraprobe using a Trimble R10 GNSS System. The Trimble R10 system uses the Global Navigation Satellite System and the Can-Net reference system to determine target location and elevation. The Trimble R10 system is reported to have an accuracy of up to 10 mm horizontally and up to 30 mm vertically. Borehole elevations are provided relative to Geodetic Datum (NAD). The horizontal coordinates are reported relative to the Universal Transverse Mercator geographic coordinate system (UTM Zone 17T).

It should be noted that the elevations provided on the Borehole Log are approximate, for the purpose of relating soil stratigraphy and should not be used or relied on for other purposes.

4 SUBSURFACE CONDITIONS

The specific soil conditions encountered at each borehole locations are described in greater detail on the Borehole Logs, with a summary of the general subsurface soil conditions outlined below. This summary is intended to correlate this data to assist in the interpretation of the subsurface conditions encountered at the site.

It should be noted that the subsurface conditions are confirmed at the borehole locations only, and may vary between and beyond the borehole locations. The boundaries between the various strata as shown in the logs are based on non-continuous sampling. These boundaries represent an inferred transition between the various strata, rather than a precise plane of geologic change.

4.1 Earth Fill

Earth fill materials, consisting of sand, with some gravel and trace amount of rootlets were encountered at the surface layer in each borehole and extended to 0.8 m depth below grade.

Standard Penetration Test results (N-values) obtained from the earth fill zone ranged from 8 to 35 blows per 300 mm of penetration, indicating a loose to dense relative density. The in-situ moisture contents of the fill samples ranged from 2 to 7 percent by mass, indicating a moist condition.

4.2 Silty Sand to Sand and Silt

Silty sand to Sand and Silt deposits, with trace amounts of clay and gravel was encountered beneath the earth fill zone in each borehole and extended to the depths ranging from 6.1 m to the full depth of investigation.

Standard Penetration Test results (N-values) obtained from the silty sand to sand and silt deposits ranged from 8 blows per 300 mm of penetration to 50 blows per 150 mm of penetration, indicating loose to very dense relative density. The in-situ moisture contents of the silt soil samples ranged from 0 to 22 percent by mass, indicating a moist to wet condition.

4.3 Clayey Silt

Clayey Silt deposits, with trace amount of sand was encountered beneath the silty sand to sand and silt deposits in Borehole 1 and extended to the depth of 6.6 m below the grade.

Standard Penetration Test result (N-values) obtained from the clayey silt deposit was 27 blows per 300 mm of penetration, indicating a very stiff consistency. The in-situ moisture content of the clayey silt sample was 15 percent by weight, indicating a moist condition.

4.4 Geotechnical Laboratory Test Results

The geotechnical laboratory testing consisted of natural water content determination for all samples, while a Sieve and Hydrometer analysis were conducted on selected soil samples. The test results are plotted on the enclosed Borehole Logs at respective sampling depths. The results (graphs) of the Sieve and Hydrometer (grain size) analysis are appended, and a summary of these results are presented as follows:

Borehole No. Sample No.	Sampling Depth below Grade (m)	Percentage (by mass)				Descriptions (MIT System)
		Gravel	Sand	Silt	Clay	
Borehole 1, Sample 7	6.3	0	3	72	25	CLAYEY SILT trace sand
Borehole 3, Sample 7	6.3	0	36	59	5	SILT AND SAND trace clay
Borehole 5, Sample 3	1.8	0	73	26	1	SILTY SAND trace clay

4.5 Ground Water

Observations pertaining to the depth of water level and caving were made in all boreholes immediately after completion of drilling and are noted on the enclosed Borehole Logs. Monitoring wells were installed in four (4) boreholes to facilitate ground water level monitoring and for the purpose of the hydrogeological study. The ground water level measurements in the monitoring wells were taken on August 24, September 7 and 19, 2022 and are noted on the enclosed Borehole Logs. A summary of these observations is provided as follows:

Borehole No.	Depth of Borehole (m)	Upon Completion of Drilling		Water Level Depth/Elevation in Monitoring Wells		
		Depth to Cave (m)	Unstabilized Water Level (m)	Aug 24, 2022	Sep 7, 2022	Sep 19, 2022
BH 1	6.6	open	dry	dry	dry	dry
BH 2	4.8	open	dry	6.6/311.6	6.7/311.5	6.8/311.4
BH 3	9.4	7.2	dry	5.2/311.9	5.3/311.8	5.4/311.7
BH 5	9.4	6.1	dry	5.1/311.7	5.2/311.6	5.2/311.6

Construction dewatering at adjacent sites, existing building drains or dewatering systems, and seasonal fluctuations may cause significant changes to the depth of the ground water table over time. Additional information pertaining to ground water at the site is discussed in the hydrogeological report by Terraprobe provided under a separate cover (File No. 1-22-0482-46).

5 DISCUSSIONS AND RECOMMENDATIONS

The following discussion and recommendations are based on the factual data obtained from this investigation and are intended for the use of the owner and the design engineer. Contractors bidding or providing services on this project should review the factual data and determine their own conclusions regarding construction methods and scheduling.

This report is provided on the basis of these terms of reference and on the assumption that the design features relevant to the geotechnical analyses will be in accordance with applicable codes, standards and guidelines of practice. If there are any changes to the site development features or there is any additional information relevant to the interpretations made of the subsurface information with respect to the geotechnical analyses or other recommendations, then Terraprobe should be retained to review the implications of these changes with respect to the contents of this report.

5.1 Foundations

The proposed development would include a residential subdivision, consisting of single detached dwellings and internal roadways. The site is generally undulated and has a significant topographic relief (about 5 m) from west to east at the north portion of the site and a significant topographic relief (about 3 m) from west to east at the south portion of the site. It is understood that the proposed single detached dwelling would include a basement. The preliminary sit plan does not indicate the finished floor elevation (FFE) for the proposed basement.

The earth fill soils are unsuitable for the support of proposed building foundations. All foundations must be supported on the underlying competent undisturbed native soils and engineered fill.

5.1.1 Foundation on Native Soils

The undisturbed silty sand to silt and sand deposits were encountered at 0.8 m depth below grade (Elev. 312.2 to 319.1 m). This undisturbed native deposit is considered suitable to support the proposed building foundations. A net geotechnical reaction of 300 kPa (Serviceability Limit States, SLS) and factored geotechnical resistance of 450 kPa (Ultimate Limit States, ULS) will be used for the design of conventional spread footing foundations (for vertical and concentric loads) supported on the underlying competent native silty sand to silt and sand deposits of compact to dense relatively density. The geotechnical reaction(s) as recommended allow for up to 25 mm of total settlement. This settlement will occur as load is applied and is linear elastic and non-recoverable. Differential settlement is a function of spacing, loading and foundation size.

The final grading plan and design drawings must be reviewed by Terraprobe to better assess the design foundation elevations and to provide updated foundation bearing pressure (geotechnical reaction and resistance) recommendations prior to the individual development.

The minimum width of the continuous strip footings must be 450 mm and the minimum size of isolated footings must be 900 mm×900 mm regardless of loading considerations, in conjunction with the above recommended geotechnical resistance. Footing sizes for houses and small buildings are provided in Division B, Part 9 of Ontario Building Code and must be followed regardless of footing sizes provided above. The geotechnical reaction (s) as recommended allow for up to 25 mm of total settlement. This settlement will occur as load is applied and is linear elastic and non-recoverable. Differential settlement is a function of spacing, loading and foundation size.

5.1.2 Foundation on Engineered Fill

Where site grades are required to be raised, consideration should be given to the construction of engineered fill which may also support house foundations at normal depths, if needed.

The engineered fill refers to earth fill designed and constructed with a full-time inspection and testing to support the building foundations without excessive settlement. Construction of engineered fill should only be conducted under the full-time engineering guidance and supervision.

Prior to the placement of the engineered fill, it is recommended that the topsoil, weathered /disturbed native soils be stripped from beneath and beyond the proposed building footprints (a minimum of 2 m beyond), and that the subgrade be proof rolled. Any soft or wet areas that deflect excessively during the proof roll should be sub-excavated and replaced with suitably compacted clean earth fill placed in maximum 150 mm thick lifts. It should be noted that localized subgrade stabilization measures may be required, based on proof roll assessment. The selection and sorting of the existing earth fill or weathered/disturbed native soil materials present on the site should be conducted under the supervision of a geotechnical engineer. These materials may be utilized as engineered fill, provided these soils are not too wet to achieve specified compaction and do not contain excessive organic inclusion. The moisture content of the engineered fill material must be within 2 percent of its optimum moisture content

The engineered fill should consist of clean earth fill or imported granular materials (OPSS.MUNI 1010), and should be placed in maximum 150 mm thick lifts, and compacted to a minimum of 98 percent Standard Proctor Maximum Dry Density (SPMDD). The engineered fill should extend for a distance of at least 2 m beyond the building footprint as measured at the founding level and should extend downwards from this point at a 1 to 1 (horizontal to vertical) slope, to the approved subgrade. In addition, the engineered fill should extend at least 0.6 m above the proposed foundation elevation. This is to ensure that the foundations are placed on the engineered fill both in plan and elevation. The engineered fill must be provided with a minimum of 1.2 m of earth cover or equivalent insulation to provide adequate frost protection.

The placement and inspection of the engineered fill must be conducted under the full-time supervision of a qualified geotechnical engineer. Provided the engineered fill is placed and compacted as indicated above, a maximum net allowable geotechnical reaction of 150 kPa at SLS and factored geotechnical

resistance of 225 kPa at ULS may be utilized for the design of conventional spread footing foundations supported on engineered fill. Site grading plan should be reviewed by Terraprobe to better assess the suitability and requirements for engineered fill.

In case of footings supported on engineered fill, the minimum width for the conventional spread strip footing must be 600 mm, and the minimum size of the individual column footing must be 1,000 mm×1,000 mm, regardless of loading considerations.

It should be noted that for buildings placed on engineered fill, nominal reinforcing steel is recommended in the foundation walls. The reinforcing steel should consist of two (2) continuous 15 M bars at the top of the foundation wall and two (2) continuous 15 M bars at the bottom (Figure 3). A draft copy of "Engineered Fill Earthworks Specifications" is enclosed in the appendix section of this report for reference.

5.1.3 Foundation Installation

Prior to pouring concrete for the footings, the footing subgrade must be cleaned of all deleterious materials such as softened, disturbed or caved materials, as well as any standing water. If construction proceeds during freezing weather conditions, adequate temporary frost protection for the footing bases and concrete must be provided. As per the Ontario Building Code (2012), the foundation excavations must be inspected and approved (by Terraprobe) to ensure the bearing capacities stated below are applicable. If incompetent soils are encountered at the proposed bearing depths during foundation excavation or due to inadequate dewatering, sub-excavation to competent soil subgrade is required under the direction of the geotechnical engineer.

All exterior foundations and foundations in unheated areas must be provided with a minimum soil cover of 1.2 m or equivalent insulation for frost protection. All footings must be designed and constructed to bear at least 0.3 m into the undisturbed native soil/engineered fill stratum.

Prior to pouring foundation concrete, the foundation subgrade should be cleaned of all deleterious materials such as topsoil, fill, softened, disturbed or caved materials, as well as any standing water. If construction proceeds during freezing weather conditions, adequate temporary frost protection for the foundation subgrade and concrete must be provided.

It is noted that the native soils tend to weather rapidly and deteriorate on exposure to the atmosphere or surface water. Hence, foundation bases which remain open for an extended period of time should be protected by a skim coat of lean concrete. Provisions should be made to minimize disturbance to the exposed foundation subgrade.

5.2 Earth Pressure Design Parameters

Walls or bracings subject to unbalanced earth pressures must be designed to resist a pressure that can be calculated based on the following equation:

$$P = K[\gamma (h-h_w) + \gamma' h_w + q] + \gamma_w h_w$$

Where:
- **P** = the horizontal pressure (kPa)
- **K** = the earth pressure coefficient
- **h** = the depth below the ground surface (m)
- $\mathbf{h_w}$ = the depth below the ground water level (m)
- $\boldsymbol{\gamma}$ = the bulk unit weight of soil (kN/m^3)
- $\boldsymbol{\gamma_w}$ = the bulk unit weight of water (9.8 kN/m^3)
- $\boldsymbol{\gamma'}$ = the submerged unit weight of the exterior soil, (γ_{sat} - γ_w)
- **q** = the complete surcharge loading (kPa)

Where the wall backfill can be drained effectively to eliminate hydrostatic pressures on the wall, this equation can be simplified to:

$$P = K[\gamma h + q]$$

This equation assumes that free-draining granular backfill is used and positive drainage is provided to ensure that there is no hydrostatic pressure acting in conjunction with the earth pressure.

Resistance to sliding of retaining structures is developed by friction between the base of the footing and the soil. This friction **(R)** depends on the normal load on the soil contact (**N**) and the frictional resistance of the soil (**tan ϕ**) expressed as **R = N tan ϕ**. The factored geotechnical resistance at ULS is **0.8 R**.

Passive earth pressure resistance is generally not considered as a resisting force against sliding for conventional retaining structure design because a structure must deflect significantly to develop the full passive resistance.

The average values for use in the design of walls subjected to unbalanced earth pressures at this site are tabulated as follow:

Parameter	Definition	Units
ϕ	angle of internal friction	degrees
γ	bulk unit weight of soil	kN/ m^3
K_a	active earth pressure coefficient (Rankine)	dimensionless
K_o	at-rest earth pressure coefficient (Rankine)	dimensionless
K_p	passive earth pressure coefficient (Rankine)	dimensionless

Stratum/Parameter	γ	Φ	K_a	K_o	K_p
Engineered Fill	19.0	28	0.36	0.53	2.77
Silty Sand to Silt and Sand	21.0	32	0.31	0.47	3.25
Clayey Silt	21.0	32	0.31	0.47	3.25

The above values of the earth pressure coefficients are for the horizontal backfill grade behind the wall. The earth pressure coefficients for inclined grade will vary based on the inclination of the retained ground surface.

5.3 Earthquake Design Parameters

Under Ontario Regulation 88/19, the ministry amended Ontario's Building Code (O. Reg 332/12) to further harmonize Ontario's Building Code with the 2015 National Codes. These changes will help reduce red tape for businesses and remove barriers to interprovincial trade throughout the country. The amendments are based on code change proposals the ministry consulted in 2016 and 2017. The majority of the amendments came into effect on January 1, 2020, which includes structural sufficiency of buildings to withstand external forces and improve resilience.

Seismic hazard is defined in the 2012 Ontario Building Code (OBC 2012) by uniform hazard spectra (UHS) at spectral coordinates of 0.2 s, 0.5 s, 1.0 s and 2.0 s and a probability of exceedance of 2% in 50 years. The OBC method uses a site classification system defined by the average soil/bedrock properties (e.g. shear wave velocity (v_s), Standard Penetration Test (SPT) resistance, and undrained shear strength (s_u)) in the top 30 meters of the site stratigraphy below the foundation level, as set out in Table 4.1.8.4A of the Ontario Building Code (2012). There are 6 site classes from A to F, decreasing in ground stiffness from A, hard rock, to E, soft soil; with site class F used to denote problematic soils (e.g. sites underlain by thick peat deposits and/or liquefiable soils). The site class is then used to obtain peak ground acceleration (PGA), peak ground velocity (PGV) site coefficients Fa and Fv, respectively, used to modify the UHS to account for the effects of site-specific soil conditions.

Based on the above noted information, it is recommended that the site designation for seismic analysis be **Site Class D**, as per Table 4.1.8.4.A of the Ontario Building Code (2012). Consideration may be given to conducting a site-specific Multichannel Analysis of Surface Waves (MASW) at this site to determine the average shear wave velocity in the top 30 metres of the site stratigraphy.

The values of the site coefficient for design spectral acceleration at period T, F(T), and of similar coefficients F(PGA) and F(PGV) shall conform to Tables 4.1.8.4.B. to 4.1.8.4.I. using linear interpolation for intermediate values of PGA.

5.4 Basement Floor Slab

The excavated surface should be assessed by a qualified geotechnical engineer. The modulus of subgrade reaction appropriate for the slab design constructed on undisturbed silty sand to silt and sand subgrade is 35,000 kPa/m, and the modulus of subgrade reaction appropriate for the slab design constructed on engineered fill subgrade is 20,000 kPa/m.

Prior to the construction of the slab, it is recommended that the subgrade be cut-neat, approved and inspected under the supervision of Terraprobe for obvious loose or disturbed areas as exposed, or for areas containing excessively deleterious materials or moisture. All sub excavated areas shall be replaced with Granular B placed as compacted fill (in lifts 150 mm thick or less and compacted to a minimum of 98 percent Standard Proctor Maximum Dry Density, SPMDD).

The basement floor slab should be provided with a capillary moisture barrier and drainage layer. This can be made by placing the slab on a minimum of 300 mm thick 19 mm clear stone layer (OPSS.MUNI 1004) compacted by vibration to a dense state. This material also serves as the drainage media for the subfloor drainage system. Provision of subfloor drainage is required in conjunction with the perimeter drainage of the structure. Suitable geotextile (for instance OPSS.MUNI 1860 Class II non-woven geotextile) needs to be placed to separate granular base course from the subgrade to prevent migration of soil fines.

The subfloor drainage system is an important building element, as such the storm sumps which ensure the performance of this system must have a duplexed pump arrangement for 100 percent pumping redundancy provided with emergency power as needed. Basement and subfloor drainage provisions are further discussed in Section 5.5 of this report.

5.5 Basement Drainage

The ground water level measurements in the monitoring wells were taken on August 24, September 7 and 19, 2022. The measured ground levels in the wells installed in Boreholes 2, 3 and 5 ranged from Elev. 311.4 to 311.9 m while the well installed in Borehole 1 remained dry.

The exterior grade around the buildings should be sloped away at a 2 percent gradient or more for a distance of at least 1.2 m to assist in maintaining basement dry from seepage. The basement wall (for basement) must be provided with damp-proofing provisions in conformance to the Section 9.13.2 of the Ontario Building Code (2012). In case of open excavation, the basement wall backfill for a minimum lateral distance of 0.6 m out from the wall should consist of free-draining granular material (OPSS.MUNI 1010 Granular B), or provided with a prefabricated drain material (for instance, CCW MiraDRAIN 6000 series or Terrafix Terradrain 600), see Figure 3 Typical Basement Drainage Schematic. The perimeter drain installation and outlet provisions must conform to the plumbing code requirements.

The sub-floor drainage system should consist of perforated pipes (minimum 100 mm diameter) located at a spacing of about 5.0 m centre to centre (Refer to Figure 4 Basement Floor Subdrain Detail). The subdrain system should be outlet to a suitable discharge point under gravity flow, or connected to a sump located in the lowest level of the basement. The water from the sump must be pumped out to a suitable discharge point/positive outlet. The installation of the drains as well as the outlet must conform to the applicable plumbing code requirements.

The size of the sump should be adequate to accommodate the anticipated water seepage. An industrial duplex pumping arrangement (main pump with a provision of a backup pump) on emergency backup power is recommended. The pump capacity must be adequate to accommodate peak flow conditions expected during the wet seasons (i.e., spring melt and fall).

The subfloor drainage system is an important building element at this site, as such the storm sump that ensures the performance of this system must have an industrial duplexed pump arrangement on emergency power, as noted above, for 100 percent pumping redundancy.

5.6 Pavement

Design recommendations for the asphalt pavement supported on the soil subgrade are provided in this section.

5.6.1 Pavement Design

The asphalt pavement design is provided in the following table.

Pavement Structural Layers	Light-Duty	Heavy-Duty
HMA Surface Course, OPSS.MUNI 1150 HL 3	40 mm	40 mm
HMA Binder Course, OPSS.MUNI 1150 HL 8	50 mm	100 mm
Base Course, OPSS.MUNI 1010 Granular A	150 mm	150 mm
Subbase Course, OPSS.MUNI 1010 Granular B Type I	300 mm	450 mm
Total Thickness	540 mm	740 mm

It should be noted that in addition to the adherence to the above pavement design recommendations, a close control on the pavement construction process will also be required in order to obtain the desired pavement life. It is recommended that regular inspection and testing be conducted during the pavement construction to confirm material quality, thickness, and to ensure adequate compaction.

5.6.2 Drainage

Control of water is an important factor in achieving a good pavement life. Therefore, we recommend that provisions be made to drain the new pavement subgrade and its granular layers. Drainage can be achieved by installing catch basin(s) and a storm sewer system to collect surface runoff and, this system can also be used for subsurface drainage by installing sub drains that are designed to drain into the catch basins. The subgrade must be free of depressions and sloped at a grade of 3 percent to provide positive drainages.

Continuous pavement sub drains (designed to drain into catch basins) should be provided along both sides of the internal route curb lines. Two lengths of sub drain (each minimum 3 m long) should also be installed at each catch basin at the parking lot area. All sub-drain arrangements should comply with OPSD 216.021.

5.6.3 General Pavement Recommendations

HL 3 and HL 8 hot mix asphalt mixes should be designed, produced and placed in conformance with OPSS.MUNI 1150 and OPSS.MUNI 310 requirements and pertinent Town's standards.

Portland cement concrete should be design, produced and placed in conformation with CAN/CSA A23.1, OPSS.MUNI 1350 and OPSS 350 requirements and relevant Town's standards.

Granular base and subbase materials should be compacted to 100 percent SPMDD at ±2 percent of the OMC.

PG 58-28, conforming to OPSS.MUNI 1101 is recommended in the HMA surface and binder courses.

Tack coat SS-1 should be applied between hot mix asphalt binder course and surface course.

5.6.4 Subgrade Preparation

All topsoil, organics, soft/loose soils should be stripped from the subgrade areas. The exposed subgrade is expected to consist of earth fill, engineered fill or native soils and these soils will be weakened by construction traffic when wet; especially if site work is carried out during the periods of wet weather. An adequate granular working surface would be likely required in order to minimize subgrade disturbance and protect its integrity in wet periods.

Immediately prior to placing the granular subbase, the exposed subgrade should be proof rolled with a heavy rubber tired vehicle (such as a loaded gravel truck). The subgrade should be inspected for signs of rutting, distress and displacement. Areas displaying signs of rutting, distress and displacement should be re-compacted and re-tested or, these materials should be locally excavated and replaced with well-compacted clean approved fill material.

The fill material may consist of either granular material or local inorganic soils provided that its moisture content is within ±2 percent of OMC. Fill material should be placed and compacted in accordance with OPSS.MUNI 501 and the subgrade should be compacted to 98 percent of SPMDD. The final subgrade surface should be sloped at least 3 percent to provide positive drainage.

5.7 Excavations

The boreholes data indicate that the earth fill materials and undisturbed native soils would be encountered in the excavations. Excavations must be carried out in accordance with the Occupational Health and Safety Act and Regulations for Construction Projects. These regulations designate four (4) broad classifications of soils to stipulate appropriate measures for excavation safety.

TYPE 1 SOIL

a. is hard, very dense and only able to be penetrated with difficulty by a small sharp object;
b. has a low natural moisture content and a high degree of internal strength;
c. has no signs of water seepage; and
d. can be excavated only by mechanical equipment.

TYPE 2 SOIL

a. is very stiff, dense and can be penetrated with moderate difficulty by a small sharp object;
b. has a low to medium natural moisture content and a medium degree of internal strength; and
c. has a damp appearance after it is excavated.

TYPE 3 SOIL

a. is stiff to firm and compact to loose in consistency or is previously-excavated soil;
b. exhibits signs of surface cracking;
c. exhibits signs of water seepage;
d. if it is dry, may run easily into a well-defined conical pile; and
e. has a low degree of internal strength

TYPE 4 SOIL

a. is soft to very soft and very loose in consistency, very sensitive and upon disturbance is significantly reduced in natural strength;
b. runs easily or flows, unless it is completely supported before excavating procedures;
c. has almost no internal strength;
d. is wet or muddy; and
e. exerts substantial fluid pressure on its supporting system.

The earth fill materials encountered in the boreholes are classified as Type 3 Soil, while the undisturbed native soils would be classified as Type 2 Soil above and Type 3 Soil below prevailing ground water level under these regulations.

Where workmen must enter excavations advanced deeper than 1.2 m, the trench walls should be suitably sloped and/or braced in accordance with the Occupational Health and Safety Act and Regulations for Construction Projects. The regulation stipulates the steepest slopes of excavation by soil type as follows:

Soil Type	Base of Slope	Steepest Slope Inclination
1	within 1.2 metres of bottom of trench	1 horizontal to 1 vertical
2	within 1.2 metres of bottom of trench	1 horizontal to 1 vertical
3	from bottom of trench	1 horizontal to 1 vertical
4	from bottom of trench	3 horizontal to 1 vertical

Minimum support system requirements for steeper excavations are stipulated in the Occupational Health and Safety Act and Regulations for Construction Projects, and include provisions for timbering, shoring and moveable trench boxes.

5.8 Ground Water Control

Terraprobe has completed Hydrogeological Report (File No. 1-22-0482-46) for this site to provide ground water control measures and estimate ground water discharge volume (Refer to this report for detailed information about ground water volumes, quality and control provisions).

The ground water level measurements in the monitoring wells were taken on August 24, September 7 and 19, 2022. The measured ground levels in the wells installed in Boreholes 2, 3 and 5 ranged from Elev. 311.4 to 311.9 m while the well installed in Borehole 1 remained dry. Considering relatively shallow excavation at this project site, significant amount of groundwater will not be encountered during the foundation and trench excavations. However, perched water seepage may be encountered during the excavations primarily emanating from the earth fill zone. The perched ground water seepage should diminish slowly and can be controlled by continuous pumping from a conventional sump and pump arrangement at the base of the excavation. For excavations extending to depths greater than 0.3 m below the prevailing water table, it will be necessary to lower the ground water level below the excavation base, prior to, and maintain during the subsurface construction. A professional dewater contractor should review the subsurface information to provide further comments for the potential requirements for the ground water control.

5.8.1 Regulatory Requirements

The volume of water entering the excavation will be based on both ground water infiltration and precipitation events. Based on recent regulation changes within O.Reg. 63/16, the following dewatering limits and requirements are as follows:

- Construction Dewatering less than 50,000 L/day: The takings of both ground water and storm water **does not require** a Construction Dewatering Assessment Report (CDAR) and **does not require** a Permit to Take Water (PTTW) from the Ministry of the Environment and Climate Change (MOECC).

- Construction Dewatering greater than 50,000 L/day and less than 400,000 L/day: The taking of ground water and/or storm water **requires** a Construction Dewatering Assessment Report (CDAR) and **does not** require a Permit to Take Water (PTTW) from the Ministry of the Environment and Climate Change (MOECC).
- Construction Dewatering greater than 400,000 L/day: The taking of ground water and/or storm water **requires** a Construction Dewatering Assessment Report (CDAR) and **requires** a Permit to Take Water (PTTW) from the Ministry of the Environment and Climate Change (MOECC).

If it is expected that greater than 50,000 L/day of water will be pumped, a CDAR and/or a PTTW should be obtained as soon as possible in advance of construction to avoid possible delays. Depending on the construction methodology for the site servicing (trench boxes or open cut, and length of trench) and the time of year (high versus low ground water levels), there is the possibility that water taking of greater than 50,000 L/day may occur at this site.

A CDAR takes up to 1 month to complete if monitoring wells are already installed on site. Once the CDAR is completed, it is uploaded to the Environmental Activity and Sector Registry (EASR), which registers the construction dewatering with the MOECC without the need for a permit. If the results of the CDAR indicate that greater than 400,000 L/day will be pumped, a PTTW application must be submitted to the MOECC. A PTTW application can take up to an additional 3 months for the MOECC to process upon completion of the CDAR. Note that Environmental Compliance Assessments, Impact Study Reports and applicable municipal, provincial and conservation authority approvals (completed by others) will be required as part of the CDAR.

5.9 Backfill

The native soils are considered suitable for backfill provided the moisture content of these soils is within 3 percent of the Optimum Moisture Content (OMC). It should be noted that there may be wet zones within the subsurface soils which could be too wet to compact. Any soil material with 3 percent or higher in-situ moisture content than its OMC, could be put aside to dry or be tilled to reduce the moisture content so that it can be effectively compacted. Alternatively, materials of higher moisture content could be wasted and replaced with imported material which can be readily compacted.

In settlement sensitive areas, the backfill should consist of clean earth and should be placed in lifts of 150 mm thickness or less, and heavily compacted to a minimum of 95 percent Standard Proctor Maximum Dry Density (SPMDD) at a water content close to OMC (within 3 percent). The upper 1.2 m of the pavement subgrade must be compacted to a minimum of 98 percent SPMDD.

5.10 Quality Control

Excavations on this site must be shored to preserve the integrity of the surrounding properties and structures. The Ontario Building Code 2012 stipulates that engineering review of the subsurface conditions is required on a continuous basis during the installation of earth retaining structures. Terraprobe should be retained to provide this review, which is an integral part of the geotechnical design function as it relates to the shoring design considerations. Terraprobe can provide detailed shoring design services for the project, if requested.

All foundations must be monitored by the geotechnical engineer on a continuous basis as they are constructed. The on-site review of the condition of the foundation soil as the foundations are constructed is an integral part of the geotechnical design function and is required by Section 4.2.2.2 of the Ontario Building Code 2012. If Terraprobe is not retained to carry out foundation evaluations during construction, then Terraprobe accepts no responsibility for the performance or non-performance of the foundations, even if they are ostensibly constructed in accordance with the conceptual design advice provided in this report.
Concrete for this structure will be specified in accordance with the requirements of CAN3 - CSA A23.1. Terraprobe maintains a CSA certified concrete laboratory and can provide concrete sampling and testing services for the project as necessary.

The requirements for fill placement on this project should be stipulated relative to SPMDD, as determined by ASTM D698. In-situ determinations of density during fill placement by Procedure Method B of ASTM D2922 are recommended to demonstrate that the contractor is achieving the specified soil density. Terraprobe is a CNSC licensed operator of appropriate nuclear density gauges for this work and can provide sampling and testing services for the project as necessary.

Terraprobe can provide thorough in house resources, quality control services for Building Envelope, Roofing, as well as Structural Steel in accordance with CSA W178, as necessary, for the Structural and Architectural quality control requirements of the project. Terraprobe is certified by the Canadian Welding Bureau under W178.1-1996.

6 LIMITATIONS AND RISK

6.1 Procedures

This investigation has been carried out using investigation techniques and engineering analysis methods consistent with those ordinarily exercised by Terraprobe and other engineering practitioners, working under similar conditions and subject to the time, financial and physical constraints applicable to this project. The discussions and recommendations that have been presented are based on the factual data obtained by Terraprobe.

It must be recognized that there are special risks whenever engineering or related disciplines are applied to identify subsurface conditions. Even a comprehensive sampling and testing programme implemented in accordance with the most stringent level of care may fail to detect certain conditions. Terraprobe has assumed for the purposes of providing design parameters and advice, that the conditions that exist between sampling points are similar to those found at the sample locations. The conditions that Terraprobe has interpreted to exist between sampling points can differ from those that actually exist.
It may not be possible to drill a sufficient number of boreholes or sample and report them in a way that would provide all the subsurface information that could affect construction costs, techniques, equipment and scheduling. Contractors bidding on or undertaking work on the project should be directed to draw their own conclusions as to how the subsurface conditions may affect them, based on their own investigations and their own interpretations of the factual investigation results, cognizant of the risks implicit in the subsurface investigation activities so that they may draw their own conclusions as to how the subsurface conditions may affect them.

6.2 Changes in Site and Scope

It must also be recognized that the passage of time, natural occurrences, and direct or indirect human intervention at or near the site have the potential to alter subsurface conditions. Groundwater levels are particularly susceptible to seasonal fluctuations.
The discussion and recommendations are based on the factual data obtained from this investigation conducted at the site by Terraprobe and are intended for use by the owner and its retained designers in the design phase of the project. If there are changes to the project scope and development features, the interpretations made of the subsurface information, the geotechnical design parameters and comments relating to constructability issues and quality control may not be relevant or complete for the revised project. Terraprobe should be retained to review the implications of such changes with respect to the contents of this report.

This report was prepared for the express use of Mr. Varun Gupta and their retained design consultants and is not for use by others. This report is copyright of Terraprobe Inc. and no part of this report may be reproduced by any means, in any form, without the prior written permission of Terraprobe Inc. and Mr. Varun Gupta who are the authorized users.

It is recognized that the regulatory agencies in their capacities as the planning and building authorities under Provincial statues, will make use of and rely upon this report, cognizant of the limitations thereof, both expressed and implied.

We trust the foregoing information is sufficient for your present requirements. If you have any questions, or if we can be of further assistance, please do not hesitate to contact us.

Yours truly,

Terraprobe Inc.

[redacted]

[redacted]

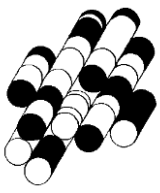
[redacted]

Frank Meng, M.Eng., P.Eng.
Geotechnical Engineer

Seth Zhang, M. Eng, M.Sc., P.Eng.
Associate

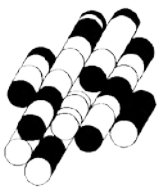
ENCLOSURES

TERRAPROBE INC.



FIGURES

TERRAPROBE INC.



Terraprobe
11 Indell Lane, Brampton, Ontario, L6T 3Y3
Tel: (905) 796-2650 Fax: (905) 796-2250

Title:

SITE LOCATION PLAN

File. No.: 1-22-0482-01

FIGURE : 1

Y:\Share\CA\Terraprobe\Brampton\1 - Project Files\2022\1-22-0482 - 11 Main Street, Puslinch\01-Geotechnical Investigation\A Dwgs, Logs\AutoCAD\1-22-0482-01 Figure 1 & 2.dwg, DWG To PDF.pc3, Kamal, Kamal

REFERENCE
Image © 2022 Google Earth

LEGEND
Approximate Borehole Location

SCALE 16 0 40m

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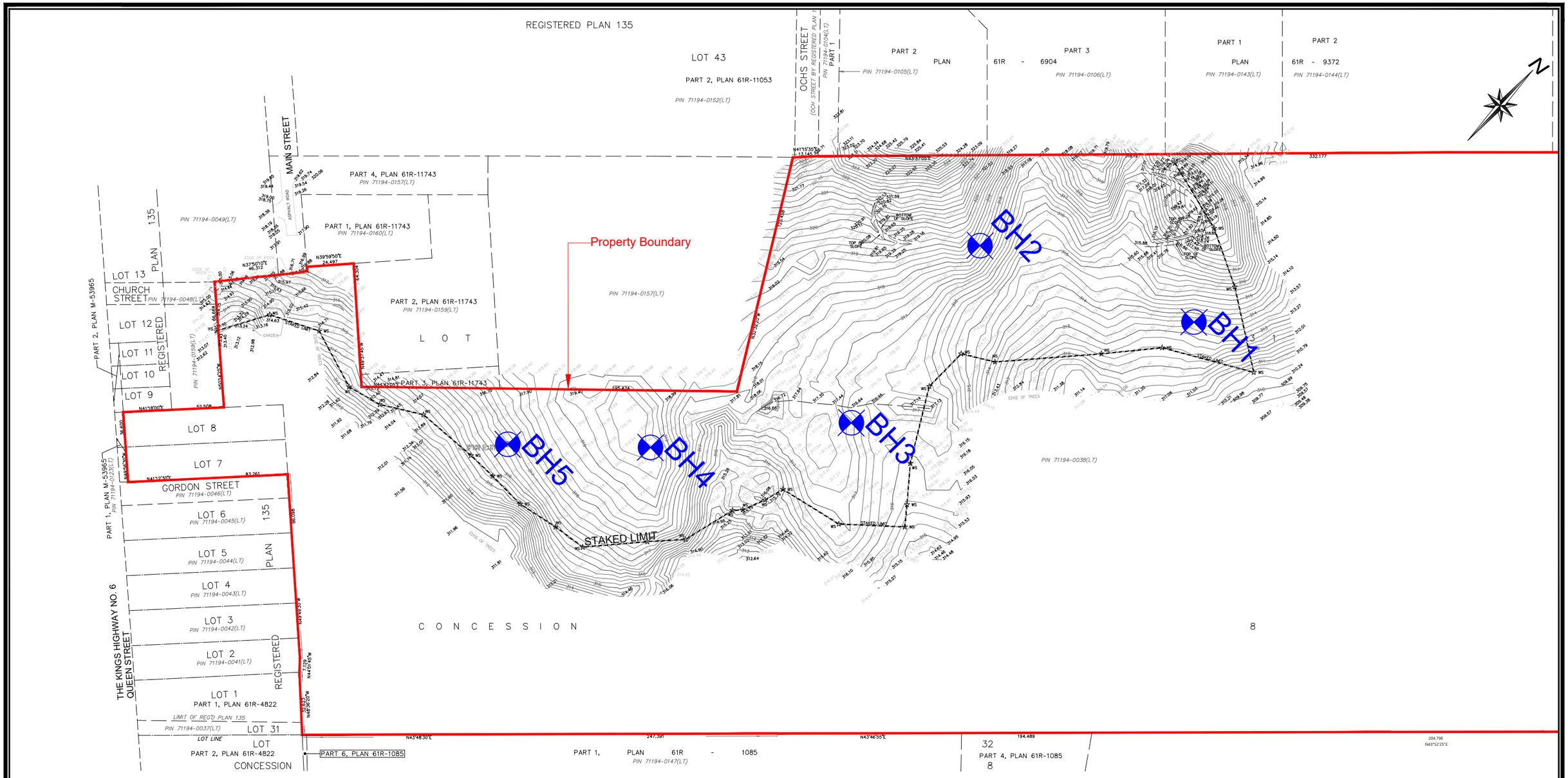
11 Indell Lane, Brampton, Ontario, L6T 3Y3
Tel: (905) 796-2650 Fax: (905) 796-2250

Title: **BOREHOLE LOCATION PLAN**
Aerial Photograph

File No. 1-22-0482-01

FIGURE : 2

Y:\Shared\GA\Terraprobe\Brampton\1-Project Files\2022\1-22-0482 - 11 Main Street, Pusliinch\01-Geotechnical Investigation\A. Dwgs, Logs\AutoCAD\1-22-0482-01 Figure 2.dwg, DWG To PDF.pc3, Kamal, Kamal



REFERENCE

Part of Lots 7 & 8 North of Queen Street, Registered Plan 135,
Township of Puslinch, City of Wellington
Reference No.: 22-14-718-00-topo, Date: September 16, 2022
By: J.D.Barnes Limited

LEGEND

Approximate Borehole Location

SCALE 16 0 40m

Terraprobe
11 Indell Lane, Brampton, Ontario, L6T 3Y3
Tel: (905) 796-2650 Fax: (905) 796-2250

Title: **BOREHOLE LOCATION PLAN**
Existing Condition

File No. 1-22-0482-01

FIGURE : 2A

Y:\Shared\GAT\Terraprobe\Brampton\1-Project Files\2022\1-22-0482 - 11 Main Street, Puslinch\01-Geotechnical Investigation\A. Dwgs. Logs\AutoCAD\1-22-0482-01 Figure 2.dwg,
DWG To PDF.pc3, kamal, kamal

Highway 6

Main St

Ochs St

OTHER LANDS

Property Boundary

OTHER LANDS

OTHER LANDS

N

BH1

BH2

BH3

BH4

BH5

0.2 HA

0.21 HA

0.23 HA

0.29 HA

BUFFER

WETLAND

FLOODPLAIN HAZARD

WOODLANDS

MEANDER

STAKED LIMIT

EDGE OF TREES

EDGE OF ROCK

THE KINGS HIGHWAY NO. 6
QUEEN STREET

LIMIT OF REG'D PLAN 135

LOT LINE

REFERENCE
Development Concept
File No.: 10779, Date: 2022-03-16
Drawing No.: C2, By: Weston Consulting

LEGEND
Approximate Borehole Location

SCALE 16 0 40m

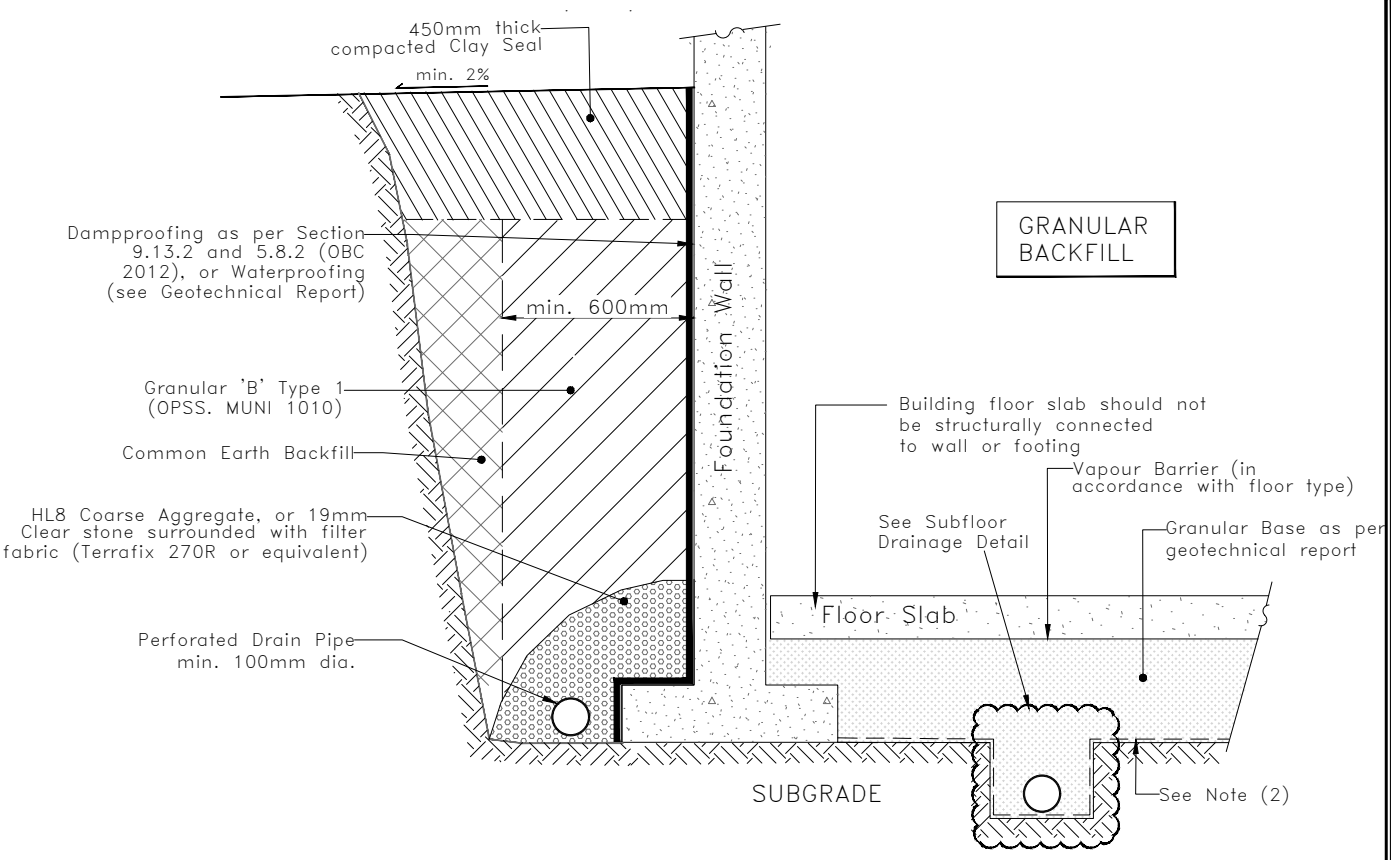
Terraprobe
11 Indell Lane, Brampton, Ontario, L6T 3Y3
Tel: (905) 796-2650 Fax: (905) 796-2250

Title: **BOREHOLE LOCATION PLAN**
Proposed Condition

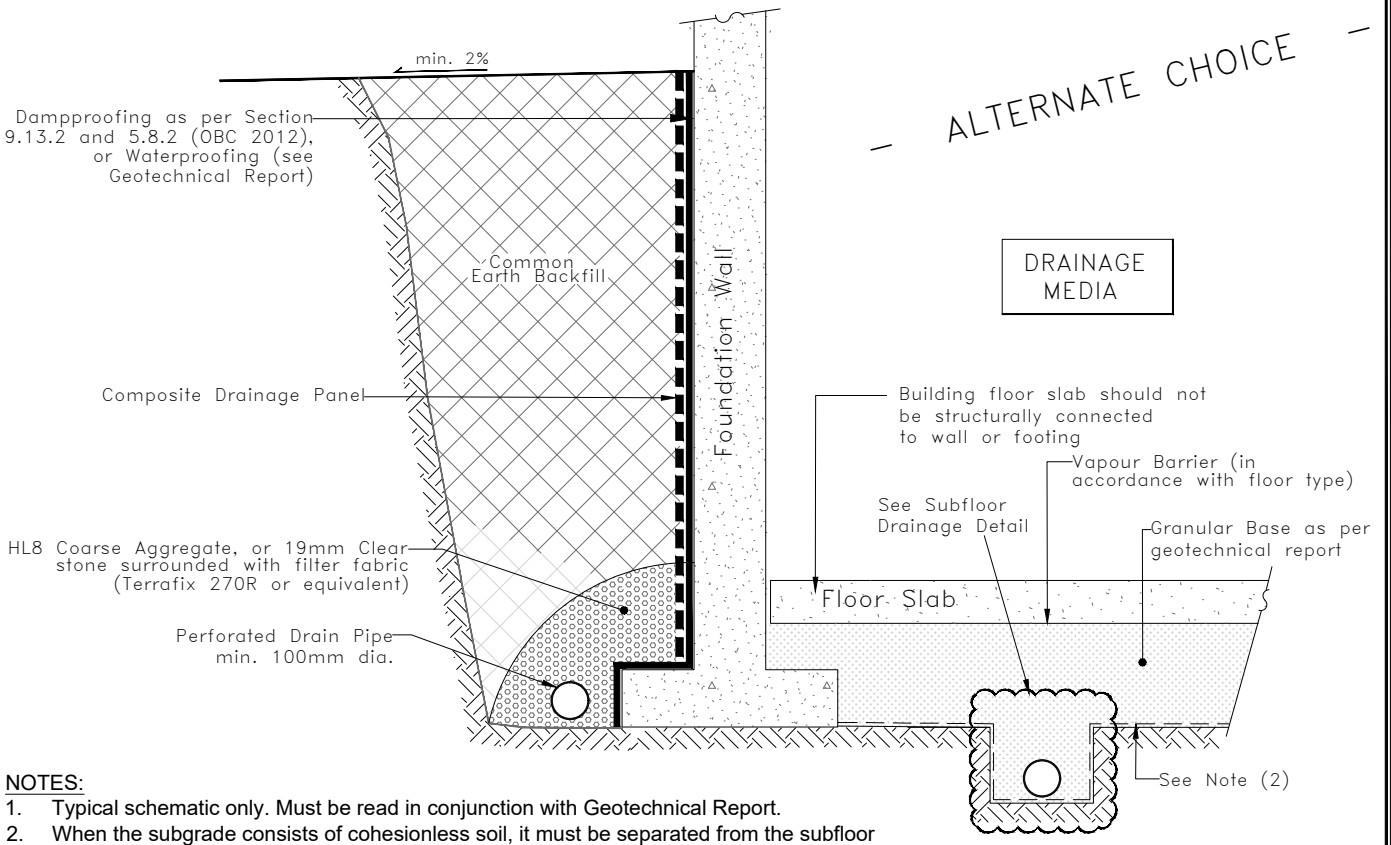
File No. 1-22-0482-01

FIGURE : 2B

Y:\Shared\GA\Terraprobe\Brampton\1-Project Files\2022\1-22-0482 - 11 Main Street, Pusliinch\01-Geotechnical Investigation\A. Dwgs, Logs\AutoCAD\1-22-0482-01 Figure 2.dwg, DWG To PDF.pc3, Kamal, Kamal



ALTERNATE CHOICE



NOTES:

1. Typical schematic only. Must be read in conjunction with Geotechnical Report.
2. When the subgrade consists of cohesionless soil, it must be separated from the subfloor drainage layer using a non-woven geotextile (Terrafix 360R or approved equivalent).
3. Not to Scale

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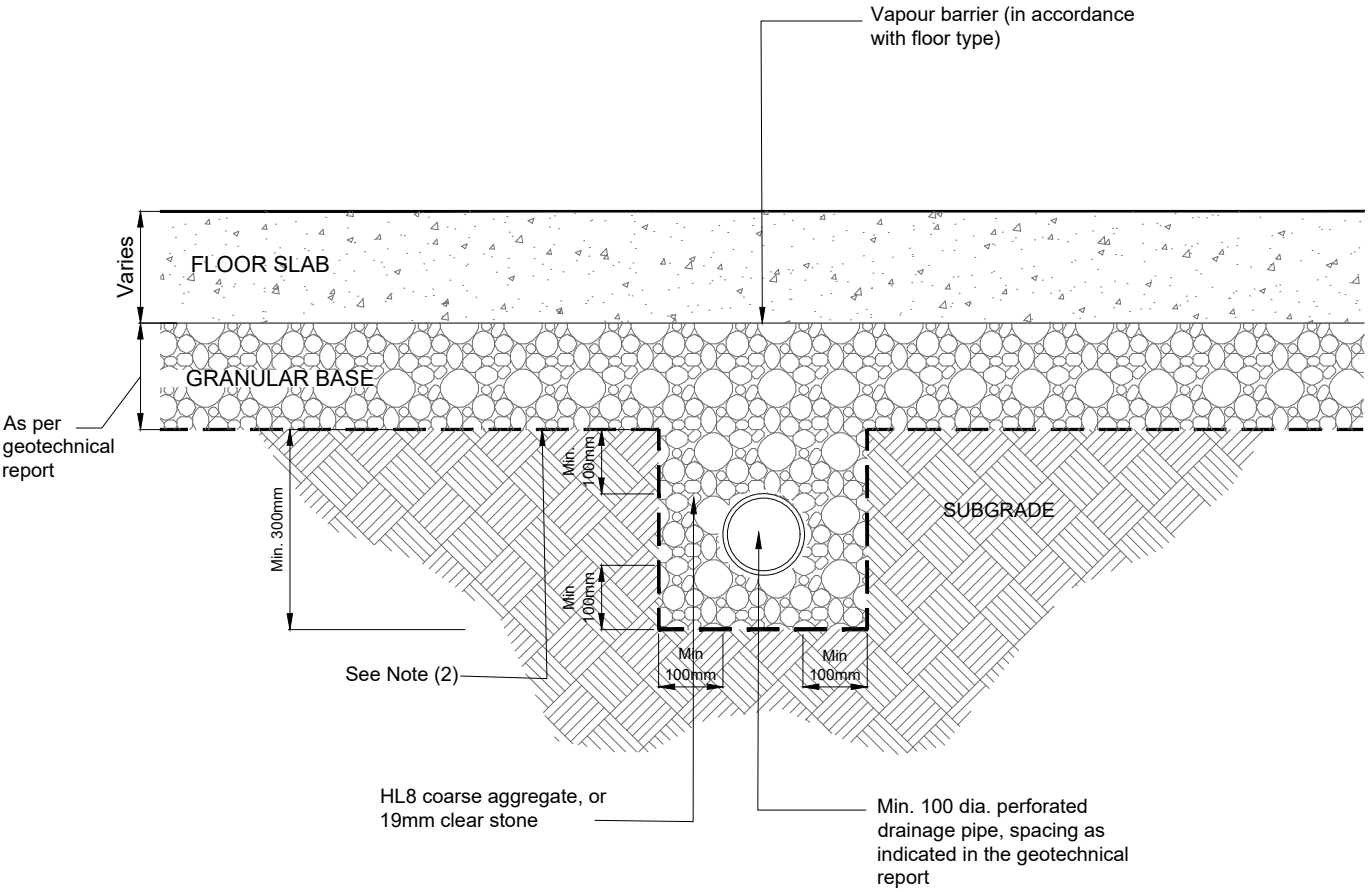
Title:

TYPICAL BASEMENT DRAINAGE SCHEMATIC
(OPEN EXCAVATION)



NOTES:

1. Typical schematic only. Must be read in conjunction with Geotechnical Report.
2. When the subgrade consists of cohesionless soil, it must be separated from the subfloor drainage layer using a non-woven geotextile (Terrafix 360R or approved equivalent).
3. Not to Scale

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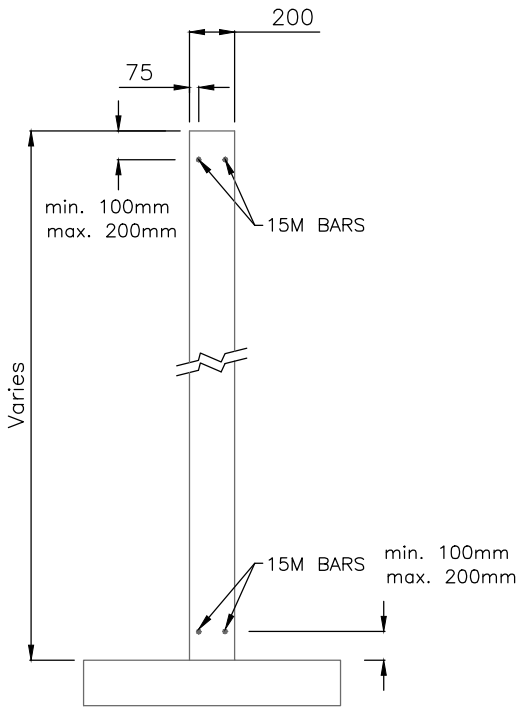
Tel: (905) 796-2650 Fax: (905) 796-2250

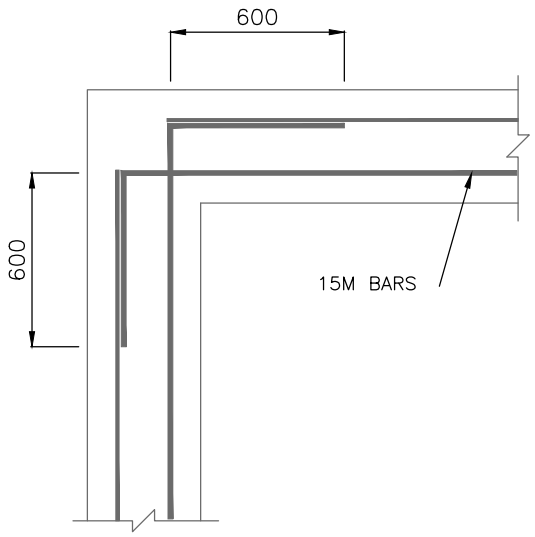
Title:

TYPICAL BASEMENT SUBDRAIN DETAIL



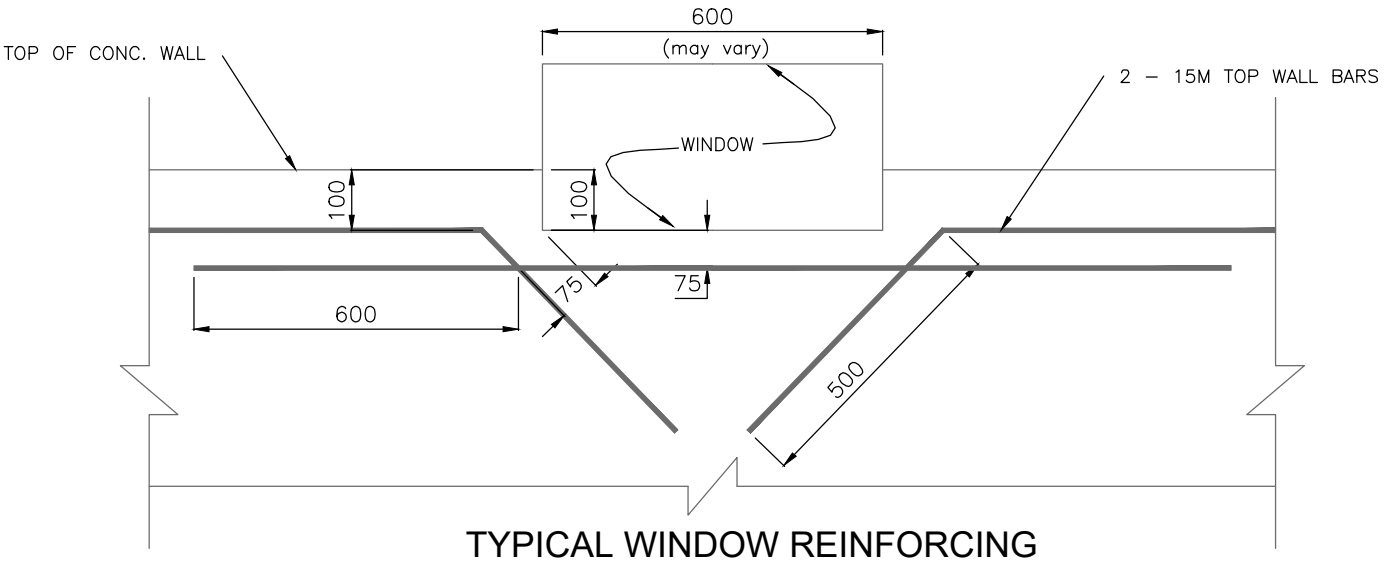
TYPICAL REINFORCED WALL

NOT TO SCALE



TYPICAL SPLICING AT CORNERS

NOT TO SCALE



TYPICAL WINDOW REINFORCING

NOT TO SCALE

NOTES:

1. Reinforcing steel C.S.A. G30.18–09 Grade 400
2. Concrete min. 28 day strength 20MPa (3000psi)
3. Base of all footing excavations to be inspected and approved prior to placing formwork.
4. All dimensions are in mm.

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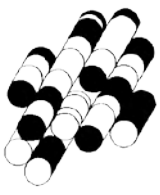
Title:

TYPICAL FOUNDATION WALL DETAILS FOR STRUCTURES ON ENGINEERED FILL

APPENDIX A

TERRAPROBE INC.



Alignment: From E:571779, N:4810959, to E:572011, N:4811284

Elevation (m)

BH 5
'N'
19
26
29
31
32
42
24
0 - 73 - 26 - 1
50 mm dia. monitoring well

BH 4
'N'
12
10
11
8

BH 3
'N'
11
28
16
43
56
76
53
50 / 150mm
0 - 36 - 59 - 5
50 mm dia. monitoring well

BH 2
'N'
8
32
53
23
50 / 150mm
69
60
57
50 mm dia. monitoring well

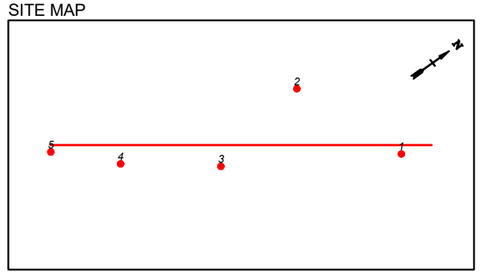
BH 1
'N'
35
24
21
17
19
25
27
0 - 3 - 72 - 25
50 mm dia. monitoring well

320
318
316
314
312
310
308
306

0
50
100
150
200
250
300
350
400

Distance Along Baseline (m)

SITE MAP



LITHOLOGY GRAPHIC LEGEND

- Fill
- Silty Sand
- Clayey Silt

INTERPRETIVE LEGEND

- WL on completion of drilling
- Stabilized WL, most recent

- *FILL*
- *GRAVELS (gravel to gravelly sand)*
- *SILT TO SAND (not till)*
- *COHESIONLESS TILLS*
- *COHESIVE SOILS (clayey silt to clay, incl. tills)*
- *DISTURBED/REWORKED SOILS*

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title: **SUBSURFACE PROFILE (INSERT CAPTION)**

File No.: **1-22-0482-01**

FIGURE: **X**

Report: !SECTION - TABLOID - ELEV

Terraprobe

ABBREVIATIONS AND TERMINOLOGY

SAMPLING METHODS

AS	auger sample
CORE	cored sample
DP	direct push
FV	field vane
GS	grab sample
SS	split spoon
ST	shelby tube
WS	wash sample

PENETRATION RESISTANCE

Standard Penetration Test (SPT) resistance ('N' values) is defined as the number of blows by a hammer weighing 63.6 kg (140 lb.) falling freely for a distance of 0.76 m (30 in.) required to advance a standard 50 mm (2 in.) diameter split spoon sampler for a distance of 0.3 m (12 in.).

Dynamic Cone Test (DCT) resistance is defined as the number of blows by a hammer weighing 63.6 kg (140 lb.) falling freely for a distance of 0.76 m (30 in.) required to advance a conical steel point of 50 mm (2 in.) diameter and with 60° sides on 'A' size drill rods for a distance of 0.3 m (12 in.)."

COHESIONLESS SOILS

Compactness	'N' value
very loose	< 4
loose	4 – 10
compact	10 – 30
dense	30 – 50
very dense	> 50

COHESIVE SOILS

Consistency	'N' value	Undrained Shear Strength (kPa)
very soft	< 2	< 12
soft	2 – 4	12 – 25
firm	4 – 8	25 – 50
stiff	8 – 15	50 – 100
very stiff	15 – 30	100 – 200
hard	> 30	> 200

COMPOSITION

Term (e.g)	% by weight
trace silt	< 10
some silt	10 – 20
silt*y*	20 – 35
sand *and* silt	> 35

TESTS AND SYMBOLS

MH	mechanical sieve and hydrometer analysis
w, w_c	water content
w_L, LL	liquid limit
w_P, PL	plastic limit
I_P, PI	plasticity index
k	coefficient of permeability
γ	soil unit weight, bulk
G_s	specific gravity
φ'	internal friction angle
c'	effective cohesion
c_u	undrained shear strength

▽	Unstabilized water level
▼	1st water level measurement
▽	2nd water level measurement
▼	Most recent water level measurement
3.0 +	Undrained shear strength from field vane (with sensitivity)
C_c	compression index
c_v	coefficient of consolidation
m_v	coefficient of compressibility
e	void ratio

FIELD MOISTURE DESCRIPTIONS

Damp	refers to a soil sample that does not exhibit any observable pore water from field/hand inspection.
Moist	refers to a soil sample that exhibits evidence of existing pore water (e.g. sample feels cool, cohesive soil is at or close to plastic limit) but does not have visible pore water
Wet	refers to a soil sample that has visible pore water

LOG OF BOREHOLE 1

Terraprobe

Project No. : 1-22-0482-01	Client : Wdd Main Street	Originated by : AA
Date started : August 16, 2022	Project : 11 Main Street	Compiled by : FM
Sheet No. : 1 of 1	Location : Puslinch, Ontario	Checked by : SZ

Position : E: 572000, N: 4811253 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
0	313.0	**GROUND SURFACE**				
		FILL, sand, some gravel, trace rootlets, dense, brown, moist		1	SS	35
	312.2					
	0.8	**SILTY SAND**, trace clay, trace gravel, compact, brown, moist		2	SS	24
1				3	SS	21
2				4	SS	17
3				5	SS	19
4				6	SS	25
5				7	SS	27
6	306.9					
	6.1	**CLAYEY SILT**, trace sand, very stiff, brown, moist				
	306.4					
	6.6	**END OF BOREHOLE**				

Elevation Scale (m): 313, 312, 311, 310, 309, 308, 307

Penetration Test Values (Blows / 0.3m): Dynamic Cone; 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane; 40 80 120 160

Moisture / Plasticity: Plastic Limit, Natural Water Content, Liquid Limit; PL MC LL; 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)

GR SA SI CL

0 3 72 25

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Aug 24, 2022	dry	n/a
Sep 7, 2022	dry	n/a
Sep 19, 2022	dry	n/a

file: 1-22-0482-01 bh logs.gpj

LOG OF BOREHOLE 2

Terraprobe

Project No. : 1-22-0482-01	Client : Wdd Main Street	Originated by : AA
Date started : August 16, 2022	Project : 11 Main Street	Compiled by : FM
Sheet No. : 1 of 1	Location : Puslinch, Ontario	Checked by : SZ

Position : E: 571881, N: 4811204 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
0	318.2	**GROUND SURFACE**				
		FILL, sand, some gravel, trace rootlets, loose, brown, moist		1	SS	8
	317.4 / 0.8					
1		**SILTY SAND to SILT AND SAND**, trace clay, trace gravel, compact to very dense, brown, moist		2	SS	32
				3	SS	53
2				4	SS	23
3				5	SS	50 / 150mm
4						
5				6	SS	69
6		...wet below		7	SS	60
7						
8	310.1 / 8.1			8	SS	57

Elevation Scale (m): 318, 317, 316, 315, 314, 313, 312, 311

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10, 20, 30, 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40, 80, 120, 160

Moisture / Plasticity — Plastic Limit (PL), Natural Water Content (MC), Liquid Limit (LL): 10, 20, 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) — GR SA SI CL

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Aug 24, 2022	6.6	311.6
Sep 7, 2022	6.7	311.5
Sep 19, 2022	6.8	311.4

file: 1-22-0482-01 bh logs.gpj

LOG OF BOREHOLE 3

Terraprobe

Project No. : 1-22-0482-01	Client : Wdd Main Street	Originated by : AA
Date started : August 16, 2022	Project : 11 Main Street	Compiled by : FM
Sheet No. : 1 of 1	Location : Puslinch, Ontario	Checked by : SZ

Position : E: 571901, N: 4811091 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)
	317.1	**GROUND SURFACE**					
0		**FILL**, sand, some gravel, trace rootlets, compact, brown, moist		1	SS	11	317
	316.3						
	0.8	**SILTY SAND to SILT AND SAND**, trace clay, trace gravel, compact to very dense, brown, moist		2	SS	28	
1							316
				3	SS	16	
2							315
				4	SS	43	
3							314
				5	SS	56	
4							313
				6	SS	76	
5							312
6		...wet below		7	SS	53	311
7							310
	309.3			8	SS	50 / 150mm	
	7.8	**END OF BOREHOLE**					

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10, 20, 30, 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40, 80, 120, 160

Moisture / Plasticity — Plastic Limit (PL), Natural Water Content (MC), Liquid Limit (LL): 10, 20, 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)

GR	SA	SI	CL
0	36	59	5

Borehole was dry and caved to 7.2 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Aug 24, 2022	5.2	311.9
Sep 7, 2022	5.3	311.8
Sep 19, 2022	5.4	311.7

file: 1-22-0482-01 bh logs.gpj

Terraprobe

LOG OF BOREHOLE 4

Project No. : 1-22-0482-01 | Client : Wdd Main Street | Originated by : AA

Date started : August 16, 2022 | Project : 11 Main Street | Compiled by : FM

Sheet No. : 1 of 1 | Location : Puslinch, Ontario | Checked by : SZ

Position : E: 571837, N: 4811007 (UTM 17T) | Elevation Datum : Geodetic

Rig type : Track-mounted | Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
0	319.9	**GROUND SURFACE**				
		FILL, sand, some gravel, trace rootlets, compact, brown, moist		1	SS	12
	319.1 / 0.8					
1		**SILTY SAND**, trace clay, trace gravel, loose to compact, brown, moist		2	SS	10
				3	SS	11
2				4	SS	8
3				5	AS	
4				6	AS	
5				7	AS	
6	313.3 / 6.6					

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

Elevation Scale (m): 319, 318, 317, 316, 315, 314

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10, 20, 30, 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40, 80, 120, 160

Moisture / Plasticity — Plastic Limit (PL), Natural Water Content (MC), Liquid Limit (LL): 10, 20, 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) — GR SA SI CL

file: 1-22-0482-01 bh logs.gpj

LOG OF BOREHOLE 5

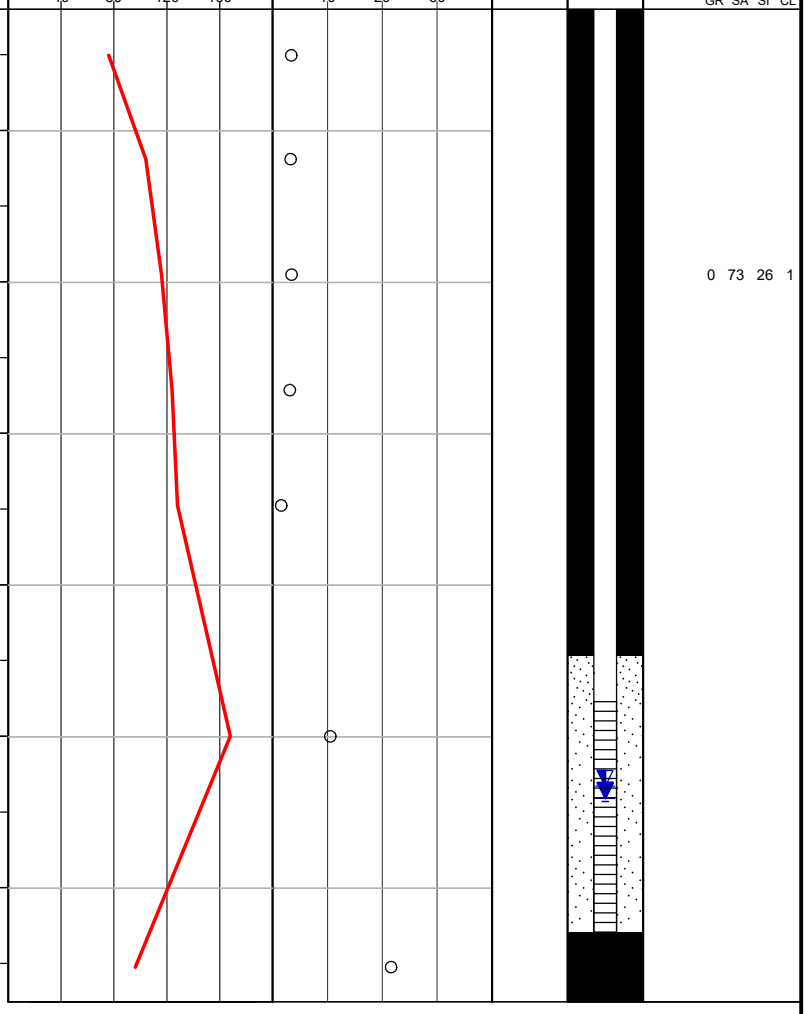
Terraprobe

Project No. : 1-22-0482-01	Client : Wdd Main Street	Originated by : AA
Date started : August 16, 2022	Project : 11 Main Street	Compiled by : FM
Sheet No. : 1 of 1	Location : Puslinch, Ontario	Checked by : SZ

Position : E: 571785, N: 4810955 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0	316.8	**GROUND SURFACE**				
		FILL, sand, some gravel, trace rootlets, compact, brown, moist		1	SS	19
	316.0					
	0.8	**SILTY SAND**, trace clay, trace gravel, compact to dense, brown, moist		2	SS	26
1						
				3	SS	29
2						
				4	SS	31
3		...gravelly sand				
				5	SS	32
4						
		...wet below				
				6	SS	42
5						
				7	SS	24
6	310.2					
	6.6	**END OF BOREHOLE**				



Penetration Test Values (Blows / 0.3m)
Dynamic Cone
10 20 30 40

Undrained Shear Strength (kPa)
Unconfined Field Vane
Pocket Penetrometer Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments
GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL
0 73 26 1

Borehole was dry and caved to 6.1 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.

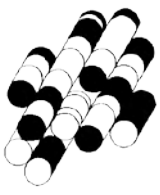
WATER LEVEL READINGS

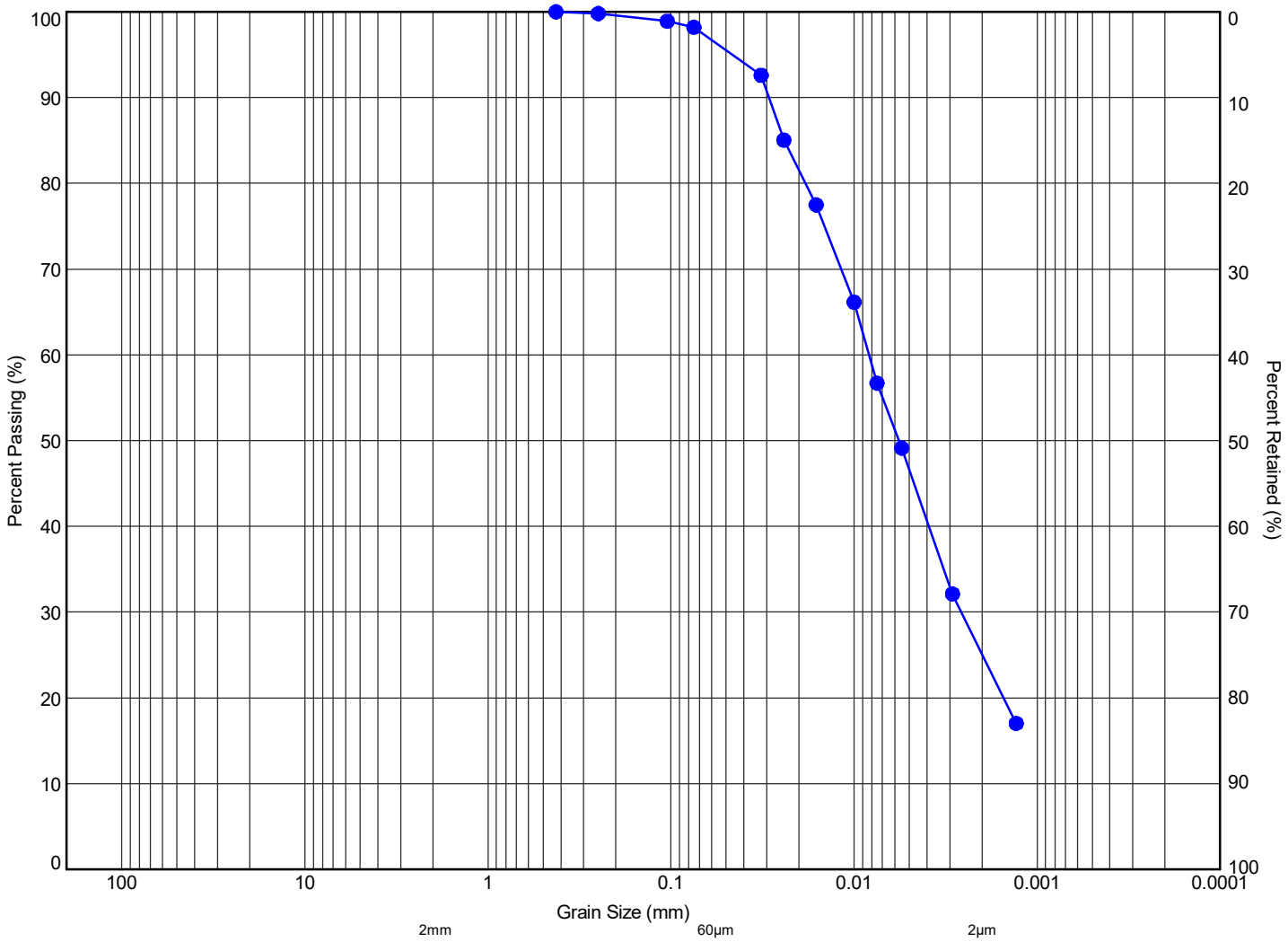
Date	Water Depth (m)	Elevation (m)
Aug 24, 2022	5.1	311.7
Sep 7, 2022	5.2	311.6
Sep 19, 2022	5.2	311.6

file: 1-22-0482-01 bh logs.gpj

APPENDIX B

TERRAPROBE INC.





MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

MIT SYSTEM

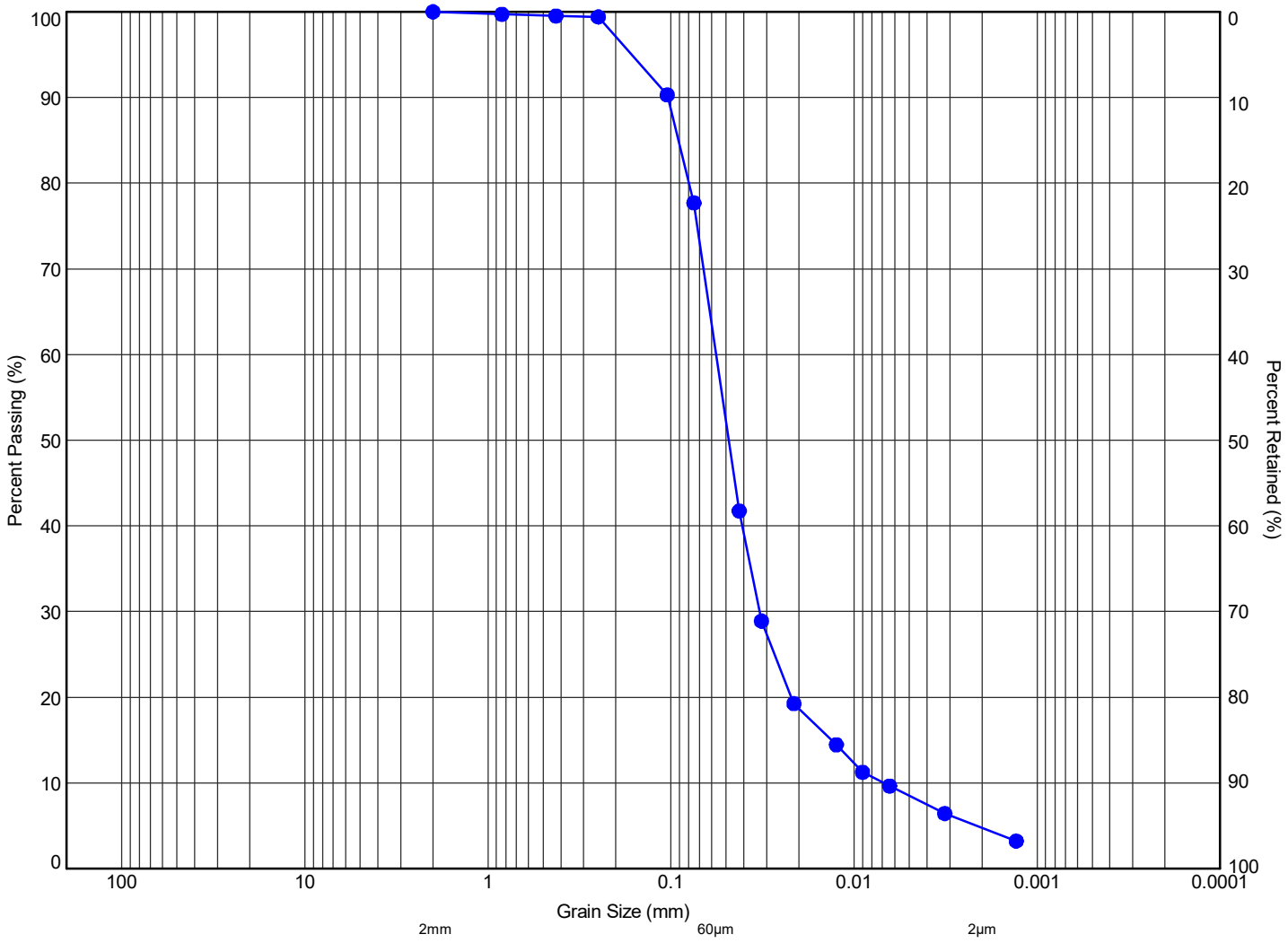
	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**1**	SS7	6.3	306.7	0	3	72	25	

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title:

GRAIN SIZE DISTRIBUTION
CLAYEY SILT, TRACE SAND

File No.: **1-22-0482-01**



MIT SYSTEM

	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**3**	SS7	6.3	310.8	0	36	59	5	

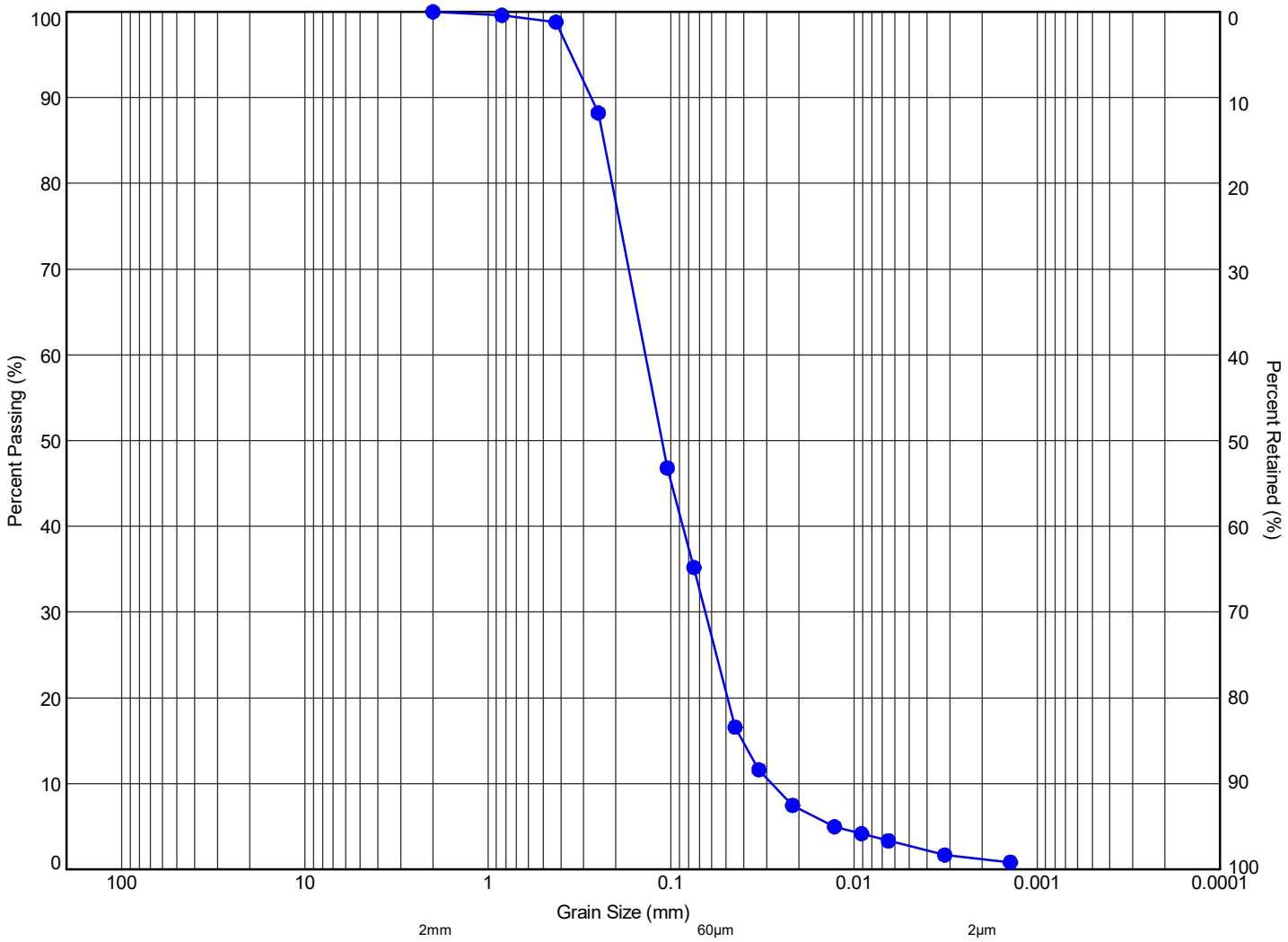
Terraprobe

11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title:

GRAIN SIZE DISTRIBUTION
SILT AND SAND, TRACE CLAY

File No.: **1-22-0482-01**



MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

MIT SYSTEM

	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**5**	SS3	1.8	315.0	0	73	26	1	

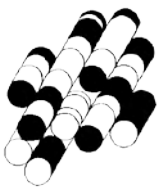
Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title: **GRAIN SIZE DISTRIBUTION**
SILTY SAND, TRACE CLAY

File No.: **1-22-0482-01**

APPENDIX C

TERRAPROBE INC.



PART 1 GENERAL

1.01 Description

Engineered Fill refers to earth fill (earthworks) designed and constructed with engineering inspection and testing, so as to be capable of supporting structure foundations and slabs without excessive settlement. Poured concrete foundation walls must be provided with nominal reinforcing steel to provide stiffening of the foundation walls and to protect against excessive crack formation within the foundation walls.

Preparation for Engineered Fill and Engineered Fill operations must only be conducted under full time inspection and testing by the Geotechnical Engineer, in order to ensure adequate compaction and fill quality.

The work for the construction of Engineered Fill, is shown on the Design Drawings prepared by the Design Civil Engineer and as described by these specifications. The work included in this section includes the following:

a) Stripping of the existing topsoil, fill layer, and weathered/disturbed soil as needed from the ground surface below all areas to be covered with Engineered Fill,

b) Excavation of Test Holes into the subgrade to investigate the suitability of subsurface conditions for support of the Engineered Fill and determine if any prior existing fill materials are present,

c) Proof-rolling or visual inspection (as directed by the geotechnical engineer) of the subgrade below areas to be covered with Engineered Fill, to detect the presence and extent of unstable ground conditions,

d) Excavation and removal of unstable subgrade materials or other approved stabilization measures, if required prior to the placement of Engineered Fill,

e) Surveying of ground elevations prior to placing Engineered Fill,

f) Supply, placement, and compaction of approved clean earth as specified herein, with full time inspection and testing,

g) Surveying of ground elevations on completion of Engineered Fill placement,

h) Providing and maintaining survey layout of areas to receive Engineered Fill, and monitoring of ground elevations throughout the construction of Engineered Fill.

1.02 The Project Parties

A) The term Contractor shall refer to the individual or firm who will be carrying out the earthworks related to preparation and construction of Engineered Fill.

B) The term Geotechnical Engineer shall refer to the individual or firm who will be carrying out the full time inspection and testing of the earthworks related to preparation and construction of Engineered Fill.

C) The term Design Civil Engineer shall refer to the individual or firm who will be carrying out the Site Grading Design (pre-grading), the determination of Design Foundation Grades for the structures on the site, and the choice of lots and site areas to receive Engineered Fill.

PART 2 MATERIALS

2.01 Definitions

A) Topsoil Layer is the surface layer of naturally organic soil typically found at the ground surface and with thickness on the order of 25 to 250 mm thick.

B) Earth fill is soil material which has been placed by man-made effort and has not been deposited by nature over a long period of time.

C) Weathered/disturbed soil is natural or native soil that has been disrupted by weathering processes such as frost damage.

D) Subgrade soil is the “in situ” (in place) natural or native soil beneath any earth fill and/or weathered/disturbed soil and/or topsoil layer(s).

E) Engineered Fill soils must consist of clean earth materials (not excessively wet), free of organics and topsoil, free of deleterious materials such as building rubble, wood, plant materials, placed in thin lifts not exceeding 150 mm in thickness. Cohesionless soils such as sand or gravel, are the easiest to handle and compact.

F) All values stated in metric units shall be considered as accurate.

PART 3 ENGINEERED FILL DESIGN

3.01 Design Foundation Pressure

A) Engineered Fill can be expected to experience post-construction settlement on the order of 1 percent of the depth of the Engineered Fill. The time period over which most of this settlement typically occurs, depends on the composition of the Engineered Fill as follows (after initial placement);

a) Sand or gravel soil; several days,

b) Silt soil; several weeks,

c) Clay or clayey soil; several months.

The placement of Engineered Fill might also result in post-construction settlement of the underlying natural soil.

The timing of foundation construction must take into account the post-construction settlement of the Engineered Fill and the foundation soil.

B) Unless otherwise stated, the Engineered Fill is to be placed over the entire lot or site area.

C) The Engineered Fill is to extend up to 1 m above the highest level of required foundation support. Typically this can be within 1 m of the design final grades. Additional common fill can be placed over the Engineered Fill to provide protection against environmental factors such as wind, frost, precipitation, and the like.

E) A geotechnical reaction at SLS of 150 kPa for 25 mm of settlement is typically recommended for the Engineered Fill, unless it consists of glaciolacustrine silt and clay in which case a lower design foundation pressure will need to be determined on a site specific basis. Foundations shall have minimum widths of 0.6 m for continuous strip footings, and minimum dimensions of 1 m for column footings.

F) At the foundation level, sufficient Engineered Fill shall be constructed to ensure that it extends at least 1.0 m laterally beyond the edge of any foundations, and that it extends outward within an area defined by a 1 to 1 line downward from the edge of any Engineered Fill.

G) Foundations placed on the Engineered Fill must be provided with nominal reinforcing steel for protection against excessive minor cracking. The reinforcing steel must consist of 2-15M bars continuous at the top of the foundation wall, and 2-15M bars continuous at the bottom of the foundation walls.

H) At the time of foundation construction, foundation excavations must be reviewed by the Geotechnical Engineer to confirm suitable bearing capacity of the Engineered Fill. The Geotechnical Engineer must inspect the foundation subgrade immediately after excavation, and must inspect the foundation subgrade immediately prior to placement of concrete for footings. The Geotechnical Engineer must also inspect the placement of reinforcing steel in the foundation walls. Written approval must be obtained from the Geotechnical Engineer prior to,

a) placement of footing concrete, and

b) placement of foundation wall concrete.

PART 4 CONSTRUCTION

4.01 Survey Layout

A) The survey layout shall be carried out and maintained throughout the construction of Engineered Fill activities. A suitable layout stake shall be placed at the corners of the start and finish of every block or work area to receive Engineered Fill.

B) At least two temporary survey elevation benchmarks shall be provided for every work area to receive Engineered Fill, to assist in monitoring the level of the Engineered Fill as it is constructed.

C) The ground elevations of the subgrade approved for receiving Engineered Fill shall be surveyed and recorded on a regular grid pattern. Engineered Fill shall not be placed on any work area without the written approval of the Geotechnical Engineer.

D) The ground elevations of the Engineered Fill on each work area shall be surveyed and recorded on a regular grid pattern at the end of each day during the placement of Engineered Fill.

E) On completion of Engineered Fill construction, the final ground elevations shall be surveyed and recorded on a regular grid pattern.

4.02 Topsoil Stripping

A) The Geotechnical Engineer must observe the stripping of topsoil from the areas proposed for Engineered Fill, from start to finish.

B) Topsoil must be stripped from the entire building site area. The Geotechnical Engineer must photograph the work areas which have had the earth fill suitably stripped.

4.03 Test Holes Into Subgrade

A) After the topsoil has been stripped, the exposed subgrade must be investigated for the presence of weak zones or deleterious material, which may be unsuitable for the support of Engineered Fill.

B) Exploratory test holes must be dug using a small backhoe, on a suitable pattern to obtain a representative indication of the entire site area.

C) The Geotechnical Engineer must observe the digging and backfilling of the test holes; must log the test hole stratigraphy; must obtain soil samples at maximum depth intervals of 0.3m; and must photograph each dug test hole.

D) If the test holes discover any old buried fill or deleterious materials, it must be excavated and removed from the lot area down to undisturbed, stable native soil.

E) All test holes must be properly backfilled and compacted in loose lifts of maximum 150 mm thickness to at least 98 percent Standard Proctor Maximum Dry Density (SPMDD), at the optimum water content plus or minus 2 percent. The Geotechnical Engineer must observe the backfilling and compaction of the test holes.

4.04 Subgrade Proof-rolling

A) Prior to placing any Engineered Fill, the exposed subgrade must be proof-rolled with a static smooth-drum roller and the Geotechnical Engineer must observe the proof-rolling.

B) Cohesive soil will be disrupted by proof-rolling. Competency must be determined by a geotechnical engineer by cutting and inspecting the soil.

C) If unstable subgrade conditions are encountered, the unstable subgrade must be sub-excavated. If wet site conditions exist during filling, stabilization with granular materials may be required.

4.05 Engineered Fill Placement

A) Engineered fill must not be placed without the approval of the Geotechnical Engineer. Prior to placing any Engineered Fill, the existing fill must be removed down to native soil subgrade, the subgrade must be investigated for old buried fill or deleterious material, the subgrade must be proof-rolled, and the subgrade elevations must be surveyed.

B) Prior to the placement of Engineered Fill, the source or borrow area for the Engineered Fill must be evaluated for its suitability. Some of the existing site fill that is removed prior to placement of Engineered Fill may be sorted and reused as Engineered Fill, but must first be approved by the Geotechnical Engineer. Samples of the proposed fill material must be obtained by the Geotechnical Engineer and tested in the geotechnical laboratory for Standard Proctor Maximum Dry Density, prior to approval of the material for use as Engineered Fill. The Engineered Fill must be free of organics and other deleterious material (wood, building debris, rubble, cobbles, boulders, and the like).

C) The Engineered Fill must be placed in maximum loose lift thicknesses of 150 mm. Each lift of Engineered Fill must be compacted with a heavy roller, to at least 98 percent Standard Proctor Maximum Dry Density (SPMDD), at the optimum water content plus or minus 2 percent.

D) Field density tests must be taken by the Geotechnical Engineer, on each lift of Engineered Fill, on each lot area. Any Engineered Fill which is tested and found to not meet the specifications, shall be either removed or, reworked and retested.

E) Engineered fill must not be placed during the period of the year when cold weather occurs, i.e., when there are freezing ambient temperatures during the daytime and overnight.

ENVIRONMENTAL IMPACT STUDY
11 MAIN STREET, MORRISTON, TOWNSHIP OF PUSLINCH

Prepared for:

WDD International
499 Brant Street
Burlington, ON
L7R 2G5

Prepared by:

Colville Consulting Inc.
432 Niagara Street, Unit 2
St. Catharines, Ontario
L2M 4W3

File No.: C22059
Date: August 2024

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1.0 INTRODUCTION

Colville Consulting Inc. was retained by WDD International to prepare an Environmental Impact Study (EIS) for a development proposed on the property located at 11 Main Street, in the Village of Morriston, Wellington County, hereafter referred to as the Subject Property. This EIS has been prepared to delineate the extent of natural heritage features on the Subject Property and assess the potential impacts of future development on natural heritage features on and adjacent to the Subject Property. The conclusions and recommendations of this report are intended to assist with informing proposed zone boundaries to be established on the Subject Lands.

This study has been requested by the County of Wellington and the Halton Region Conservation Authority (HRCA) to assess the extent of potential natural heritage features on and adjacent to the Subject Property, as well as assess potential impacts associated with a proposed development. This EIS has been prepared to assess potential impacts the proposed development may have on natural heritage features located on and adjacent to the Subject Property and provide mitigation measures to avoid or minimize any potential impacts. A summary of our assessment is included below.

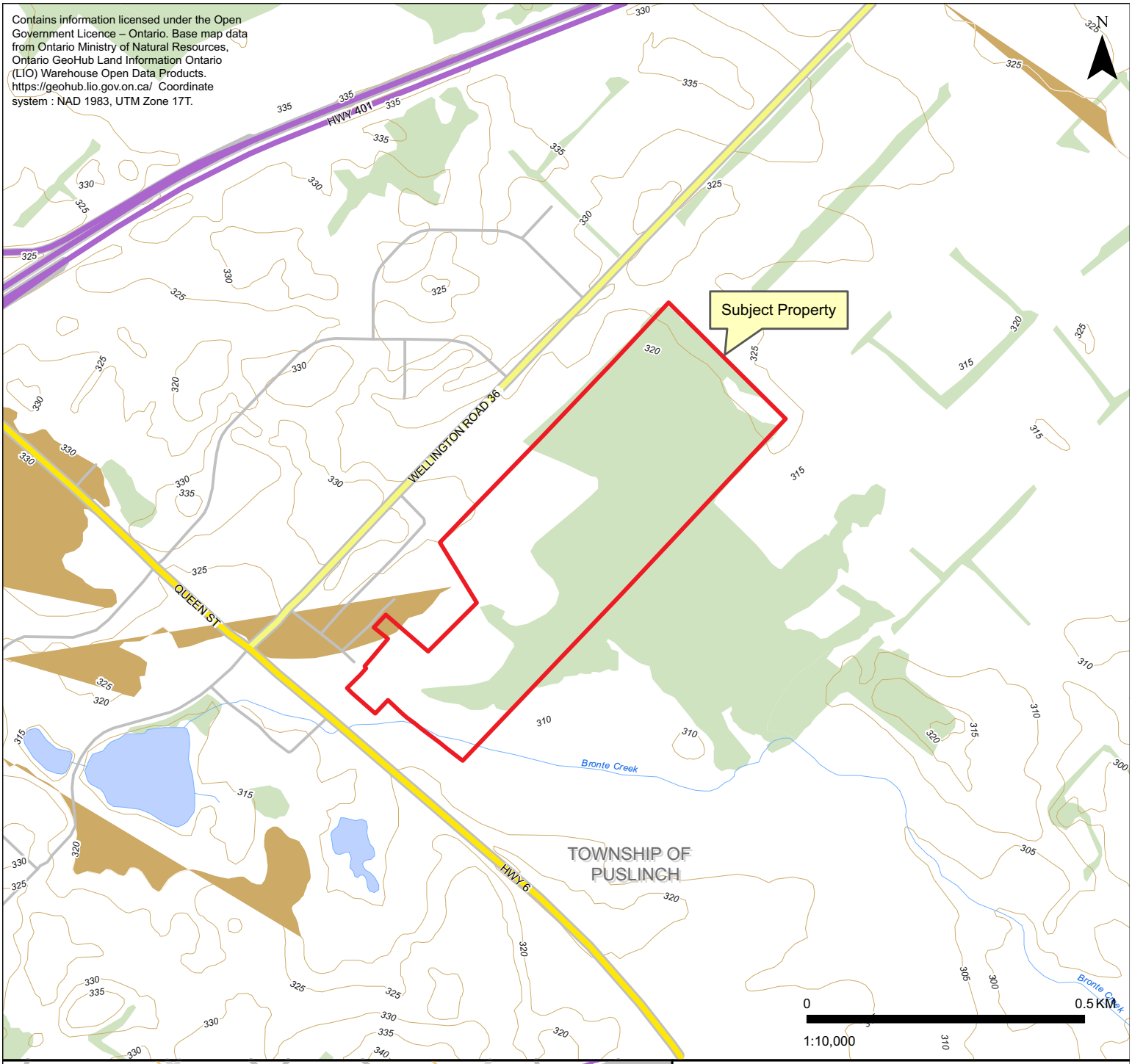
1.1 Description of Subject Property

The Subject Property measures approximately 23.1 ha (57.1 acres) in size and is generally located southeast of the intersection of Highway 6 and Badenoch Street in Morriston, Township of Puslinch (see Figure 1). There are no existing buildings or structures on the Subject Property and current land use consists of a mix of cultivated lands and natural heritage features. There is a significant amount of topographical variability throughout the Subject Property, with undulating topography resulting in upwards of 10 metres or more in elevation change across the property. Surface drainage on the west side of the property is generally directed towards a tributary of Bronte Creek, which runs along the western portion of the property. The remainder of surface drainage on the property is directed to the southeast towards minor drainages within the woodland feature.

Based on our review of background mapping, it is our understanding that mapped natural heritage features on the property consist of non-provincially significant and unevaluated wetlands, significant woodlands, and watercourses. Wetland features and hazard lands associated with the watercourse are designated "Core Greenlands" in the Wellington County Official Plan Schedule A7-2. The significant woodland on the Subject Property has been designated as "Greenlands" in the County of Wellington Official Plan due to size (over 1 hectare).

Two watercourses on the Subject Property have been identified as lands regulated by HRCA. One regulated watercourse is a tributary of Bronte Creek that bisects the southwestern corner of the Subject Property, and the other is an unnamed watercourse in the woodland feature on the central portion of the property. The extent of mapped natural heritage features on and adjacent to the Subject Property are illustrated in Figure 2.

Contains information licensed under the Open Government Licence – Ontario. Base map data from Ontario Ministry of Natural Resources, Ontario GeoHub Land Information Ontario (LIO) Warehouse Open Data Products. https://geohub.lio.gov.on.ca/ Coordinate system : NAD 1983, UTM Zone 17T.



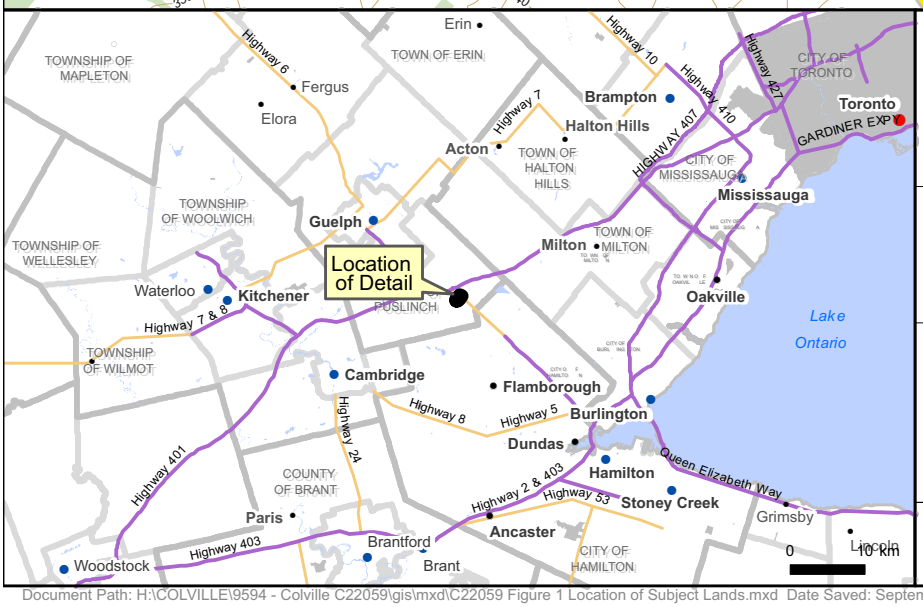


Figure 1
Location of Subject Property

Environmental Impact Study for
11 Main Street, Morriston

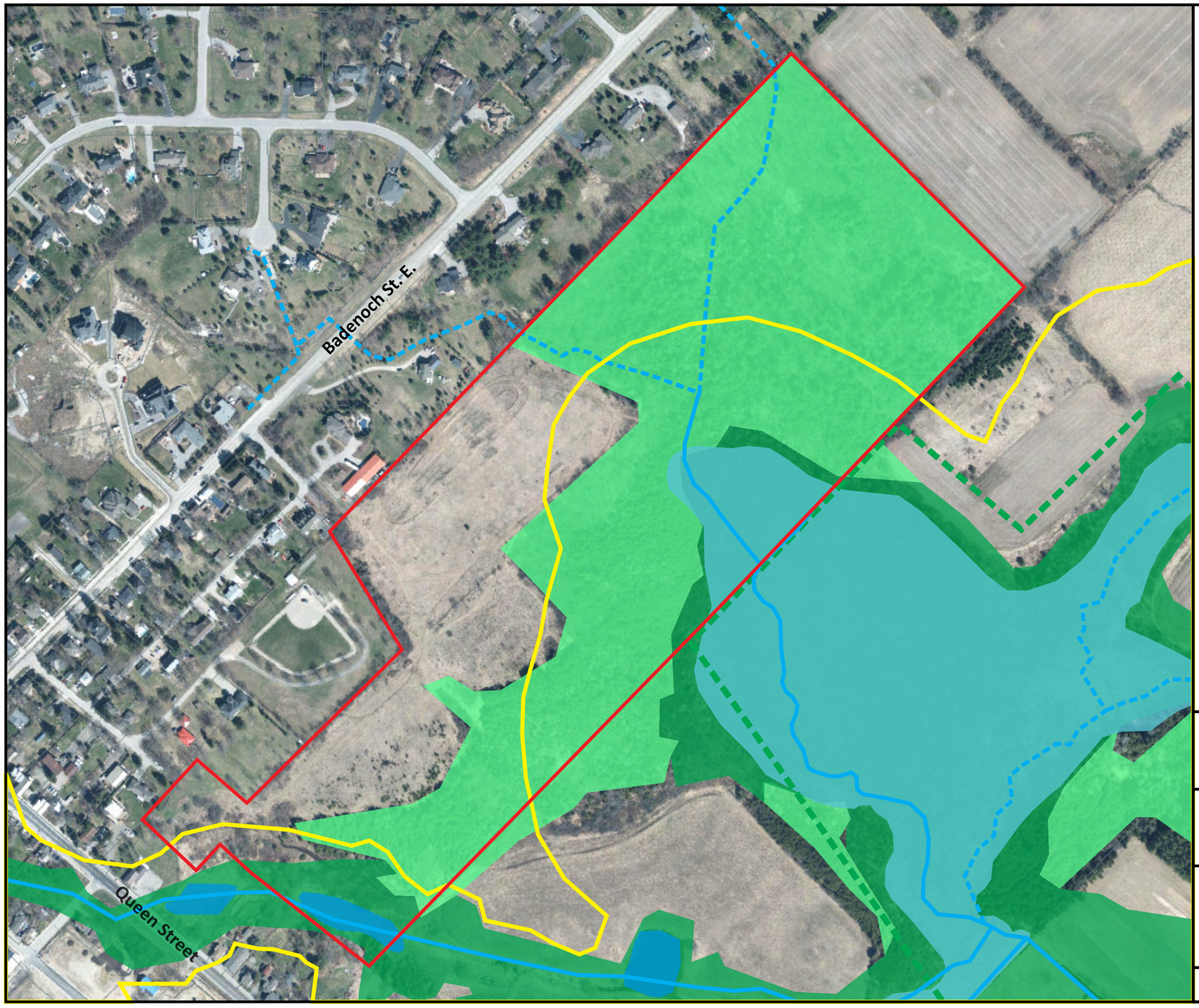
Prepared for: WDD International

Prepared by: COLVILLE CONSULTING INC.

DATE: December 2023

FILE: C22059

Document Path: H:\COLVILLE\9594 - Colville C22059\gis\mxd\C22059 Figure 1 Location of Subject Lands.mxd Date Saved: September 22, 2022



Legend

Subject Property

Greenbelt Mapping

Natural Heritage System

MNRF Mapping

Non-Provincially Significant Wetland

Unevaluated Wetland

County of Wellington Official Plan Schedule A7-2

Core Greenlands

Greenlands

Halton Region Conservation Authority Mapping

Conservation Halton Regulated Lands

Regulated Watercourses

Non-Regulated Watercourses

Figure 2
Extent of Natural Heritage Features on the Subject Property

Environmental Impact Study for 11 Main Street, Morriston

Prepared for: **WDD International**

Prepared by: COLVILLE CONSULTING INC.

DATE: December 2023

FILE: C22059

As mapping indicates that natural heritage features are located on and adjacent to the Subject Property, any development within or adjacent to these features will be subject to environmental policies of wellington County, as well as policies of the HRCA. These policies generally require that proposed development demonstrate no negative impacts on the natural heritage features or their ecological functions.

1.2 Description of Proposed Development

It is our understanding that the proposed development includes 21 single detached lots along the northwestern portion of the Subject Property. All proposed residential lots are approximately 0.20ha in size and will front onto new streets to be constructed as part of the development. Development adjacent to the Subject Property will also include the extension of an existing street (Ochs Street) along the northern boundary of the Subject Property to provide access to the property.

To facilitate this proposed development, we understand that a Plan of Subdivision is required by the County of Wellington, and zoning By-Law amendments are required by the Township of Puslinch. The approximate extent of the proposed development is illustrated in Appendix A.

2.0 ENVIRONMENTAL POLICY

2.1 Provincial Policy Statement

Land Use Policy and development in the province of Ontario is directed by the PPS, which was issued under the authority of Section 3 of the Planning Act and came into effect on May 1, 2020, replacing the PPS issued April 30, 2014. It states that decisions affecting planning matters "shall be consistent with" policy statements issued under the Act. This EIS has been prepared in compliance with Part V, Policy 2.1 of the PPS, which deals specifically with the long-term protection and management of natural heritage features and areas.

The intent of the PPS is to ensure that natural features and areas be protected for the long term. The PPS indicates that diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features.

Natural heritage features and areas are defined in the PPS as those which are important for their environmental and social values as a legacy of the natural landscapes of an area and include: significant wetlands, significant coastal wetlands, fish habitat, significant woodlands south and east of the Canadian Shield, significant valleylands south and east of the Canadian Shield, significant habitat of endangered species and threatened species, significant wildlife habitat and significant areas of natural and scientific interest.

Unless it can be demonstrated that there will be no negative impacts on the natural heritage features or their ecological functions, development and site alteration is not permitted in or adjacent to:

- significant woodlands and valleylands south and east of the Canadian Shield;
- significant wildlife habitat;

- significant fish habitat; and
- significant areas of natural and scientific interest.

Furthermore, development and site alteration shall not be permitted on adjacent lands to the natural heritage features identified above, unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.

2.2 Greenbelt Plan

The Greenbelt Plan was first introduced in 2005 to help shape the future of the Greater Golden Horseshoe. It was most recently updated in 2017 and continues to build on the PPS to establish land use planning framework for environmental and agricultural protection. The Subject Property is designated as Settlement Area within the Greenbelt Plan and mapped as "Towns/Villages" in Schedule 1: Greenbelt Area of the Greenbelt Plan.

The intent of this designation as it pertains to development is outlined in Section 3.4.1 and states the following:

> "Towns/Villages have the largest concentrations of population, employment and development within the Protected Countryside and tend to be the central settlement area(s) for their respective municipalities. Although most have full municipal water and sewer services, some only have a municipal water service and/or a combination of private and municipal water services. Towns/Villages are the focus of development and related economic and social activity."

The Greenbelt Plan also includes a Natural Heritage System. Section 3.2.1 defines the system as "…a continuous and permanent land base necessary to support human and ecological health in the Greenbelt and beyond". No portion of the Subject Property is mapped within the Natural Heritage System.

2.3 County of Wellington Official Plan

The County of Wellington Official Plan (2022) is intended to give direction to the physical development of the County, its local municipalities and to the long-term protection of County resources. To help achieve this goal and protect the natural heritage system within the County, a Greenlands System was developed. The Greenland System is illustrated in Schedule A of the Official Plan. Schedule A7-2 shows the community of Morriston and the Subject Property which are designated as a mix of Residential, Core Greenlands, and Greenlands.

The intent of the Greenland System as defined in Section 5.1 of the Official Plan is "to include those features and areas which are part of Wellington's natural heritage or areas in which natural or human-made conditions may pose a threat to public safety". These areas include, but are not limited to wetlands, environmentally sensitive areas, streams, waterbodies, woodlands, fish and wildlife habitat, and threatened and endangered species. The Greenland is divided into two broad categories, Core Greenlands and Greenlands.

Section 5.4 of the Official Plan outlines that policies surround Core Greenlands and the areas within them, which include areas that have a greater sensitivity or significance. These areas include provincially

significant wetlands, all other wetlands, habitat of endangered or threatened species and fish habitat, and hazardous lands.

Section 5.5 discusses the other component of the Greenland System, Greenlands. Lands designated as Greenlands include the following as:

> "Other significant natural heritage features including habitat, areas of natural and scientific interest, streams and valleylands, woodlands, environmentally sensitive areas, ponds, lakes and reservoirs and natural links are also intended to be afforded protection from development or site alteration which would have negative impacts
>
> These areas are often found within Core Greenlands. Where they are outside Core Greenlands they are identified as Greenlands.".

Policy related to development within and adjacent to the Greenland System is discussed in Section 5.6 Impacts associated with development and when it is permitted in the Core Greenlands and Greenlands are elaborated on further in Section 5.6.2 which states:

> "Where development is proposed in the Greenland system or on adjacent lands, the County or local municipality shall require the developer to:
>
> a) identify the nature of the features potentially impacted by the development;
>
> b) prepare, where required, an environmental impact assessment to ensure that the requirements of this Plan will be met, and consider enhancement of the natural area where appropriate and reasonable.
>
> c) address any other relevant requirements set out in Section 4.6.3 Environmental Impact Assessment.
>
> No development will be approved unless the County is satisfied that the Greenland and Environmental Impact Assessment policies are met."

As per Section 5.6.2.c above, Section 4.6.3 is defined the following:

> "Environmental impact assessments prepared by a qualified person may be required to evaluate the impacts a proposed development may have on the natural environment and the means by which negative impacts may be reduced or eliminated..."

This Environmental Impact Assessment has been prepared to satisfy the requirements of Section 4.6.3.

2.4 Halton Region Conservation Authority

The Halton Region Conservation Authority (HRCA) is responsible for the administration of Ontario Regulation 41/24, which provides the HRCA jurisdiction to regulate development activities within and adjacent to flood and erosion hazards, valleys, watercourses and wetlands. The guiding principle of this regulation is to ensure any development works proposed within regulated areas will have no adverse impact on flooding, erosion, dynamic beaches or unstable soil or bedrock.

In order to administer Ontario Regulation 41/24, the HRCA has created a document titled *Conservation Halton Policies and Guidelines for the Administration of Pary VI of the Conservation Authorities Act and Ontario*

Regulation 41/06 and Land Use Planning Policy Document (HRCA, 2024). The purpose of the document is to provide guidance for development applications that are located within and adjacent to regulated areas.

Regulated features on the Subject Property include a tributary of Bronte Creek and the associated floodplain, an unnamed watercourse, non-provincially significant wetlands, and unevaluated wetlands as identified by the Ministry of Natural Resources and Forestry (MNRF). The non-provincially significant wetland on the property is the northwest portion of the East Morriston Swamp Wetland Complex that extends southeast of the Subject Property. The unevaluated wetland on the Subject Property is associated with the riparian area along the north side of the tributary of Bronte Creek and is located on the southern edge of the Subject Property

HRCA policies related to the management of watercourses are contained in Sections 2.14 to 2.19 and policies related to wetlands are included in Sections 2.32, 2.33 and 3.4. These policies are generally intended to protect and maintain the hydrological function of these features.

3.0 STUDY APPROACH

3.1 Background Review

Prior to the commencement of primary field inventories, a review of background material available for the Subject Property and surrounding area was conducted. Some of the background information reviewed included:

- County of Wellington Official Plan (2022);
- Background data and mapping available from the Ministry of Natural Resources and Forestry (MNRF) and Conservation Halton;
- Conservation Halton Policies and Guidelines for the Administration of Ontario Regulation 162/06 and Land Use Planning Policy Document (HRCA, 2020);
- A search for information on rare, Threatened and Endangered species available through the Natural Heritage Information Centre (NHIC) (Square(s) - 17TNJ7111, 17NJ7211, 17NJ7110, 17NJ7210);
- Available Atlas Data including
    - Ontario Reptile and Amphibian Atlas, 2009-2019 (Ontario Nature 2023);
    - Ontario Breeding Bird Atlas (OBBN) (Square - 17TNJ71);
    - Ontario Butterfly Atlas (MacNaughton et al, 2023) (Square – 17NJ71),
    - Ontario Mammal Atlas (Dobbyn 1994)
- Aquatic Species at Risk Maps (Fisheries and Oceans Canada); and
- Natural Heritage Evaluation, 97 Queen Street, Morriston, Wellington County (Beacon Environmental Limited (2023).

3.2 Field Inventories

In order to identify potential natural heritage constraints on the property, Colville Consulting Inc. conducted the following inventories:

- Three season botanical inventory of the property, with the inventories conducted in summer and fall of 2022 and spring of 2023;
- Ecological Land Classification description of vegetation communities on the Subject Property;
- Breeding bird surveys on and adjacent to the Subject Property;
- An assessment of the watercourse feature on the southwest side of the property;
- An assessment of potential bat maternal roost trees and installation of acoustic monitors;
- Hand searches for reptiles that may be using the property;
- Amphibian call surveys; and
- Document incidental wildlife observations during site visits, including any species of insects that may be considered locally rare or species at risk.

For the purposes of field assessments, the study area for this assessment includes the entirely to the Subject lands and adjacent lands are considered the detectable area or surveyable lands adjacent to the Subject Property.

4.0 STUDY FINDINGS

4.1 Botanical Inventories and Vegetation Mapping

Botanical inventories of the Subject Property were conducted on August 10, September 24 and 26, 2022 and June 10, 2023. Vegetation communities (ELC Units – Lee et al. 1998) were mapped and described (Figure 3). A vascular plant checklist is provided in Appendix B and ELC data cards are provided in Appendix C. Species status was assessed for Ontario (Oldham and Brinker, 2009) and Wellington County (Frank and Anderson 2009. Site photos illustrating the vegetation conditions on the Subject Property are included in Appendix D.

4.1.1 Botanical Inventory

Two hundred (200) plant species were documented during our inventories (Appendix B). Of the 200 species observed, one species is listed as Endangered (Butternut), one is listed as provincially rare (Honey Locust), and three are ranked as locally rare (Butterfly Weed, Heart-leaved Aster, and Rough-leaved Goldenrod).

One triple stemmed Butternut tree was documented adjacent to the western edge of the property during inventories. An assessment of this tree was conducted twice during the 2023 leaf-on season and it was determined that this tree exhibited external characteristics typical of Butternut hybrids. Because of the location of this tree off-property and visible hybrid characteristics, no further genetic assessment was conducted to determine purity.

One provincially rare plant, Honey Locust (S2?), was documented on the Subject Property. A single Honey Locust sapling is located within the hedgerow, along the edge of the baseball diamond. Based on site characteristics, it is highly probable that this specimen was either planted or escaped and represents an introduced individual.

Three locally rare species (Butterfly Weed, Heart-leaved Aster, and Rough-leaved Goldenrod) were observed. The Butterfly Weed was observed near the treed hedge-row at the foot of Ochs Road and was

likely introduced or escaped from a residential garden. Heart-leaved Aster was found in low numbers in the successional woodland adjacent to the eastern edge of the old field meadow. The Rough-leaved Goldenrod was observed in rare instances around open seepage areas within the White Cedar coniferous swamp. The locations of these species are illustrated in Figure 3.

4.1.2 Vegetation Communities

A total of 14 vegetation communities were identified on and adjacent to the Subject Property. These vegetation communities were classified and mapped according to the Ecological Land Classification System for Southern Ontario (Lee et al. 1998). The Subject Property generally occurs on rolling uplands (likely drumlins), composed of silt or silty very fine sand. In places, the soils are stoney and limestone boulders or cobbles are mixed with the tills. In the intervening lowlands, large wetland areas support seepage swamps with organic deposits that often exceed 40cm in depth.

Descriptions of the vegetation communities identified on and adjacent the Subject Property as provided below.

Dry - Moist Old Field Meadow Type (CUM1-1)

A large portion of the Subject Property supports an old field meadow. This former agricultural field has been left fallow for some time and now supports an abundance (60-100% vegetation cover) of Smooth Brome, Orchard Grass, Timothy Grass, Kentucky Bluegrass, Quack Grass, Tall Goldenrod, New England Aster, Heath Aster, Spotted Knapweed, Wild Carrot, Canada Thistle, and White Sweet Clover. To facilitate archaeological work on the site, the entirety of the CUM1-1 community was tilled in October 2022, after botanical inventories were conducted.

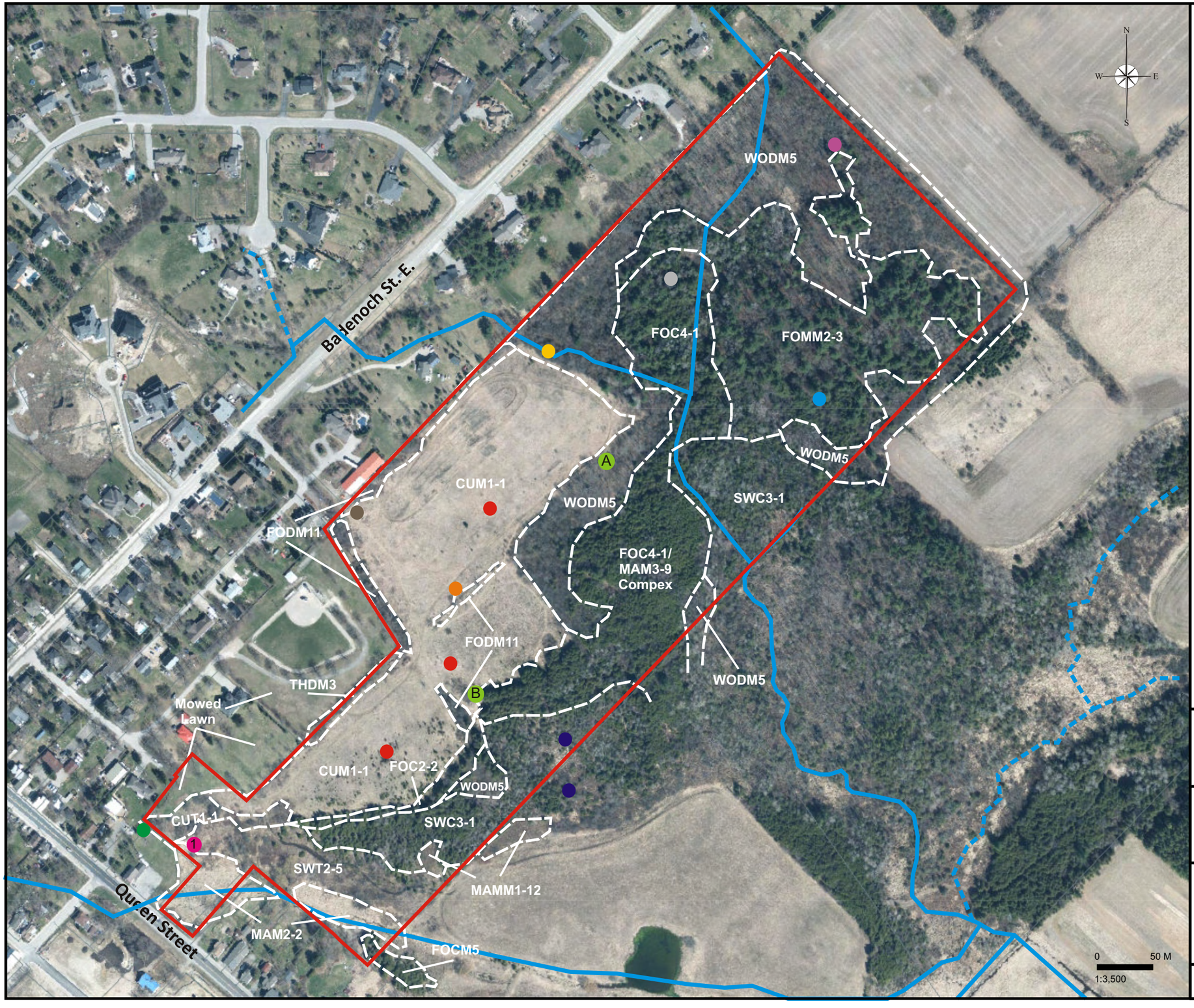
On the driest knolls, Canada Bluegrass, Gray Goldenrod, Spotted Knapweed, Wild Basil, Common Strawberry, Hawkweed and Sedge species dominate the lower ground layer (0.5 to less than 0.2m in height) forming a sparse (between 25 to 60%) cover. A slightly taller (0.5 to 1m in height) layer of Smooth Brome, Heath Aster, New England Aster, Tall Goldenrod, Wild Carrot and Orchard Grass forms greater than 60% cover.

White Sweet Clover dominates the sparse 1 to 2m height layer, along with some vines of Riverbank Grape and low shrubs of Common Lilac or saplings of Manitoba Maple, White Cedar and Staghorn Sumac.

Sumac Cultural Thicket Type (CUT1-1)

The southwestern edge of the old field meadow supports a cultural thicket which slopes down to a thicket swamp below. Orchard Grass, Tall Goldenrod, Reed Canarygrass and Panicled Aster cover 60 to 100% of the ground layer. Staghorn Sumac forms a 25 to 60% cover of tall shrubs, 1 to 2m + in height. An abundance of Riverbank Grape, Black Walnut saplings and Chokecherry shrubs also occur in this layer.

An abundance of young to mature Black Walnut trees occurs in the sparse 2 to 10m+ height layer, almost forming a Black Walnut Savanna, along with some Red\Green Ash, Common Apple and Staghorn Sumac trees, providing between 10 to 25% cover.



Legend

Subject Property

Watercourse

ELC Community

CUM1-1	Dry-Moist Old Field Meadow Type
CUT1-1	Sumac Cultural Thicket Type
THDM3	Dry-Fresh Deciduous Hedge-row Ecosite
FODM11	Naturalize Deciduous Hedge-row Ecosite
FOCM5	Naturalized Coniferous Hedge-row Ecosite
WODM5	Fresh-Moist Deciduous Woodland Ecosite
FOMM2-3	Dry-Fresh White Pine - Hardwood Mixed Forest Type
FOC4-1	Fresh-Moist White Cedar Coniferous Forest Type
MAM3-9	Forb Organic Meadow Marsh Type
FOC2-2	Dry-Fresh White Cedar Coniferous Forest Type
SWC3-1	White Cedar Organic Coniferous Swamp Type
SWT2-5	Red-osier Mineral Thicket Swamp Type
MAM2-2	Reed-canary Grass Mineral Meadow Marsh Type
MAMM1-12	Common Reed Graminoid Mineral Meadow Marsh Type

Botanical

- Location of putative Butternut
- Location of Butterfly Weed
- Location of Heart-leaved Aster
- Location of Rough-leaved Goldenrod

Wildlife

- Location of calling Eastern Wood-pewee (First Visit)
- Location of calling Eastern Wood-pewee (Second Visit)
- Location of calling Eastern Wood-pewee (Both Visits)
- Location of calling Eastern Meadowlark (First Visit)
- Location of calling Grasshopper Sparrow (Second Visit)
- A — Location of Acoustic Bat Monitors
- 1 — Location of Amphibian Monitoring Station

Figure 3
Extent of Vegetation Communities on the Subject Property

Environmental Impact Study for 11 Main Street, Morriston

Prepared for: **WDD International**

Prepared by: COLVILLE CONSULTING INC.

DATE: December 2023

FILE: C22059

Dry - Fresh Deciduous Hedgerow Thicket Ecosite (THDM3)

Separating the old field meadow from the adjacent residential properties of mowed lawns and a parkland, is a very dense thicket of tall Common Buckthorn shrubs, along with a few trees (often Manitoba Maple or Basswood) and Hawthorns forming a shrub hedge-row.

Naturalized Deciduous Hedge-row Ecosite (FODM11)

Hedge-rows of mature (greater than 10m tall) Basswood and Manitoba Maple or Sugar Maple and rarely Black Cherry trees are located adjacent to the old field meadow. The dense sub-canopy (2 to 10m in height) and understory layers (1 to 2m in height) are often dominated by Common Buckthorn, Hawthorn species, Riverbank Grape and young Manitoba maple or Cherry species. Thicket Creeper, Asters, Goldenrods, Grasses and Riverbank Grape are abundant in the ground layer.

Some of these hedge-row support mature and large diameter Sugar Maple trees. Located southeast of the meadow is a former hedge-row or fence line which has now been surrounded and infilled by Fresh - Moist Deciduous Woodland. A number of large Sugar Maple and Red Oak trees grow in a line above the successional woodland species.

Fresh - Moist Deciduous Woodland Ecosite (WODM5)

In places, the old field meadow is bordered by a Fresh - Moist Deciduous Woodland. The open canopy layer (greater than 10 to 25m + in height) is formed by a 10 to 25% cover of mature Basswood, Black Cherry, White Pine, Bitternut Hickory, Sugar Maple or Trembling Aspen trees. In places the canopy of this community it is more dense and ranges from 25 to 60% cover.

Common Buckthorn, Hawthorn species, vines of Riverbank Grape, Alternate-leaved Dogwood, White Cedar and White Elm form a denser cover (25 to 60% cover or occasional less) in the 2 to 10m height layer. Many large (10-25cm or 25cm + dbh) and open-grown Hawthorns are still standing, forming part of the original woodland cover, however many are now declining as they are being shaded out or over-topped by Common Buckthorn.

In the 1 to 2m + height layer, Common Buckthorn, Chokecherry, vines of Riverbank Grape and Red\Green Ash saplings form a cover greater than 60% (or occasionally less in places). The ground layer (0.5 to 1m in height or less) supports an abundance of seedlings and young saplings of Common Buckthorn and Red\Green Ash along with vines of Wild Red Raspberry, Riverbank Grape and Poison Ivy.

On the east end of the property, this successional woodland community also occurs under towering White Pine and very mature Basswood and Black Cherry trees associated with the FOMM2-3 ELC community.

Dry - Fresh White Pine - Hardwood Mixed Forest Type (FOMM2-3)

Tall White Pine (greater than 25m or less) and very mature Basswood and Black Cherry trees form a super canopy of less than 25% cover. Below the super canopy layer is a 25 to 60% cover of very mature Hawthorn (often dead or over-topped and shaded out by Buckthorn), Common Buckthorn and occasionally Hop Hornbeam trees in the 2 to 10m height range. This mature stand often occurs on upper slopes adjacent to lowland or seepage areas.

In the understory layer (1 to 2m in height), Common Buckthorn, Chokecherry, Black Cherry and Alternate-leaved Dogwood form greater than 60% cover. The ground layer, where it is mostly shaded, is

often dominated by seedlings of Common Buckthorn and Red\Green Ash or Wild Red Raspberry, however in the full sun, a number of meadow openings occur throughout and support typical old field meadow species.

Fresh - Moist White Cedar Coniferous Forest Type (FOC4-1) with Forb Organic Meadow Marsh Type (MAM3-9) complex

Fresh - Moist White Cedar Coniferous Forest occurs on mid to lower slopes of the rolling uplands. This vegetation community is mostly even aged (25-50cm dbh or less) and dominated by White Cedar. Occasional openings in the dense canopy support stands of Trembling Aspen or Black Cherry, or thickets of Hawthorn - Common Buckthorn. The canopy layer is almost entirely dominated by a dense cover (60 to 100%) of White Cedar (in the 2 to 10m height layer). Forming an additional cover of up to 10% are stands or scattered super canopy trees (10 - 25m + in height) of Trembling Aspen, Black Cherry and occasionally White Pine.

A very sparse (0 to 10% cover) understory layer is composed of young White Cedar and occasionally Red\Green Ash trees or saplings with shrubs of Chokecherry and saplings of Black Cherry (in the 1 to 2m height layer). The ground layer often contains little to no vegetation where it is most shaded, but occasionally (10 to 25% cover or less) supports seedlings of White Cedar, Chokecherry and Red\Green Ash.

Forb Organic Meadow Marsh Type (MAM3-9) complex

Numerous seeps and open meadow marshes occur throughout the White Cedar forest. These areas have been complexed as Forb Organic Meadow Marsh Type. Seepage areas support openings of meadow marsh with pockets of organic soils (greater than 40cm in depth). Swamp Aster, Panicled Aster and Boneset form a greater than 60% cover of tall forbs in the 1 to 2m height layer. Below this layer is a ground cover (approx. 100% cover) of Creeping Bent Grass, Reed Canarygrass, Rice-cut Grass and Spotted Touch-me-not (in the less than or 0.5 to 1m height layer). Occasionally, tall shrubs of Willow species or Red-osier Dogwood form less than 10% cover in the 2 to 10m height layer. In places, open seeps with flowing groundwater support patches of Watercress.

Dry - Fresh White Cedar Coniferous Forest Type (FOC2-2)

Along the rim and upper slopes, adjacent to a coniferous swamp, is a linear stand (possibly a former hedge-row bordering the old field meadow) of Dry - Fresh White Cedar Coniferous Forest. Limestone boulders, likely removed when the adjacent agricultural field was first cleared and plowed, are piled here. Along this pile of stones is an open grown, contorted, and multi trunked White Cedar tree, perhaps a marker tree. This tree is now surrounded by an even aged stand (25-50cm dbh) of White Cedar and occasionally Trembling Aspen, forming a fringe of coniferous forest between the conifer swamp and old field meadow.

White Cedar Organic Coniferous Swamp Type (SWC3-1)

This White Cedar Swamp has pockets of deep organics and seepage areas throughout. This community grades uphill and then meets the fringe of Dry - Fresh White Cedar Coniferous Forest and the Fresh - Moist White Cedar Coniferous Forest. In places, this coniferous swamp has a closed canopy and trees 5 to 10m tall (mostly on the mineral soil edges), but mostly supports an open cover of stunted White Cedar trees 1 to 3m tall on organic deposits.

A sparse super-canopy (with less than 10% cover) occasionally supports Trembling Aspen or White Cedar trees 10 to 25m tall. White Cedar is dominant (25 to 60% cover or less) in the 2 to 10m height layer

with the occasional Trembling Aspen trees and rarely some tall Glossy Buckthorn shrubs. White Cedar is also dominant (10 to 25% or more cover) in the 1 to 2m height layer with some shrubs of Glossy Buckthorn and Red-osier Dogwood.

The ground layer (60 to 100% cover) is dominated by mosses and Field Horsetail and supports an abundance of Sensitive Fern, Dwarf Raspberry, Coltsfoot, Rough Goldenrod, Swamp Aster, Rice-cut Grass and Marsh Fern.

Located at the south end of this community are two small areas Common Reed Graminoid Mineral Meadow Marsh Type (MAM1-12). A monoculture of phragmites occurs in these areas.

Red-osier Mineral Thicket Swamp Type (SWT2-5)

Bordering a stream corridor to the southwest and grading northeast into the White Cedar Coniferous Swamp is a Red-osier Thicket Swamp. Red-osier Dogwood is abundant in the 1 to 2m height layer, along with Swamp Aster, Panicled Aster, Grass-leaved Goldenrod and Tall Goldenrod, together forming greater than 60% vegetation cover.

Slender Willow, Bebb's Willow and occasionally Red-osier Dogwood form a tall shrub layer 2 to 10m in height with only 10 to 25% cover or less. The ground layer supports between 25 to 60% vegetation cover of Field Horsetail, Reed Canarygrass, Rush and Sedge species and occasionally Black Bulrush or patches of Creeping Bent Grass. There are occasional pockets of deeper organics but overall the substrates are mineral.

Reed-canary Grass Mineral Meadow Marsh Type (MAM2-2)

A culvert crossing Hwy 6 conveys a tributary to Bronte Creek onto lands adjacent to the property. Vegetation in this lowland area and stream corridor was described as a Reed-canary Grass Mineral Meadow Marsh. This depauperate area is almost entirely dominated by Reed Canarygrass and grades into the adjacent Red-osier Dogwood Thicket Swamp.

Naturalized Coniferous Hedge-row Ecosite (FOCM5)

A stand of mature White Cedar occurs as a hedgerow in the southwest corner of the property. This community occurs primarily on the adjacent lands and separates a large agricultural field from residential lands to the west.

4.2 Wildlife and Wildlife Habitat

4.2.1 Breeding Birds

Breeding bird surveys were conducted on June 11 and July 6, 2022 to inventory breeding birds on the Subject Property. Surveys were completed at least 15 days apart, under suitable weather conditions with little to no wind or precipitation. A thorough search of the subject property was completed during both surveys between dawn and no later than 10:00 am. All birds seen or heard calling were recorded and the highest breeding evidence per species was determined in accordance with the criteria of the Atlas of the Breeding Birds of Ontario (Cadman et al. 2007).

A total of 35 species of birds were observed or heard on or above the Subject Property. According to Ontario conservation status ranks (S-rank) designations, with the exception of one non-native species all other recorded species are considered to be “secure” (S5 - common, widespread and abundant) or “apparently secure” (S4 - uncommon but not rare) in the province of Ontario.

Table 1: List of Bird Species Documented on and Adjacent to the Subject Property.

Species	S Rank	Thicket/Meadow	Woodland	Adjacent Lands	Highest Breeding Evidence*	Breeding Code**
American Crow	S5		X		CO	FY
American Goldfinch	S5	X	X		PO	S
American Redstart	S5B		X		PO	S
American Robin	S5	X		X	CO	FY
Baltimore Oriole	S4B		X		CO	FY
Black-capped Chickadee	S5	X	X		PO	S
Blue Jay	S5	X	X		PO	H
Brown-headed Cowbird	S5	X			PO	S
Carolina Wren	S4		X		PO	S
Cedar Waxwing	S5	X	X		PO	H
Chipping Sparrow	S5B	X	X		PO	S
Common Grackle	S5	X		X	PO	H
Common Yellowthroat	S5B		X		PO	S
Cuckoo species (heard)	S4B/S5B	X			PO	S
Downy Woodpecker	S5	X	X		PO	S
Eastern Meadowlark	S4B	X			PO	S
Eastern Towhee	S4B	X	X		PO	S
Eastern Wood-pewee	S4B		X		PO	S
European Starling	SNA	X		X	CO	FY
Field Sparrow	S4B	X	X		PR	A
Grasshopper Sparrow	S4B	X			PO	S
Gray Catbird	S5B	X			PR	A
Great Crested Flycatcher	S5B		X		PO	S
House Wren	S5B	X			PO	S
Killdeer	S4B	X		X	PO	H
Indigo Bunting	S5B	X		X	PO	S
Mourning Dove	S5	X		X	PO	S
Northern Cardinal	S5	X	X		CO	FY
Northern Flicker	S5	X	X		PO	S
Pine Warbler	S5B		X		PO	S
Red-eyed Vireo	S5B		X		CO	NY
Red-winged Blackbird	S5	X			PO	S
Rose-breasted Grosbeak	S5B	X			PR	A
Song Sparrow	S5	X	X		PO	S
Yellow Warbler	S5B	X	X		PO	S

* OBS – observed, no evidence of breeding; PO – possible breeding; PR – probable breeding; CO - confirmed breeding

** X – observed in its breeding season, no evidence of breeding

H – species observed in its breeding season in suitable nesting habitat

S – singing male present in its breeding season in suitable nesting habitat

P – pair observed in their breeding season in suitable nesting habitat

A – agitated behavior or anxiety calls of an adult

FY – recently fledged young CF – adult carrying food for young NY – nest with young

The Eastern Meadowlark heard calling on the first site visit in the meadow are designated as Threatened in both Ontario and Canada.

The Eastern Wood-pewee heard calling on both site visits in the woodland are designated as Special Concern in Ontario and in Canada.

The Grasshopper Sparrow heard calling on the second site visit in the meadow is designated as Special Concern provincially and federally.

4.2.2 Assessment of Potential Bat Roosting Habitat

During the summer, the Little Brown Myotis, Northern Myotis and Tri-colored Bats are found in a variety of forested habitats, as well as abandoned buildings, barns and attics. In forested habitats, cavities in trees, loose bark, foliage and other cover objects are used for roosting. These species forage in a variety of habitats where flying insects and spiders are present, often in association with wetlands, ponds and streams. Overwintering typically occurs in caves.

Assessments of potential bat roosting habitat were conducted on November 23, 2022 and May 31, 2023 using methods described in MNRF (2017). Several snag and cavity trees were identified during the assessment throughout the property. Snag trees along the northern portion of the Subject Property were limited to larger some diameter Silver Maples located primarily on private property adjacent the Main Street road allowance and clustered on the northeastern extent of the FODM11 community adjacent to the WODM5 community. The vast majority of snag and cavity trees on the Subject Property were observed throughout the WODM5 and FOC4-1 ELC communities which are proposed to be retained as part of future development on the property.

Based on the results of this assessment, acoustic bat monitoring was conducted at the property to determine if maternity roost colonies were present and determine the presence of any SAR bats. Two passive acoustic monitors were deployed on May 31, 2023 and recovered on June 11, 2023 for a total of 12 monitoring days. Deployment locations were selected to assess potential use of the candidate roosting habitat in identified trees. The locations of the bat monitors are illustrated in Figure 3.

Two passive acoustic monitoring devices were used at two separate locations during the monitoring period. Both sites were monitored using identical equipment consisting of the SM4Bat Full spectrum monitor and SMM-U1 Omni-directional ultrasonic microphones developed by Wildlife Acoustics Inc. All bat calls that were recorded by the equipment were analyzed using the Kaleidoscope Pro auto-identification program and confirmed for accuracy through manual review. Table 2 below illustrates the total number of bat passes identified to species detected at both monitors during the deployment and a more detailed summary is provided in Appendix E.

Table 2. Summary of Bat Acoustic Monitoring Results.

	Big Brown Bat (EPFU)	Eastern Red Bat (LABO)	Hoary Bat (LACI)	Silver-haired Bat (LANO)	Eastern Small Footed Bat (MYLE)	Little Brown Bat (MYLU)	Northern Long Eared Bat (MYSE)	Tri-colored Bat (PESU)	Monitor Totals
Unit A	-	2	5	1	-	-	-	-	7
Unit B	4	3	87	42	-	21	-	2	159
Total Passes	4	5	92	43	0	21	0	2	166

*Bat passes do not equal the actual number of bats. Individual bats can make multiple passes significantly skewing the results.

A total of 166 identifiable to species bat passes were recorded over the duration of the monitoring period. The majority of passes were detected at Monitor B, with most recordings identified as Silver-haired Bats and Hoary Bats. Little Brown Bat and Tri-colored Bat were also detected during the monitoring period. Further discussion is provided in Sections 5.1 and 5.5.1 below.

As discussed above, the Kaleidoscope Pro auto-identification program was used as part of the initial analysis to identify bats to species. Audio files that appear to be Chiroptera but that are not clear enough or lack sufficient call volume are classified as "No ID". Where specific species identification was not possible, these audio files were manually reviewed and classified as either low frequency or high frequency to determine if calls were within the range of Ontario's Species at Risk bats.

Unit A had seven No ID files after auto identification all of which were determined to fall within the low frequency range. Unit B had a total of 136 No ID files post auto identification with 42 of those falling in the high frequency range.

Recordings collected during the monitoring period also included audio files that were identified as non Chiroptera and categorized as noise (i.e. anthropogenic, atmospheric, other wildlife, etc.). These recordings were selected at random for review to ensure auto identification software was functioning correctly.

4.2.3 Amphibian Call Surveys

Our assessment indicates that the potential amphibian breeding habitat on the property is limited to the watercourse on the west side of the property. Amphibian use of the watercourse was assessed using amphibian call surveys, which were conducted in the spring of 2023.

An assessment of wetland communities (SWC3-1, MAM3-9, MAMM1-12, MAM2-2 and SWT2-5) was conducted prior to the onset of the first monitoring period. These areas were assessed for suitable breeding habitat. Prior to identifying potential monitoring stations, visual assessments of these wetland communities were conducted. A preliminary auditory assessment was also conducted by walking along the extent of the tree line on the property to identify amphibian calling on and adjacent to the property.

Suitable breeding habitat was not identified within the SWC3-1, MAM3-9, and MAMM1-12 communities and no calling was observed during the preliminary site walk. The wetland features at MAM2-2 and SWT2-5 were identified as potential amphibian breeding habitat, and this area was therefore selected for a monitoring station. The location of the amphibian survey station is illustrated in Figure 3.

The survey station was surveyed for a period of three minutes, between one half-hour after sunset, and midnight. All species of calling amphibians were recorded along with a calling code (0 – no calling; 1- calls not overlapping, can be discretely counted; 2 – calls overlapping, but numbers of individuals can still be estimated; 3 – full chorus, numbers of individuals cannot be estimated), along with an estimate of the number of individual amphibians where possible.

The first amphibian survey was conducted on April 3, 2023 and commenced at 20:43, while the air temperature was 9°C, winds were estimated to be 1 on the Beaufort Scale and sky was partly cloudy. The May 8, 2023 visit commenced at 21:40. Conditions were mostly cloudy, with an air temperature of 14°C and slight breeze. The final amphibian survey was completed on June 19, 2023 beginning at 21:34. Conditions were partly cloudy, with an air temperature of 19°C and a gentle breeze.

No amphibians were heard calling during the surveys. Intermittent road noise from Highway 6 west of the monitoring station was significant throughout each of the survey periods. This road noise, along with the marginal potential breeding habitat in the area, limits the overall quality of breeding habitat available in the wetland.

Although no calling amphibians were heard during surveys, a single Northern Leopard Frog was noted in a watercourse pool on May 3, 2023. Our observations indicate that it is not likely that the hydroperiod of this pool is sufficient to provide suitable breeding habitat for this species. Amphibian species heard calling off-site included Spring Peepers and Gray Treefrogs.

During an assessment completed previously on the property southeast of the Subject Lands, Beacon Environmental (2023) reported detecting Spring Peepers, Gray Treefrogs, Wood Frog, Green Frog and American Toad at various monitoring stations. A total of seven amphibian monitoring stations were established as part of the project. Two of these stations were located within 50 metres of the Subject Property boundary. Monitoring stations 4 and 5 were located in Willow Mineral Thicket Swamp (SWT2-2) and Cattail Mineral Shallow Marsh (MAS2-1) ELC communities respectively. A full chorus of Spring Peepers was identified outside of the outside survey station 4 on the first site visit. Spring Peepers were also identified during the second survey outside the survey station; however, no call code is provided. American Toad was also identified calling outside the property boundary and presumed to have been calling from the southern edge of the Subject Property based on the location of the survey station. A Gray Treefrog was also observed calling outside of the station area but located within the property boundary. No calling was detected at station 5 at any of the survey periods.

The amphibian breeding survey results of the Beacon Environmental (2023) report are comparable to those observed on the Subject Property and appears to confirm limited use of the Subject Property and adjacent lands to the south for amphibian breeding habitat.

4.2.4 Reptile Surveys

Active hand searches for reptiles and amphibians were conducted on June 23, July 14, August 10 and September 27, 2022, and May 3, June 10 and August 18, 2023, generally following methods described in OMNRF (2016). These searches resulted in the observation of one Eastern Gartersnake in the southeast corner of the meadow and into the woodland area.

4.2.5 Incidental Wildlife Observations

Incidental wildlife observations including signs were recorded during each visit to the Subject Property and included Eastern Chipmunk, Grey Squirrel, Red Squirrel, and White-tailed Deer.

Incidental insect observations include Cabbage White Butterfly *(Pieris rapae),* Calico Pennant *(Celithemis elisa),* Common Wood-Nymph *(Cercyonis pegala)* Cricket (*Gryllidae*), Dragonfly (*Odonata*), Emerald Ash Borer *(Agrilus planipennis),* Mosquito (*Culicidae*), Moth (*Lepidoptera*), Spittlebug (*Cercopidae*) and Skipper Butterfly (*Hesperiidae*).

4.3 Aquatic Habitat Assessment

A review of background mapping indicates that two tributaries to Bronte Creek are located on the property. The largest of the two tributaries is located on and adjacent to the west end of the property. This watercourse (identified as Reach TBC-1 in the 2023 GEO Morphix Fluvial Geomorphological Assessment) originates at the culvert under Highway 6 and conveys water across the southwest corner of the Subject Property. The channel of this watercourse is poorly defined within a Reed Canarygrass marsh and consists primarily of small, braided drainages that are often not discernible among the Reed Canarygrass. Where more defined sections of channel are present south of the property, bankfull width ranged from 1.0-2.0m in width and 0.2-0.3m in depth. The silty clay substates of this watercourse and adjacent areas support Reed Canarygrass and mixed emergent species.

No flow or standing water was present in the watercourse during assessments on August 10, 2022, September 27, 2022 and August 18, 2023, however a small pool of water within the Reed Canarygrass was present during assessments on April 3 and May 3, 2023. This pool was approximately 1m in length, 0.6m in width and approximately 0.15m in depth and was observed to be providing refuge for a single Northern Leopard Frog. No fish were observed in the pool, however shallow pools and the pond downstream are likely providing refuge for resident fish species. Fish community sampling was not completed in this watercourse as part of this assessment.

Background mapping also identifies a small watercourse on the eastern portion of the property. An assessment of this area indicates that a small ephemeral drainage is located within the woodland area, however this drainage is poorly defined and not considered to be a watercourse.

5.0 ASSESSMENT OF SIGNIFICANT NATURAL HERITAGE FEATURES

5.1 Species at Risk

Three Endangered species (Butternut, Little Brown Myotis and Tri-colored Bat) were observed or detected on the Subject Property and Threatened species observed on the property were limited to Eastern Meadowlark.

Butternut

Butternut is a medium-sized tree in the walnut family that can reach up to 30 m in height. This species is generally intolerant of shade and is often found growing in sunny openings within forests or in open areas. Butternut are known to hybridize with other members of the genus *Juglans*, including Japanese Walnut, Black Walnut and English Walnut.

The Butternut observed west of the property is a suspected hybrid based on physical characteristics and is not considered to represent a pure Butternut. The location of this tree is illustrated in Figure 3. Although this individual is suspected to be a hybrid, no portion of the proposed development is anticipated to impact this tree and adequate setbacks to prevent damage will be adhered to.

Myotis and Perimyotis Species

Two Endangered bat species (Little Brown Myotis and Tri-colored Bat) were detected during acoustic monitoring. Tri-colored Bats are known to roost within forested habitats and may roost in clumps of dead foliage and lichens (ECCC 2018). In more anthropogenically-modified landscapes, maternity roosts may also include barns or similar human-made structures (ECCC 2018). Females roost alone or in small colonies.

Single passes by Tri-colored Bats were detected on June 2 and June 10, 2023. Based on the occurrences, these passes are considered to be incidental movement past the monitor and do not likely represent roosting associated with trees in the vicinity of Unit B.

Little Brown Myotis often use buildings and other anthropogenic structures (e.g., bat boxes, bridges, and barns) for maternal roosting, but will also use cavities of canopy trees, foliage, tree bark, crevices on cliffs, and other structures (ECCC 2018). Maternity colonies range from several to hundreds of females with young (ECCC 2018).

Twenty-one passes by Little Brown Myotis were detected over eight nights at Unit B. Nightly passes ranged from 0 to 5. Passes were primarily recorded between 00:00 and 4:30 which are times typically associated with peak foraging activity. Little Brown bats typically emerge from their roost during dusk which is generally ends around 21:30 in early June. The passes recorded are not reflective of emergence times characteristic of Little Brown Myotis and do not indicate the use of maternal roost trees in the vicinity of the acoustic monitor. Since Little Brown Myotis typically roost in maternal colonies with several individuals, the number of passes detected at Unit B suggest that these passes are related to incidental daily movements and none of the trees near Unit B are being used as maternal roosting habitat. It is possible that a maternal roost is present in the vicinity of the property, however no potential roost trees will be impacted by the proposed project.

In addition to the bat passes identified to species, 42 additional audio recordings were manually reviewed and assessed to be within the high frequency range consistent with Ontario's SAR bat calls. These passes occurred most nights in similar frequency to the Little Brown Myotis throughout the 12-day monitoring period with the exception of June 8, where approximately 10 passes were recorded. The relatively low number of additional Myotis/Perimyotis passes identified through manual identification does not change the conclusions reached above that these passes are related to incidental daily movements.

Eastern Meadowlark

During the second breeding bird survey, one Eastern Meadowlark was heard calling in the meadow area adjacent to a deciduous hedgerow on the central portion of the property. The approximate call location of the Eastern Meadowlark is illustrated in Figure 3.

Eastern Meadowlark is an obligate grassland species that will breed in a variety of grassland habitat types, as well as pastures and hayfields, however Eastern Meadowlarks now nest most commonly in a variety of anthropogenic grassland habitats (pastures and hayfields) that effectively mimic the structural attributes (vegetation height and vegetation density) of native prairies (McCracken et al. 2013). Optimal nesting habitat for Eastern Meadowlark generally contains moderately tall (25 to 50 cm) grasses with abundant litter cover, a high proportion of grass cover and low proportions of shrub/woody vegetation cover and a low percent cover of bare ground (McCracken et al. 2013).

Based on the timing of the single Eastern Meadowlark observation on June 11, 2022, it is assumed that this individual was a solitary male and not part of a breeding pair on the Subject Property. Based on our assessments, the Subject Property does not appear to be providing breeding habitat for Eastern Meadowlark, however it does appear to be providing incidental foraging habitat.

Using data available from the Natural Heritage Information Centre (NHIC), as well as various atlases and information sources, a species at risk screening was prepared as part of our assessment (see Appendix F). Information available from NHIC indicated that two Endangered species (Butternut and Redside Dace) as well as two Threatened species (Bobolink and Eastern Meadowlark) have been documented in the vicinity of the Subject Property. Data retrieved from the NHIC is provided in Appendix G.

Aquatic assessments were not completed as part of this assessment, however based on the intermittent nature of the west watercourse on the Subject Property, it was determined that Redside Dace habitat is not present on the property.

No genetically pure Butternut were observed on the property. A Butternut hybrid was documented along the west limit of the property, however this trees is not considered to represent a species at risk.

Bobolink are known to use habitats similar to Eastern Meadowlark. Although breeding bird surveys were conducted as part of this project, this species was not detected on or adjacent to the Subject Property. Therefore, it is our conclusion that the Subject Property is not providing habitat for this species.

5.1.1 Other Potential Species of Conservation Concern

In addition to the above, Special Concern species observed on the property were limited to Eastern Wood-pewee and Grasshopper Sparrow. The Eastern Wood-pewee is one of the most common and

widespread songbirds associated with North America's eastern forests (COSEWIC 2012). Often associated with forest clearings and edges, Eastern Wood-Pewee breeds in virtually every type of wooded community in eastern North America (Watt et al. 2020). Breeding territories of Eastern Wood-pewee in Southern Ontario are reported to range from 1.37ha to 2.03ha in size (COSEWIC 2012). This species is relatively common in southwestern Ontario; however, declining population of this species has prompted the federal and provincial governments to designate this species as Special Concern.

Eastern Wood-pewee were heard calling from the woodland east of the meadow area on the eastern portion of the Subject Property. Eastern Wood-pewee were heard calling during each of the breeding bird surveys and appear to be using the woodland feature for breeding.

Grasshopper Sparrows were heard calling at three locations in the meadow community on the Subject Property during the second breeding bird survey on July 6, 2022. Grasshopper Sparrows typically arrive in southern Ontario in late-May, where they initially nest for 8-9 days, followed by a second clutch in Mid-June (Vickery 2020). Based on the timing of observations, it is likely that the observation on the Subject Property were of fledged juveniles from adjacent nesting sites who were using the property as incidental foraging.

Information obtained from NHIC indicates that two additional Special Concern Species (Snapping Turtle and Eastern Ribbonsnake) have been documented in the vicinity of the Subject Property. Potential habitat for Snapping Turtles is presumed to be present in the tributary to Bronte Creek and associated wetlands and pond downstream of the property, as well as the East Morriston Swamp Wetland Complex.

No Snapping Turtles were observed on or adjacent to the Subject Property and the lack of standing water in these wetlands makes the habitat unsuitable for prolonged use by this species.

Eastern Ribbonsnake is a semi-aquatic species that is almost always found close to water, such as wetlands and the shorelines of lakes and rivers, where it hunts for frogs and small fish. Potential habitat for Eastern Ribbonsnake is not located on or adjacent to the property. The limited standing water in wetlands on the property make these wetlands unsuitable for this species. This species may occur in portions of the East Morriston Swamp Wetland Complex, with any potential habitat located off-site.

5.2 Significant Woodlands

During our review of background mapping available for the property, it was noted that portions of the Subject Property have been designated as Greenland (Significant Woodland) in the County of Wellington Official Plan (Figure 2). The county of Wellington Official Plan provides a definition of woodland but does not provide criteria for delineating woodlands. To be consistent with the definition of woodland in the PPS and mapping standards of the MNRF, the extent of woodlands on this property were refined to coincide with vegetation communities that meet the ELC definition of forest (60% or more canopy cover).

Using this criteria, our assessment indicates that the woodland on this property generally follows the White Cedar Forest (FOC2-2 and FOC4-1) on the property. Since canopy cover in the WODM5 community on the property is less than 60% and often dominated by hawthorns, this vegetation community was generally excluded from the refined extent of woodlands illustrated in Figure 4.

To be considered as significant, Section 5.5.4 of the Wellington Official Plan states that "In the Urban System, woodlands over 1 hectare are considered to be significant by the County and are included in the Greenlands System." Section 5.5.4 also states that Significant woodlands will be protected from development or site alterations which would negatively impact the woodlands or their ecological functions.

As the woodland on and adjacent to this property measures more than 1ha in size, the refined woodland is considered to be significant woodland.

5.3 Wetlands

As illustrated in Figure 2, mapping available from the Ministry of Natural Resources and Forestry (MNRF) indicates that a portion of the East Morriston Swamp Non-Provincially Significant Wetland Complex (non-PSW) is located along the eastern end of the Subject Property and extends south of the property within the woodland feature. Our assessment confirmed the presence of three primary wetland vegetation communities on and adjacent to the property. A discussion of each community is provided below.

From our assessment, the current extent of the East Morriston Swamp Wetland Complex generally follows the extent of the SWC3-1 community on the southern portion of the property. Although not included in the mapped extent of the evaluated wetland, the SWC3-1 community generally follows the lower elevation sections of the slope on the western portion of the property, extending towards the Bronte Creek tributary on the west side of the property. For the purposes of this assessment, this portion of the SWC3-1 community is considered to be contiguous with the non-PSW.

Located on the western end of the property is a Red-osier Mineral Thicket Swamp, which also follows the lower elevation portion of a slope. This vegetation community serves as a transition to the Reed Canarygrass marsh associated with the Bronte Creek tributary. For the purposes of this assessment, these vegetation communities are considered to be wetland.

Site visits were conducted with Conservation Halton staff on August 18, 2023 and May 1, 2024 to verify the extent of wetlands on this property. The refined extent of wetlands on this property are illustrated in Figure 4.

5.4 Watercourses and Fish Habitat

As illustrated in Figure 2, two tributaries to Bronte Creek have been identified on the Subject Property. The Bronte Creek tributary located on the western portion of the property was determined to be providing intermittent potential fish habitat, as this poorly defined watercourse contains isolated pools in the spring and dries completely during the summer. No obvious seeps or springs were noted in the Reed Canarygrass marsh, however it is assumed that some spring or seasonal groundwater inputs do occur. Further discussion of potential impacts to this watercourse is provided below.

The Bronte Creek tributary on the east side of the property was determined to be a minor drainage swale, which conveys water ephemerally across the property. Because this drainage is poorly defined, this drainage is not considered to be a watercourse and is not considered to be providing fish habitat. The

proposed development will not affect flow conveyance in this watercourse or affect any potential erosion on the property.

5.5 Significant Wildlife Habitat

The SWH Criteria Schedule for Ecoregion 6E (OMNRF 2015) identifies four main types of Significant Wildlife Habitat (SWH): seasonal concentrations areas, rare vegetation communities and specialized wildlife habitat, habitats of species of Conservation Concern, animal movement corridors. These are discussed below in relation to the natural features on and adjacent to the site and an assessment table is provided in Appendix H.

5.5.1 Seasonal Concentration Areas

The Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E identifies 16 types of seasonal concentrations of animals that may be considered significant wildlife habitat. These include, but are not limited to:

- Waterfowl Stopover and Staging Areas (Aquatic and Terrestrial);
- Shorebird Migratory Stopover Area;
- Raptor Wintering Area;
- Bat Hibernacula;
- Bat Maternity Colonies;
- Bat Migratory Stopover Area
- Turtle Wintering Areas;
- Reptile Hibernaculum;
- Colonially -Nesting Bird Breeding Habitat (Bank and Cliff);
- Colonially -Nesting Bird Breeding Habitat (Tree/Shrubs);
- Colonially -Nesting Bird Breeding Habitat (Ground);
- Migratory Butterfly Stopover Areas;
- Landbird Migratory Stopover Areas;
- Deer Yarding Areas; and
- Deer Winter Congregation Areas.

Seasonal concentration areas are typically designated as significant wildlife habitat if it supports a species at risk or if habitat destruction is expected to result in large population loss.

Silver-haired bats were detected at each monitor during acoustic monitoring. As only one pass was detected by Unit A, no potential maternal colonies are located near this monitor.

A total of 42 passes by Silver-haired bats were recorded at Unit B. Passes ranged from 1-7 per night over the monitoring period. Because passes were generally less than 5 per night, these data do not indicate that a potential Silver-haired Bat maternal colony is located near this monitor.

Our assessment of the property indicates that it is unlikely that snake hibernacula are located within the cultural meadow portion of the property. As this portion of the property is generally high and will not likely maintain suitable soil moisture conditions over the winter, this portion of the property is not likely

being used by snakes for overwintering. It is possible that hibernacula may be present in the cedar woodland near the bottom of slope, and if so, no impact to potential hibernacula will occur as a result of this project.

It is also possible that the cedar woodland and wetland areas are providing winter habitat for White-tailed Deer. For the purposes of this assessment, it is assumed that the cedar forest on the property is providing habitat as a seasonal concentration area for White-tailed Deer.

5.5.2 Rare Vegetation Communities

Rare habitat includes vegetation communities that are designated as extremely rare to uncommon in Ontario. Those that qualify as rare habitats are assigned an S-Rank of S1, S2 or S3 by the Natural Heritage Information Center.

The Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E identifies 7 specialized habitats that may be considered significant wildlife habitat. They are:

- Cliffs and Talus Slopes;
- Sand Barren;
- Alvar;
- Old Growth Forest;
- Savannah;
- Tallgrass Prairie; and
- Other Rare Vegetation Communities.

No rare vegetation communities are present on or adjacent to the Subject Property.

5.5.3 Specialized Habitats of Wildlife considered SWH

Some wildlife species require large areas of suitable habitat for their long-term survival and many wildlife species require substantial areas of suitable habitat for successful breeding. Their populations are at risk of decline when habitat becomes fragmented or reduced in size.

Specialized habitats for wildlife include:

- Waterfowl Nesting Area;
- Bald Eagle and Osprey Nesting, Foraging and Perching Habitat;
- Woodland Raptor Nesting Habitat;
- Turtle Nesting Areas;
- Seeps and Springs;
- Amphibian Breeding Habitat (Woodland);
- Amphibian Breeding Habitat (Wetlands); and
- Woodland Area-Sensitive Bird Breeding Habitat.

Several seeps were observed in the White Cedar forest during our assessments of the property. These seeps are located near lower positions on the slope and are too small to delineate on figures. Wetlands in

the vicinity of these seeps did not contain standing surface water in the spring and no amphibian or specialized wildlife use of these areas were noted.

Although various wetland features are located on the property, no vernal pools are present that would provide suitable habitat for amphibian breeding. Amphibian call surveys completed in 2023 confirmed that no significant amphibian breeding occurs on the property.

5.5.4 Habitats of Species of Conservation Concern

Habitats of Species of Conservation Concern include wildlife species that are listed as Special Concern or rare, that are declining, or are featured species. Habitats of Species of Conservation Concern do not include habitats of Endangered or Threatened species as identified by the Endangered Species Act. The following habitats are considered candidate SWH:

- Marsh Breeding Bird Habitat;
- Open Country Bird Breeding Habitat;
- Shrub/Early Successional Bird Breeding Habitat;
- Terrestrial Crayfish; and
- Special Concern and Rare Wildlife Species.

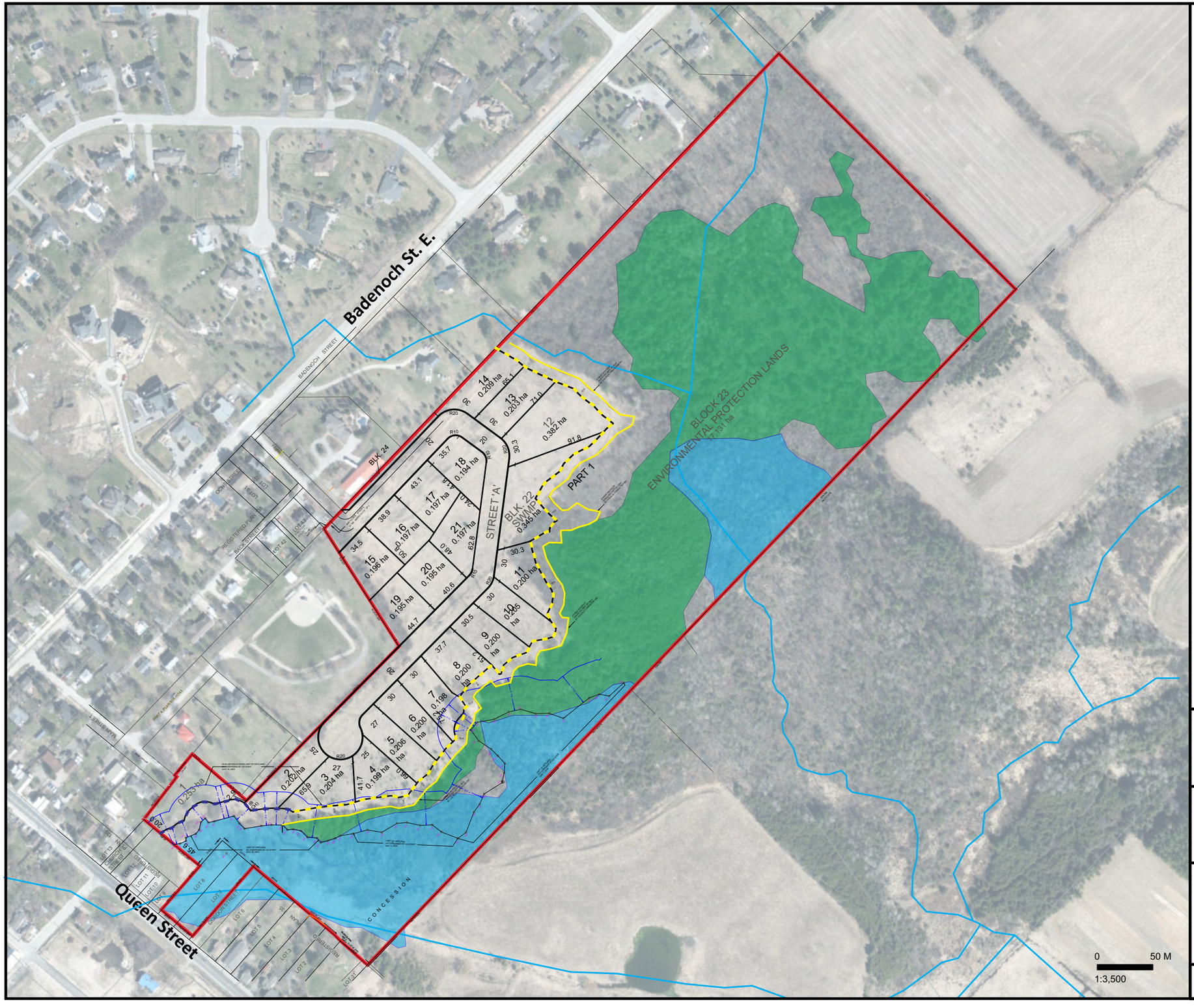
As described above, Eastern Wood-pewee was heard calling during both breeding bird surveys from the woodland on the northeast portion of the property. For the purposes of this assessment, the woodland on the eastern portion of the property is considered to be Eastern Wood-pewee habitat and therefore also considered Significant Wildlife Habitat.

The portion of the WODM5 community on the central and southern portion of the property was observed to be dominated by tall shrubs of hawthorn, which are not typical habitat for Eastern Wood-pewee. Because available habitat on this portion of the property is not typical breeding habitat for Eastern Wood-pewee and was not being used by this species, the WODM5 community on the central and southern portion of the property is not considered to be breeding habitat for Eastern Wood-pewee or significant wildlife habitat.

Grasshopper Sparrows were heard calling within the cultural meadow on the Subject Property during the second breeding bird survey. Based on the timing of when calls were detected, it is our assessment that these individuals were likely recently fledged juveniles who were using the property for incidental foraging. It is therefore our assessment that the meadow on the property is not providing habitat for species of conservation concern.

5.5.5 Migration Corridors

The Significant Wildlife Habitat Technical Guide (SWHTG) defines animal movement corridors as elongated; naturally vegetated parts of the landscape used by animals to move from one habitat to another. To qualify as significant wildlife habitat, these corridors should be a critical link between habitats that are regularly used by wildlife.



Legend

- Subject Property
- Watercourse
- Extent of Significant Wildlife Habitat
- 10m Significant Wildlife Habitat Buffer
- 15m Wetland Buffer
- Refined Significant Woodland
- Refined Wetland

Figure 4
Refined Extent of Natural Heritage Features on the Subject Property

Environmental Impact Study for 11 Main Street, Morriston

Prepared for: **WDD International**

Prepared by: COLVILLE CONSULTING INC.

DATE: August 2024

FILE: C22059

Based on our review of aerial imagery, it appears that the woodland and wetland features on and adjacent the Subject Property provide opportunities for localized wildlife movement in the area, but does not provide a corridor function.

5.6 Significant Areas of Natural and Scientific Interest (ANSI)

No Areas of Natural and Scientific Interest are located on or adjacent to the Subject Property.

6.0 IMPACT ASSESSMENT

The proposed development on the Subject Property includes 21 estate residential lots along the northwestern portion of the property, as well as a stormwater management pond. Proposed residential lots are approximately 0.20ha in size and will front onto new streets to be constructed as part of the development (see Appendix A and Figure 4). Development adjacent to the Subject Property will also include the extension of Ochs Street along the northern boundary of the Subject Property to provide access to the property.

The vast majority of the proposed development has been designed to be located within the cultural meadow portion of the Subject Property and incorporate buffers from woodland and wetland areas. An assessment of potential impacts to the various natural heritage features on and adjacent to the property is included below.

6.1 Significant Habitat of Endangered and Threatened Species

Three Endangered species (Butternut, Little Brown Myotis and Tri-colored Bat) were documented on the property during our surveys. As described previously in this report, the Butternut is considered to be a hybrid based on physical characteristics and is not considered to be a pure Butternut for the purposes of application of the Endangered Species Act.

Despite this tree being considered a putative hybrid Butternut, the tree is located adjacent to the Subject Property and suitable setbacks to prevent damage to the tree during construction activities will be adhered to. No negative impact to the putative hybrid Butternut is anticipated.

Little Brown Myotis and Tri-colored Bat were detected during acoustic monitoring. As described above, the passes recorded by Tri-colored Bats and Little Brown Myotis are considered to be incidental daily movements and no potential maternal roosts are suspected to occur in trees near the proposed development.

Threatened species observed on the property were limited to an Eastern Meadowlark, which was observed in the meadow portion of the property during the first breeding bird survey. This individual was only observed during the first visit and not the second visit, which suggests this male is not part of a breeding pair. As Eastern Meadowlarks often have multiple clutches per year and males often stay in close proximity nesting females (Vickery 2020), there are no indications that Eastern Meadowlark are breeding on the Subject Property and the observed use is assumed to be limited to foraging.

It is our assessment that the proposed project will have no impact on significant habitat of Endangered or Threatened Species.

6.2 Species of Special Concern

Two Species of Special Concern (Eastern Wood-pewee and Grasshopper Sparrow) were documented during our survey work. The Eastern Wood-pewee was heard calling within the woodland on the east side of the Subject Property and the Grasshopper Sparrow was observed foraging within the cultural meadow on the central portion of the property. The approximate observed locations of these species are illustrated in Figure 3.

Eastern Wood-pewee is one of the most common and widespread songbirds associated with North America's eastern forests (COSEWIC 2012). This species breeds in virtually every type of wooded habitat, from urban shade trees, roadsides, woodlots, and orchards to mature forests (McCarty 1996). Breeding territories of Eastern Wood-pewee in Southern Ontario are reported to range from 1.37ha to 2.03ha in size (COSEWIC 2012). Eastern Wood-pewee is still considered common in southern Ontario, however the declining population of this species has prompted the federal and provincial governments to designate this species as Special Concern.

Eastern Wood-pewee were heard calling from the woodland on the eastern portion of the Subject Property during both breeding bird surveys, suggesting that the woodland is being used as breeding habitat. Based on our observations, Eastern Wood-pewee were utilizing the interior portions of the woodland on the east side of the property, with the nearest detection approximately 120m from the woodland edge.

As illustrated in Figure 4, no portion of the refined woodland will be directly affected by the proposed development lots have been located 10m from the edge of the woodland. Based on the proximity of Eastern Wood-pewee to the proposed development and the understanding that Eastern Wood-pewee are somewhat tolerant to urban land uses, the proposed development will have no impact on habitat of Eastern Wood-pewee.

Grasshopper Sparrows were heard calling at three locations in the meadow community on the Subject Property during the second breeding bird survey on July 6, 2022. Based on the timing of observations, it is likely that the observations on the Subject Property were of fledged juveniles from adjacent nesting sites who were using the property as incidental foraging habitat. Because the Subject Property appears to only be providing incidental foraging habitat, proposed development in the meadow will not impact significant habitat of this species.

6.3 Significant Woodlands

As stated above, the woodland on this property has been refined to follow the White Cedar forest community. During our assessment it was noted that the portion of the woodland on and adjacent to the property was providing habitat for bird and wildlife species which are generally common in the vicinity of the property.

Based on the results of our observations, proposed lots were recommended to be located 10m from the extent of the woodland on this property. The recommended buffer will be sufficient to avoid directly impacting trees in the woodland, as well as avoiding any impacts to species using the woodland area.

Based on our assessment, the proposed residential lots adjacent to the woodland will have no impact on ecological functions of the Significant Woodland on and adjacent to the Subject Property. Despite the above conclusion, it is recommended that the mitigation measures included below be incorporated during future construction on the Subject Property.

As illustrated in Figure 4 and Appendix A, the stormwater management block has been located in the southeast corner of the proposed development, adjacent to the refined woodland boundary. It is understood that water from the stormwater pond will outlet into a flow dissipator and into the woodland. The pond and flow dissipator will have no impact on the functions of the woodland, however water discharged from the stormwater pond will have the potential to affect hydrology and tree health within a small portion of the woodland.

It should be noted that detailed design for the stormwater pond has not been finalized, and therefore this assessment of potential impacts is intended to be preliminary and is based on the conceptual plans prepared. Our assessment of the woodland and wetland on the portion of the property adjacent to the stormwater pond indicates that these vegetation communities are dominated Eastern White Cedar. It is anticipated that soil moisture in the woodland area downstream of the outfall will increase as a result of the water discharged from the stormwater pond, however as this species is capable of growing in moist soil conditions, additional soil moisture is not likely to affect Cedar trees in the woodland.

Since this stormwater pond is intended to hold an attenuate runoff from installed impermeable surfaces such as roadways and driveways, it is expected that runoff from these areas will occasionally contain de-icing compounds. Road salt and de-icing compounds can be absorbed by trees, resulting in scorching of leaves and an overall decline in tree health. Various species are affected by these compounds differently, with Eastern White Cedar considered to be moderately tolerant to the effects of road salt.

It is anticipated that some of the White Cedar trees immediately downstream of the outfall may be affected by water quality, however this impact is likely to be localized. It is recommended monitoring be completed downstream of the outfall for two years after completion of the proposed project to assess any impacts stormwater may have on tree health or soil stability. If tree health concerns are noted, it is recommended that salt tolerant species, such as White Spruce or Balsam Poplar be installed in place of any declining White Cedars. Both of these species are known to occur on or adjacent to the property.

In addition to water quality issues, it is possible that increased water volumes discharged to the woodland may result in localized erosion from focused water flow. Our assessment of the property and the anticipated outfall location indicates that the microtopography in this area makes it difficult to predict where stormwater pond discharge will flow. Because of this uncertainty, it is recommended that a future monitoring program also incorporate monitoring for any downstream focused flow or erosion. If any future focused flow or erosion is observed, it is recommended that the stormwater engineer be re-engaged to provide mitigative options and be involved with adaptive management activities on the site.

6.4 Wetlands

Our assessment confirmed the presence of three primary wetland vegetation communities on and adjacent to the property. For the purposes of this assessment, the extent of the East Morriston Swamp

Non-PSW Wetland Complex generally follows the extent of the SWC3-1 community on the southern portion of the property. The Red-osier Mineral Thicket Swamp and the Reed Canarygrass marsh are also considered to be wetland. The refined extent of wetlands on this property are illustrated in Figure 4.

As illustrated in Figure 4, a portion of the development is proposed to be located near the Red-osier Mineral Thicket Swamp and the Reed Canarygrass marsh on the west side of the property. Based on our assessments, the Reed Canarygrass marsh occurs primarily in association with the Bronte Creek tributary and appears to be sustained by a combination of surface water runoff from upstream of the property and seasonal groundwater seepage. This portion of the wetland does not contain any vernal pools or appear to provide any significant wildlife habitat functions. The Red-osier Mineral Thicket Swamp occurs as a relatively narrow band of vegetation on the peripheries of the Reed Canarygrass marsh, generally occurring near of at the toe of the slope.

Based on our assessment of the wetland on the west side of the property, a 15m buffer from the wetland is recommended to maintain any ecological functions of this wetland. It is our assessment that wildlife functions in this wetland are impaired by road noise and disturbance along Highway 6 and that development associated with the proposed lots will not impact wildlife habitat in the wetland.

Our observations of the wetland indicate that a majority of water conveyed to this wetland is from lands upstream of Highway 6. The proposed development will not impact the conveyance of surface water to and from this wetland. As part of the assessment of this property, a preliminary water balance was completed to assess potential impacts development of the property may have on adjacent wetlands. This assessment indicates that grading within the proposed development areas will not pose a hydrologic impact to adjacent wetland areas.

As illustrated in Figure 4 and described above, the wetland on the remainder of the property generally follows the White Cedar swamp, which occurs near and down gradient from the toe of slope. These wetland areas generally occur south of the White Cedar forest community, which occurs on the middle and upper portions of the slope. The White Cedar swamp communities on the property were observed to be providing limited specialized wildlife habitat functions, and very little, if any, surface water was observed in most wetland areas.

As illustrated in Figure 4, proposed lot boundaries have been located a minimum of 15m from the refined extent of the wetland, with varying portions of lots 3, 4, 6, 7 and 8 occurring within 30m of the mapped extent of the wetland. It is anticipated that future development on parts 3, 4, 6 and 8 will be limited to site grading, which will have no direct impact on the adjacent wetland area. Additionally, due to the nature of the soils in this area and the wetland adjacent to these lots, the anticipated lot grading will not impact water volumes entering this wetland.

Our assessment of the property indicates that the wetland adjacent to lot 7 generally occurs in a location where drainage from a portion of the property and baseball diamond is directed. Surface water and shallow groundwater appears to discharge to this area, ultimately resulting in a wetland that has development on often saturated soils. Standing water in this area is generally limited to water that accumulates in ATV ruts, with no vernal pools occurring.

Based on our observations and assessment, the proposed lot boundaries and anticipated grading associated with lot 7 will have no ecological impact to the adjacent wetland area. Vegetation currently in this area will continue to persist following development and any observed wildlife functions should be unchanged.

It is our assessment that the proposed lot boundaries and anticipated future grading required for these lots will not impact the observed ecological functions of the wetland. Additionally, it is expected that future development on these lots will have no effect on the hydrological functions of wetland on this property and the proposed development will not result in any flooding or erosion concerns downstream of the property.

Although not illustrated on Figure 4, it is recommended that the provided buffers between the proposed lot boundaries and the adjacent woodlands and wetlands be restored to enhance the ecological function of the buffer and complement the adjacent natural areas. It is expected that a detailed enhancement plan will be prepared as a condition of future approvals on the property. This plan is anticipated to outline recommended enhancements, including incorporating a combination of native trees and shrubs, as well as habitat enhancements, such as brush piles and nesting boxes. Periodic monitoring can also be incorporated into this plan as required.

6.5 Fish Habitat

The Bronte Creek tributary located on the western portion of the property was determined to be providing potential intermittent fish habitat. Proposed grading and future development on the site is planned to be located over 75m from this watercourse and the vegetation within the riparian and wetland feature will be maintained. From our assessment, the proposed development will have no impact on fish habitat in the Bronte Creek tributary.

6.6 Significant Wildlife Habitat

For the purposes of this assessment, it is assumed that the woodland and portions of the WODM5 community are providing significant wildlife habitat. Our assessment indicates that it is possible that scattered trees in the woodland are providing potential roosting habitat for bats. As no trees in the woodland areas will be removed to facilitate development on the property, potential bat roosting habitat on this property will not be impacted.

Our assessment of the White Cedar woodland and wetland areas indicate that these areas could be providing winter habitat for White-tailed Deer, due to the canopy of this community and the potential to minimize snow depths. Since no portion of these vegetation communities will be impacted by the proposed project, no impact to potential use by White-tailed deer will result from this development.

Several seeps were observed in the White Cedar forest during our assessments of the property. These seeps are located near lower positions on the slope and are too small to delineate on figures. Although no specific specialized habitat functions were noted in association with these seeps, these areas are located in the woodland and will not be directly impacted by the proposed development.

Eastern Wood-pewee was heard calling during both breeding bird surveys from the woodland on the northeast portion of the property. For the purposes of this assessment, the woodland on the eastern portion of the property is considered to be Eastern Wood-pewee habitat and also considered Significant Wildlife Habitat. Because potential habitat of Eastern Wood-pewee on the property will not be altered and development setbacks from the woodland will be sufficient to avoid impacts to this species, the proposed development will not affect potential significant wildlife habitat in the woodland.

6.7 Indirect Impacts

In addition to the direct impacts discussed above, it is anticipated that the proposed development may result in indirect impacts which may affect the ecological functions of the woodland and wetland features. Potential indirect impacts that could occur as part of this project include increases in ambient light and noise.

It is anticipated that security and decorative lighting will be installed on the proposed residences and street lighting, which could increase the existing ambient lighting in the area. As the area north and west of the Subject Property is already urbanized and most of the species observed utilizing the woodland adjacent to the development are common in association with residential land uses, it is not anticipated that the expected increase in ambient lighting will pose an impact to wildlife species using the woodland. To minimize any increases in ambient light to lands adjacent to the development, it is recommended that security lighting be directed away from the woodland and wetland areas. It is also recommended that shades be installed on lighting to avoid direct lighting upwards, which may adversely influence bird behaviors.

Although it is not anticipated that noise levels on the property will significantly increase as a result of everyday living activities, it is anticipated that an increase in noise may result for a short period of time during construction activities on the property. This increase in noise has the potential to temporarily disrupt wildlife in close proximity to the development, however based on the species observed, impacts are not anticipated to be significant.

7.0 MITIGATION MEASURES

As discussed above, it is our expectation that the proposed development will have no impact on the ecological functions of the significant woodland, wetlands, and watercourses on and adjacent to the Subject Property. To assist in avoiding any impacts associated with the proposed residential development, it is recommended that the following mitigation measures be implemented during detailed design and construction of residences on these properties.

- Any required vegetation removal should be conducted in a manner to avoid impacts to nesting birds that may be utilizing habitats on the property. The breeding bird period for this area is generally March 15 to August 31. A survey for active bird nests should be conducted prior to any vegetation removal or site alteration planned to occur during this window;
- Any grading or filling to be conducted on the Subject Property should be designed where possible to maintain existing overland flow patterns to help avoid hydrological and sedimentation impacts to the woodland and wetland.

- It is recommended that roof drains and runoff from impervious surfaces be directed towards the wetland and woodland where possible and the use of low impact development features be considered to assist with maintaining water infiltration.
- Exclusion fencing should be installed no less than 1m from the drip-line of trees to be retained in the Significant Woodland to ensure roots are not compacted or injured;
- Appropriate sediment and erosion controls should be installed prior to any grading, construction or site alteration works on the Subject Property to prevent sediment transfer to the wetland and watercourse features;
- Any silt fences should be properly embedded (as per Ontario Provincial Standard Specification 805) into the ground to reduce any offsite movement of silt;
- Native tree and shrub species should be incorporated into future landscape plans where possible; and,
- Any exterior lighting should be directed away from the Significant Woodland and wetland on and adjacent to the property where possible.
- It is recommended that continuous rear yard fencing be installed adjacent to buffer areas to help prevent encroachments into established buffers.
- It is recommended that a buffer enhancement plan be prepared following detailed design, with this plan to outline works to enhance buffers adjacent to the woodland and wetland and complement these features. Monitoring of plantings and enhancement should be incorporated into this plan.
- Due to the uncertainty regarding discharge from the stormwater management pond, it is recommended that that a detailed monitoring plan be prepared to assess potential impacts related to water quality and quantity in the woodland. The monitoring plan should incorporate observations during the spring, summer and fall of the first two years of operation and include observations related to tree health, any change in species composition in ground covers and potential signs of soil erosion. Monitoring should also include consultation with the adjacent landowner to assess downstream impacts. Any change in vegetation health, composition or signs of erosion should be discussed with the stormwater engineer to determine mitigative measures.

8.0 CONCLUSION

Colville Consulting Inc. was retained to complete an Environmental Impact Study to identify potential impacts associated with the proposed development on the Subject Property located at 11 Main Street, Village of Morriston, Wellington County. Our assessment of the property verified that natural heritage features located on or adjacent to the property include a tributary to Bronte Creek, wetland, woodland and areas likely functioning as significant wildlife habitat. The woodland and wetland features have been delineated and suitable buffers applied to prevent potential negative impacts from the proposed development.

Based on our observations of the property and adjacent areas, it is our conclusion that the proposed development will have no impact on ecological function of natural heritage features on and adjacent to the Subject Property. To assist with avoiding impacts, it is recommended that the above noted mitigation measures be implemented as required during development design, construction and post construction on the property.

Please do not hesitate to contact the undersigned at 905-935-2161 should you have any questions regarding the contents of this EIS.

Respectfully submitted by:

Brett Espensen, B.A. Hons, EP.
Colville Consulting Inc.

Ian Barrett, M.Sc.
Colville Consulting Inc.

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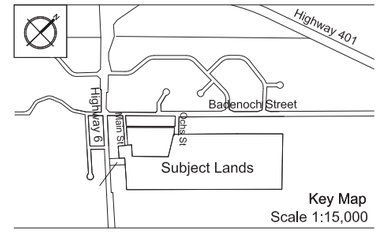
Appendix A

Development Plan

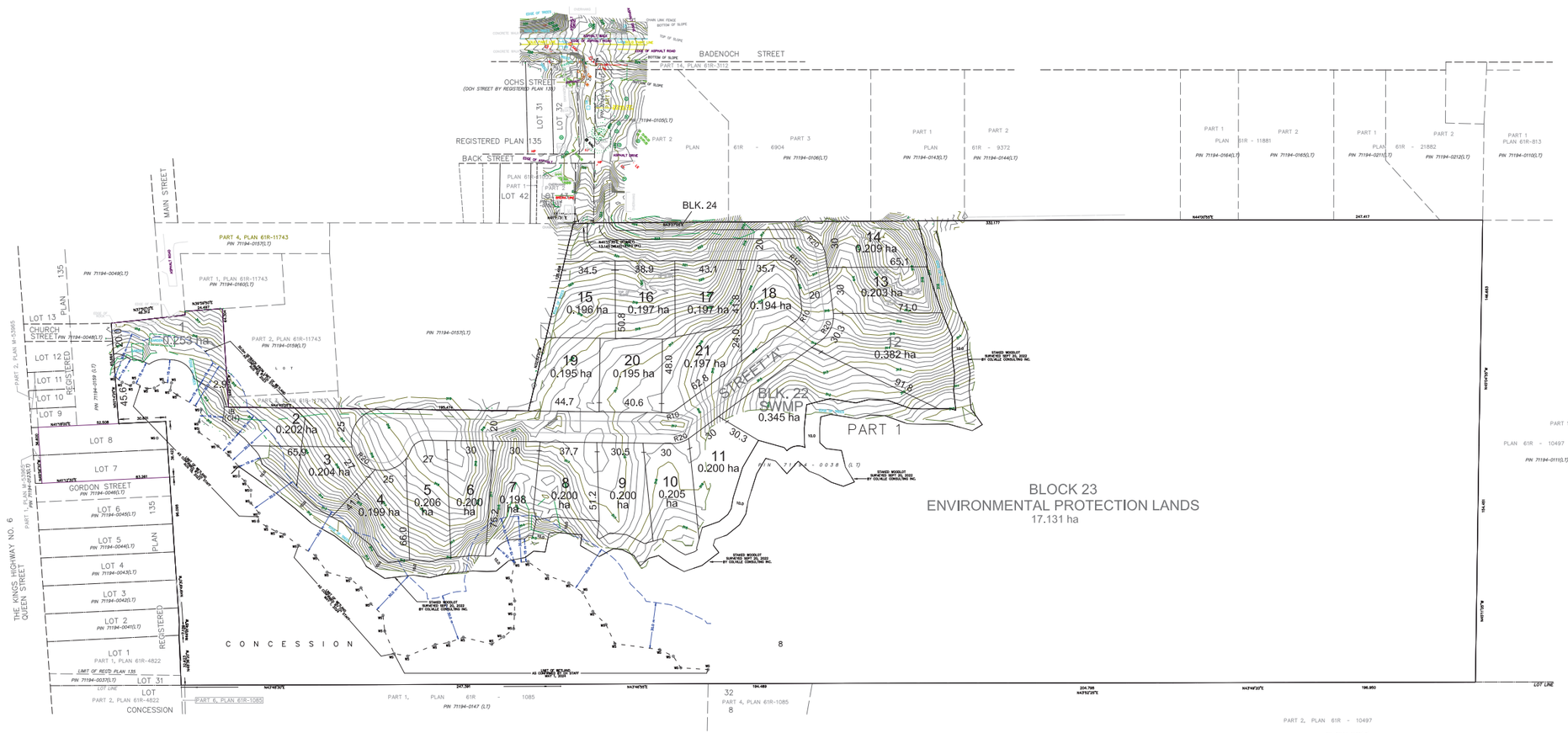
DRAFT PLAN OF SUBDIVISION

PART OF LOTS 7 & 8
NORTH OF QUEEN STREET
REGISTERED PLAN 135

AND PART OF LOT 31
CONCESSION 8
TOWNSHIP OF PUSLINCH
COUNTY OF WELLINGTON



Key Map
Scale 1:15,000



OWNER'S CERTIFICATE:

I authorize Weston Consulting Group Inc. to prepare and submit this plan for draft approval.

Date: ___ ___ ___

WDD MAIN STREET Inc. c/o FAISAL HAMADI
499 BRANT STREET
BURLINGTON, ONTARIO L7R 2G5
PHONE: 905-483-7399
Info@wddinternational.com

SURVEYOR'S CERTIFICATE:

I hereby certify that the boundaries of the lands being subdivided and their correct relationship to the adjacent lands are accurately and correctly shown on this plan.

Date: ___ ___ ___

RAYMOND J. SIBTHORP, OLS
J.D. BARNES LIMITED
257 WOODLAWN ROAD WEST, UNIT 101
GUELPH, ONTARIO N1H 8J1
PHONE: (519) 822-4031 www.jdarnes.com

ADDITIONAL INFORMATION:

[Section 51(17) of the Planning Act, R.S.O. 1990, c. P.13],
as amended to June 20, 2024.
a), b), e), f), g), j) & l) - on plan.
c) - on key plan
d) - see statistics
h) - piped water to be installed by developer
i) - silty sand, sand and silt, and clayey silt
k) - all services to be made available by developer

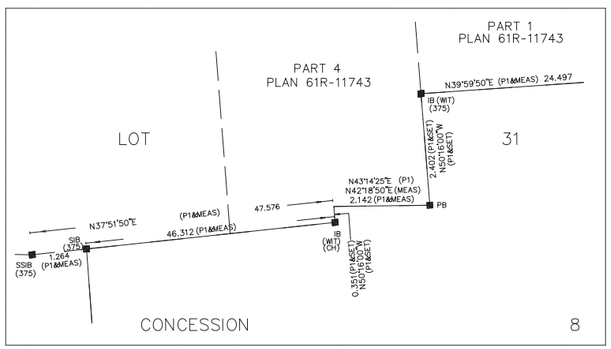
DEVELOPMENT STATISTICS:

LOTS/BLOCKS	LOTS	AREA
Single Detached Lots (20 m+) [Lots 1-21]:	21	4.436 ha
SWMP [Blk. 22]:		0.345 ha
Environmental Protection Lands [Blk 23]:		17.131 ha
Additional lands [Blk. 24]:		0.059 ha
Roads:		1.133 ha
Total:	21	23.104 ha

INTEGRATION DATA		
OBSERVED REFERENCE POINTS (ORPs): UTM ZONE 17, NAD83 (CSRS) (2010.0). COORDINATES TO URBAN ACCURACY PER SECTION 14 (2) OF O.REG 216/10.		
POINT ID	EASTING	NORTHING
ORP (A)	571 819.11	4 810 772.76
ORP (B)	572 189.46	4 811 593.30
COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.		

THE RESULTANT TIE BETWEEN ORP (A) AND ORP (B) IS 900.588 N24°17'31"E

NOT TO SCALE



SCALE
0 80m

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REVISIONS LIST

09 JUN 2024	Modify Lots 1-3,7 per 15m wetland setback. Outline/measure enhanced buffer area
14 MAY 2024	Update using new topo survey with 30m wetland setback. Modify SWM & Lots 1-14.
02 MAY 2024	Revise Lots 1-14 & SWM Block. Remove walkway and revise Lots 15-21
20 DEC 2023	Revise cul-de-sac to R=20 m & lots 3-5,
03 OCT 2023	Remove wetland limits by Colville Sept 20, 2022. Remove original edge of trees & staked limit. Insert Staked Woodlot Surveyed Sept 20, 2022 by Colville Consulting Inc.
20 SEP 2023	Remove old treeline, Regulated Limits. Update using 2023-09-11 topo file
15 SEP 2023	Revise ROW width to 20m & revert back to north-east access
23 FEB-11 APR 2023	Revise per topo plan Revise per updated survey plan & survey text
14 DEC 2022	Revise St. B per grading plan (Crozier) & revise Lots 17-23
11 NOV 2022	Revise ROW width to 18 metres & design lots (min 0.2 ha)
20 OCT 2022	Update drawing using 2022-10-12 survey

Drawing Number: D14

File Number:	10779
Drawn By:	SM
Planner:	PT
Scale:	1:1500
CAD:	10040 Draft Plan D14 2024-07-09.dgn

Appendix B

Vascular Plant Checklist

Plant List for 11 Main Street, Morriston, Puslinch Township, Wellington County conducted on August 10, September 24 & 26, 2022, and June 10, 2023

ScientificName	CommonNames	Coeff.Cons.	Coeff.Wet.	GRank	COSEWIC	COSSARO	SRank	LRank	CUM1-1	FOC	FODM11	SWD	WODM5	Notes
Acer negundo	Manitoba Maple	0	-2	G5			S5		X		X	X	X	
Acer platanoides	Norway Maple		5	GNR			SNA		X					
Acer saccharum ssp. saccharum	Sugar Maple	4	3	G5			S5				X		X	
Achillea millefolium ssp. lanulosa	Woolly Yarrow	0	3	G5			S5		X					
Actaea pachypoda	White Baneberry	6	5	G5			S5						X	
Agrimonia gryposepala	Tall Agrimony	2	2	G5			S5						X	
Agrostis stolonifera	Creeping Bent Grass	0	-3	G5			S5			X		X		
Alisma plantago-aquatica	Common Water-plantain	3	-5	G5			S5			X				
Alliaria petiolata	Garlic Mustard	0	0	G?			SE5		X				X	
Alnus glutinosa	Black Alder	0	-2	G?			SE4					X		
Ambrosia artemisiifolia	Common Ragweed	0	3	G5			S5		X					
Antennaria sp	Pussytoes Species								X					
Aquilegia canadensis	Wild Columbine	5	1	G5			S5		X				X	Growing on limestone boulder in FOC4-1
Arisaema triphyllum	Jack-in-the-pulpit	5	-3	G5			S5						X	
Asclepias incarnata ssp. incarnata	Swamp Milkweed	6	-5	G5			S5			X		X		
Asclepias syriaca	Common Milkweed	0	5	G5			S5		X					
Asclepias tuberosa	Butterfly Weed	8	5	G5			S4	R-A	X					Growing in corner of the CUM1-1, near treed hedge-row at the foot of Ochs Street. Likely introduced or escaped
Asparagus officinalis	Garden Asparagus		3	G5?			SNA		X					
Aster cordifolius	Heart-leaved Aster	5	5	G5			S5	R-A					X	
Aster ericoides var. ericoides	Heath Aster	4	4	G5			S5		X					
Aster lanceolatus ssp. lanceolatus	Panicled Aster	3	-3	G5			S5		X	X		X		
Aster novae-angliae	New England Aster	2	-3	G5			S5		X					
Aster pilosus var. pilosus	Hairy Aster	4	2	G5			S5		X					
Aster puniceus var. puniceus	Purple-stem Aster	6	-5	G5			S5			X		X		
Aster urophyllus	Arrow-leaved Aster	6	5	G4			S4		X					
Betula alleghaniensis	Yellow Birch	6	0	G5			S5					X		
Betula papyrifera	White Birch	2	2	G5			S5					X	X	
Bidens tripartita	Three-lobed Beggar-ticks	4	-3	G5			S5			X				
Bromus inermis ssp. inermis	Smooth Brome	0	5	G4G5			SE5		X					
Campanula rapunculoides	European Bellflower	0	5	G?			SE5		X					Growing in corner of the CUM1-1, near treed hedge-row at the foot of Ochs Street. Likely introduced or escaped
Carex gracillima	Graceful Sedge	4	3	G5			S5			X		X		
Carex granularis	Meadow Sedge	3	-4	G5			S5		X					
Carex spp	Sedge Species								X	X		X		
Carex vulpinoidea	Fox Sedge	3	-5	G5			S5						X	
Carya cordiformis	Bitternut Hickory	6	0	G5			S5						X	
Celastrus scandens	Climbing Bittersweet	3	3	G5			S5						X	
Centaurea maculosa	Spotted Knapweed	0	5	G?			SE5		X					
cf. Lespedeza sp	Bush-clover Species								X					Growing in corner of the CUM1-1, near treed hedge-row at the foot of Ochs Street. Likely introduced or escaped. L. hirta is known locally and rare but this could be a Medicago or Trifolium instead
Chelone glabra	Turtlehead	7	-5	G5			S5					X		
Chenopodium album var. album	Lamb's Quarters	0	1	G5			SE5		X					
Cichorium intybus	Chicory	0	5	G?			SE5		X					
Cicuta maculata	Spotted Water-hemlock	6	-5	G5			S5			X				
Circaea canadensis	Broad-leaved Enchanter's Night	2	3	G5			S5						X	
Cirsium arvense	Canada Thistle	0	3	G?			SE5		X					
Clinopodium vulgare	Wild Basil	4	5	G?			S5		X					
Coreopsis lanceolata	Lance-leaved Coreopsis	5	3	G5			S4?		X					Growing in corner of the CUM1-1, near treed hedge-row at the foot of Ochs Street. Likely introduced or escaped
Cornus alternifolia	Alternate-leaved Dogwood	6	5	G5			S5					X	X	
Cornus amomum ssp. obliqua	Silky Dogwood	5	-4	G5			S5		X			X		
Cornus foemina ssp. racemosa	Grey Dogwood	2	-2	G5			S5		X				X	
Cornus stolonifera	Red-osier Dogwood	2	-3	G5			S5		X	X	X	X	X	
Crataegus punctata	Dotted Hawthorn	4	5	G5			S5				X		X	
Crataegus sp	Hawthorn Species								X	X	X			
Cucurbita sp	Gourd Species								X					
Dactylis glomerata	Orchard Grass	0	3	G?			SE5		X					
Daucus carota	Wild Carrot	0	5	G?			SE5		X					
Digitaria sp	Crabgrass Species								X					
Draba verna	Spring Draba		5	GNR			SNA		X					
Dryopteris carthusiana	Spinulose Wood Fern	5	-2	G5			S5			X			X	
Echinochloa sp	Barnyard Grass Species								X					
Echium vulgare	Viper's Bugloss	0	5	G?			SE5		X					
Elaeagnus umbellata	Autumn Olive	0	3	G?			SE3		X		X			
Elymus repens	Quack Grass	0	3	G5			SE5		X					

ScientificName	CommonNames	Coeff.Cons.	Coeff.Wet.	GRank	COSEWIC	COSSARO	SRank	LRank	CUM1-1	FOC	FODM11	SWD	WODM5	Notes
Equisetum arvense	Field Horsetail	0	0	G5			S5			X		X	X	
Erigeron annuus	Daisy Fleabane	0	1	G5			S5		X				X	
Euonymus obovatus	Running Strawberry-bush	6	5	G5			S4						X	
Eupatorium maculatum ssp. maculatum	Spotted Joe-pye-weed	3	-5	G5			S5			X		X	X	
Eupatorium perfoliatum	Common Boneset	2	-4	G5			S5			X				
Euthamia graminifolia	Grass-leaved Goldenrod	2	-2	G5			S5		X			X		
Fragaria vesca	Woodland Strawberry	4	3	G5			S5						X	
Fragaria virginiana ssp. virginiana	Common Strawberry	2	1	G5			S5		X				X	
Fraxinus pennsylvanica	Red Ash	3	-3	G5			S5		X	X	X		X	
Galium sp	Bedstraw Species								X					
Geranium robertianum	Herb Robert	0	5	G5			SE5						X	
Geum spp	Avens Species												X	Likely G. cana plus meadow species
Glechoma hederacea	Ground-ivy		3	GNR			SNA		X					
Gleditsia triacanthos	Honey Locust	3	0	G5			S2				X			Planted or escaped
Helianthus annuus ssp. annuus	Common Sunflower	0	1	G5			SE4		X					Growing in pile of yard debris in old field meadow along shrub hedge-row
Hesperis matronalis	Dame's Rocket		3	G4G5			SNA		X					
Hieracium sp	Hawkweed Species								X					
Impatiens capensis	Spotted Touch-me-not	4	-3	G5			S5			X				
Inula helenium	Elecampane	0	5	G?			SE5		X			X		
Juglans cinerea	Butternut	6	2	G4			S4	R-B			X			Location noted on map; 25-50cm dbh tree; healthy with little to no dieback in canopy; growing near a hedge row of 50-100cm dbh Sugar Maples
Juglans nigra	Black Walnut	5	3	G5			S4		X		X			
Juncus articulatus	Jointed Rush	5	-5	G5			S5					X		
Juncus dudleyi	Dudley's Rush	1	0	G5			S5					X		
Juncus sp	Rush Species									X				
Juniperus virginiana	Eastern Red Cedar	4	3	G5			S5		X		X			
Lactuca sp	Lettuce Species								X					
Larix sp	Larch Species											X		
Leersia oryzoides	Rice Cut Grass	3	-5	G5			S5			X		X		
Leonurus cardiaca ssp. cardiaca	Motherwort	0	5	G?			SE5		X					
Lepidium campestre	Field Peppergrass		5	GNR			SNA		X					
Leucanthemum vulgare	Oxeye Daisy		5	GNR			SNA		X					
Ligustrum vulgare	Common Privet	0	1	G?			SE5				X		X	
Linaria vulgaris	Butter-and-eggs		5	GNR			SNA		X					
Lobelia siphilitica	Great Blue Lobelia	6	-4	G5			S5			X		X		Growing in seepage areas
Lonicera morrowii	Morrow's Honeysuckle	0	5	G?			SE3		X				X	
Lonicera sp	Honeysuckle Species										X			
Lonicera tatarica	Tartarian Honeysuckle	0	3	G?			SE5		X				X	
Lotus corniculatus	Bird's-foot Trefoil	0	1	G?					X					
Lupinus polyphyllus	Many-leaved Lupine	0	5	G5			SE4		X					Growing in corner of the CUM1-1, near treed hedge-row at the foot of Ochs Street. Likely introduced or escaped
Lycopus uniflorus	Northern Water-horehound	5	-5	G5			S5			X				
Lythrum salicaria	Purple Loosestrife	0	-5	G5			SE5					X		
Maianthemum canadense	Wild Lily-of-the-valley	5	3	G5			S5						X	
Malus pumila	Common Apple	0	5	G5			SE5		X		X		X	
Malva neglecta	Cheeses	0	5	G?			SE5		X					
Matteuccia struthiopteris	Ostrich Fern	5	0	G5			S5						X	
Medicago lupulina	Black Medick		3	GNR			SNA		X					
Medicago sativa	Alfalfa		5	GNR			SNA		X					
Melilotus alba	White Sweet-clover	0	3	G5			SE5		X					
Moss spp	Moss Species											X		
Myosotis laxa	Small Forget-me-not	6	-5	G5			S5		X	X				
Nasturtium officinale	Water-cress	0	-5	G?			SE			X			X	Forming floating mats on flowing ground water seeps
Onoclea sensibilis	Sensitive Fern	4	-3	G5			S5			X		X		
Ostrya virginiana	Hop Hornbeam	4	4	G5			S5						X	
Oxalis sp	Wood-sorrel Species								X					
Panicum capillare	Witch Panic Grass	0	0	G5			S5		X					
Parthenocissus inserta	Thicket Creeper	3	3	G5			S5		X		X		X	
Phalaris arundinacea	Reed Canary Grass	0	-4	G5			S5		X	X		X		
Phleum pratense	Timothy	0	3	G?			SE5		X					
Phragmites australis	Common Reed	0	-4	G5			S5					X		
Picea glauca	White Spruce	6	3	G5			S5					X		
Pilea sp	Clearweed Species									X		X		Growing in seepage openings, SWT and SWC. Either P. pumila or P. fontana
Pinus strobus	Eastern White Pine	4	3	G5			S5			X	X		X	
Pinus sylvestris	Scots Pine	0	5	G?			SE5					X		
Plantago lanceolata	Ribgrass	0	0	G5			SE5		X					

ScientificName	CommonNames	Coeff.Cons.	Coeff.Wet.	GRank	COSEWIC	COSSARO	SRank	LRank	CUM1-1	FOC	FODM11	SWD	WODM5	Notes
Plantago rugelii	Pale Plantain	1	0	G5			S5		X					
Poa compressa	Canada Blue Grass	0	2	G?			S5		X					
Poa palustris	Fowl Blue Grass	5	-4	G5			S5			X				
Poa pratensis ssp. pratensis	Kentucky Blue Grass	0	1	G?			S5		X					
Podophyllum peltatum	May-apple	5	3	G5			S5		X				X	
Polygonum aviculare	Common Knotweed	0	1	G?			SE5		X					
Polygonum persicaria	Lady's Thumb	0	-3	G?			SE5			X				
Populus grandidentata	Largetooth Aspen	5	3	G5			S5		X		X	X	X	
Populus tremuloides	Trembling Aspen	2	0	G5			S5		X	X		X	X	
Potentilla recta	Sulphur Cinquefoil		5	GNR			SNA		X					
Prunella vulgaris ssp. lanceolata	Heal-all	5	5	G5			S5			X		X		
Prunus avium	Sweet Cherry	0	5	G?			SE4		X		X		X	
Prunus serotina	Black Cherry	3	3	G5			S5			X	X		X	
Prunus virginiana ssp. virginiana	Choke Cherry	2	1	G5			S5		X	X	X		X	
Pyrus communis	Common Pear	0	5	G5			SE4		X			X		
Quercus macrocarpa	Bur Oak	5	3	G5			S5		X					
Quercus macrocarpa	Bur Oak	5	3	G5			S5		X					
Quercus rubra	Red Oak	6	3	G5			S5		X		X			
Ranunculus acris	Tall Buttercup	0	-2	G5			SE5		X				X	
Rhamnus cathartica	Common Buckthorn	0	3	G?			SE5		X	X	X		X	
Rhamnus frangula	Glossy Buckthorn	0	-1	G?			SE5			X		X	X	
Rhus radicans ssp. rydbergii	Western Poison-ivy	0	0	G5			S5		X				X	
Rhus typhina	Staghorn Sumac	1	5	G5			S5		X		X			
Ribes americanum	Wild Black Currant	4	-3	G5			S5					X		
Ribes cynosbati	Prickly Gooseberry	4	5	G5			S5						X	
Ribes sp	Currant Species										X			
Robinia pseudo-acacia	Black Locust	0	4	G5			SE5				X			
Rosa sp	Rose Species								X					
Rubus idaeus ssp. melanolasius	Wild Red Raspberry	0	-2	G5			S5		X				X	
Rubus occidentalis	Black Raspberry	2	5	G5			S5				X			
Rubus pubescens	Dwarf Raspberry	4	-4	G5			S5					X		
Rumex crispus	Curly Dock	0	-1	G?			SE5		X					
Rumex sp	Dock Species									X				
Salix alba var. tristis	Weeping Willow	0	-3	G5			SE4					X		A few very large trees in SWT
Salix bebbiana	Bebb's Willow	4	-4	G5			S5			X		X		
Salix discolor	Pussy Willow	3	-3	G5			S5			X		X		
Salix petiolaris	Slender Willow	3	-4	G5			S5			X		X		
Sanguinaria canadensis	Bloodroot	5	3	G5			S5		X					
Saponaria officinalis	Bouncing Bet	0	3	G?			SE5		X					
Scirpus atrovirens	Black Bulrush	3	-5	G5?			S5			X		X		
Senecio jacobaea	Tansy Ragwort	0	5	G?			SE1		X					Growing in corner of the CUM1-1, near treed hedge-row at the foot of Ochs Street. Likely introduced or escaped
Setaria pumila	Yellow Foxtail	0	0	G?			SE5		X					
Silene latifolia	White Campion		5	GNR			SNA		X					
Silene vulgaris	Bladder Campion		5	GNR			SNA		X					
Sisyrinchium sp	Blue-eyed-grass Species								X					
Solanum dulcamara	Bittersweet Nightshade	0	0	G?			SE5		X	X		X	X	
Solidago altissima var. altissima	Tall Goldenrod	1	3	G?			S5		X			X		
Solidago flexicaulis	Zigzag Goldenrod	6	3	G5			S5						X	
Solidago nemoralis ssp. nemoralis	Gray Goldenrod	2	5	G5			S5		X					
Solidago patula	Rough-leaved Goldenrod	8	-5	G5			S5	R-A				X		In seepy openings of SWC
Solidago rugosa ssp. rugosa	Rough Goldenrod	4	-1	G5			S5					X	X	
Sorbus sp	Mountain-ash Species										X			
Syringa vulgaris	Common Lilac	0	5	G?			SE5		X		X		X	
Taraxacum officinale	Common Dandelion	0	3	G5			SE5		X					
Thelypteris palustris var. pubescens	Marsh Fern	5	-4	G5			S5			X		X	X	
Thuja occidentalis	Eastern White Cedar	4	-3	G5			S5		X	X	X	X	X	
Tilia americana	Basswood	4	3	G5			S5		X		X		X	
Tragopogon dubius	Yellow Goatsbeard		5	GNR			SNA		X					
Trifolium pratense	Red Clover	0	2	G?			SE5		X					
Triosteum aurantiacum	Wild Coffee	7	5	G5			S5		X		X		X	Location noted on map, along open hedge-row in CUM1-1; also on and around limestone boulder in FOC4-1
Tussilago farfara	Coltsfoot	0	3	G?			SE5		X	X		X	X	
Typha angustifolia	Narrow-leaved Cattail	3	-5	G5			S5			X		X		
Ulmus americana	White Elm	3	-2	G5?			S5		X	X		X	X	
Verbascum thapsus	Common Mullein	0	5	G?			SE5		X					
Verbena hastata	Blue Vervain	4	-4	G5			S5					X		
Veronica officinalis	Common Speedwell	0	5	G5			SE5		X				X	

ScientificName	CommonNames	Coeff.Cons.	Coeff.Wet.	GRank	COSEWIC	COSSARO	SRank	LRank	CUM1-1	FOC	FODM11	SWD	WODM5	Notes
Veronica persica	Bird's-eye Speedwell		5	GNR			SNA		X					
Viburnum lentago	Nannyberry	4	-1	G5			S5		X		X	X		
Viburnum opulus	European Highbush Cranberry	0	0	G5			SE4						X	
Viburnum trilobum	Highbush Cranberry	5	-3	G5T5			S5		X			X		
Vicia sp	Vetch Species								X					
Viola sp	Violet Species											X		
Vitis riparia	Riverbank Grape	0	-2	G5			S5		X	X	X		X	
Vicia cracca	Tufted Vetch		5	GNR			SNA		X					

Legend

CoeCons. - Coefficient of Conservatism. Scores for each species range from 0 (low conservatism) to 10 (high conservatism).
A conservatism value of 0 indicates species is widespread. A value of 8, 9 or 10 indicates that a species is a habitat specialist.
CoeWet. - Coefficient of Wetness
5 - Almost always occur in upland areas
4, 3, 2 - Usually occur in upland areas
1, 0, -1 - Found equally in upland and wetland areas
-2, -3, -4 Usually occur in wetlands
-5 Almost always occur in wetlands

Grank - Global Rank G1 — Critically Imperiled, G2 — Imperiled, G3 — Vulnerable, G4 — Apparently Secure, G5 — Secure

COSEWIC - Committee on the Status of Endangered Wildlife in Canada

COSSARO - Committee on the Status of Species at Risk in Ontario

Srank - Subnational Rank
S1 — Critically Imperiled - Critically imperiled in the province because of extreme rarity, (often 5 or fewer occurrences)
S2 — Imperiled - Imperiled in the province because of rarity due to very restricted range, very few populations (often 20 or fewer)
S3 — Vulnerable - Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer)
S4 — Apparently Secure - Uncommon but not rare
S5 — Secure - Common, widespread, and abundant in the province
SE — Exotic

Appendix C

ELC Data Cards

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: 11 MAIN STREET, MORRISTON PUSLINCH | POLYGON:
SURVEYOR(S): ACG | DATE: Sept 21/22 | TIME: start / finish
UTMZ: | UTMZ: | UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☑ TERRESTRIAL ☐ WETLAND ☐ AQUATIC	☐ ORGANIC ☑ MINERAL SOIL ☐ PARENT MIN. ☐ ACIDIC BEDRK. ☐ BASIC BEDRK. ☐ CARB. BEDRK.	☐ LACUSTRINE ☐ RIVERINE ☐ BOTTOMLAND ☐ TERRACE ☐ VALLEY SLOPE ☐ TABLELAND ☑ ROLL UPLAND ☐ CLIFF ☐ TALUS ☐ CREVICE / CAVE ☐ ALVAR ☐ ROCKLAND ☐ BEACH / BAR ☐ SAND DUNE ☐ BLUFF	☐ NATURAL ☑ CULTURAL	☐ PLANKTON ☐ SUBMERGED ☐ FLOATING-LVD. ☐ GRAMINOID ☐ FORB ☐ LICHEN ☐ BRYOPHYTE ☐ DECIDUOUS ☐ CONIFEROUS ☐ MIXED	☐ LAKE ☐ POND ☐ RIVER ☐ STREAM ☐ MARSH ☐ SWAMP ☐ FEN ☐ BOG ☐ BARREN ☑ MEADOW ☐ PRAIRIE ☐ THICKET ☐ SAVANNAH ☐ WOODLAND ☐ FOREST ☐ PLANTATION

SITE	COVER
☐ OPEN WATER ☐ SHALLOW WATER ☑ SURFICIAL DEP. ☐ BEDROCK	☑ OPEN ☐ SHRUB ☐ TREED

STAND DESCRIPTION

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY	4	1	MEL ALBA >> VIT RIPA > BYR VULG > ACE NEGU > [illegible]
3	UNDERSTOREY	5	4	BRO INER > AST ERIC > AST NOVA > SOL ALTI > DAC CARO > DAC GLAU
4	GRD. LAYER	6-7	3	POA PRAT > SOL NEMO > CERT > SAT VULG > FRA [illegible] > CAREX > POA [illegible]

HT CODES: 1 = >25 m 2 = 10<HT<25 m 3 = 2<HT<10 m 4 = 1<HT<2 m 5 = 0.5<HT<1 m 6 = 0.2<HT<0.5 m 7 = HT<0.2 m

CVR CODES: 0 = NONE 1 = 0% < CVR ≤ 10% 2 = 10 < CVR ≤ 25% 3 = 25 < CVR ≤ 50% 4 = CVR > 50%

STAND COMPOSITION: | BA:

SIZE CLASS ANALYSIS:	O	< 10	R	10 - 24	R	25 - 50	N	> 50
STANDING SNAGS:	R	< 10	N	10 - 24	N	25 - 50	N	> 50
DEAD/FALLEN LOGS:	R	< 10	N	10 - 24	N	25 - 50	N	> 50

ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE:	PIONEER	YOUNG	MID-AGE	MATURE	OLD GROWTH

SOIL ANALYSIS:

TEXTURE: SIL | DEPTH TO MOTTLES / GLEY: g = | G =
MOISTURE: | DEPTH OF ORGANICS: (cm)
HOMOGENEOUS / VARIABLE | DEPTH TO BEDROCK: (cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	DRY - MOIST OLD FIELD MEADOW	CUM1-1
INCLUSION		
COMPLEX		

Notes:

ELC
STAND CHARACTERISTICS

SITE: SE OF BADENOCH STREET / Hwy 6
POLYGON: PUSLINCH TWP, WELLINGTON COUNTY
DATE:
SURVEYOR(S):

TREE TALLY BY SPECIES:

PRISM FACTOR:

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	A	1	JUG NIGR
2	SUB-CANOPY	3	2	JUG NIGR >> FRA PENN > MAL PUMI > RHO THY
3	UNDERSTOREY	4-3	3	RUB TYPH > VIT RIPA > JUG NIGR = PRU VIRG
4	GRD. LAYER	5-7	4	DAC GLOM > SOL ALTI > PHA ARUN > AST LANC

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	A	1	TIL AMER >> ACE NEGU > [illegible]
2	SUB-CANOPY	3	2	RHA CATH >> CRAT (MACR) > ACT NEGU >> [illegible]
3	UNDERSTOREY	4	4	RHA CATH > VIT RIPA
4	GRD. LAYER	5-7	3	PAR INSE > ASTURE > SOL > CERAST > VIT RIPA

ELC PLANT SPECIES LIST

SITE:
POLYGON:
DATE:
SURVEYOR(S):

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER
ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
BRO ININ				D	
DAC GLOM				A	
SOL ALTI				A	
AST NOVA				A	
AST LAEV				O	
AST ERIC				A	
POA PRAT				A	
PHL PRAT				A	
ELY REPE				A	
AST PIL				O	
DAU CAR.				A	
VICCIA				O	
CIR ARVE				A	
PLA LANC				O	
SAP OFFI				O	
CHE ALBA				O	
TAR OFFI				O	
PLA ARUN				O	
SAT VULG				O	
CENT STOEB				A	
ACH MILL				O	
ASC SYRI				O	
CIC INTY				O	
RUM CRISP				O	
VER THAP			O		
MEL ALBA			A		
PAN CAPI				O	
ERI CANA				O	
CAMP RAPU				R	
SOL DULC				R	
LACTUCA			O		
PYR COMM			R		

SPECIES CODE	LAYER 1	2	3	4	COL.
MAL PUMI			R		
LED CACA				O	
OXALIS				O	
AMB ARTE				O	
SET PUMI				O	
LOT CORN				O	
SOL NEMO				R	
TRIF PRAT				O	
ANTENARIA				R	
ECH VULG				O	BUG LOSS
LONI TATA			R	R	
LONI MYRR			R		
PLA RUGE				O	
DIGITARIA				R	CRAB
CAREX (GRAM)				O	
HIER				O	
FRA VIVI				O	
* AST UROP				O	RHIZ
RUB IDAE				O	
POA COMP				A	
COR FORA			R		
EUT GRAM			R		
VINE				R	
POL (AVIC)					
HEL ANNU			R		SAP
SYR VULG			O	O	
ACE NEGU			O	O	
ECHINOCYS				O	SEED
MYRR MACULATA				R	
RHA CATH			R		
JUN VIRG		O	O	O	
RHU TYPH		O	O	O	
RAN ACRI				R	

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ELC PLANT SPECIES LIST

SITE:
POLYGON: OLD FIELD MEADOW & HEDGEROWS
DATE:
SURVEYOR(S):

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER
ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
ROB. PUC				R	
QUE RUBR	R				
SORBUS S		R			
JUG CINE	R				25-50
TRI AURA				R	
VIB LENT			R		
POP GRAN	R	R			
FRA PENN		R	O	O	
PIN STRO			R	R	
THU OCCI	R	R	R		
JUN VIRG		O	O		
PRU SERO	R	O	O	O	
SOR STOL				R	
ACE SASA	R	R			
MAL PUMI		R			
GLED TRIC		R			EXAMP
RUB OCCI				O	
RIBES				O	
RHU TYPH		O	O	O	
SYR VULG			O	O	
JUG NIGR		R	O	O	
LIG VULG			O	O	
CRAT MACR			O		
ELEA UMBEL			R	R	AUTUMN
PRU VIVI			O	O	
RHA CATH		A	A	A	
VIT RIPA		A	A	A	
PAR INSE			A	A	
PRU AVIU	R	A	A		
CRAT PUNC		O	O		
ACE NEGU	O	A	A	A	
TIL AMER	O	O			

* A triple stemmed 25-50cm dbh Butternut (located a little to the east of the hedge row)
Growing along a hedge row at 50-100m S sugar maples

TREED & SHRUB HEDGEROWS

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: 11 MAIN STREET, MORRISTON		POLYGON:	
	SURVEYOR(S): ACG	DATE: Sept. 24/22	TIME: start / finish	
	UTMZ:	UTMZ:	UTMN:	

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☑ TERRESTRIAL ☐ WETLAND ☐ AQUATIC	☐ ORGANIC ☑ MINERAL SOIL ☐ PARENT MIN. ☐ ACIDIC BEDRK. ☐ BASIC BEDRK. ☐ CARB. BEDRK.	☑ LACUSTRINE ☐ RIVERINE ☐ BOTTOMLAND ☐ TERRACE ☐ VALLEY SLOPE ☐ TABLELAND ☐ ROLL. UPLAND ☐ CLIFF ☐ TALUS ☐ CREVICE / CAVE ☐ ALVAR ☐ ROCKLAND ☐ BEACH / BAR ☐ SAND DUNE ☐ BLUFF	☑ NATURAL ☐ CULTURAL	☐ PLANKTON ☐ SUBMERGED ☐ FLOATING-LVD. ☐ GRAMINOID ☐ FORB ☐ LICHEN ☐ BRYOPHYTE ☑ DECIDUOUS ☐ CONIFEROUS ☐ MIXED	☐ LAKE ☐ POND ☐ RIVER ☐ STREAM ☐ MARSH ☐ SWAMP ☐ FEN ☐ BOG ☐ BARREN ☐ MEADOW ☐ PRAIRIE ☐ THICKET ☐ SAVANNAH ☑ WOODLAND ☐ FOREST ☐ PLANTATION
SITE			COVER		
☐ OPEN WATER ☐ SHALLOW WATER ☐ SURFICIAL DEP. ☐ BEDROCK			☐ OPEN ☐ SHRUB ☐ TREED		

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2,1	2,3	TIL AMER>PRU SER >PIN STRO>CAR [illegible]>ACE SAA >POP TREM
2	SUB-CANOPY	3	3,2	RHA CATH>CRAT MONO > CRAT SP > VIT RIPA> [illegible] >TIL [illegible]
3	UNDERSTOREY	4	4,3	RHA CATH>PRU VIVI>VIT RIPA>FRA PENN
4	GRD. LAYER	3,2	5-7	RHA CATH>RUB IDME>FRA PENN>VIT RIPA>RHU RADI

HT CODES: 1 = >25 m 2 = 10<HT≤25 m 3 = 2<HT≤10 m 4 = 1<HT≤2 m 5 = 0.5<HT≤1 m 6 = 0.2<HT≤0.5 m 7 = HT<0.2 m

CVR CODES: 0 = NONE 1 = 0% < CVR ≤ 10% 2 = 10 < CVR ≤ 25% 3 = 25 < CVR ≤ 60% 4 = CVR > 60%

STAND COMPOSITION:	BA:

SIZE CLASS ANALYSIS:	A	< 10	A	10 - 24	A	25 - 50	R	> 50
STANDING SNAGS:	R	< 10	O	10 - 24	O	25 - 50	R	> 50
DEADFALL / LOGS:		< 10	R	10 - 24	O	25 - 50	N	> 50

ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE:		PIONEER		YOUNG	✓	MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS:

TEXTURE:	DEPTH TO MOTTLES / GLEY	g =	G =
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	FRESH - MOIST DECIDUOUS WOODLAND ECOSITE	WODM5
INCLUSION		
COMPLEX		

Notes:

ELC STAND CHARACTERISTICS	SITE:
	POLYGON:
	DATE:
	SURVEYOR(S): EAST @ [illegible] 3, [illegible]

TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL AVG
TOTAL							100
BASAL AREA (BA)							
DEAD							

STAND DESCRIPTION: MATURE STAND ON SLOPE AROUND [illegible]

FOMM[illegible]

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	1,2	2,1	PIN STRO > TIL AMER > PRU SERO
2	SUB-CANOPY	2	3	CRAT (DOM) >> RHA CATH > OST VIRG
3	UNDERSTOREY	4	4	RHA CATH > PRU VIVI > PRU SERO > [illegible]
4	GRD. LAYER	5-7	4	RHA CATH > RUB IDME > FRA PENN

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

ELC
PLANT SPECIES LIST

SITE:
POLYGON:
DATE:
SURVEYOR(S):

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER
ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

WOODS SPECIES CODE YOUNG EDGE	LAYER 1	2	3	4	COL
RHA CATH		D	A		
PRU SERO	R	O	O		
COR ALTE		O	O		
LON MORR			O		
LON TATA			O		
CAR CORD	R	R	O	D	
MAL PUMI		R			
PRU VIVI			A		
VIT RIPA		O	A	A	
RUB IDME				A	
CRAT PUNC		O	O		
FRA PENS			O	A	
PIN STRO	R	R			
ACE SASA	R	R			
LIG VULG			O	O	
SYR VULG			O	O	
PAR INSE				O	
RHUS RADI				O	
GEUM				A	
FRA VIVI					
PRU AVIUM		R			
ACE NEGU	R	O	O	O	
POP TREM	R	R			
SOL RUGO				O	
AGR GRYP				R	
VER OFFI				O	
ULM AMER	R	O	O	O	
THU OCCI		R	O	O	
VIB OPUL					

FOCMM2-3 SPECIES CODE MATURE BACK	LAYER 1	2	3	4	COL.
PIN STRO	A				
PRU SERO	A				
OST VIRG		O			
BET PAPY	O				
ULM AMER		O	O		
THU OCCI		R	O	O	
TIL AMER	A				
GER ROBE				R	
ALL PETI				R	
* TRI AURA				R	
TUS FAFA				R	
* AQU CANA				R	
RIB CYNO				R	
AST CORD				O	
COR FOEM?					
POT GRAN?					

(GER ROBE, ALL PETI, TRI AURA:) ON LIMESTONE BOULDER

Page ...... of ......

ELC
PLANT SPECIES LIST

SITE:
POLYGON: WOODLAND
DATE:
SURVEYOR(S):

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER
ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL

Many large
10-25 or 25cm + Ø
OPEN GROWN CRATEGUS
ALL STILL STANDING OR
DECLINING AND BEING
FILLED IN AND OVERTOPPED
BY RHA CATH

The [illegible]
[illegible]
[illegible]
BUT I SPENT [illegible]
[illegible] LARGE (EAST) OF [illegible]

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: 11 MAIN STREET, MORRISTON		POLYGON:	
SURVEYOR(S): ACG	DATE: SEPT 26/23	TIME: start / finish	
UTMZ:	UTMZ:	UTMN:	

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☐ TERRESTRIAL ☐ WETLAND ☐ AQUATIC	☐ ORGANIC ☐ MINERAL SOIL ☐ PARENT MIN. ☐ ACIDIC BEDRK. ☐ BASIC BEDRK. ☐ CARB. BEDRK.	☒ LACUSTRINE ☐ RIVERINE ☐ BOTTOMLAND ☐ TERRACE ☐ VALLEY SLOPE ☐ TABLELAND ☐ ROLL UPLAND ☐ CLIFF ☐ TALUS ☐ CREVICE / CAVE ☐ ALVAR ☐ ROCKLAND ☐ BEACH / BAR ☐ SAND DUNE ☐ BLUFF	☐ NATURAL ☐ CULTURAL	☐ PLANKTON ☒ SUBMERGED ☐ FLOATING-LVD. ☐ GRAMINOID ☐ FORB ☐ LICHEN ☐ BRYOPHYTE ☐ DECIDUOUS ☐ CONIFEROUS ☐ MIXED	☐ LAKE ☐ POND ☐ RIVER ☐ STREAM ☐ MARSH ☐ SWAMP ☐ FEN ☐ BOG ☐ BARREN ☐ MEADOW ☐ PRAIRIE ☐ THICKET ☐ SAVANNAH ☐ WOODLAND ☐ FOREST ☐ PLANTATION

SITE	COVER
☐ OPEN WATER ☐ SHALLOW WATER ☐ SURFICIAL DEP. ☐ BEDROCK	☒ OPEN ☐ SHRUB ☐ TREED

STAND DESCRIPTION

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	21	1	POP TREM > PRU SER >> PIN STR
2	SUB-CANOPY	3	4	THU OCC
3	UNDERSTOREY	4	1	THU OCC >> FRA PENN > PRU VIR
4	GRD. LAYER	5-7	1-2	THU OCC > PRU VIR > FRA PENN

HT CODES: 1 = >25 m 2 = 10<HT<25 m 3 = 2<HT<10 m 4 = 1<HT<2 m 5 = 0.5<HT 1 m 6 = 0.2<HT 0.5 m 7 = HT<0.2 m

CVR CODES 0 = NONE 1 = 0% < CVR < 10% 2 = 10 < CVR < 25% 3 = 25 < CVR < 60% 4 = CVR > 60%

STAND COMPOSITION:

BA:

SIZE CLASS ANALYSIS:	A	< 10	A	10 - 24	A	25 - 50	A	> 50
STANDING SNAGS:	A	< 10	O	10 - 24	R	25 - 50	R	> 50
DEADFALL LOGS:	A	< 10	O	10 - 24	R	25 - 50	N	> 50

ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE:		PIONEER		YOUNG		MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS:

TEXTURE: SIL	DEPTH TO MOTTLES / GLEY	g =	G =
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	FRESH - MOIST WHITE CEDAR CONIFEROUS FOREST	FOC4-1
INCLUSION	20% FRESH WHITE CEDAR CONIFEROUS FOREST	FOC3-2
COMPLEX		MAM2-9

Notes:

ELC
STAND CHARACTERISTICS

SITE:	
POLYGON:	
DATE:	
SURVEYOR(S):	

TREE TALLY BY SPECIES:

PRISM FACTOR: 2

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL AVG
THU OCCI	𝍸 𝍸 |	𝍸 𝍸 ||	𝍸 |||				
PIN STR	||						
ULM AMER	|						
POP TREM	|						
PRU SER			𝍸 |				
TOTAL							
BASAL AREA (BA)							100
DEAD							

STAND DESCRIPTION

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY	3	1	SAL SPP >> ACE SPP
3	UNDERSTOREY	4	4	AST PUNI > ALT LANC >> EUP PERF
4	GRD. LAYER	5-7	4	AGR STOL > FRA ALNI > LET ORYZ > IMP CAPE

ELC
PLANT SPECIES LIST

SITE:
POLYGON:
DATE:
SURVEYOR(S):

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER
ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	LAYER 2	LAYER 3	LAYER 4	COL.
THU OCCI		D	A	O	
PIN STRO	R				
VIT RIPA		O	O	O	
PRU VIVI			A	O	
DRY CART				O	
FRA PENN		R	D	O	
ULM AMER		R	O		
RHA FRAN			O	O	
SOL DULC				R	
SAL PETI			R		
PRU VULG				O	
CAR GRACILIMA				O	
TUS FAFA				O	
RHA CATH			O	O	
PRU SERO	O	O	O	O	
POP TREM	O	R	R	R	
CRAT SP.		O	O	O	

SPECIES CODE	LAYER 1	LAYER 2	LAYER 3	LAYER 4	COL.

ELC
PLANT SPECIES LIST

SITE:
POLYGON:
DATE:
SURVEYOR(S):

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER
ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	LAYER 2	LAYER 3	LAYER 4	COL.
ALI PLAN				R	
LYC UNIF				O	
JUNCUS				O	
TUS FAFA				O	
EQU ARVE				O	
POA PALU				O	
* NAS OFFI				R	in seep
ONO SENS				O	
PILEA				O	
* LOB (S.PH)				O	
LEE ORYZ				A	
IMP CAPE				A	
SCI ATRO				O	
THE PALU				O	
EUP MACU			O		
TYP ANGU			R		
SAL BEBB		R	O		
COR STOL			O		
PHA ARUN				O	
RUMEX				O	
BID TRIP				O	
MYO LAXA				O	
CAREX				O	
POP TREM		O	O	O	
SAL DISC			O		
CIC MACU				O	
EUP PERF			O		
POL PERS				O	
ASC INCA				O	
AGR STOL				D	
AST PUNI			A		
AST LANC			A		

* ORGANIC OPEN SEEPS AST PUNI MEADOW

FRESH–MOIST FOC ON UPPER-LOWER SLOPE OF DRO KNOLLS

MOSTLY A STABLE CEDAR FOREST EVEN AGED STAND, BUT OCCASIONAL OPENINGS SUPPORT [illegible] TREM OR PRU SERO [illegible] HAWTHORN TOUNDS.

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: 11 MAIN STREET MORRISTON		POLYGON:
	SURVEYOR(S):	DATE:	TIME: start / finish
	UTMZ:	UTMZ:	UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☐ TERRESTRIAL ☑ WETLAND ☐ AQUATIC	☑ ORGANIC ☐ MINERAL SOIL ☐ PARENT MIN. ☐ ACIDIC BEDRK. ☐ BASIC BEDRK. ☐ CARB. BEDRK.	☑ LACUSTRINE ☐ RIVERINE ☑ BOTTOMLAND ☐ TERRACE ☐ VALLEY SLOPE ☐ TABLELAND ☐ ROLL. UPLAND ☐ CLIFF ☐ TALUS ☐ CREVICE / CAVE ☐ ALVAR ☐ ROCKLAND ☐ BEACH / BAR ☐ SAND DUNE ☐ BLUFF	☑ NATURAL ☐ CULTURAL	☐ PLANKTON ☑ SUBMERGED ☐ FLOATING-LVD. ☐ GRAMINOID ☐ FORB ☐ LICHEN ☐ BRYOPHYTE ☐ DECIDUOUS ☑ CONIFEROUS ☐ MIXED	☐ LAKE ☐ POND ☐ RIVER ☐ STREAM ☐ MARSH ☑ SWAMP ☐ FEN ☐ BOG ☐ BARREN ☐ MEADOW ☐ PRAIRIE ☐ THICKET ☐ SAVANNAH ☐ WOODLAND ☐ FOREST ☐ PLANTATION
SITE			**COVER**		
☐ OPEN WATER ☐ SHALLOW WATER ☑ SURFICIAL DEP. ☐ BEDROCK			☑ OPEN ☐ SHRUB ☑ TREED		

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	1	POP TREM > THU OCC
2	SUB-CANOPY	3	3a	THU OCCI >> POP TREM >> RHA FRAN
3	UNDERSTOREY	4	2a	THU OCCI >> RHA FRANGULA ...
4	GRD. LAYER	5-7	4	EQU ARVE >> ONO SENS = RUB PUBE > TUS FARA ...

HT CODES: 1 = >25 m 2 = 10<HT≤25 m 3 = 2<HT≤10 m 4 = 1<HT≤2 m 5 = 0.5<HT≤1 m 6 = 0.2<HT≤0.5 m 7 = HT<0.2 m

CVR CODES: 0 = NONE 1 = 0% < CVR ≤ 10% 2 = 10 < CVR ≤ 25% 3 = 25 < CVR ≤ 60% 4 = CVR > 60%

STAND COMPOSITION:	BA:

SIZE CLASS ANALYSIS:	A	< 10	A	10 - 24	O	25 - 50	R	> 50
STANDING SNAGS:	O	< 10		10 - 24		25 - 50	R	> 50
DEADFALL / LOGS:	O	< 10		10 - 24		25 - 50	R	> 50

ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE:	PIONEER	YOUNG	MID-AGE	MATURE	OLD GROWTH

SOIL ANALYSIS:

TEXTURE: ORGANIC	DEPTH TO MOTTLES / GLEY	g =	G =
MOISTURE:	DEPTH OF ORGANICS: 30-40 cm ...		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:	WHITE CEDAR ORGANIC CONIFEROUS SWAMP	SWC3-1
INCLUSION		
COMPLEX		

Notes:

ELC STAND CHARACTERISTICS	SITE:
	POLYGON: SEDGE SWAMP
	DATE:
	SURVEYOR(S):

TREE TALLY BY SPECIES:

PRISM FACTOR

SPECIES	TALLY 1	TALLY 2	TALLY 3	TALLY 4	TALLY 5	TOTAL	REL AVG
TOTAL							
BASAL AREA (BA)							100
DEAD							

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

RED-OSIER MINERAL THICKET SWAMP SWT2-5

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY	3	2.1	SAL PET >> SAL ...
3	UNDERSTOREY	4	4	COR STOL > ALT RUNI > AST LANC ...
4	GRD. LAYER	5-7	3	EQU ARVE > PHAL ARUN > JUNCUS > CAREX ...

ELC PLANT SPECIES LIST

SITE:
POLYGON:
DATE:
SURVEYOR(S):

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER
ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
THU OCCI	D	D			
POP TREM	O				
POP GRAN					
PYR COMM		R			
PIN SYLV		R	R		
ONO SENS				A	
EQU ARVE				D	[illegible]
AST PUNI				O	
PHA ARUN				O	
SOL RUGO				O	
RUB PUBE					
THE PALU					
MOSS				D	
PICEA GLAUCA		R			
LOT CORN				O	
TUS FAFA				O	
LARX		R			
RHA FRAN			O	O	
PRU VULG				O	
SCI ATRO			O		
COR ALTE		O	O		
PILEA				O	
CAREX GRAC					
BET ALLE	R	R	O	O	
COR AMOM			O	O	
VIB TRIL				R	
RIBES (AMER)				O	NO [illegible]
* SOL PATU				R	

SPECIES CODE	LAYER 1	2	3	4	COL.

Page ...... of ....

ELC PLANT SPECIES LIST

SITE:
POLYGON:
DATE:
SURVEYOR(S):

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER
ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

JUN ARTI — O

SPECIES CODE	LAYER 1	2	3	4	COL.
BET PAPY		R			
LARX		R			
CHE GLAB				R	
RHA FRAN			R	R	
PIN SYLV			R		
VIOLA SP				R	
CARD (…)				O	
COR AMOM			R		
SAL DISC		O	O		
LOB SIPH				R	
JUNCUS (TENUIS, DUDD)				A	
CAREX SPP				O	
SCI ATRO			O	O	
ULM AMER		R	R		
EQU ARVE				O	
SAL PETI			O		
SOL DULC				O	
EUP MACU			O		
ACE NEGU		O	O	O	
SAL BEBB		O	O		
THU OCCI		R	O	O	
SAL ALBA	R				WEEPING WILLOW
VER HAST				O	
AGR STOL				A	
SOL ALTI				O	
TYP ANGU			O		
LYT SALI				O	
EUT GRAM				O	
AST LANC			A		
AST PUNI			A		
PHAL ARUN				A	
COR STOL			O	A	

INU HELE — R
AN GLUT — R
VIB LENT — O O
SOL RUGO — O
PHR AUST — R

This [illegible] [illegible] has pockets of deep organics & seepage areas. — grades upslope and then into a fringe of [illegible] [illegible] - bottom and [illegible] meadow.

In places its closed canopy and tree 15-20 ft tall.
Mostly its open stunted cedars 4-8 ft tall.

col. sol patch dominates end by [illegible] [illegible] FOC

Appendix D

Site Photographs

Photo 1: View from CUM1-1 towards Ochs Road

Photo 2: View from northwest corner of property of manicured lawn on adjacent residential property.

Photo 3: View of FODM11 community along northern boundary of Subject Property

Photo 4: Example of CUM1-1 ELC community after cultivation. Viewing southeast.

Photo 5: View or CUM1-1 ELC Community on the Subject Property, viewing east.

Photo 6: View of WODM5 ELC community in background, CUM1-1 ELC community in foreground.

Photo 7: View of WODM5 ELC community on Subject Property.

Photo 8: View of SWT2-5 ELC community on Subject Property, viewing south.

Appendix E

Summary of Bat Acoustic Monitoring Data

KALEIDOSCOPE 4.5.4

Bats of North America		EPTFUS	LASBOR	LASCIN	LASNOC	MYOLEI	MYOLUC	MYOSEP	PERSUB		NOID	NOISE		Presence P	EPTFUS	LASBOR	LASCIN	LASNOC	MYOLEI	MYOLUC	MYOSEP	PERSUB
Unit A	Totals		2	5	1						7	592			1	0.001513	0.0000009	0.985708	1	1	1	1
	20230531				1						1	32			1	1	1	0.1435802	1	1	1	1
	20230601			1							1	50			1	1	0.0409786	1	1	1	1	1
	20230602			1							1	18			1	1	0.0409786	1	1	1	1	1
	20230603			1							1	61			1	1	0.0409786	1	1	1	1	1
	20230604										0	9			1	1	1	1	1	1	1	1
	20230605										1	4			1	1	1	1	1	1	1	1
	20230606										0	1			1	1	1	1	1	1	1	1
	20230607										0	4			1	1	1	1	1	1	1	1
	20230608			2							0	0			1	1	0.0016792	1	1	1	1	1
	20230609		1								2	0			1	0.039036	1	1	1	1	1	1
	20230610		1								0	3			1	0.039036	1	1	1	1	1	1
	20230611										0	410			1	1	1	1	1	1	1	1

KALEIDOSCOPE 4.5.4

Bats of North America		EPTFUS	LASBOR	LASCIN	LASNOC	MYOLEI	MYOLUC	MYOSEP	PERSUB		NOID	NOISE		Presence P	EPTFUS	LASBOR	LASCIN	LASNOC	MYOLEI	MYOLUC	MYOSEP	PERSUB
Unit B	Totals	4	3	87	42		21		2		136	214			1	0.13256	0	0.0000002	1	0	1	0.098868
	20230531	1		13	6		2				16	6			1	1	0	0.1133279	1	0.033687	1	1
	20230601			14	4		2				19	10			1	1	0	0.6597848	1	0.033211	1	1
	20230602			10	4				1		11	6			1	1	0	0.3822535	1	1	1	0.036832
	20230603			4	6		4				9	8			1	1	0.0010079	0.003735	1	0.001103	1	1
	20230604			11	1						10	3			1	1	0	1	1	1	1	1
	20230605	3	1	7	7		3				20	14			0.612312	0.276324	0.0000038	0.009549	1	0.04412	1	1
	20230606			6	1		1				3	10			1	1	0	0.9999839	1	0.18224	1	1
	20230607			3	1		5				12	3			1	1	0.0003903	0.8507304	1	0.000201	1	1
	20230608		1	4	4						6	1			1	0.038895	0.0003477	0.0564665	1	1	1	1
	20230609		1	6	3		3				11	7			1	0.27546	0.0000005	0.3515393	1	0.042865	1	1
	20230610			9	5		1		1		17	12			1	1	0	0.1338887	1	0.229786	1	0.049013
	20230611										2	134			1	1	1	1	1	1	1	1

	EPTFUS	LASBOR	LASCIN	LASNOC	MYOLEI	MYOLUC	MYOSEP	PERSUB	NO ID	
Unit A	0	2	5	1	0	0	0	0	7	15
Unit B	4	3	87	42	0	21	0	2	136	295
Totals	4	5	92	43	0	21	0	2	143	310

Appendix F

Species at Risk Screening

Puslinch Area

Species At Risk Designations
ENDANGERED
THREATENED
SPECIAL CONCERN
EXTIRPATED

AMPHIBIANS		ESA Protection	Key Habitats Used By Species	Subject Property

BIRDS		ESA Protection	Key Habitats Used By Species	Subject Property
Bank Swallow (*Riparia riparia*)	Known to Occur	*Species and General Habitat Protection June 27, 2014*	It nests in a wide variety of naturally and anthropogenically created vertical banks, which often erode and change over time including aggregate pits and the shores of large lakes and rivers	Typical breeding habitat not present on Subject Property. Not observed during breeding bird surveys.
Barn Swallow (*Hirundo rustica*)	Known to Occur	*Species and General Habitat Protection*	prefers farmland; lake/river shorelines; wooded clearings; urban populated areas; rocky cliffs; and wetlands. They nest inside or outside buildings; under bridges and in road culverts; on rock faces and in caves etc.	Barn Swallows observed foraging over property during breeding bird surveys. No potential nest structures located on Subject Property.
Bobolink (*Dolichonyx oryzivorus*)	Known to Occur	*Species and General Habitat Protection*	generally prefers open grasslands and hay fields. In migration and in winter uses freshwater marshes and grasslands	Typical breeding habitat not present on Subject Property. Not observed during breeding bird surveys.
Canada Warbler (*Cardellina canadensis*; formerly *Wilsonia canadensis*)	Known to Occur	*N/A*	Generally prefers wet coniferous, decediuous and mixed forest types, with a dense shrub layer. Nests on the ground, on logs or hummocks, and uses dense shrub layer to conceal the nest.	Potential breeding habitat present on Subject Property. Not observed during breeding bird surveys.
Cerulean Warbler (*Setophaga cerulea;* formerly *Dendoica cerulea*)	Known to Occur	*Species and General Habitat Protection*	generally found in mature deciduous forests with an open understorey; also nests in older, second-growth deciduous forests.	Typical breeding habitat not present on Subject Property. Not observed during breeding bird surveys.
Chimney Swift (*Chaetura pelagica*)	Known to Occur	*Species and General Habitat Protection*	historically found in deciduous and coniferous, usually wet forest types, all with a welldeveloped, dense shrub layer; now most are found in urban areas in large uncapped chimneys	Typical breeding habitat not present on Subject Property. Not observed during breeding bird surveys.
Common Nighthawk (*Chordeiles minor*)	Suspected to Occur	*N/A*	generally prefer open, vegetation-free habitats, including dunes, beaches, recently harvested forests, burnt-over areas, logged areas, rocky outcrops, rocky barrens, grasslands, pastures, peat bogs, marshes, lakeshores, and river banks. This species also inhabits mixed and coniferous forests. Can also be found in urban areas (nest on flat roof-tops)	Typical breeding habitat not present on Subject Property.
Eastern Meadowlark (*Sturnella Magna*)	Known to Occur	*Species and General Habitat Protection*	generally prefers grassy pastures, meadows and hay fields. Nests are always on the ground and usually hidden in or under grass clumps.	Typical breeding habitat not present on Subject Property. Not observed during breeding bird surveys.
Eastern Wood-Pewee (*Contopus virens*)	Known to Occur	*N/A*	asscoiated with deciduous and mixed forests. Witin mature and intermediate age stands it prefers areas with little understory vegetation as well as forest clearings and edges.	Typical breeding habitat present on Subject Property. Species detected on east side of property during breeding bird surveys.
Golden-winged Warbler (Vermivora chrysoptera)	Known to Occur	*N/A*	generally prefer areas of early successional vegetation, found primarily on field edges, hydro or utility right-of-ways, or recently logged areas.	Typical breeding habitat not present on Subject Property. Not observed during breeding bird surveys.
Wood Thrush (*Hylocichla mustelina*)	Known to Occur	*N/A*	Nests mainly in second-growth and mature deciduous and mixed forests, with saplings and well-developed understory layers. Prefers large forest mosaics, but may also nest in small forest fragments.	Typical breeding habitat not present on Subject Property. Not observed during breeding bird surveys.

FISH			Key Habitats Used By Species	Subject Property
Redside Dace (*Clinostomus elongatus*)	Known to Occur	*Species Protection and* ***Habitat Regulation***	generally found in pools and slow-moving areas of small headwater streams with a moderate to high gradien	Potential habitat not present on Subject Property.

INSECTS		ESA Protection	Key Habitats Used By Species	Subject Property
Monarch Butterfly (*Danaus plexippus*)	Known to Occur	*N/A*	exist primarily wherever milkweed and wildflowers exist; abandoned farmland, along roadsides, and other open spaces	Isolated stems of Common and Swamp Milkweed noted on Subject Property. Monarch use of stems not documented.
West Virginia White (Pieris virginiensis)	Known to Occur Historically	*N/A*	generally prefer moist, deciduous woodlands. The larvae feed only on the leaves of the two-leaved toothwort (Cardamine diphylla), which is a small, spring-blooming plant of the forest floor.	Typical habitat not present on Subject Property.

MAMMALS		ESA Protection	Key Habitats Used By Species	Subject Property
Eastern small-footed Myotis (*Myotis leibii*)	**Suspected to Occur**	*Species and General Habitat Protection*	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius Maternal Roosts: primarily under loose rocks on exposed rock outcrops, crevices and cliffs, and occasionally in buildings, under bridges and highway overpasses and under tree bark.	Typical roosting habitat not present on Subject Property Species not detected on property.
Little Brown Myotis (*Myotis lucifugus*)	**Suspected to Occur**	*Species and General Habitat Protection*	Overwintering habitat: Caves and mines that remain above 0 Maternal Roosts: Often associated with buildings (attics, barns etc.). Occasionally found in trees (25-44 cm dbh).	Potential roosting habitat present on Subject Property. Use of habitat on property limited.
Northern Myotis (*Myotis septentrionalis*)	**Suspected to Occur**	*Species and General Habitat Protection*	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius Maternal Roosts: Often asssociated with cavities of large diameter trees (25-44 cm dbh). Occasionally found in structures (attics, barns etc.)	Typical roosting habitat not present on Subject Property Species use of property not significant.
Tri-colored Bat (*Perimyotis subflavus*)	**Suspected to Occur**	*Species and General Habitat Protection*	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius Maternal Roosts: Can be in trees or dead clusters of leaves or arboreal lichens on trees. May also use barns or similar structures.	Typical roosting habitat not present on Subject Property.
Woodland Vole *(Microtus pinetorum)*	**Suspected to Occur**	*N/A*	generally associated with deciduous forests in areas of soft, friable, often sandy soil beneath deep humus, where it can burrow easily.	Typical habitat not present on Subject Property. Not observed during site visits.

MOLLUSCS	ESA Protection	Key Habitats Used By Species	Subject Property

MOSSES	ESA Protection	Key Habitats Used By Species	Subject Property

PLANTS		ESA Protection	Key Habitats Used By Species	Subject Property
Butternut *(Juglans cinerea)*	**Known to Occur**	*Species and General Habitat Protection*	generally grows in rich, moist, and well-drained soils often found along streams. It may also be found on well-drained gravel sites, especially those made up of limestone. It is also found, though seldomly, on dry, rocky and sterile soils. In Ontario, the Butternut generally grows alone or in small groups in deciduous forests as well as in hedgerows	Hybrid individual observed during botanical inventories.

REPTILES		ESA Protection	Key Habitats Used By Species	Subject Property
Blanding's Turtle *(Emydonidea blandingii)*	**Known to Occur**	*Species and General Habitat Protection*	generally occur in freshwater lakes, permanent or temporary pools, slow-flowing streams, marshes and swamps. They prefer shallow water that is rich in nutrients, organic soil and dense vegetation. Adults are generally found in open or partially vegetated sites, and juveniles prefer areas that contain thick aquatic vegetation including sphagnum, water lilies and algae. They dig their nest in a variety of loose substrates, including sand, organic soil, gravel and cobblestone. Overwintering occurs in permanent pools that average about one metre in depth, or in slow-flowing streams.	Typical habitat not present on Subject Property. Not observed on property.
Eastern Ribbonsnake *(Thamnophis sauritus)*	**Known to Occur**	*N/A*	generally occur along the edges of shallow ponds, streams, marshes, swamps, or bogs bordered by dense vegetation that provides cover. Abundant exposure to sunlight is also required, and adjacent upland areas may be used for nesting.	Typical habitat not present on Subject Property. Not observed on property.
Northern Map Turtle *(Graptemys geographica)*	**Known to Occur**	*N/A*	generally inhabits both lakes and rivers, showing a preference for slow moving currents, muddy bottoms, and abundant aquatic vegetation. These turtles need suitable basking sites (such as rocks and logs) and exposure to the sun for at least part of the day.	Typical habitat not present on Subject Property. Not observed on property.
Snapping Turtle *(Chelydra serpentina)*	**Known to Occur**	*N/A*	generally inhabit shallow waters where they can hide under the soft mud and leaf litter. Nesting sites usually occur on gravely or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits.	Typical habitat not present on Subject Property. Not observed on property.

Appendix G

NHIC Data

NHIC Data

To work further with this data select the content and copy it into your own word or excel documents.

OGF ID	Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	ATLAS NAD83 IDENT	COMMENTS
977245	SPECIES	Midland Painted Turtle	Chrysemys picta marginata			SC	17NJ7111	
977245	SPECIES	Eastern Meadowlark	Sturnella magna		THR	THR	17NJ7111	
977245	SPECIES	Snapping Turtle	Chelydra serpentina		SC	SC	17NJ7111	
977255	SPECIES	Midland Painted Turtle	Chrysemys picta marginata			SC	17NJ7211	
977255	SPECIES	Eastern Meadowlark	Sturnella magna		THR	THR	17NJ7211	
977255	SPECIES	Snapping Turtle	Chelydra serpentina		SC	SC	17NJ7211	
977255	SPECIES	Butternut	Juglans cinerea		END	END	17NJ7211	
977244	SPECIES	Midland Painted Turtle	Chrysemys picta marginata			SC	17NJ7110	
977244	SPECIES	Redside Dace	Clinostomus elongatus		END	END	17NJ7110	
977244	SPECIES	Snapping Turtle	Chelydra serpentina		SC	SC	17NJ7110	
977244	SPECIES	Eastern Meadowlark	Sturnella magna		THR	THR	17NJ7110	
977244	SPECIES	Bobolink	Dolichonyx oryzivorus		THR	THR	17NJ7110	
977254	SPECIES	Eastern Ribbonsnake	Thamnophis sauritus		SC	SC	17NJ7210	
977254	SPECIES	Redside Dace	Clinostomus elongatus		END	END	17NJ7210	
977254	SPECIES	Snapping Turtle	Chelydra serpentina		SC	SC	17NJ7210	
977254	SPECIES	Eastern Meadowlark	Sturnella magna		THR	THR	17NJ7210	

Appendix H

Significant Wildlife Habitat Table

Assessment of potential Significant Wildlife Habitat for 11 Main Street, Morriston

Significant Wildlife Habitat (SWH) Type	Known or Candidate SWH present/absent	Rationale
SEASONAL CONCENTRATION AREAS OF ANIMALS		
Waterfowl Stopover and Staging Areas	Absent	Suitable habitat is not present on Subject Property.
Shorebird Migratory Stopover Area	Absent	Significant potential habitat is not present on Subject Property.
Raptor Wintering Area	Absent	Suitable habitat is not present on Subject Property.
Bat Hibernacula	Absent	Suitable overwintering habitat is not present on Subject Properties
Bat Maternity Colonies	Absent within development area	Potential roost trees present within portions of WODM5 and FOC4-1 vegetation communities on Subject Property. No development proposed within these communities.
Bat Migratory Stopover Area	Absent within development area	No evidence that development area is providing migratory stopover habitat for bats.
Turtle Wintering Areas	Absent	Potential overwintering habitat not present on Subject Property.
Reptile Hibernaculum	Absent within development area	Suitable overwintering habitat not observed in proposed development area on property. Overwintering habitat may be present in woodland areas near the toe of slopes, but no potential hibernacula identified.
Colonially -Nesting Bird Breeding Habitat (Bank and Cliff)	Absent	Not known to occur on Subject Property.
Colonially -Nesting Bird Breeding Habitat (Tree/Shrubs)	Absent	Not known to occur on Subject Property.
Colonially -Nesting Bird Breeding Habitat (Ground)	Absent	Not known to occur on Subject Property.
Migratory Butterfly Stopover Areas	Absent	Significant potential habitat is not present on Subject Property.

Landbird Migratory Stopover Areas	Absent	Significant potential habitat is not present on Subject Property.
Deer Yarding Areas	Absent	Not known to occur on Subject Property
Deer Winter Congregation Areas	Absent within development area	Not known to occur on Subject Property, but potential habitat is present in White Cedar forest and wetland. The proposed development will not impact these areas or potential function.
RARE VEGETATION COMMUNITIES		
Cliffs and Talus Slopes	Absent	Habitat type not present on Subject Property
Sand Barren	Absent	Habitat type not present on Subject Property
Alvar	Absent	Habitat type not present on Subject Property
Old Growth Forest	Absent	Habitat type not present on Subject Property
Savannah	Absent	Habitat type not present on Subject Property
Tallgrass Prairie	Absent	Habitat type not present on Subject Property
Other Rare Vegetation Communities	Absent	Habitat type not present on Subject Property
SPECIALIZED HABITATS OF WILDLIFE CONSIDERED SWH		
Waterfowl Nesting Area	Absent	Suitable habitat not present on Subject Property
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat	Absent	Suitable habitat not present on Subject Property
Woodland Raptor Nesting Habitat	Absent	Suitable habitat not present on Subject Property
Turtle Nesting Areas	Absent	No evidence of turtle nesting observed on Subject Property
Seeps and Springs	Absent within development area	Small and isolated seeps occur along bottom of slope edge in cedar forest. No significant habitat functions noted in association with seeps. No development proposed near these areas.
Amphibian Breeding Habitat (Woodland)	Absent	No Amphibians heard calling from property. No vernal pools or suitable potential breeding habitat observed on Subject Property.

Amphibian Breeding Habitat (Wetlands)	Absent	No Amphibians heard calling from property. No vernal pools or suitable potential breeding habitat observed on Subject Property.
Woodland Area-Sensitive Bird Breeding Habitat	Absent	Suitable habitat not present on Subject Property
HABITATS OF SPECIES OF CONSERVATION CONCERN CONSIDERED SWH		
Marsh Breeding Bird Habitat	Absent	Suitable habitat not present on Subject Property.
Open Country Bird Breeding Habitat	Absent	Indicator species not present on Subject Property
Shrub/Early Successional Bird Breeding Habitat	Absent	Indicator species not present on Subject Property
Terrestrial Crayfish	Absent	Suitable habitat not present on Subject Property
Special Concern and Rare Wildlife Species	Present	Eastern Wood-pewee assumed to be breeding in woodland on east side of property. No development proposed within or near potential habitat for this species.
ANIMAL MOVEMENT CORRIDORS		
Amphibian Movement Corridors	Absent	Amphibian use of the property is limited. This property does not serve as a link between suitable upland and wetland habitats.

Please note the above SWH criteria are based on guidance provided by the Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E and modified to be specific for the Subject Property.

August 23rd, 2024

Faisal Hamadi
WDD International
499 Brant Street
Burlington, ON. L7R 2G5

Attention Mr. Faisal Hamadi

RE: **Updated Tree Preservation Plan for 11 Main Street, Village of Morriston**

This Tree Preservation Plan (TPP) has been prepared in association with the Updated Scoped Environmental Impact Study (EIS) prepared by Colville Consulting Inc. dated August 2024, for a development proposed on the property located at 11 Main Street, in the Village of Morriston, Wellington County, hereafter referred to as the Subject Property. A TPP has been requested by County of Wellington staff to inventory trees on and adjacent to the Subject Property, with the intention of protecting and preserving trees where possible. As the majority of trees on the Subject Property are located within woodland and wetland features which are not proposed for development, the focus of this TPP is for trees within and adjacent to the development footprint that may be impacted during construction and grading of the Subject Property.

The conclusions and recommendations of this report are intended to assist with informing proposed zone boundaries to be established on the Subject Lands. A summary of our assessment is provided below.

PROPOSED DEVELOPMENT

It is our understanding that the proposed development includes 21 single detached lots along the northwestern portion of the Subject Property. All proposed residential lots are approximately 0.20ha in size and will front onto new streets to be constructed as part of the development. Development adjacent to the Subject Property will also include the extension of an existing street (Ochs Street) along the northern boundary of the Subject Property to provide access to the property.

To facilitate this proposed development, we understand that a Plan of Subdivision is required by the County of Wellington, and zoning By-Law amendments are required by the Township of Puslinch. The approximate extent of the proposed development is illustrated in Appendix A.

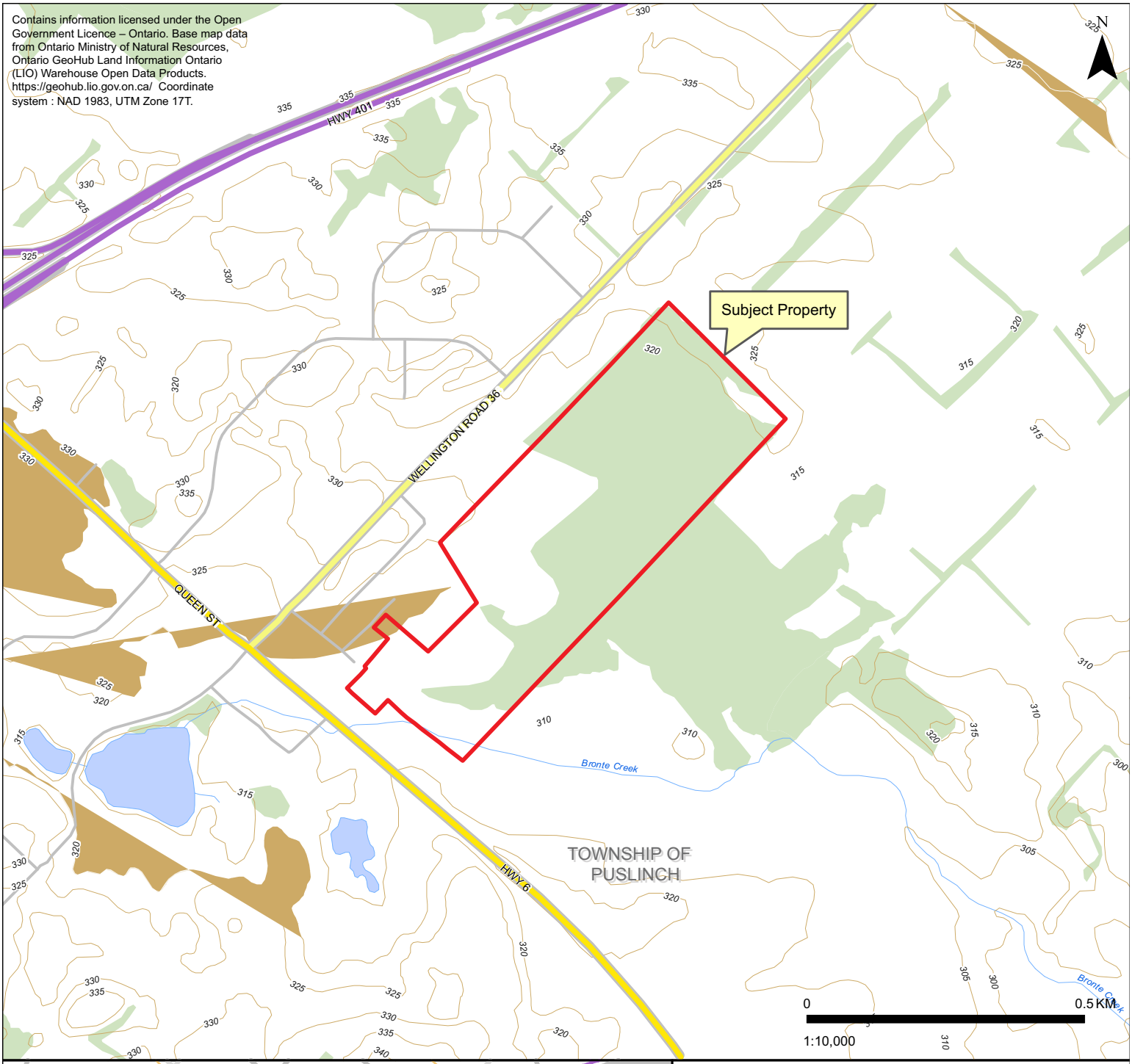
METHODS

This Tree Preservation Plan has been prepared with the goal of retaining and protecting as many trees as possible on the Subject Property and is intended to be read in conjunction with the Scoped Environmental Impact Study (EIS) report prepared for the property (January 2024).

It is our understanding that Wellington County does not have a Tree Preservation Plan Guideline. This TPP has been completed in general compliance with the Cty of Toronto's "Tree Protection Policy and Specifications for Construction Near Trees" and also includes components of the County of Wellington Woodland Conservation By-Law 5115-09, hereafter referred to as the By-Law.

The general intent of this assessment is to determine the extent and composition of trees on and immediately adjacent the development footprint on the Subject Property and identify mitigation

Contains information licensed under the Open Government Licence – Ontario. Base map data from Ontario Ministry of Natural Resources, Ontario GeoHub Land Information Ontario (LIO) Warehouse Open Data Products. https://geohub.lio.gov.on.ca/ Coordinate system : NAD 1983, UTM Zone 17T.



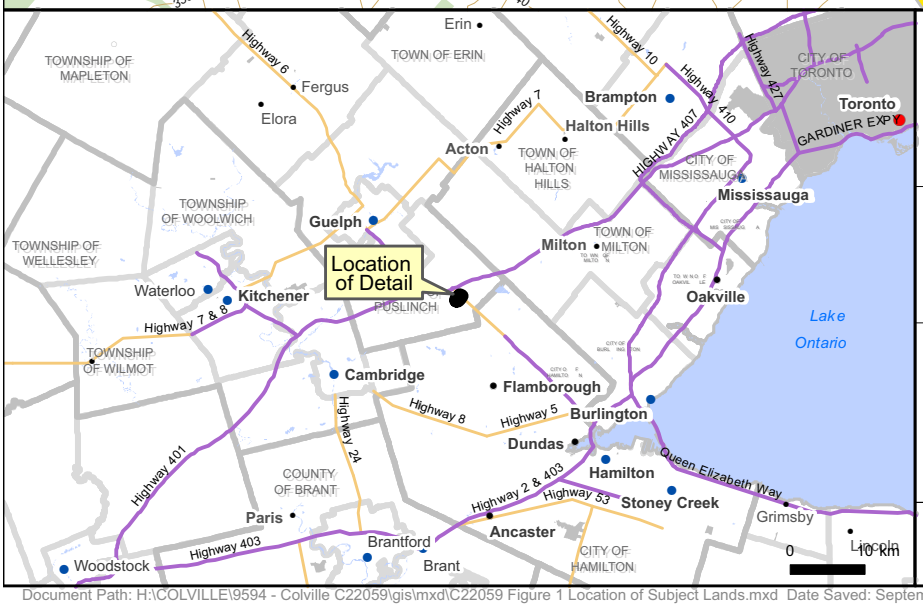


Figure 1
Location of Subject Property

Tree Preservation Plan for
11 Main Street, Morriston

Prepared for: WDD International

Prepared by: COLVILLE CONSULTING INC.

DATE: August 2024

FILE: C22059

Document Path: H:\COLVILLE\9594 - Colville C22059\gis\mxd\C22059 Figure 1 Location of Subject Lands.mxd Date Saved: September 22, 2022

measures for trees to be retained. For the purposes of this assessment and to be consistent with By-Law 5115-09, a tree in this assessment means a specimen of any species of woody perennial vegetation that has or has the potential grow to a height of at least 4.5 metres from the ground at physiological maturity and has a diameter at breast height (DBH) of at least 10 cm.

The work plan for this study included the following components:

1. Inventory all live trees greater than 10cm in diameter on and adjacent to proposed development on the Subject Property, including location, size, species, distribution, and health. An individual identification tag was affixed to each tree for future reference;
2. Prepare a figure illustrating the location of live trees on and adjacent to the Subject Property;
3. Prepare a summary report to provide all relevant information for trees on the Subject Property, including recommendations for each tree and appropriate mitigative measures.

Information collected as part of the EIS completed on the Subject Property was reviewed as part of background data collection for this report. This report contains the results of an inventory and data collection that was completed over four days on November 23rd & 24th, 2022 and January 10th and May 31st, 2023. The following parameters were assessed as part of our inventory:

Species – common and botanical names provided in the inventory table.

DBH – diameter at breast height (cm), measured at 1.4 m above the ground.

Dripline – measurement of the outermost circumference of the tree branches

Condition – condition of tree considering trunk integrity, crown structure and crown vigor. Condition ratings include Good, Fair, and Poor.

Location – UTM coordinates of the tagged tree.

The inventory of trees on this property was limited to trees 10 cm in DBH and larger, which were situated within the development footprint and surrounding area. All live trees greater than 10cm in diameter were tagged. A summary of tree tally information is provided in Appendix B.

EXISTING CONDITIONS

A total of 14 vegetation communities were identified on and adjacent to the Subject Property. These vegetation communities were classified and mapped according to the Ecological Land Classification (ELC) System for Southern Ontario. The Subject Property generally occurs on rolling uplands composed of silt or silty very fine sand. In places, the soils are stoney and limestone boulders or cobbles are mixed in with the tills. In the intervening lowlands, large wetland areas support seepage swamps with organic deposits that often exceed 40cm in depth. Although 14 vegetation communities were identified on the Subject Property and mapped on Figure 2, only those directly impacted by the proposed tree removal are discussed below.

Dry - Moist Old Field Meadow Type (CUM1-1)

A large portion of the Subject Property supports an old field meadow. This former agricultural field has been left fallow for some time and now supports an abundance (60-100% vegetation cover) of Smooth Brome, Orchard Grass, Timothy Grass, Kentucky Bluegrass, Quack Grass, Tall Goldenrod, New England Aster, Heath Aster, Spotted Knapweed, Wild Carrot, Canada Thistle,

and White Sweet Clover. To facilitate archaeological work on the site, the entirety of the CUM1-1 community was tilled in October 2022, after botanical inventories were conducted.

Sumac Cultural Thicket Type (CUT1-1)

The southwestern edge of the old field meadow supports a cultural thicket which slopes down to a thicket swamp below. Orchard Grass, Tall Goldenrod, Reed-canary Grass and Panicled Aster cover 60 to 100% of the ground layer. Staghorn Sumac forms a 25 to 60% cover of tall shrubs, 1 to 2m + in height. An abundance of Riverbank Grape, Black Walnut saplings and Chokecherry shrubs also occur in this layer.

In the 2 to 10m + height layer is an abundance of young to mature Black Walnut trees, almost forming a Black Walnut Savanna, along with some Red\Green Ash, Common Apple and Staghorn Sumac trees provide between 10 to 25% cover.

Dry - Fresh Deciduous Hedgerow Thicket Ecosite (THDM3)

Separating the old field meadow from the adjacent residential properties of mowed lawns and a parkland, is a very dense thicket of tall Common Buckthorn shrubs, along with a few trees (often Manitoba Maple or Basswood) and Hawthorns forming a shrub hedge-row.

Naturalized Deciduous Hedge-row Ecosite (FODM11)

Hedge-rows of mature (greater than 10m tall) Basswood and Manitoba Maple or Sugar Maple and rarely Black Cherry trees are associated with the old field meadow. The dense sub canopy (2 to 10m in height) and understory layers (1 to 2m in height) are often dominated by Common Buckthorn, Hawthorn species, Riverbank Grape and young Manitoba maple or Cherry species. Thicket Creeper, Asters, Goldenrods, Grasses and Riverbank Grape are abundant in the ground layer.

Some of these hedge-row support mature and large diameter Sugar Maple trees. Noted on the vegetation community map is a former hedge-row or fence line which has now been surrounded and infilled by Fresh - Moist Deciduous Woodland.

Fresh - Moist Deciduous Woodland Ecosite (WODM5)

In places, the old field meadow is bordered by a Fresh - Moist Deciduous Woodland. The open canopy layer (greater than 10 to 25m + in height) is formed by a 10 to 25% cover (in places it is more dense with up to 25 to 60% cover) of mature Basswood, Black Cherry, White Pine, Bitternut Hickory, Sugar Maple or Trembling Aspen trees.

Common Buckthorn, Hawthorn species, vines of Riverbank Grape, Alternate-leaved Dogwood, White Cedar and White Elm form a denser cover (25 to 60% cover or occasional less) in the 2 to 10m height layer. Many large (10-25cm or 25cm + dbh) and open-grown Hawthorns are still standing, forming part of the original woodland cover. However, many are now declining as they are being shaded out or over-topped by Common Buckthorn.

Dry - Fresh White Cedar Coniferous Forest Type (FOC2-2)

Along the rim and upper slopes, adjacent to a coniferous swamp, is a linear stand (possibly a former hedge-row bordering the old field meadow) of Dry - Fresh White Cedar Coniferous Forest. Limestone boulders, likely removed when the adjacent agricultural field was first cleared and plowed, are piled here. Along this pile of stones is an open grown, contorted, and multi trunked White Cedar tree, perhaps a marker tree. This tree is now surrounded by an even aged stand (25-50cm dbh) of White Cedar and occasionally Trembling Aspen, forming a fringe of coniferous forest between the conifer swamp and old field meadow.

Legend

Subject Property

ELC Community

CUM1-1	Dry-Moist Old Field Meadow
CUT1-1	Sumac Cultural Thicket
THDM3	Dry-Fresh Deciduous Hedge-row Ecosite
FODM11	Naturalize Deciduous Hedge-row Ecosite
FOCM5	Naturalized Coniferous Hedge-row Ecosite
WODM5	Fresh-Moist Deciduous Woodland Ecosite
FOMM2-3	Dry-Fresh White Pine - Hardwood Mixed Forest Type
FOC4-1	Fresh-Moist White Cedar Coniferous Forest Type
MAM3-9	Forb Organic Meadow Marsh Type
FOC2-2	Dry-Fresh White Cedar Coniferous Forest Type
SWC3-1	White Cedar Organic Coniferous Swamp Type
SWT2-5	Red-osier Mineral Thicket Swamp Type
MAM2-2	Reed-canary Grass Mineral Meadow Marsh Type
MAMM1-12	Common Reed Graminoid Mineral Meadow Marsh

Figure 2
Extent of Vegetation Communities on the Subject Property

Tree Preservation Plan for 11 Main Street, Morriston

Prepared for: **WDD International**

Prepared by: COLVILLE CONSULTING INC.

DATE: August 2024

FILE: C22059

RESULTS

Our inventory indicates that a total of 264 trees greater than 10cm in diameter are located within and adjacent the development footprint on the Subject Property (see Figure 3). Trees inventoried were comprised predominantly of Hawthorn sp. (20%), Eastern White Cedar (13%), American Basswood (11%), Black Cherry (11%), and Sugar Maple (11%) with 17 other species comprising the remaining 34%. Details of the tree inventory are provided in Appendix B and representative site photographs are provided in Appendix C.

Based on the locations of trees on and adjacent the property, it is expected a total of 116 trees will need to be removed to facilitate grading and future construction of the proposed development. Of these 116 trees, eighteen are conditionally recommended for removal due to being boundary trees or located on Public Property immediately adjacent the Subject Property. These trees are located within the hedgerow along the Old Morriston Baseball diamond and cannot be removed without consultation and consent from the Township. Pending the results of this consultation, additional tree removal in the hedgerow may be considered to facilitate future landscaping along the boundary of these properties. Further assessment may be required pending the results of consultation. There may also be further opportunities to retain additional trees once a final grading plan is set.

Survey data was initially collected by Colville Consulting Inc and later refined by JD Barnes Ltd. surveying was reviewed to determine if these trees were boundary trees. Information collected by J.D Barnes Ltd. was used in the final determination of boundary trees where inconsistencies in mapping data were observed.

A total of thirteen trees within the road allowance are recommended for removal to allow for the proposed construction of the Ochs Street extension. Removal of these trees will also require consultation with the municipality prior to removal.

A total of 148 trees inventoried are recommended to be retained. These are a mix of publicly and privately owned trees, and also includes trees on the Subject Property located within the buffer zone of the woodland and wetland features to be retained. Minimum Tree Protection Zones (TPZ) for trees to be retained have been mapped on Figure 3 and provided in Appendix B. Additional information on tree protection zone requirements are provided in the mitigation section below. It is recommended that retainment trees be considered while creating final grading plan as well as re-examined to ensure no long term impacts to any retainment trees health. It is important that no TPZ be impacted through grading. It also should be noted that the TPZ of Tree #544's 6 meter setback encroaches approximately 80cm into the proposed roadway construction. It is recommended that this tree be re-evaluated before and during the construction process, as further consideration may be necessary to ensure this tree's health is not impacted during roadway construction.

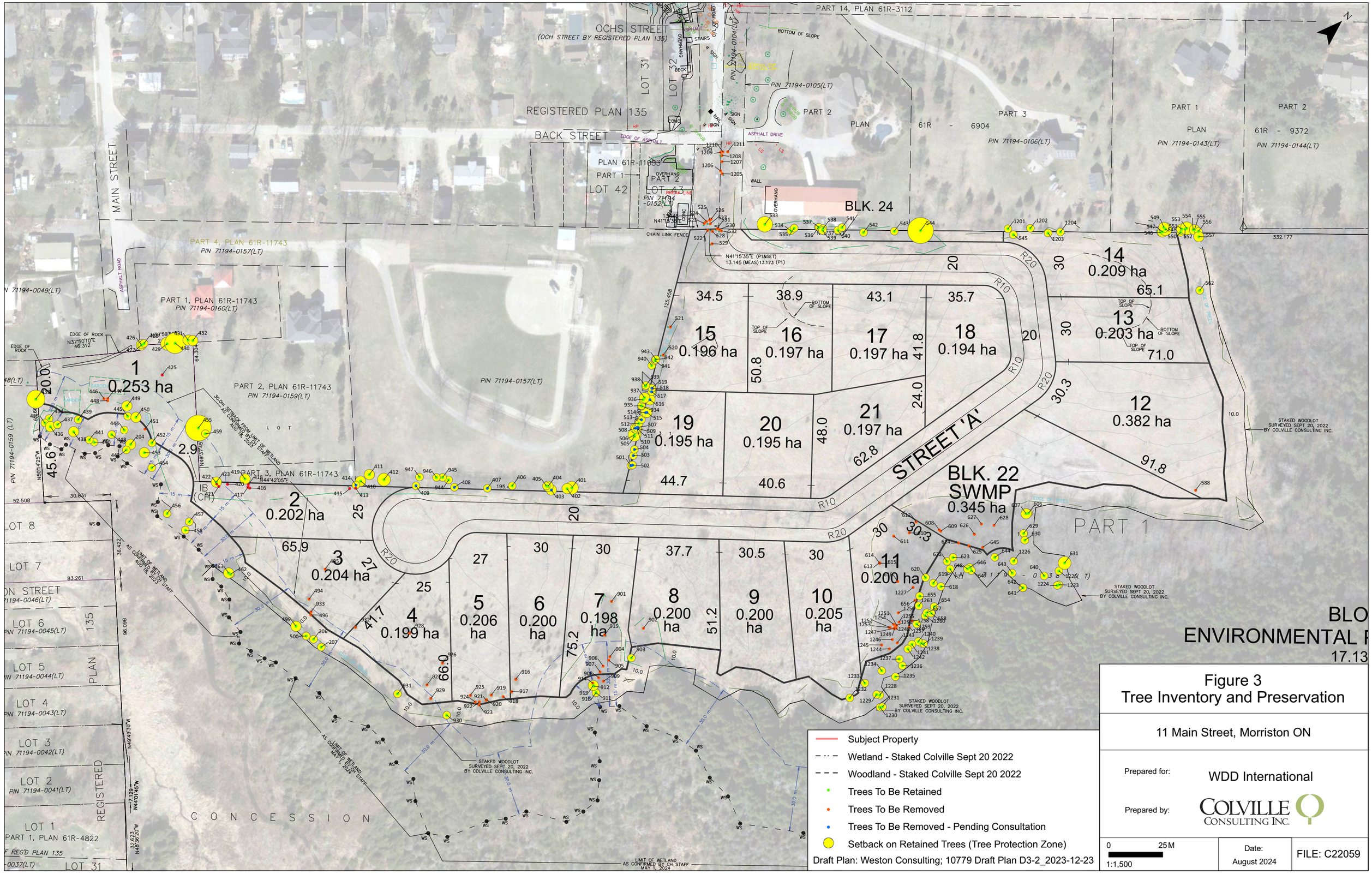
During the tree inventory, one botanical Species at Risk (SAR) was observed adjacent the Subject Property. A single Butternut was observed adjacent the northwestern corner of the property on private property. An assessment of this tree was conducted twice during the 2023 leaf-on season and it was determined that this tree exhibited external characteristics typical of Butternut hybrids. Because of the location of this tree off-property and visible hybrid characteristics, no further genetic assessment was conducted to determine purity. No genetically pure Butternut were observed on the property. Additional buffering from this tree is not recommend, however adequate setbacks based on DBH should be adhered to prevent potential injury. If injury to the

tree is anticipated and/or required as part of future development, further assessment (genetic testing) is recommended to further demonstrate hybridity as required.

There was a significant range in tree diameters on the property with several large >100cm DBH Sugar Maples and Red Oaks present within the Woodlands on the Subject Property. The average DBH of trees inventoried was 22cm.

Significant Wildlife Habitat Assessment Bats

Assessments of potential bat roosting habitat were conducted on November 23, 2022 and May 31, 2023 using methods described in MNRF (2017). Several snag and cavity trees were identified during the assessment throughout the property. Snag trees along the northern portion of the Subject Property were limited to larger some diameter Silver Maples located primarily on private property adjacent the Main Street road allowance and clustered on the northeastern extent of the FODM11 community adjacent to the WODM5 community. The vast majority of snag and cavity trees on the Subject Property were observed throughout the WODM5 and FOC4-1 ELC communities which are proposed to be retained as part of future development on the property. Further information is provided in the EIS.



Subject Property
Wetland - Staked Colville Sept 20 2022
Woodland - Staked Colville Sept 20 2022
Trees To Be Retained
Trees To Be Removed
Trees To Be Removed - Pending Consultation
Setback on Retained Trees (Tree Protection Zone)

Draft Plan: Weston Consulting; 10779 Draft Plan D3-2_2023-12-23

Figure 3
Tree Inventory and Preservation

11 Main Street, Morriston ON

Prepared for: WDD International

Prepared by: Colville Consulting Inc.

Date: August 2024

FILE: C22059

SUMMARY AND RECOMMENDATIONS

This report was completed to inventory trees on and adjacent to the proposed development footprint on the property located at 11 Main Street and assess potential impacts the development may have on these trees. From our assessment it is anticipated that 116 trees greater than 10cm in diameter will need to be removed from the Subject Property to facilitate the construction of the proposed development. Of the 116 trees to be removed, 18 are either boundary trees or located entirely on public property. These trees cannot be removed until consultation with the Township and permission for removal has been obtained.

Please note that the assessment and recommendations above are based on the proposed Draft Plan of Subdivision provided by WDD International and illustrated in Figure 3. Should any changes to this plan be required, including changes to grading, an update to this TPP should be completed to address these changes and assess impacts.

MITIGATION MEASURES

To assist in maintaining the health of trees to remain on and adjacent to the Subject Property, it is recommended that the following mitigation measures be implemented.

- A limit of work fence should be erected on the Subject Property where anticipated works are to occur in close proximity to trees. A minimum TPZ as outlined in Appendix B should be installed for trees to be retained prior to the start of construction.
- Equipment use in close proximity to trees to be retained should be minimized where possible. No equipment use should occur within the Tree Protection Zone.
- Construction materials, equipment, soil, construction waste or debris shall not to be stored within the Tree Protection Zone or within the dripline of any trees identified for protection.
- Any trees located adjacent to the development area which are to be retained should be clearly marked with high visibility marking paint.
- Consultation with adjacent landowners is required prior to the removal of boundary trees. It is strongly encouraged that written consent be obtained through this process. Compensation or replacement plantings may be required where boundary trees are removed.
- Compensation for trees removed from the Subject property to facilitate development should be considered to offset any potential negative ecological impacts. It is recommended be native trees be incorporated into the landscape planting plan and that tree compensation of 2:1 replacement, or greater, be considered.
- Any tree roots encountered outside of the recommended tree hoarding limit of work fence during excavation should be flush-cut to promote new root growth. Work should be conducted following current arboricultural industry standards and under the supervision of a qualified arborist. If the root damage is extensive and determined to be critical, tree replacement should be discussed with Township.
- A tree risk assessment should be completed where root cutting is required within the Tree Protection Zone to facilitate the installation of underground utilities. Alternative

techniques such as boring or hydro excavating are recommended to be employed where possible.

- Any required vegetation removal should be conducted in a manner to avoid impacts to nesting birds and wildlife that may be utilizing habitats on the Subject Property. Any required tree removal is recommended to occur between October 1st and May 31st to avoid the active bird season and prevent negative impacts to bats that may be utilizing trees for roosting on the Subject Property.
- It is recommended that tree and vegetation removal on the Subject Property be completed by a reputable tree clearing contractor to help avoid impacts to trees remaining on the site.
- All areas of disturbed soil should be seeded and vegetated following construction to help minimize soil erosion on the site.

LIMITATIONS OF ASSESSMENT

It is our policy to attach the following clause regarding limitations. We do this to ensure that all interested parties are aware of what is technically and professionally realistic in retaining trees.

The assessment of trees presented in this report has been made using accepted arboricultural techniques. Specifically, we conducted a visual examination of all the above ground parts of the tree for structural defects, external indications of decay such as fungal fruiting bodies and evidence of attack by insects. We also noted the general condition of trees, but did not complete any risk assessments or assessment of hazard potential. Trees were not cored, probed, or climbed and there was no detailed inspection of the root crowns involving excavations.

The observations and recommendations within this document are true for the period that staff were on site and therefore do not include any other activities and/or change in overall condition or health to any trees occurring on site before or after our site visit. The existence of any and all trees on site represent a certain inherent degree of risk and our evaluation and recommendation does not preclude all potential risk of failure. Inspection of trees was conducted using visual examination and limited to information gathered through visual observation.

Notwithstanding the recommendations and conclusions made in this report, it must be recognized that trees are living organisms, and their health and vigour constantly change over time. They are not immune to changes in site conditions or seasonal variations in the weather conditions.

Please do not hesitate to contact the undersigned should you have any questions regarding the results of this report.

Respectively submitted by:

Brett Espensen, B.A (Hons.), EP.
I.S.A. Certified Arborist (ID: ON-2656A)
Colville Consulting Inc.

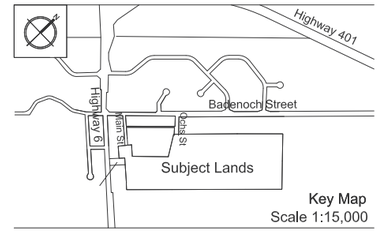
Appendix A

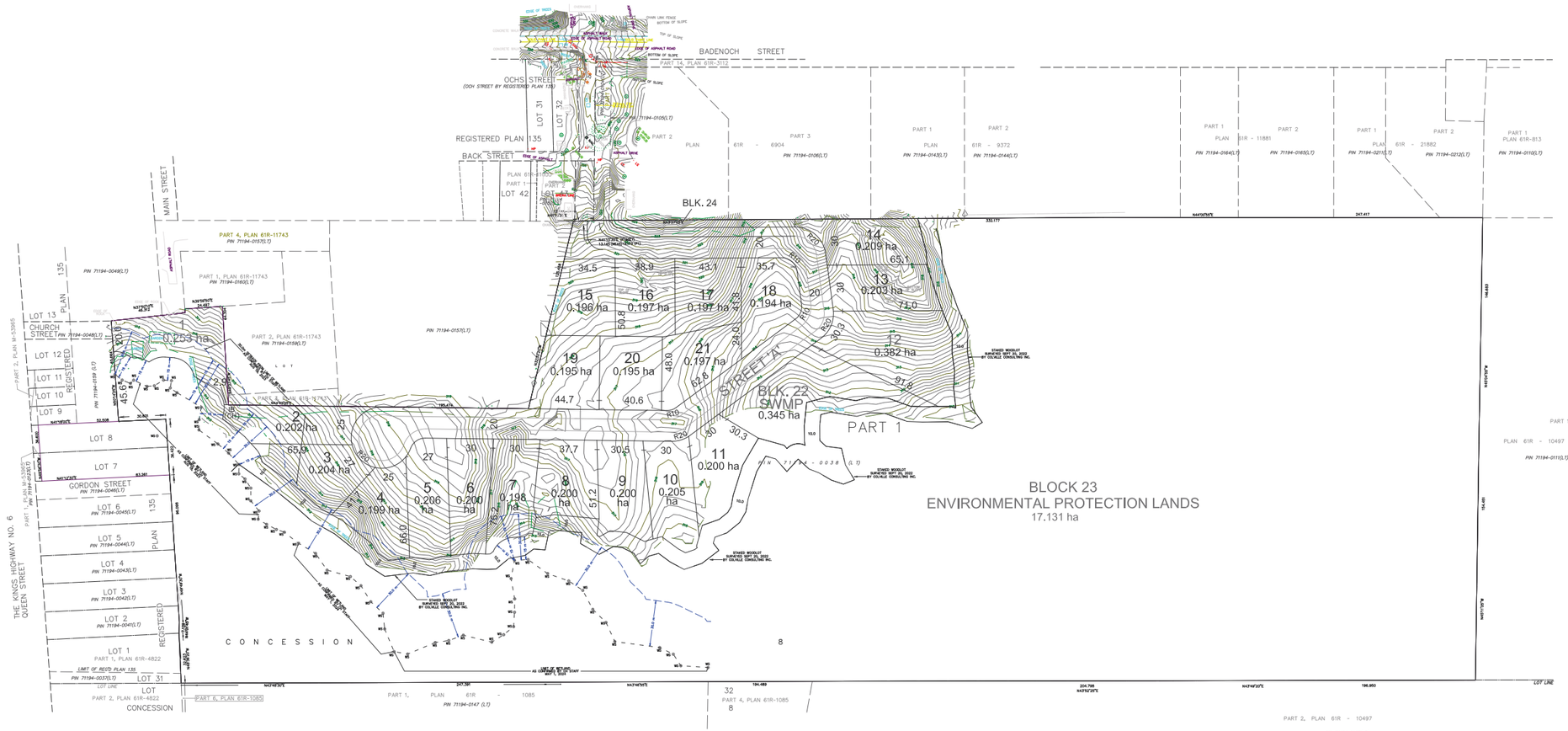
Development Plan

DRAFT PLAN OF SUBDIVISION

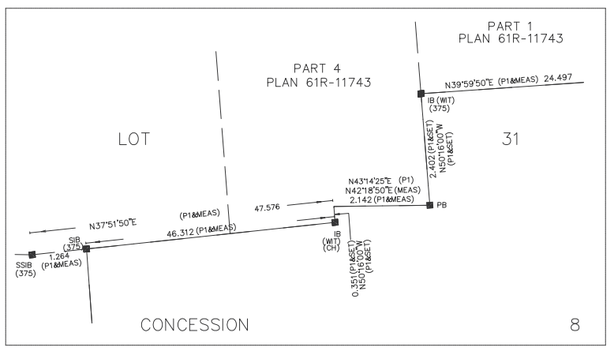
PART OF LOTS 7 & 8
NORTH OF QUEEN STREET
REGISTERED PLAN 135

AND PART OF LOT 31
CONCESSION 8
TOWNSHIP OF PUSLINCH
COUNTY OF WELLINGTON





NOT TO SCALE



INTEGRATION DATA

OBSERVED REFERENCE POINTS (ORPs): UTM ZONE 17, NAD83 (CSRS) (2010.0).
COORDINATES TO URBAN ACCURACY PER SECTION 14 (2) OF O.REG 216/10.

POINT ID	EASTING	NORTHING
ORP Ⓐ	571 819.11	4 810 772.76
ORP Ⓑ	572 189.46	4 811 593.30

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

THE RESULTANT TIE BETWEEN ORP Ⓐ AND ORP Ⓑ IS 900.588 N24°17'31"E

OWNER'S CERTIFICATE:

I authorize Weston Consulting Group Inc. to prepare and submit this plan for draft approval.

Date: ____ ____ ____

WDD MAIN STREET Inc. c/o FAISAL HAMADI
499 BRANT STREET
BURLINGTON, ONTARIO L7R 2G5
PHONE: 905-483-7399
Info@wddinternational.com

SURVEYOR'S CERTIFICATE:

I hereby certify that the boundaries of the lands being subdivided and their correct relationship to the adjacent lands are accurately and correctly shown on this plan.

Date: ____ ____ ____

RAYMOND J. SIBTHORP, OLS
J.D. BARNES LIMITED
257 WOODLAWN ROAD WEST, UNIT 101
GUELPH, ONTARIO N1H 8J1
PHONE: (519) 822-4031 www.jdarnes.com

ADDITIONAL INFORMATION:

[Section 51(17) of the Planning Act, R.S.O. 1990, c. P.13],
as amended to June 20, 2024.
a), b), e), f), g), j) & l) - on plan.
c) - on key plan
d) - see statistics
h) - piped water to be installed by developer
i) - silty sand, sand and silt, and clayey silt
k) - all services to be made available by developer

DEVELOPMENT STATISTICS:

LOTS/BLOCKS	LOTS	AREA
Single Detached Lots (20 m+) [Lots 1-21]:	21	4.436 ha
SWMP [Blk. 22]:		0.345 ha
Environmental Protection Lands [Blk 23]:		17.131 ha
Additional lands [Blk. 24]:		0.059 ha
Roads:		1.133 ha
Total:	21	23.104 ha

SCALE
0 80m

WESTON CONSULTING
1-800.363.3558 westonconsulting.com
Vaughan: 201 Millway Ave. Suite 19 Vaughan, Ontario L4K 5K8 T. 905.738.8080 F. 905.738.6637
Toronto: 268 Berkeley St. Toronto, Ontario M5A 2X1 T. 416.640.9917 F. 905.738.6637

REVISIONS LIST

09 JUN 2024	Modify Lots 1-3,7 per 15m wetland setback. Outline/measure enhanced buffer area
14 MAY 2024	Update using new topo survey with 30m wetland setback. Modify SWM & Lots 1-14.
02 MAY 2024	Revise Lots 1-14 & SWM Block. Remove walkway and revise Lots 15-21
20 DEC 2023	Revise cul-de-sac to R=20 m & lots 3-5.
03 OCT 2023	Remove wetland limits by Colville Sept 20, 2022. Remove original edge of trees & staked limit. Insert Staked Woodlot Surveyed Sept 20, 2022 by Colville Consulting Inc.
20 SEP 2023	Remove old treeline, Regulated Limits. Update using 2023-09-11 topo file
15 SEP 2023	Revise ROW width to 20m & revert back to north-east access
23 FEB-11 APR 2023	Revise per topo plan Revise per updated survey plan & survey text
14 DEC 2022	Revise St. B per grading plan (Crozier) & revise Lots 17-23
11 NOV 2022	Revise ROW width to 18 metres & design lots (min 0.2 ha)
20 OCT 2022	Update drawing using 2022-10-12 survey

Drawing Number: D14

File Number:	10779
Drawn By:	SM
Planner:	PT
Scale:	1:1500
CAD:	10040 Draft Plan D14 2024-07-09.dgn

Appendix B

Tree Inventory Data

Tag #	Species		DBH (cm)	Dripline	Setback Required (m)	Health	Location	Remove Or Retain	Other comments
204	Common Apple	*Malus pumila*	32,40,22	5	2.4	Fair	Subject Property	Retain	Coppice, vine growth, water sprouts
206	Eastern White Cedar	*Thuja occidentalis*	20,18,16,18	3	1.8	Good	Subject Property	Retain	
207	Eastern White Cedar	*Thuja occidentalis*	16	2	1.8	Good	Subject Property	Retain	Coppice
401	Manitoba Maple	*Acer negundo*	30,48	5	3.0	Good	Public Property	Retain	Coppice, lots of suckers
402	Manitoba Maple	*Acer negundo*	12,30	4	2.4	Good	Public Property	Retain	
403	Red Oak	*Quercus rubra*	24,40,22,38	5	2.4	Good	Boundary Tree - Public Property	Remove - Pending Consultation	4 large steams, coppice
404	Red Oak	*Quercus rubra*	36	5	2.4	Good	Public Property	Retain	
405	American Basswood	*Tilia americana*	16	4	1.8	Good	Public Property	Retain	Coppice
406	Sweet Cherry	*Prunus avium*	16,16	2	1.8	Good	Public Property	Retain	
407	Black Cherry	*Prunus serotina*	10	2	1.8	Good	Boundary Tree - Public Property	Remove - Pending Consultation	
408	Black Cherry	*Prunus serotina*	14	3	1.8	Fair	Boundary Tree - Public Property	Remove - Pending Consultation	3 stems, two damaged
409	Sugar Maple	*Acer saccharum*	22	3	1.8	Good	Boundary Tree - Public Property	Remove - Pending Consultation	
410	Red Oak	*Quercus rubra*	38	4	2.4	Good	Public Property	Retain	Coppice at 2m
411	Black Locust	*Robinia pseudo-acacia*	32	3	2.4	Good	Public Property	Retain	
412	Red Oak	*Quercus rubra*	40	4	3.0	Good	Public Property	Retain	
413	Black Walnut	*Juglans nigra*	10	4	1.8	Good	Subject Property	Remove	
414	Hawthorn sp.	*Crataegus sp*	14	3	1.8	Fair/Poor	Boundary Tree - Public Property	Retain	
415	Common Apple	*Malus pumila*	26	4	1.8	Good	Subject Property	Remove	
416	Black Walnut	*Juglans nigra*	22	5	1.8	Good	Subject Property	Remove	
417	Black Walnut	*Juglans nigra*	26	5	1.8	Good	Subject Property	Remove	
418	Hawthorn sp.	*Crataegus sp.*	14,14	4	1.8	Good	Subject Property	Remove	
419	Black Walnut	*Juglans nigra*	36	4	2.4	Good	Private Property	Retain	
420	Black Walnut	*Juglans nigra*	36	5	2.4	Good	Subject Property	Remove	
421	Black Walnut	*Juglans nigra*	26	4	1.8	Good	Subject Property	Remove	
422	Black Walnut	*Juglans nigra*	38	5	2.4	Good	Subject Property	Remove	
423	Black Walnut	*Juglans nigra*	36	6	2.4	Good	Boundary Tree -Private Property	Retain	
424	Black Walnut	*Juglans nigra*	18	4	1.8	Good	Subject Property	Retain	
425	Black Cherry	*Prunus serotina*	50	5	3.0	Good	Subject Property	Remove	
426	Sugar Maple	*Acer saccharum*	30	4	2.4	Good	Boundary Tree -Private Property	Retain	Sweep at 1m
427	Sugar Maple	*Acer saccharum*	12	5	1.8	Good	Boundary Tree -Private Property	Retain	
428	Sugar Maple	*Acer saccharum*	22	5	1.8	Good	Boundary Tree -Private Property	Retain	Sweep
429	Sugar Maple	*Acer saccharum*	48,48	5	3.0	Good	Boundary Tree -Private Property	Retain	Coppice, weak union at 1m
430	Sugar Maple	*Acer saccharum*	72	6	4.8	Good	Boundary Tree -Private Property	Retain	
431	Sugar Maple	*Acer saccharum*	30	5	2.4	Good	Boundary Tree -Private Property	Retain	
432	Sugar Maple	*Acer saccharum*	32	5	2.4	Good	Private Property	Retain	
433	Hybrid Butternut	*Juglans cinerea*	62,46	6	4.2	Fair	Private Property	Retain	
434	Black Walnut	*Juglans nigra*	20	4	1.8	Good	Subject Property	Retain	
435	Black Walnut	*Juglans nigra*	12	2	1.8	Good	Subject Property	Retain	
436	Weeping Willow	*Salix alba var. tristis*	36,38,26	4	2.4	Fair	Subject Property	Retain	
437	Manitoba Maple	*Acer negundo*	28	3	1.8	Poor	Subject Property	Retain	
438	Manitoba Maple	*Acer negundo*	30	1	2.4	Poor	Subject Property	Retain	
439	Hawthorn sp.	*Crataegus sp.*	12	2	1.8	Fair	Subject Property	Retain	
440	Common Apple	*Malus pumila*	12	3	1.8	Good	Subject Property	Retain	
441	Common Apple	*Malus pumila*	28,26,16	4	1.8	Good	Subject Property	Retain	
442	Common Apple	*Malus pumila*	28,30,16	4	1.8	Good	Subject Property	Retain	
443	Common Apple	*Malus pumila*	12	3	1.8	Good	Subject Property	Retain	
444	Black Walnut	*Juglans nigra*	10	3	1.8	Good	Subject Property	Retain	
445	Black Walnut	*Juglans nigra*	10	3	1.8	Good	Subject Property	Retain	
446	Common Apple	*Malus pumila*	28,16	3	1.8	Fair	Subject Property	Remove	
447	Common Apple	*Malus pumila*	16	2	1.8	Fair	Subject Property	Remove	
448	Black Walnut	*Juglans nigra*	10	3	1.8	Good	Subject Property	Remove	
449	Common Apple	*Malus pumila*	38,20,34	5	2.4	Fair/Good	Subject Property	Retain	
450	Common Apple	*Malus pumila*	26,32,30	5	2.4	Good	Subject Property	Retain	
451	Black Walnut	*Juglans nigra*	28,32	5	2.4	Good	Subject Property	Remove	
452	Black Walnut	*Juglans nigra*	14	2	1.8	Good	Subject Property	Retain	
453	Common Apple	*Malus pumila*	36,38	5	2.4	Fair	Subject Property	Retain	
454	Common Apple	*Malus pumila*	10,10	3	1.8	Good	Subject Property	Retain	
455	Common Apple	*Malus pumila*	90	5	6.0	Fair	Private Property	Retain	

Tag #	Species		DBH (cm)	Dripline	Setback Required (m)	Health	Location	Remove Or Retain	Other comments
456	Common Apple	*Malus pumila*	18,18,16	3	1.8	Fair	Subject Property	Retain	
457	Red Ash	*Fraxinus pennsylvanica*	26	5	1.8	Fair	Subject Property	Retain	
458	Red Ash	*Fraxinus pennsylvanica*	26	4	1.8	Fair/Good	Subject Property	Retain	
459	Common Apple	*Malus pumila*	18	2	1.8	Good	Private Property	Retain	Same as adjacent Tre
462	Eastern White Cedar	*Thuja occidentalis*	22	3	1.8	Good	Subject Property	Retain	
463	Eastern White Cedar	*Thuja occidentalis*	30,28	3	2.4	Good	Subject Property	Retain	Coppice
494	Scots Pine	*Pinus sylvestris*	20	3	1.8	Good	Subject Property	Remove	Surrounded by young cedar
495	Eastern White Pine	*Thuja occidentalis*	10	2	1.8	Good	Subject Property	Remove	
496	Eastern White Cedar	*Thuja occidentalis*	12	2	1.8	Good	Subject Property	Remove	
499	Eastern White Cedar	*Thuja occidentalis*	18,28,32,28	4	2.4	Good	Subject Property	Retain	Coppice
500	Eastern White Cedar	*Thuja occidentalis*	22,24	3	1.8	Good	Subject Property	Retain	Coppice
501	American Basswood	*Tilia americana*	22,10	5	1.8	Good	Boundary Tree - Public Property	Remove - Pending Consultation	Coppice, two dead trees adjacent
502	American Basswood	*Tilia americana*	14	1	1.8	Fair	Boundary Tree - Public Property	Remove - Pending Consultation	Moderate branch dieback
503	American Basswood	*Tilia americana*	10	2	1.8	Good	Boundary Tree - Public Property	Remove - Pending Consultation	surrounded by buckthorn
504	American Basswood	*Tilia americana*	18	4	1.8	Good	Public Property	Remove - Pending Consultation	
505	American Basswood	*Tilia americana*	24,16,30	6	2.4	Good	Public Property	Remove - Pending Consultation	Coppice
506	American Basswood	*Tilia americana*	22,48,20	5	3.0	Good	Public Property	Retain	Coppice
507	American Basswood	*Tilia americana*	20	4	1.8	Fair	Public Property	Remove - Pending Consultation	Sweep at 3m, leaning toward ball diamond
508	American Basswood	*Tilia americana*	30	5	2.4	Fair	Public Property	Remove - Pending Consultation	Sweep at 3m, leaning toward ball diamond
509	American Basswood	*Tilia americana*	22	5	1.8	Good	Boundary Tree - Public Property	Remove - Pending Consultation	
510	American Basswood	*Tilia americana*	30,24	5	2.4	Good	Public Property	Retain	Coppice
511	American Basswood	*Tilia americana*	16	4	1.8	Good	Public Property	Retain	
512	American Basswood	*Tilia americana*	22	5	1.8	Good	Public Property	Retain	
513	American Basswood	*Tilia americana*	24	5	1.8	Fair	Boundary Tree - Public Property	Remove - Pending Consultation	Lots of vine growth
514	American Basswood	*Tilia americana*	36	5	2.4	Good	Boundary Tree - Public Property	Remove - Pending Consultation	
515	American Basswood	*Tilia americana*	38	5	2.4	Good/Fair	Boundary Tree - Public Property	Remove - Pending Consultation	branch dieback,
516	American Basswood	*Tilia americana*	16,38	5	2.4	Good	Boundary Tree - Public Property	Remove - Pending Consultation	Coppice, growing against fence
517	American Basswood	*Tilia americana*	14	2	1.8	Fair	Boundary Tree - Public Property	Remove - Pending Consultation	branch dieback, sweep
518	American Basswood	*Tilia americana*	22	4	1.8	Good	Boundary Tree - Public Property	Remove - Pending Consultation	Growing adjacent fence
519	American Basswood	*Tilia americana*	12	3	1.8	Good	Subject Property	Remove	
520	White Elm	Ulmus americana	30	5	2.4	Good	Subject Property	Remove	
521	Sweet Cherry	*Prunus avium*	16	1	1.8	Poor	Subject Property	Remove	
522	Hawthorn sp.	*Crataegus sp.*	12,12	4	1.8	Good	Road Allowance	Remove	
523	Manitoba Maple	*Acer negundo*	14	4	1.8	Good	Road Allowance	Remove	
524	Black Cherry	*Prunus serotina*	54	5	3.6	Good	Road Allowance	Remove	
525	Manitoba Maple	*Acer negundo*	30,10	5	2.4	Good	Road Allowance	Remove	
526	Black Cherry	*Prunus serotina*	10	3	1.8	Good	Road Allowance	Remove	
527	Black Cherry	*Prunus serotina*	10	3	1.8	Good	Road Allowance	Remove	
528	Hawthorn sp.	*Crataegus sp.*	14	4	1.8	Good	Subject Property	Remove	
529	Staghorn Sumac	*Rhus typhina*	12	3	1.8	Good	Subject Property	Remove	
530	Hawthorn sp.	*Crataegus sp.*	16	3	1.8	Good	Subject Property	Remove	
531	Hawthorn sp.	*Crataegus sp.*	16	4	1.8	Good	Subject Property	Remove	
532	Hawthorn sp.	*Crataegus sp.*	12,16	3	1.8	Good	Subject Property	Remove	
533	Sugar Maple	*Acer saccharum*	54	5	3.6	Good	Private Property	Retain	
534	Common Buckthorn	*Rhamnus cathartica*	12,12	4	1.8	Good	Boundary Tree - Private Property	Retain	
535	Manitoba Maple	*Acer negundo*	24	4	1.8	Good	Private Property	Retain	
536	Manitoba Maple	*Acer negundo*	12,14	4	1.8	Good	Private Property	Retain	
537	Manitoba Maple	*Acer negundo*	16,16	4	1.8	Good	Private Property	Retain	
538	Manitoba Maple	*Acer negundo*	20	4	1.8	Good	Private Property	Retain	
539	Manitoba Maple	*Acer negundo*	22	4	1.8	Good	Subject Property	Retain	
540	Common Buckthorn	*Rhamnus cathartica*	14	4	1.8	Fair	Boundary Tree - Private Property	Retain	
541	Manitoba Maple	*Acer negundo*	18	5	1.8	Good	Private Property	Retain	
542	Hawthorn sp.	*Crataegus sp.*	14,14,10,10	4	1.8	Fair	Subject Property	Remove	
543	Manitoba Maple	*Acer negundo*	14	3	1.8	Good	Boundary Tree - Private Property	Retain	
544	Sugar Maple	*Acer saccharum*	98	10	6.0	Good/Fair	Private Property	Retain	
545	Common Apple	*Malus pumila*	22	5	1.8	Good	Boundary Tree - Private Property	Retain	
546	Common Apple	*Malus pumila*	28	4	1.8	Fair	Private Property	Retain	
547	Sugar Maple	*Acer saccharum*	32	4	2.4	Good	Private Property	Retain	

Tag #	Species		DBH (cm)	Dripline	Setback Required (m)	Health	Location	Remove Or Retain	Other comments
548	Sugar Maple	*Acer saccharum*	48	4	3.0	Good	Private Property	Retain	
549	Sugar Maple	*Acer saccharum*	30	5	2.4	Good	Private Property	Retain	
550	Sugar Maple	*Acer saccharum*	16	4	1.8	Good	Private Property	Retain	Coppice, bark dieback
551	Sugar Maple	*Acer saccharum*	30	5	2.4	Good	Private Property	Retain	
552	Sugar Maple	*Acer saccharum*	12	3	1.8	Good	Private Property	Retain	
553	Sugar Maple	*Acer saccharum*	44	5	3.0	Good	Private Property	Retain	
554	Sugar Maple	*Acer saccharum*	14	4	1.8	Good	Private Property	Retain	
555	Sugar Maple	*Acer saccharum*	38	5	2.4	Good	Private Property	Retain	
556	Sugar Maple	*Acer saccharum*	18	4	1.8	Good	Private Property	Retain	
557	Sugar Maple	*Acer saccharum*	30,24	1	2.4	Poor	Subject Property	Retain	Coppice, bark dieback
562	White Cedar	*Thuja occidentalis*	16	2	1.8	Good	Subject Property	Retain	
588	American Basswood	*Tilia americana*	18,14	4	1.8	Good	Subject Property	Remove	Coppice
606	Hawthorn sp.	*Crataegus sp.*	10,10	3	1.8	Good	Subject Property	Retain	
607	Black Cherry	*Prunus serotina*	38,40	4	2.4	Fair	Subject Property	Retain	Dieback, coppice
608	Black Cherry	*Prunus serotina*	22	4	1.8	Good	Subject Property	Remove	
609	Black Cherry	*Prunus serotina*	20	3	1.8	Fair	Subject Property	Remove	some minor dieback
610	Manitoba Maple	*Acer negundo*	34	5	2.4	Fair/Good	Subject Property	Remove	
611	Sugar Maple	*Acer saccharum*	44	5	3.0	Good	Subject Property	Remove	Vine growth
612	Sweet Cherry	*Prunus avium*	10	3	1.8	Good	Subject Property	Remove	
613	Hawthorn sp.	*Crataegus sp.*	18	3	1.8	Good	Subject Property	Remove	
614	Hawthorn sp.	*Crataegus sp.*	18	3	1.8	Good	Subject Property	Remove	
615	Hawthorn sp.	*Crataegus sp.*	20	3	1.8	Good	Subject Property	Remove	
616	Black Cherry	*Prunus serotina*	22	4	1.8	Good	Subject Property	Remove	
618	Hawthorn sp.	*Crataegus sp.*	10,10,12	4	1.8	Good	Subject Property	Retain	
619	Hawthorn sp.	*Crataegus sp.*	20,24	5	1.8	Good	Subject Property	Retain	Coppice, some dieback
620	Black Cherry	*Prunus serotina*	20	4	1.8	Good	Subject Property	Retain	Multi-stem
621	Red Ash	*Fraxinus pennsylvanica*	10	3	1.8	Poor	Subject Property	Retain	Ash borer
622	Hawthorn sp.	*Crataegus sp.*	12	3	1.8	Poor	Subject Property	Retain	dieback, borken limbs
623	Common Buckthorn	Rhamnus cathartica	10,10,10	4	1.8	Fair	Subject Property	Retain	coppice, dieback
624	Black Cherry	*Prunus serotina*	24	4	1.8	Good	Subject Property	Remove	
625	Hawthorn sp.	*Crataegus sp.*	12	3	1.8	Fair	Subject Property	Remove	Coppice
626	Hawthorn sp.	*Crataegus sp.*	14	4	1.8	Good	Subject Property	Remove	
627	Black Cherry	*Prunus serotina*	16	4	1.8	Good	Subject Property	Remove	
628	Black Cherry	*Prunus serotina*	24	4	1.8	Good	Subject Property	Remove	
629	Hawthorn sp.	*Crataegus sp.*	16	4	1.8	Good	Subject Property	Retain	
630	Hawthorn sp.	*Crataegus sp.*	10,10,12	4	1.8	Good	Subject Property	Retain	Coppice
631	Black Cherry	*Prunus serotina*	28,34	4	3.0	Fair	Subject Property	Retain	Coppice, broken stem
640	Hawthorn sp.	*Crataegus sp.*	22,10	3	1.8	Good	Subject Property	Retain	Coppice
641	Eastern White Cedar	*Thuja occidentalis*	12	3	1.8	Good	Subject Property	Retain	
642	Eastern White Cedar	*Thuja occidentalis*	18	3	1.8	Good	Subject Property	Retain	
643	Eastern White Cedar	*Thuja occidentalis*	18	3	1.8	Good	Subject Property	Retain	
644	Common Pear	*Pyrus communis*	26,24	4	1.8	Good	Subject Property	Retain	Coppice
645	Black Cherry	*Prunus serotina*	20	3	1.8	Good	Subject Property	Remove	
646	Black Cherry	*Prunus serotina*	24	3	1.8	Good	Subject Property	Retain	
647	Black Cherry	*Prunus serotina*	18	3	1.8	Good	Subject Property	Retain	
648	Black Cherry	*Prunus serotina*	16	4	1.8	Good	Subject Property	Retain	
654	Hawthorn sp.	*Crataegus sp.*	10,10,12	3	1.8	Good	Subject Property	Retain	Coppice
655	Black Cherry	*Prunus serotina*	22	4	1.8	Good	Subject Property	Retain	
656	Red Ash	*Fraxinus pennsylvanica*	30	2	2.4	Poor/Dead	Subject Property	Remove	Ash borer
657	Sweet Cherry	*Prunus avium*	18	3	1.8	Fair/Poor	Subject Property	Retain	heavy dieback
658	Hawthorn sp.	*Crataegus sp.*	16	4	1.8	Good	Subject Property	Retain	
901	White Elm	Ulmus americana	10	2	1.8	Good	Subject Property	Remove	Rocks placed at trunk base
902	White Elm	Ulmus americana	14	2	1.8	Poor	Subject Property	Remove	lots of vine growth, nearly dead, loose bark
903	Black Cherry	*Prunus serotina*	22	4	1.8	Good	Subject Property	Retain	
904	Black Cherry	*Prunus serotina*	26	4	1.8	Good	Subject Property	Remove	
905	Black Cherry	*Prunus serotina*	24	4	1.8	Good	Subject Property	Remove	
906	American Beech	Fagus grandifolia	26	4	1.8	Fair	Subject Property	Remove	vine growht, peeling bark, sapsucker damage
907	American Beech	Fagus grandifolia	18	4	1.8	Good	Subject Property	Remove	vine growth

Tag #	Species		DBH (cm)	Dripline	Setback Required (m)	Health	Location	Remove Or Retain	Other comments
908	American Beech	Fagus grandifolia	14	3	1.8	Good	Subject Property	Remove	
909	Eastern White Cedar	*Thuja occidentalis*	52	4	3.6	Good	Subject Property	Remove	branch dieback, rocks at trunk base
910	Eastern White Cedar	*Thuja occidentalis*	26	3	1.8	Good	Subject Property	Retain	
911	Black Cherry	*Prunus serotina*	16	1	1.8	Poor	Subject Property	Retain	Near death, some suckers
912	American Beech	Fagus grandifolia	16	3	1.8	Good	Subject Property	Retain	sweep, vine growth
913	Black Cherry	*Prunus serotina*	40	4	2.4	Fair/Good	Subject Property	Retain	branch dieback
914	Black Cherry	*Prunus serotina*	14	3	1.8	Good	Subject Property	Remove	Large, coppice at 2m, minor brnach dieback
915	Black Cherry	*Prunus serotina*	62	3	4.2	Fair/Good	Subject Property	Remove	
916	Eastern White Cedar	*Thuja occidentalis*	12	2	1.8	Good	Subject Property	Remove	
917	Eastern White Cedar	*Thuja occidentalis*	10	2	1.8	Good	Subject Property	Remove	
918	Eastern White Cedar	*Thuja occidentalis*	10	2	1.8	Good	Subject Property	Remove	
919	Eastern White Cedar	*Thuja occidentalis*	12	2	1.8	Good	Subject Property	Remove	
920	Eastern White Cedar	*Thuja occidentalis*	14	2	1.8	Good	Subject Property	Remove	
921	Eastern White Cedar	*Thuja occidentalis*	10	2	1.8	Good	Subject Property	Remove	
922	Eastern White Cedar	*Thuja occidentalis*	10	2	1.8	Good	Subject Property	Remove	
923	Eastern White Cedar	*Thuja occidentalis*	12	2	1.8	Good	Subject Property	Remove	
924	Eastern White Cedar	*Thuja occidentalis*	12	2	1.8	Good	Subject Property	Remove	
925	Eastern White Cedar	*Thuja occidentalis*	10	2	1.8	Good	Subject Property	Remove	
926	Eastern White Cedar	*Thuja occidentalis*	12	2	1.8	Good	Subject Property	Remove	
927	Eastern White Cedar	*Thuja occidentalis*	10	2	1.8	Good	Subject Property	Remove	
928	Scots Pine	Pinus sylvestris	18	2	1.8	Good	Subject Property	Remove	
929	Eastern White Cedar	*Thuja occidentalis*	10	2	1.8	Good	Subject Property	Remove	
930	Eastern White Cedar	*Thuja occidentalis*	10	2	1.8	Good	Subject Property	Retain	
931	Eastern White Cedar	*Thuja occidentalis*	10	2	1.8	Good	Subject Property	Retain	
932	Eastern White Cedar	*Thuja occidentalis*	12	2	1.8	Good	Subject Property	Remove	
933	Eastern White Cedar	*Thuja occidentalis*	14	2	1.8	Good	Subject Property	Remove	
934	American Basswood	*Tilia americana*	10	4	1.8	Good	Public Property	Retain	
935	American Basswood	*Tilia americana*	16	4	1.8	Good	Public Property	Retain	
936	American Basswood	*Tilia americana*	12	4	1.8	Good	Public Property	Retain	
937	American Basswood	*Tilia americana*	30	4	2.4	Good	Public Property	Retain	
938	Manitoba Maple	*Acer negundo*	10	3	1.8	Good	Public Property	Retain	leaning, moderate
939	Manitoba Maple	*Acer negundo*	12	4	1.8	Good	Public Property	Retain	deadfall leaning on stem, sweep
940	Sweet Cherry	*Prunus avium*	26,24	5	1.8	Fair/Good	Public Property	Retain	coppice, at 1m, minor branch dieback
941	American Basswood	*Tilia americana*	14	3	1.8	Good	Public Property	Retain	
942	American Basswood	*Tilia americana*	12	3	1.8	Good	Public Property	Retain	
943	American Basswood	*Tilia americana*	12	3	1.8	Good	Public Property	Retain	
944	Red Ash	*Fraxinus pennsylvanica*	12	3	1.8	Poor	Public Property	Retain	ash borer signs, bark peeling
945	American Basswood	*Tilia americana*	16	3	1.8	Good	Public Property	Retain	
946	American Basswood	*Tilia americana*	16	3	1.8	Good	Public Property	Retain	
947	Red Ash	*Fraxinus pennsylvanica*	16	3	1.8	Poor	Public Property	Retain	ash borer signs, bark peeling
1201	Conifer species	*Coniferae sp.*	18	2	1.8	Poor	Private Property	Retain	
1202	Conifer species	*Coniferae sp.*	12	2	1.8	Good	Private Property	Retain	
1203	Conifer species	*Coniferae sp.*	12	2	1.8	Good	Private Property	Retain	
1204	Conifer species	*Coniferae sp.*	12	2	1.8	Good	Private Property	Retain	
1205	Sugar Maple	*Acer saccharum*	40	5	2.4	Fair	Road Allowance	Remove	some branch dieback, vine growth
1206	Sugar Maple	*Acer saccharum*	30	5	2.4	Good	Road Allowance	Remove	good central lead, some branch dieback
1207	Sugar Maple	*Acer saccharum*	38,30	6	2.4	Good	Road Allowance	Remove	coppice, bark wound
1208	Sugar Maple	*Acer saccharum*	10,12	3	1.8	Fair	Road Allowance	Remove	Coppice
1209	Sugar Maple	*Acer saccharum*	12	4	1.8	Good	Road Allowance	Remove	
1210	Sugar Maple	*Acer saccharum*	30,12	4	2.4	Good	Road Allowance	Remove	Coppice
1211	Sugar Maple	*Acer saccharum*	44	5	3.0	Good	Road Allowance	Remove	
1223	Hawthorn sp.	*Crataegus sp.*	14,12	3	1.8	Good	Subject Property	Retain	
1224	White Elm	Ulmus americana	12	1	1.8	Fair	Subject Property	Retain	Branch dieback
1225	Hawthorn sp.	*Crataegus sp.*	12	3	1.8	Good	Subject Property	Retain	
1226	Hawthorn sp.	*Crataegus sp.*	12	3	1.8	Good	Subject Property	Retain	
1227	Hawthorn sp.	*Crataegus sp.*	20,20,14	4	1.8	Fair	Subject Property	Remove	moderate dieback
1228	Hawthorn sp.	*Crataegus sp.*	14	2	1.8	Good	Subject Property	Retain	
1229	Hawthorn sp.	*Crataegus sp.*	12,14	2	1.8	Good	Subject Property	Retain	

Tag #	Species		DBH (cm)	Dripline	Setback Required (m)	Health	Location	Remove Or Retain	Other comments
1230	Hawthorn sp.	*Crataegus sp.*	12	2	1.8	Good	Subject Property	Retain	
1231	Hawthorn sp.	*Crataegus sp.*	10	2	1.8	Good	Subject Property	Retain	
1232	Eastern White Cedar	*Thuja occidentalis*	12	2	1.8	Good	Subject Property	Retain	
1233	Black Cherry	*Prunus serotina*	26	5	1.8	Good	Subject Property	Retain	
1234	Common Pear	*Pyrus communis*	10,24	4	1.8	Good	Subject Property	Retain	
1235	Eastern White Cedar	*Thuja occidentalis*	16	2	1.8	Good	Subject Property	Retain	
1236	Hawthorn sp.	*Crataegus sp.*	10,12,10	2	1.8	Good	Subject Property	Retain	
1237	Hawthorn sp.	*Crataegus sp.*	14,14	3	1.8	Good	Subject Property	Retain	
1238	Hawthorn sp.	*Crataegus sp.*	14,10	2	1.8	Good	Subject Property	Retain	
1239	Hawthorn sp.	*Crataegus sp.*	10	2	1.8	Good	Subject Property	Retain	
1240	Hawthorn sp.	*Crataegus sp.*	10,14	3	1.8	Good	Subject Property	Retain	
1241	Hawthorn sp.	*Crataegus sp.*	12,12	3	1.8	Good	Subject Property	Retain	
1242	Hawthorn sp.	*Crataegus sp.*	12,10,10	2	1.8	Good	Subject Property	Retain	Coppice
1243	Hawthorn sp.	*Crataegus sp.*	14,12,10	3	1.8	Good	Subject Property	Remove	Coppice
1244	Hawthorn sp.	*Crataegus sp.*	10,10,12	3	1.8	Good	Subject Property	Remove	Coppice
1245	Hawthorn sp.	*Crataegus sp.*	10,10	2	1.8	Good	Subject Property	Remove	Coppice
1246	Hawthorn sp.	*Crataegus sp.*	14,10,10	3	1.8	Good	Subject Property	Remove	Coppice
1247	Hawthorn sp.	*Crataegus sp.*	12,10	3	1.8	Good	Subject Property	Remove	Coppice
1248	Hawthorn sp.	*Crataegus sp.*	16,12	3	1.8	Good	Subject Property	Remove	Coppice
1249	Hawthorn sp.	*Crataegus sp.*	12	3	1.8	Good	Subject Property	Remove	
1250	Hawthorn sp.	*Crataegus sp.*	12,12	3	1.8	Good	Subject Property	Remove	Coppice
1251	Hawthorn sp.	*Crataegus sp.*	14	3	1.8	Good	Subject Property	Remove	
1252	Hawthorn sp.	*Crataegus sp.*	12	2	1.8	Good	Subject Property	Remove	
1253	Hawthorn sp.	*Crataegus sp.*	16	3	1.8	Good	Subject Property	Remove	
1254	Hawthorn sp.	*Crataegus sp.*	10,14	3	1.8	Good	Subject Property	Remove	Coppice
1255	Hawthorn sp.	*Crataegus sp.*	10,12,14	3	1.8	Good	Subject Property	Remove	Coppice
1256	Hawthorn sp.	*Crataegus sp.*	12,14	3	1.8	Good	Subject Property	Remove	Coppice
1257	Eastern White Cedar	*Thuja occidentalis*	20	2	1.8	Good	Subject Property	Remove	
1258	Eastern White Cedar	*Thuja occidentalis*	20	2	1.8	Good	Subject Property	Remove	
1259	Hawthorn sp.	*Crataegus sp.*	12,12	3	1.8	Good	Subject Property	Retain	Coppice
1260	Eastern White Cedar	*Thuja occidentalis*	20	2	1.8	Good	Subject Property	Retain	
1261	Hawthorn sp.	*Crataegus sp.*	14,10	3	1.8	Good	Subject Property	Retain	Coppice

Appendix C

Site Photographs

Photo 1: View of wetland buffer area on western portion of Subject Property

Photo 2: Manicured lawn adjacent western portion of Subject Property viewing north towards Main St.

Photo 3: Viewing south at FODM11 hedgerow along Subject Property and Old Morriston Baseball Diamond

Photo 4: Viewing north at FODM11 hedgerow along Subject Property and Old Morriston Baseball Diamond

Photo 5: View of sparse tree growth within CUM1-1 community on Subject Property

Photo 6: View of FODM11 ELC community on centre of Subject Property.

Photo 7: Example of Eastern White Cedars growing on edge of FOC2-2 ELC Community.

Photo 8: Viewing southeast towards unopened Road allowance to Subject Property from intersection of Back St. and Ochs St.

Photo 9: Example of vegetation in unopened road allowance at Ochs St.

Photo 10: Viewing northeast from Ochs St. road allowance towards FODMll community.

Fluvial Geomorphological and Meander Belt Width Assessment

11 Main Street
Puslinch, Ontario

Prepared for:
Kayly Robbins
Weston Consulting
268 Berkeley St.
Toronto, ON

February 17th, 2023

GEO Morphix Project No. 22099

GEO MORPHIX
Geomorphology
Earth Science
Observations

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Appendices

1 Introduction

GEO Morphix Ltd. was retained to complete a meander belt width assessment for two unnamed tributaries of Bronte Creek to support natural constraints delineation for the proposed development at 11 Main Street in the Town of Puslinch, Ontario. The property, herein referred to as the "subject site", contains two tributaries of Bronte Creek which flow north to south. Two environmental areas have been identified within the subject site, a wetland within the western portion of the subject site and a wooded area within the eastern portion of the subject site, both staked by North-South Environmental. The two tributaries of Bronte Creek flow through these environmental areas. We understand that Conservation Halton has requested a fluvial geomorphological assessment and meander belt width delineation to identify the potential erosion hazard limits related to the watercourses within the subject site.

To address Conservation Halton's concerns related to natural hazards, and identify the meander belt width associated with the subject site, the following activities were completed:

- Review available background reports and mapping (e.g., watershed/subwatershed reporting, geology, and topography) related to channel form and function and controlling factors related to fluvial geomorphology
- Delineate watercourse reaches based on a desktop assessment (to be confirmed during field reconnaissance)
- Review recent and historical aerial photographs of the site to understand historical changes in channel form and function, and measure meander amplitude and determine the limits of the meander belt width, where possible
- Complete rapid geomorphological field assessments such as Rapid Geomorphological Assessments (RGA) and Rapid Stream Assessment Protocol (RSAT) to characterize the watercourse and confirm reach delineation results of the desktop analysis

2 Watershed Characteristics

The subject site is located within the Bronte Creek watershed, the second largest watershed within Conservation Halton's jurisdiction. Within the subject site, the two tributaries of Bronte Creek flows from north to south. The tributary located within the eastern side of the subject site flows through a natural wooded area, whereas the tributary located within the western side of the subject site flows through a wetland. Both of these tributaries flow through identified environmental areas and converge south of the subject site. The dominant land use of the watershed is agricultural and rural residential, followed by approximately 29% forested land cover as determined by using the Ontario Watershed Information Tool (OWIT, 2022). The subject site is currently used as agriculture, directly adjacent to residential housing and a local park.

2.1 Geology and Physiography

Published mapping indicates the subject site is contained within two physiographic regions, where the contact of the two regions bisects the subject site in a southwest to northeast direction. The northern half of the subject site is contained within the Horseshoe Moraines, dominated by Till Moraine landforms. The subject site to the south is contained within the Flamborough Plains, dominated by limestone plains. Drumlin landforms are mapped directly south of the subject site (Chapman and Putnam, 2007). The quaternary geology of the entire subject site is dominated by Pleistocene Wentworth Till, which consist of highly calcareous clasts in a sandy silt to silt matrix (OGS, 2010). The eastern tributary of Bronte Creek flows parallel to the contact between the two physiographic regions for approximately 400 m through subject site. Contacts between different surficial bedrocks are more easily erodible and tend to form low points in the topography, where water may tend to collect and flow. Thus, it is possible the

observed low-grade channel and online wetland system within the study site are a result of this geological contact.

3 Study Area History

A series of historical aerial photographs were reviewed to determine changes to the channel and surrounding land use and land cover. This information, in part, provides an understanding of the historical factors that have contributed to current channel morphodynamics. Historical aerial photographs were obtained from the National Air Photo Library for the years 1945 (scale 1:25,000), 1965 (1:25,000), and 1972 (1:25,000), as well as recent digital imagery from Google Earth Pro (2004 through to 2018). Historical imagery is provided in **Appendix A** for reference.

In 1945, the predominant land use upstream and within the subject site is agriculture and rural residential. A small community of residential properties are adjacent to the subject site in the northwestern corner. The eastern wooded area is sparse and non-continuous, indicating possible forest clearing practices, perhaps for agricultural access or lumber. No tributary or watercourse is visible in the eastern wooded area, but any drainage feature there would be affected by the sparse riparian vegetation. Lands adjacent to the western tributary of Bronte Creek appear to be cultivated to the edges of the watercourse, with no evidence of natural woody riparian vegetation along the tributary within and upstream of the subject site. The lack of riparian vegetation for both western and eastern tributaries likely had a negative impact on channel form, water quality, and instream temperatures.

By 1965, the predominant land use within and adjacent to the subject site remains agricultural and rural residential. Construction of the baseball diamond began prior to 1965 in the northwestern section of the subject site. Riparian lands immediately adjacent to the western tributary of Bronte Creek remain cultivated to the edge of watercourse whereas the vegetation within the wooded area to the east has been permitted to grow and naturalize, enhancing the riparian vegetation along the eastern tributary.

There is little change in the land use, channel planform, or riparian vegetation of the subject site between 1965 and 1972. Between 1972 and 2004, the land use upstream of both tributaries becomes increasingly more residential, with the development of the lands north of Badenoch Street; however, agriculture is still the dominant land use in the area. The lands directly adjacent to the western tributary are no longer cultivated and grassy wetland vegetation is visible in the aerial imagery. By 1972, the wooded area appears as densely vegetated as it appears in aerial images from 2018. From 1945 to 2004, there has been no discernable change in planform of the western tributary while the eastern tributary remains non-visible in the aerial imagery.

In summary, there was limited change to land use within and upstream of the subject site over the period examined, with the exception of increasing residential development upstream of the tributaries in addition to the completion of a public park on the subject site. From a geomorphological perspective, the form and function of the Bronte Creek tributaries has been primarily impacted by agricultural practices, including riparian vegetation removal prior to 1945, but also the increased naturalization of riparian vegetation adjacent to both eastern and western tributaries post 1965. Throughout the period examined, the eastern tributaries remain non-visible in aerial imagery, while there has been no discernable change to the channel planform or size of the western tributary.

4 Reach Delineation

Reaches are homogeneous segments of channel used in geomorphological investigations. Reaches are studied semi-independently as each is expected to function in a manner that is at least slightly different from adjoining reaches. This method allows for a meaningful characterization of a watercourse as the

aggregate of reaches, or an understanding of a particular reach, for example, as it relates to a proposed activity.

Reaches are typically delineated based on changes in the following:

- Channel planform
- Channel gradient
- Physiography
- Land cover (land use or vegetation)
- Flow, due to tributary inputs
- Soil type and surficial geology
- Historical channel modifications

Reach delineation follows scientifically defensible methodology proposed by Montgomery and Buffington (1997), Richards et al. (1997), and the Toronto and Region Conservation Authority (2004) as well as others. Prior to the field assessment, four reaches were delineated for the subject site using a mapping stream layer provided by the project team. The reach delineation exercise was then confirmed in the field. Reach **TCB1** is located within the western portion of the study site and three reaches, **TCB3, TCB3a,** and **TCB2**, are located within the eastern portion of the study site. Reach breaks were determined based on changes in surficial geology and flow inputs from tributary confluences. Reach delineation is graphically defined in **Appendix B**.

5 Field Observations

Site observations of **Reaches TBC-1, TBC-2, TBC-3** and **TBC-3a** were collected on November 17th, 2022. Photographs are provided in **Appendix C** and field observations are provided in **Appendix D**.

Reach TBC-1 is located within the western portion of the subject site, oriented in a roughly north – south direction. The reach originates at Highway 6 where the watercourse is conveyed through an oblique concrete box culvert. Upstream (west) of the Highway 6 Road Culvert is a residential yard. At the time of assessment, there was no flowing water, but isolated pools of standing water were present within the subject site except for an area directly downstream of the Highway 6 road culvert. In general, the channels are poorly defined, with soft depressions and pools of water to indicate the flow pathway in some locations. Where discernable, the bankfull width ranged from 1.0 m to 2.0 m, and depth ranged from 0.2 m to 0.3 m. In some locations, multiple soft depressions and pools of water were observed, possibly indicating a multiple channel planform. However, for the majority of its length, the reach is an unconfined channel with no defined banks and heavy vegetation encroachment of wetland grasses. The bed and banks consist of silt and clay, except in the channel directly downstream of the road culvert, where fine gravel was observed in addition to silt and clay material.

Reach TBC-2 is located within the eastern portion of the subject site, along the southern property boundary. Field observations indicate that the portion of **Reach TBC-2** within the subject site contains no defined channel and is instead a swamp consisting of pools of water intermixed with trees, grassy hummocks, and woody debris.

Reach TBC-3 is also located within the eastern woodlot on the subject site. The drainage area for this feature consists of residential land use. This reach eventually converges with **Reach TBC-2** at the downstream extent of the subject site. The reach contains no defined channel or evidence of flow, with no discernable change in the landscape to indicate previous drainage. In several locations where the reach was located via GPS, isolated wetland pockets consisting of shallow pools of water were observed.

Reach TBC-3a is a tributary of **TBC-3** which flows through the wooded area located on the eastern portion of the subject site. The drainage area for this tributary includes residential land use. Field

observations indicate this reach contains no channel definition or flow, with no discernable change observed in the landscape.

Reaches TBC-2, **TBC-3**, and **TBC-3a** are all low-order streams with limited upstream drainage areas. As such, the reaches are likely ephemeral in nature and more indicative of a headwater drainage features rather than perennial watercourses. The reaches are graphically shown in **Appendix B**, for reference.

5.1 Rapid Geomorphological Assessments

Rapid geomorphological assessments were completed to identify dominant geomorphic processes, document stream health, and to identify any areas of concern regarding erosion or instability for watercourse features identified on site (**Reach TBC-1**). Channel instability was objectively quantified through the application of the Ontario Ministry of the Environment's (2003) Rapid Geomorphic Assessment (RGA). Observations were quantified using an index that identifies channel sensitivity based on evidence of aggradation, degradation, channel widening, and planimetric adjustment. The index produces values that indicate whether a channel is stable/in regime (score <0.20), stressed/transitional (score 0.21-0.40), or adjusting (score >0.41).

Typically, the Rapid Stream Assessment Technique (RSAT) is also applied to provide a broader view of the system as it considers the ecological function of the watercourse (Galli, 1996). Observations are made of channel stability, channel scouring or sediment deposition, instream and riparian habitats, and water quality. The RSAT score ranks the channel as maintaining a poor (<13), fair (13-24), good (25-34), or excellent (35-42) degree of stream health. A summary of the results of the rapid geomorphological assessments has been provided in **Table 1**. Given the poorly defined channel and limited presence of water or flow, the RSAT could not be applied to **Reach TBC-1**.

Table 1: Rapid Geomorphological Assessment Results for Reach TBC-1

Reach	RGA (MOE, 2003)			RSAT (Galli, 1996)*		
	Score	Condition	Dominant Systematic Adjustment	Score	Condition	Limiting Feature(s)
TBC-1	0.14	In regime	Aggradation, planimetric adjustment	N/A	N/A	N/A

**Limited presence of water or flow in Reach TBC-1 was observed at the time of rapid field assessments. RSAT is not fully applicable.*

The RGA score for **Reach TBC-1** was 0.14, indicating that the channel was in regime. The dominant systematic adjustments were equally aggradation and planimetric adjustment, namely due to deposition in the overbank zone and formation of multiple channels through the wetland riparian zone. However, the presence of these adjustment signs was extremely minor. The overall RGA score still indicates the channel is in a stable state, which is supported by additional field observations. There are no signs of erosion, either historical or active, or other geomorphological processes which could indicate potential system adjustments. The reach is also heavily encroached by grassy vegetation in the active channel which provides an additional control to potential erosion.

6 Meander Belt Width and Erosion Hazard Assessment

Most drainage features in southern Ontario have a natural tendency to develop and maintain a meandering planform, provided there are no spatial constraints. A meander belt width or erosion hazard

assessment estimates the lateral extent that a watercourse has historically occupied and will likely occupy in the future. This assessment is therefore useful for determining the potential hazard to proposed activities in the vicinity of a watercourse.

Channel planform is affected by a number of factors such as vegetation, gradient, and stream power. In the case of the western tributary within the study site, the channel is poorly defined and highly vegetated. The gradient is low, reducing the capacity of the drainage feature to develop single defined meanders. Within the eastern portion of the study site, there is no erosion, channel definition, or indicators of previous flow, making the formation of single defined meanders unlikely. The eastern features are ephemeral in nature with no potential for erosion. As such, a meander belt width is not applicable for the eastern features.

When defining the erosion hazard for a watercourse, the Ministry of Natural Resources and Forestry treat unconfined and confined systems differently. Unconfined systems are those with poorly defined valleys or slopes well outside where the channel could realistically migrate. Confined systems are those where the watercourse is contained within a defined valley, where valley wall contact is possible. Within the study site, **Reach TBC-1** is situated within an unconfined valley system.

In unconfined systems, the meander belt width can be determined through a detailed geomorphological study that examines the largest channel meanders observed through historical and recent aerial photo interpretation, to determine the meander migration rate within 100 years. The limit of the erosion hazard and migration potential can also be delineated based on the meander amplitude. Meander amplitude is defined by Leopold et al. (1964) as the lateral distance between tangential lines drawn to the center channel of two successive meander bends. This differs from meander belt, which is measured for a reach between lines drawn tangentially to the outside bends of the laterally extreme meander bends (TRCA, 2004). The meander migration rate, meander belt width, and amplitude quantify the lateral extent of a river's occupation on the floodplain (TRCA, 2004).

Reach TBC-1 was identified as unconfined and poorly defined, with no available reference reach to provide measurable meander amplitudes. Given these conditions, the reach was not traceable through aerial photo interpretation, and the calculation of the 100-year erosion rate was not possible. Instead, empirically based meander belt widths models were reviewed for the reach on the subject lands. These models are scientifically defensible and have been verified in past projects as suitable for use in Southern Ontario. The meander belt width was calculated using a suite of empirical models, outlined below, with a summary of the results outlined in **Table 2.**

The empirical relations from Williams (1986) were modified to include channel area and width, and applied using the bankfull channel dimensions such that:

$$B_w = 18A^{0.65} + W_b \quad \text{[Eq. 1]}$$

$$B_w = 4.3{W_b}^{1.12} + W_b \quad \text{[Eq. 2]}$$

where B_w is meander belt width (m), A is bankfull cross-sectional area (m^2), and Wb is bankfull channel width (m). An additional 20% buffer, or factor of safety, was applied to the computed belt width values. This addresses issues of under prediction and provides a factor of safety. The bankfull channel dimensions observed during field reconnaissance were used to inform both the Williams Area and Width (1986) models. As noted in the field observations, the reach is poorly defined, so the geometries collected are based on several spot measurements where a defined channel could be observed. As such, the geometries used for modelling are conservative compared to average conditions where there is poor channel definition.

A meander belt width was also calculated based on TRCA's (2004) empirical model:

$$B_w = -14.827 + 8.319\ln(\rho g Q S * DA) \quad \text{[Eq. 3]}$$

where ρ is water density (1000 kg/m^3), g is acceleration due to gravity (9.8 m/s^2), Q is discharge (m^3/s), S is channel slope (m/m), and DA is drainage area (km^2). The TRCA meander belt width values were determined using a drainage area of 1.35 km^2 for **TCB-1** as well as a 2-year discharge of 1.39 m^3/s. These values were based on information provided from the Ontario Watershed Information Tool (OWIT) and GEO Morphix's own flow modelling software. A channel gradient for each reach was also determined based on available elevation/contour data and OWIT. Results of the empirical modelling exercise are outlined in **Table 2**.

Table 2: Meander Belt Width Modelling Results for Reach TBC-1

Reach	Meander Belt Width (m)			Recommended Meander Belt Width (m)
	TRCA* (2004)	Modified Williams – Area** (1986)	Modified Williams – Width** (1986)	
TCB-1	38	10	9	38

**One standard deviation is included as a factor of safety in the TRCA meander belt width value*
***A 20% factor of safety has been included in the modified Williams (area and width) meander belt width value*

The Williams Area and Width models resulted in meander belt widths of 10 m and 9 m. Note that these models are based on bankfull channel geometries collected during field reconnaissance. The average bankfull channel geometries were collected in localized area where a defined channel could be discerned. However, this is not representative of average conditions along the reach given that the channel is generally poorly defined.

For **Reach TCB-1,** we recommend applying a meander belt width of 38 m, following the Toronto Region Conservation Agency (TRCA) model. The TRCA model considers contributing drainage area, flows, and local gradients rather than relying on bankfull channel geometry alone. The 38 m meander belt width is conservative in nature given that there is limited channel definition and very limited erosion potential along this reach. The recommended meander belt width also falls within the current staked wetland boundary and is therefore not a limiting constraint for the proposed development. A map of the meander belt width delineation is provided in **Appendix E**.

7 Summary and Recommendations

Two tributaries of Bronte Creek flow through the western and eastern portion of the subject site at 11 Main Street in Puslinch, Ontario. A desktop assessment was completed which included a review of existing watershed data and historical and recent aerial photographs. Field reconnaissance was also completed to document existing conditions, confirm results of the desktop assessment, and support erosion hazard delineation. This information, in part, will be used in the overall constraint plan to define the limit of development for proposed activities on site.

It was found that the drainage features to the east of the subject site are low-order streams that contain isolated and interspersed wetland pockets within a natural wooded area. No continuous defined stream could be located along each reach within the eastern staked wooded area. As such, there is no potential for erosion and a meander belt width is not applicable.

For **Reach TCB-1,** the watercourse flowing through the western portion of the subject site, a meander belt width of 38 m is recommended. The meander belt width was determined through an empirical modelling exercise. The final meander belt width is conservative given that the channel is small, poorly

defined, and shows limited evidence of erosion or adjustment. It should be noted that the meander belt width also sits within an existing staked wetland boundary and is not a limiting constraint on the proposed development.

We trust this report meets your requirements. Should you have any questions, please contact the undersigned.

Respectfully submitted,

Paul Villard, Ph.D., P.Geo., CAN-CISEC, EP, CERP
Director, Principal Geomorphologist

Kat Woodrow, M.Sc.
Manager of Watershed Studies

Lucy Lu, M.Sc., G.I.T.
River Scientist

8 References

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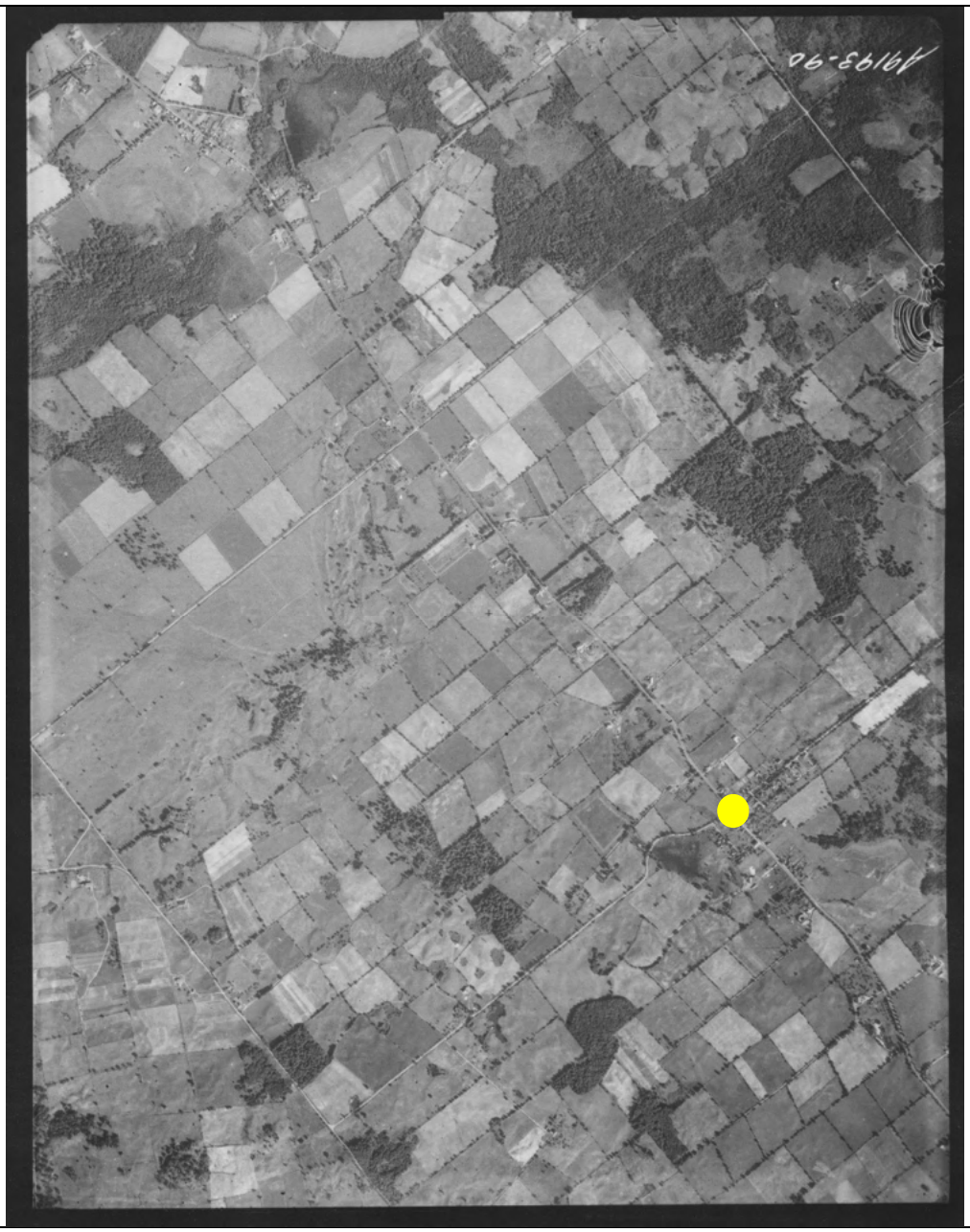
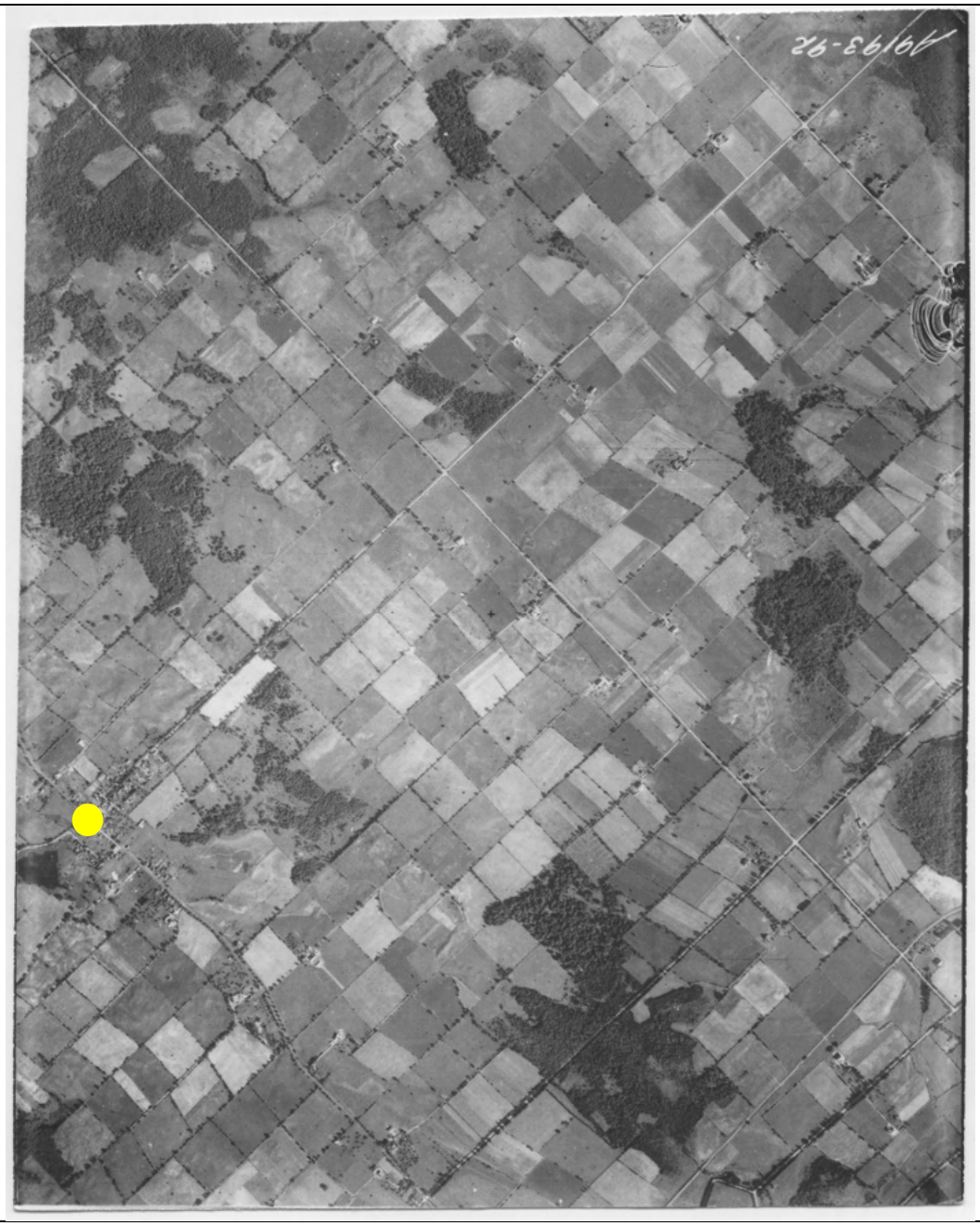
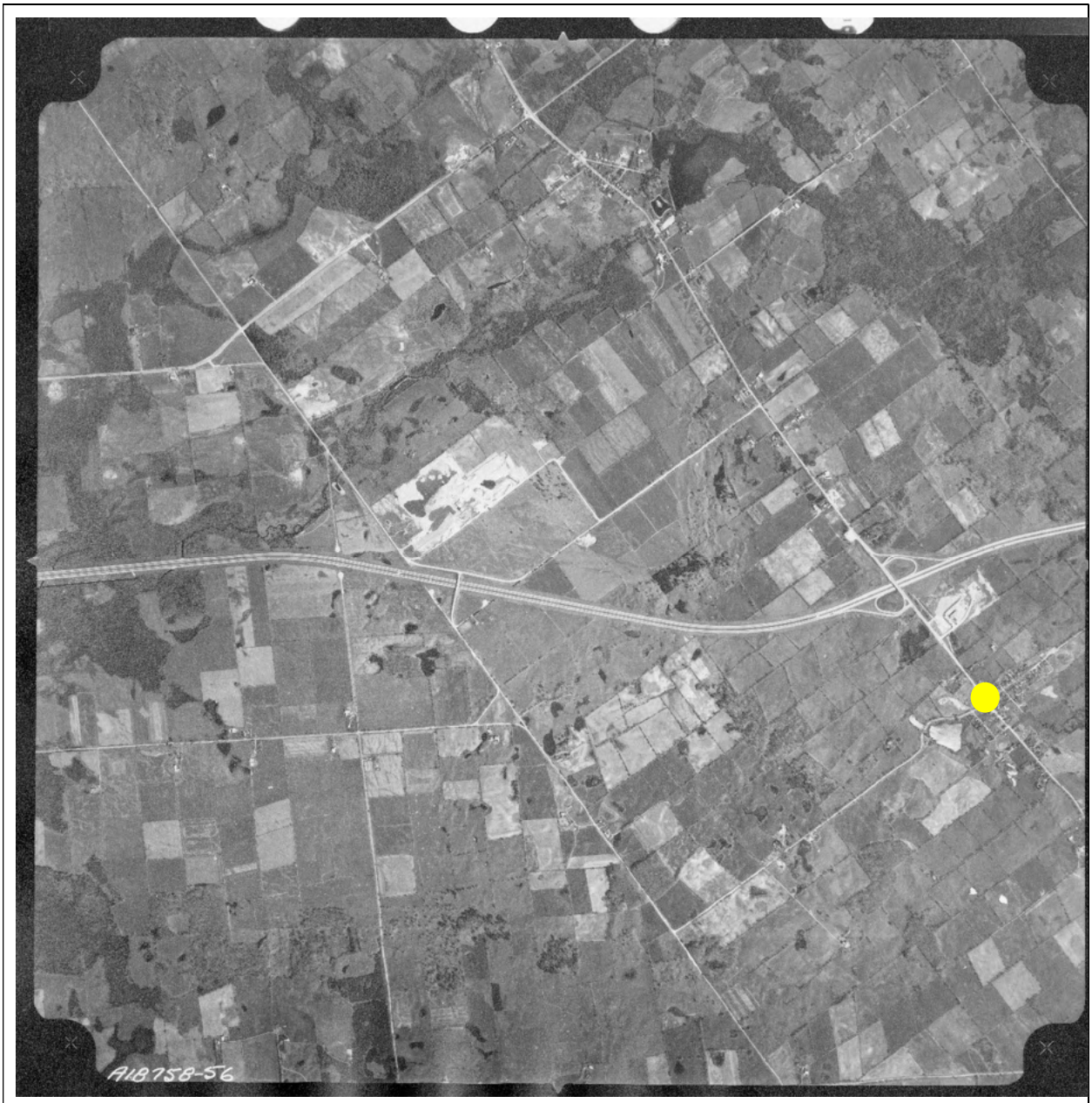
Appendix A
Historical Aerial Photographs



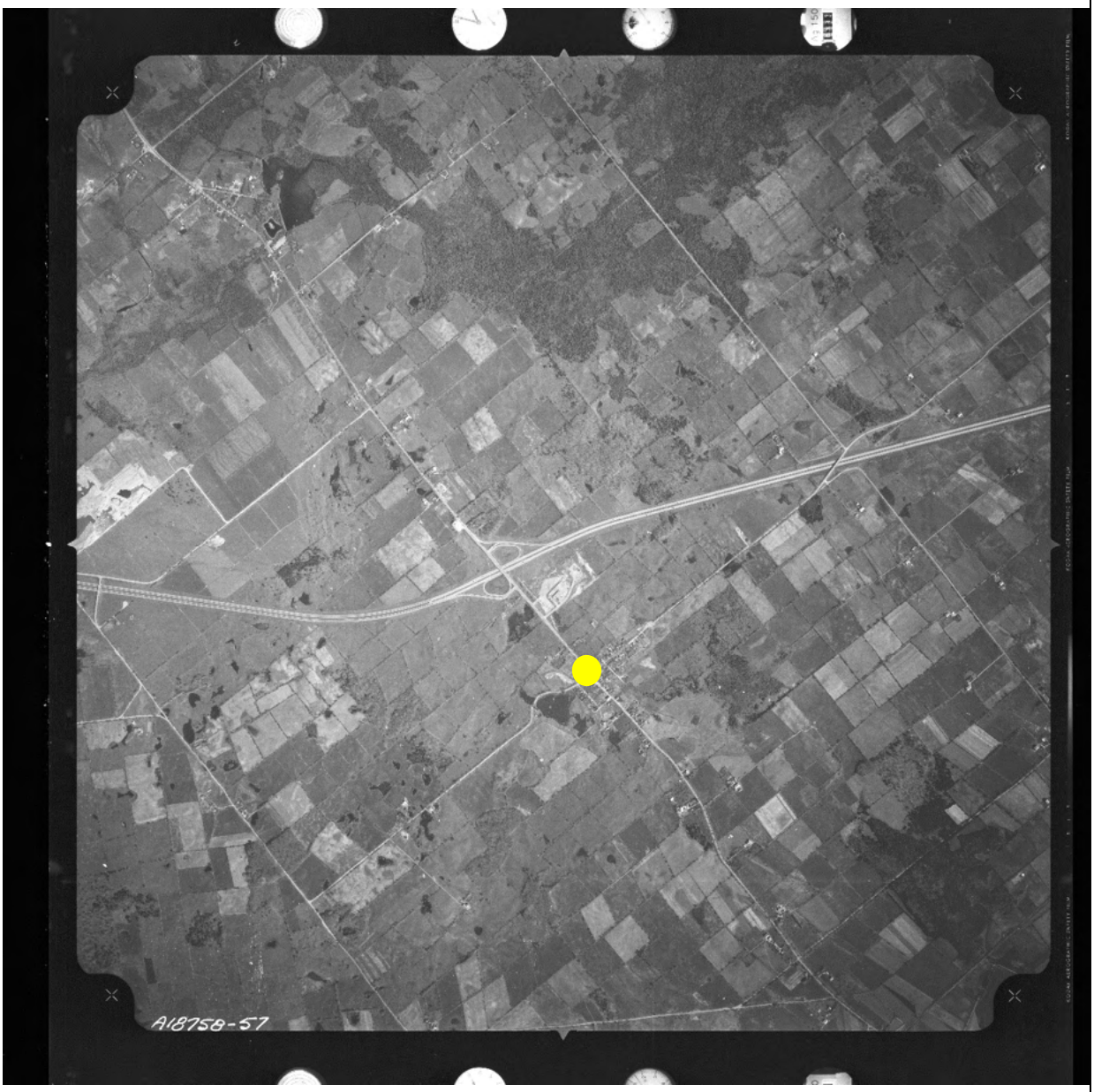
Location: Queen Street and Calfass Road, Town of Puslinch (Yellow Dot)
Year: 1945
Scale: 1:20,000
Source: National Air Photo Library



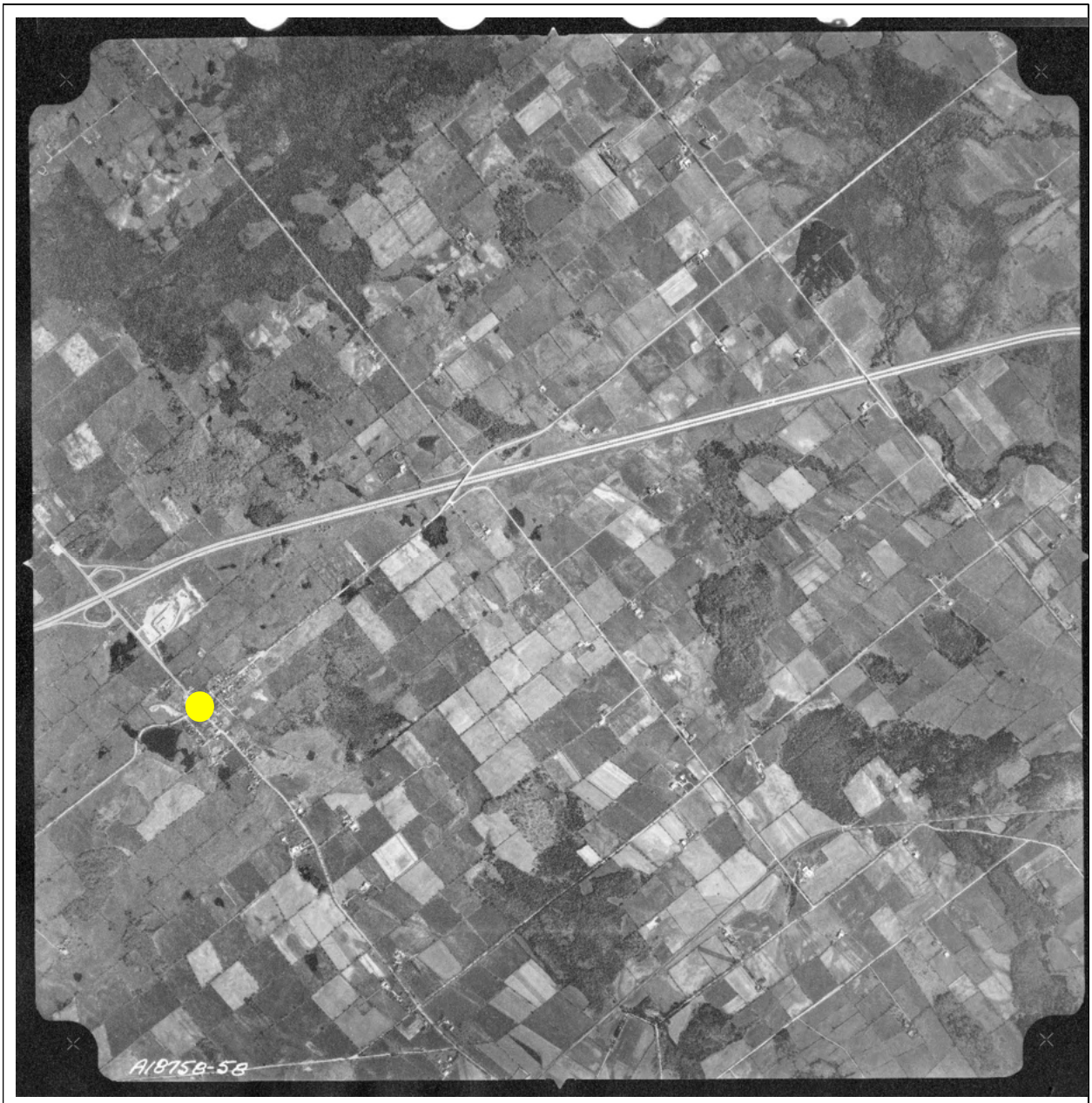
Location: Queen Street and Calfass Road, Town of Puslinch (Yellow Dot)
Year: 1945
Scale: 1:20,000
Source: National Air Photo Library



Location: Queen Street and Calfass Road, Town of Puslinch (Yellow Dot)
Year: 1965
Scale: 1:25,000
Source: National Air Photo Library



Location: Queen Street and Calfass Road, Town of Puslinch Yellow Dot)
Year: 1965
Scale: 1:25,000
Source: National Air Photo Library



Location: Queen Street and Calfass Road, Town of Puslinch (Yellow Dot)
Year: 1965
Scale: 1:25,000
Source: National Air Photo Library

Location: Queen Street and Calfass Road, Town of Puslinch (Yellow Dot)
Year: 1972
Scale: 1:25,000
Source: National Air Photo Library

Appendix B
Reach Mapping

GEO MORPHIX™

Study Area

Bronte Creek

Puslinch, Ontario

Legend

- Reach Breaks and ID
- Watercourse
- Channel observed in field as ephemeral drainage features
- 0.25 m Contour
- Staked Wetland
- Staked Woodland
- Study Boundary

0 75 150

Metres

Imagery: Google Earth, 2018. Watercourse and Study Boundary: Weston Consulting, 2022. 0.25 m Contour: J.D. Barnes, 2022. Staked Wetland, Staked Woodland: Colville Consulting Inc., 2022. PN22099. Print Date: December 2022.Drawn By: L.L., M.O.

Appendix C
Field Sheets

GEO MORPHIX

General Site Characteristics

Project Code: 22099

Date:	OCT 17th, 2022	**Stream/Reach:**	TBC-1
Weather:	overcast	**Location:**	PUSLINCH
Field Staff:	MK, LL	**Watershed/Subwatershed:**	BRONTE CREEK

Features

- Reach break
- Cross-section
- Flow direction
- Riffle
- Pool
- Medial bar
- Eroded bank
- Undercut bank
- Rip rap/stabilization/gabion
- Leaning tree
- Fence
- Culvert/outfall
- Swamp/wetland
- Grasses
- Tree
- Instream log/tree
- Woody debris
- Station location
- Vegetated island

oblique Box Culvert
n: 0.6m
W. 2.7 m
U/S wetland, private development, box culvert
oily sheen on bedrock

Flow Type

H1	Standing water
H2	Scarcely perceptible flow
H3	Smooth surface flow
H4	Upwelling
H5	Rippled
H6	Unbroken standing wave
H7	Broken standing wave
H8	Chute
H9	Free fall

pooling adjacent to LHV trail organic. bkf measured to full width

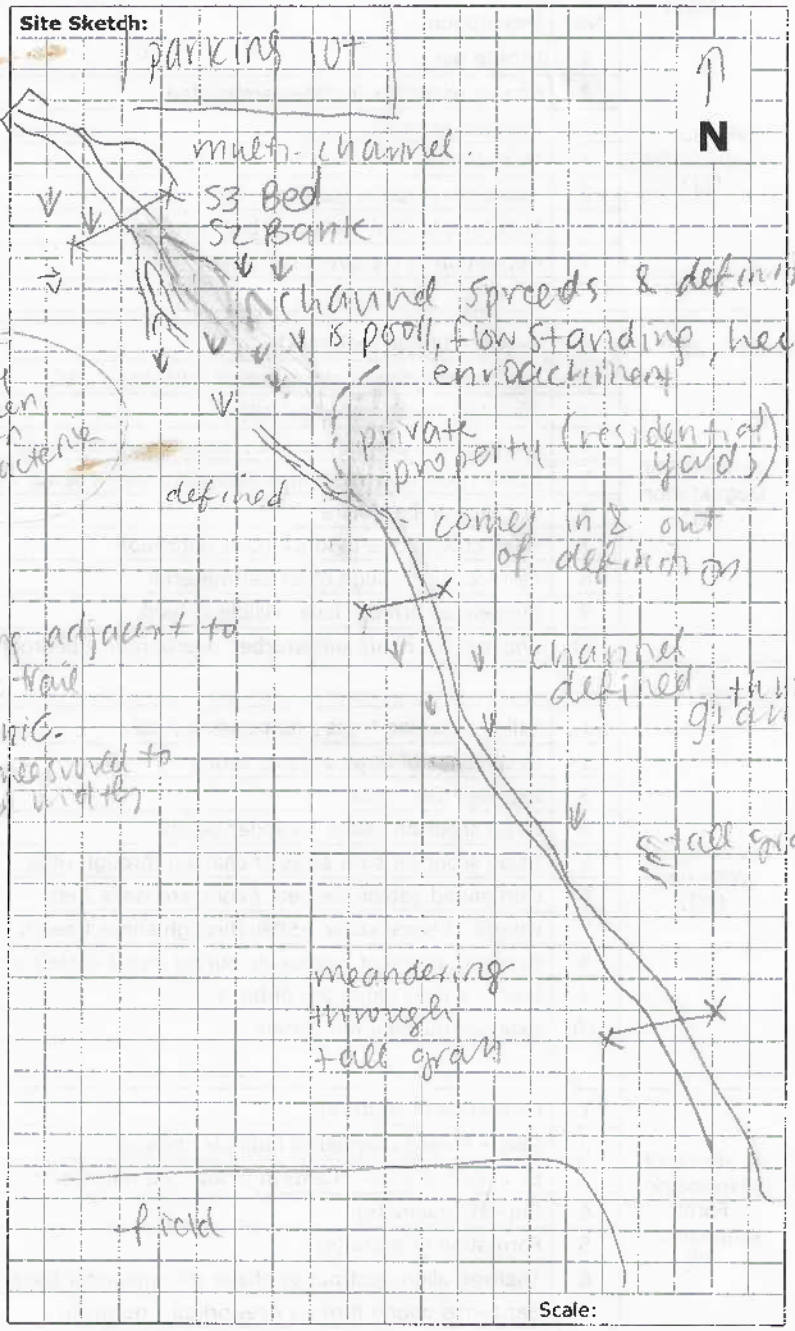
Substrate

S1	Silt	**S6**	Small boulder
S2	Sand	**S7**	Large boulder
S3	Gravel	**S8**	Bimodal
S4	Small cobble	**S9**	Bedrock/till
S5	Large cobble		

Other

BM	Benchmark	**EP**	Erosion pin
BS	Backsight	**RB**	Rebar
DS	Downstream	**US**	Upstream
WDJ	Woody debris jam	**TR**	Terrace
VWC	Valley wall contact	**FC**	Flood chute
BOS	Bottom of slope	**FP**	Flood plain
TOS	Top of slope	**KP**	Knick point

Site Sketch:



Additional Notes:

Completed by: LL Checked by: _____

GEO | MORPHIX

Rapid Geomorphic Assessment **Project Code:** PN22099

Date:	2022-10-17	**Stream/Reach:**	TCB-1
Weather:	OVERCAST	**Location:**	Puslinch
Field Staff:	MK LL	**Watershed/Subwatershed:**	Bronte

Process	Geomorphic Indicator		Present?		Factor Value
	No.	Description	Yes	No	
Evidence of Aggradation (AI)	1	Lobate bar		1	2/7
	2	Coarse materials in riffles embedded		1	
	3	Siltation in pools	1		
	4	Medial bars		1	
	5	Accretion on point bars		1	
	6	Poor longitudinal sorting of bed materials		1	
	7	Deposition in the overbank zone	1		
		Sum of indices =			0.29
Evidence of Degradation (DI)	1	Exposed bridge footing(s)	NA		0/7
	2	Exposed sanitary / storm sewer / pipeline / etc.	NA		
	3	Elevated storm sewer outfall(s)	NA	1	
	4	Undermined gabion baskets / concrete aprons / etc.	NA		
	5	Scour pools downstream of culverts / storm sewer outlets		1	
	6	Cut face on bar forms		1	
	7	Head cutting due to knick point migration		1	
	8	Terrace cut through older bar material		1	
	9	Suspended armour layer visible in bank		1	
	10	Channel worn into undisturbed overburden / bedrock		1	
		Sum of indices =			0
Evidence of Widening (WI)	1	Fallen / leaning trees / fence posts / etc.		1	0/7
	2	Occurrence of large organic debris		1	
	3	Exposed tree roots		1	
	4	Basal scour on inside meander bends		1	
	5	Basal scour on both sides of channel through riffle		1	
	6	Outflanked gabion baskets / concrete walls / etc.	NA		
	7	Length of basal scour >50% through subject reach		1	
	8	Exposed length of previously buried pipe / cable / etc.		1	
	9	Fracture lines along top of bank		1	
	10	Exposed building foundation	NA		
		Sum of indices =			0
Evidence of Planimetric Form Adjustment (PI)	1	Formation of chute(s)		1	2/7
	2	Single thread channel to multiple channel	1		
	3	Evolution of pool-riffle form to low bed relief form		1	
	4	Cut-off channel(s)		1	
	5	Formation of island(s)		1	
	6	Thalweg alignment out of phase with meander form		1	
	7	Bar forms poorly formed / reworked / removed	1		
		Sum of indices =			0.29

Additional notes:

Stability Index (SI) = (AI+DI+WI+PI)/4 = 0.14

Condition	In Regime	In Transition/Stress	In Adjustment
SI score =	☐ 0.00 - 0.20	☐ 0.21 - 0.40	☐ 0.41

Completed by: LL Checked by: _____

GEO | MORPHIX
Geomorphology Earth Science Observations

Reach Characteristics

Project Code/Phase: PN22099

Date:	2022-10-17	**Stream/Reach:**	TCB-1
Weather:	OVERCAST	**Location:**	PUSLINCH
Field staff:	MK LL	**Watershed/Subwatershed:**	BRONTE
UTM (Upstream)		**UTM (Downstream)**	

Land Use (Table 1): 7 | Valley Type (Table 2): 1 | Channel Type (Table 3): 12 | Channel Zone (Table 4): 1 | Flow Type (Table 5): 1 | ☐ Groundwater* | Evidence: _____

Riparian Vegetation

Dominant Type: (Table 6) 3/4 | Species: _____ _____

Coverage: ☐ None ☐ Fragmented ☒ Continuous

Channel widths: ☐ 1-4 ☐ 4-10 ☑ >10

Age Class (yrs): ☐ Immature (<5) ☑ Established (5-30) ☐ Mature (>30)

Encroachment: (Table 7) 3-4

Aquatic/Instream Vegetation

Type (Table8) 1 | Coverage of Reach (%) 20

Woody Debris: ☐ Present in Cutbank ☐ Present in Channel ☒ Not Present

Density of WD: N/A ☐ Low ☐ Moderate ☐ High

WDJ/50m: 0

Water Quality

Odour (Table 16): 6 organic

Turbidity (Table 17): 3/5

Channel Characteristics

Sinuosity (Type) (Table 9): 2 | Sinuosity (Degree) (Table 10): 1 | Gradient (Table 11): 1 | Number of Channels (Table 12): 2

Entrenchment (Table 13): 1 | Type of Bank Failure (Table 14): 1/N/D | Downs's Classification (Table 15): D

	Clay/Silt	Sand	Gravel	Cobble	Boulder	Parent	Rootlets
Riffle Substrate	☐	☒	☐	☐	☐	☐	☒
Pool Substrate	☒	☐	☐	☐	☐	☐	☐
Bank Material	☒	☐	☐	☐	☐	☐	☒

		*POOL			*POOL	
Bankfull Width (m)	1.0	2.00	1.00	Wetted Width (m)	0.62	0.75	0.48
Bankfull Depth (m)	0.30	0.20	0.20	Wetted Depth (m)	0.105	0.15	0.15

Riffle/Pool Spacing (m): poor RIP structure | % Riffles: | % Pools: | Meander Amplitude: 0

Pool Depth (m): 0.10 | Riffle Length (m): N/A | Undercuts (m): Ø | Comments:

Velocity (m/s): 0.013 | Ø standing water | 0.1 | Wiffle ball / ADV / Estimated

Bank Angle: ☒ 0 – 30 ☐ 30 – 60 ☐ 60 – 90 ☐ Undercut

Bank Erosion: ☒ < 5% ☐ 5 – 30% ☐ 30 – 60% ☐ 60 – 100%

Notes: WETLAND channel, goes in & out of definition, residential on one side, ~~as~~ park on other

Completed by: LL + MK | Checked by: _____

GEO MORPHIX

General Site Characteristics

Project Code: PN2100

Date:	2022-10-17	**Stream/Reach:**	TBC-2
Weather:	OVERCAST	**Location:**	PUSLINCH
Field Staff:	MK LL	**Watershed/Subwatershed:**	BRONTE

Features

- Reach break
- Cross-section
- Flow direction
- Riffle
- Pool
- Medial bar
- Eroded bank
- Undercut bank
- Rip rap/stabilization/gabion
- Leaning tree
- Fence
- Culvert/outfall
- Swamp/wetland
- Grasses
- Tree
- Instream log/tree
- Woody debris
- Station location
- Vegetated island

Flow Type

- **H1** Standing water
- **H2** Scarcely perceptible flow
- **H3** Smooth surface flow
- **H4** Upwelling
- **H5** Rippled
- **H6** Unbroken standing wave
- **H7** Broken standing wave
- **H8** Chute
- **H9** Free fall

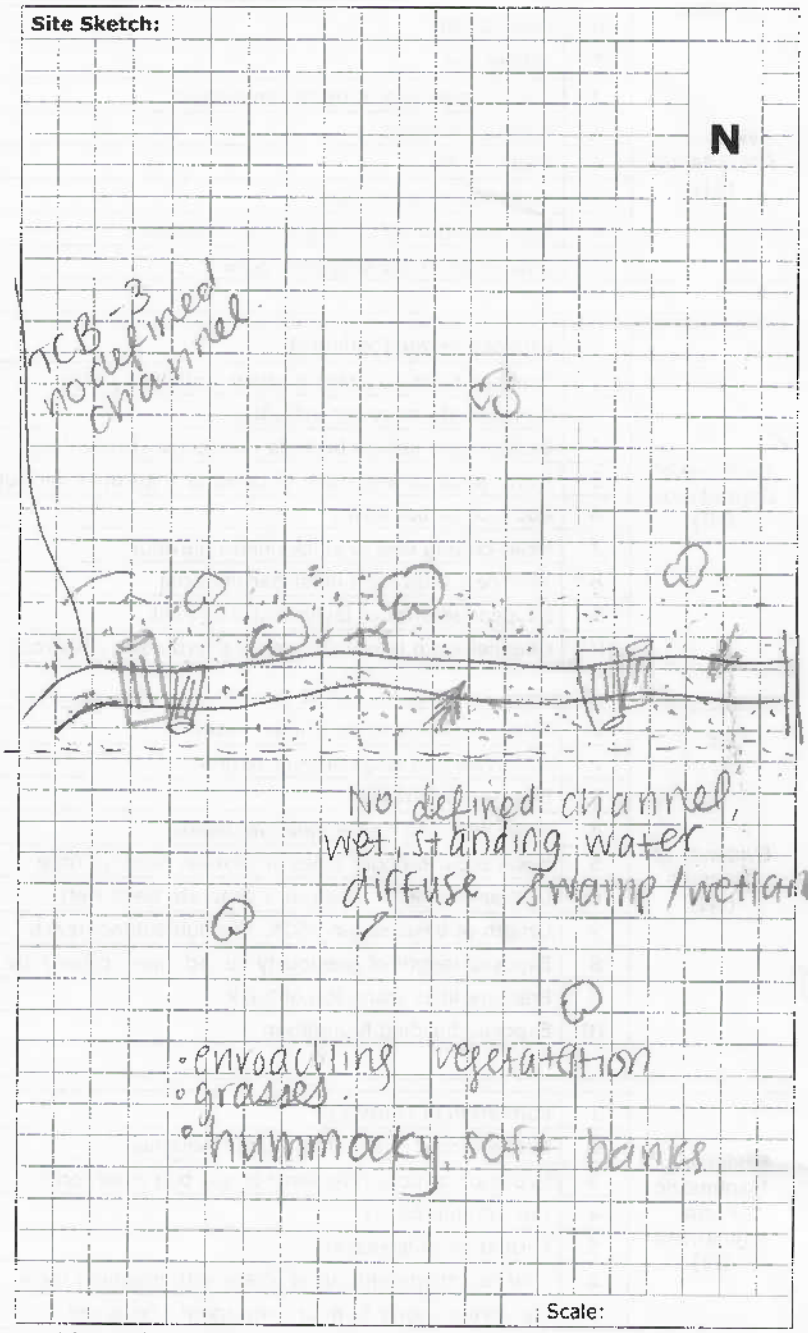
Substrate

S1	Silt	**S6**	Small boulder
S2	Sand	**S7**	Large boulder
S3	Gravel	**S8**	Bimodal
S4	Small cobble	**S9**	Bedrock/till
S5	Large cobble		

Other

BM	Benchmark	**EP**	Erosion pin
BS	Backsight	**RB**	Rebar
DS	Downstream	**US**	Upstream
WDJ	Woody debris jam	**TR**	Terrace
VWC	Valley wall contact	**FC**	Flood chute
BOS	Bottom of slope	**FP**	Flood plain
TOS	Top of slope	**KP**	Knick point

Site Sketch:



Additional Notes:

Completed by: LL Checked by: _____

GEO MORPHIX

General Site Characteristics

Project Code: PN22099

Date:	2022-10-17	**Stream/Reach:**	TBC-3
Weather:	OVERCAST	**Location:**	PUSLINCH
Field Staff:	MK LL	**Watershed/Subwatershed:**	BRONTE

Features

- Reach break
- Cross-section
- Flow direction
- Riffle
- Pool
- Medial bar
- Eroded bank
- Undercut bank
- Rip rap/stabilization/gabion
- Leaning tree
- Fence
- Culvert/outfall
- Swamp/wetland
- Grasses
- Tree
- Instream log/tree
- Woody debris
- Station location
- Vegetated island

Flow Type

H1	Standing water
H2	Scarcely perceptible flow
H3	Smooth surface flow
H4	Upwelling
H5	Rippled
H6	Unbroken standing wave
H7	Broken standing wave
H8	Chute
H9	Free fall

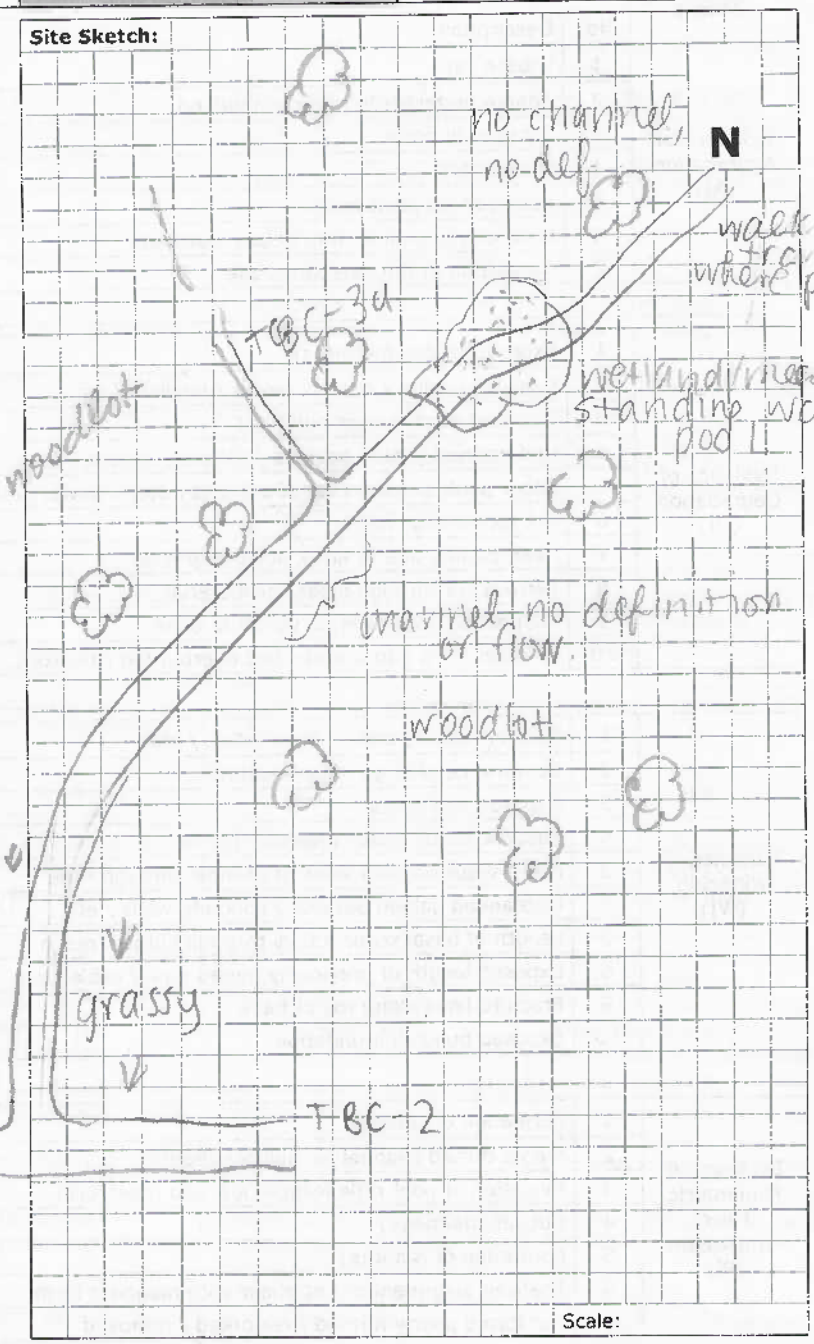
Substrate

S1	Silt	**S6**	Small boulder
S2	Sand	**S7**	Large boulder
S3	Gravel	**S8**	Bimodal
S4	Small cobble	**S9**	Bedrock/till
S5	Large cobble		

Other

BM	Benchmark	**EP**	Erosion pin
BS	Backsight	**RB**	Rebar
DS	Downstream	**US**	Upstream
WDJ	Woody debris jam	**TR**	Terrace
VWC	Valley wall contact	**FC**	Flood chute
BOS	Bottom of slope	**FP**	Flood plain
TOS	Top of slope	**KP**	Knick point

Site Sketch:



Scale:

Additional Notes:

Completed by: LL Checked by: _____

GEO MORPHIX

General Site Characteristics

Project Code: PN22099

Date:	OCT 17th	**Stream/Reach:**	TBC-3a
Weather:	OVERCAST	**Location:**	PUSLINCH
Field Staff:	MK LL	**Watershed/Subwatershed:**	BRONTE

Features

- Reach break
- Cross-section
- Flow direction
- Riffle
- Pool
- Medial bar
- Eroded bank
- Undercut bank
- Rip rap/stabilization/gabion
- Leaning tree
- Fence
- Culvert/outfall
- Swamp/wetland
- Grasses
- Tree
- Instream log/tree
- Woody debris
- Station location
- Vegetated island

Flow Type

H1	Standing water
H2	Scarcely perceptible flow
H3	Smooth surface flow
H4	Upwelling
H5	Rippled
H6	Unbroken standing wave
H7	Broken standing wave
H8	Chute
H9	Free fall

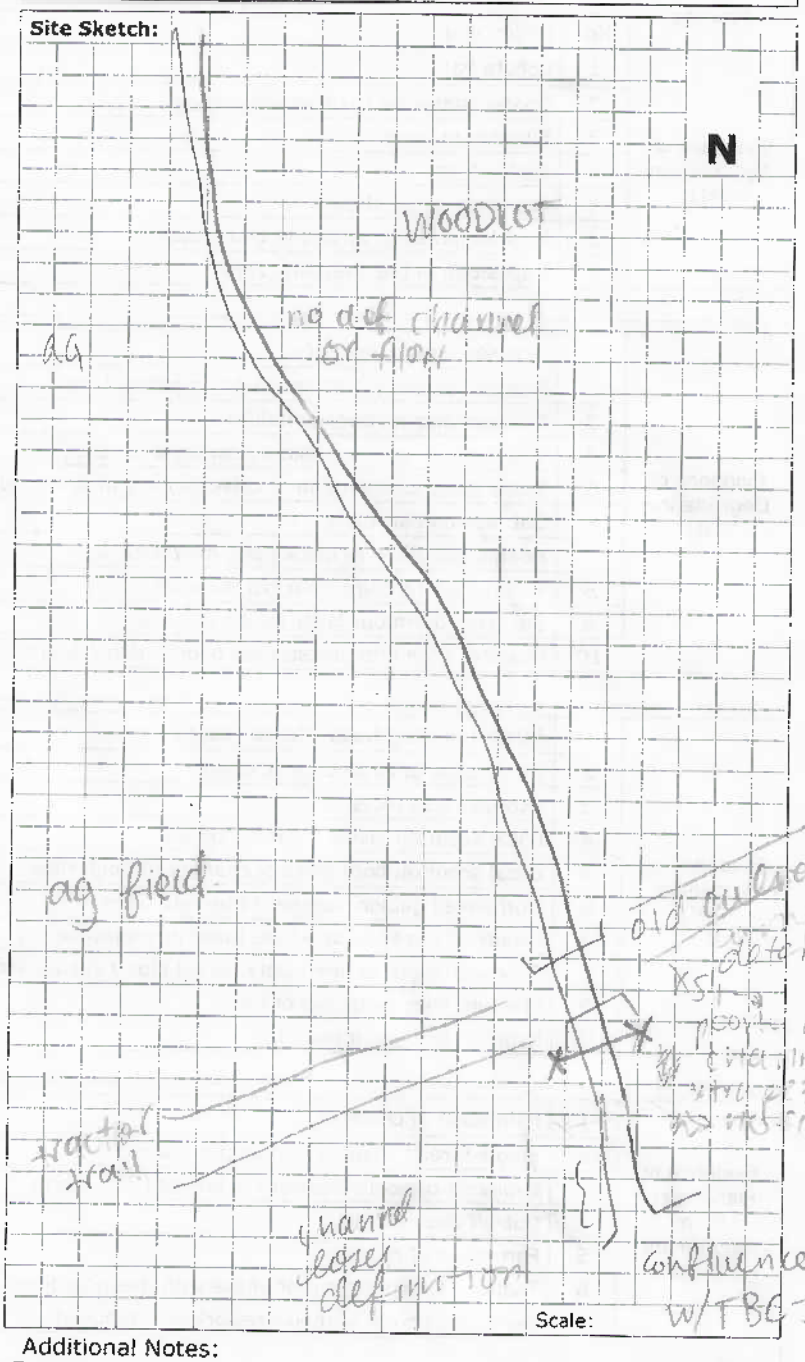
Substrate

S1	Silt	**S6**	Small boulder
S2	Sand	**S7**	Large boulder
S3	Gravel	**S8**	Bimodal
S4	Small cobble	**S9**	Bedrock/till
S5	Large cobble		

Other

BM	Benchmark	**EP**	Erosion pin
BS	Backsight	**RB**	Rebar
DS	Downstream	**US**	Upstream
WDJ	Woody debris jam	**TR**	Terrace
VWC	Valley wall contact	**FC**	Flood chute
BOS	Bottom of slope	**FP**	Flood plain
TOS	Top of slope	**KP**	Knick point

Site Sketch:



Additional Notes:

Completed by: LL Checked by: _____

Appendix D
Photo Observations

Tributary of Bronte Creek
Reach TBC-1
Photo 1

Highway 6 Concrete box culvert at the upstream extent of TBC-1

Tributary of Bronte Creek
Reach TBC-1
Photo 2

Defined bankfull conditions downstream of culvert. Metre stick for scale.

Tributary of Bronte Creek
Reach TBC-1
Photo 3

The riparian area consisted mainly of tall grasses with sparse herbaceous shrubs and trees. Bankfull channel was poorly defined throughout.

Tributary of Bronte Creek
Reach TBC-1
Photo 4

Downstream of reach as it continues to flow off property boundaries. Outside of pictured grassy riparian area is agricultural field.

Tributary of Bronte Creek Reach TBC-2 Photo 5	
	Hummocky areas with instream grasses and pooled, standing water is typical condition along Reach TBC-2
Tributary of Bronte Creek Reach TBC-2 Photo 6	
	Grassy hummocks and trees throughout pools of water. No defined bankfull channel present along Reach TBC-2

Tributary of Bronte Creek
Reach TBC-3
Photo 7

The riparian zone of Reach TBC-3 contained wooded area. No bankfull channel or flow paths observed in the upstream sections.

Tributary of Bronte Creek
Reach TBC-3
Photo 8

A minor flow path was observed in the very downstream extent of the study site, presumed to be associated with mapped stream Reach TBC-3.

Tributary of Bronte Creek
Reach TBC-3a
Photo 9

The riparian area consisted of wooded area. No defined flow path observed in association with mapped stream Reach TBC-3a

Appendix E
Meander Belt Width Delineation

GEO MORPHIX™

Meander Belt Width Delineation

Bronte Creek

Puslinch, Ontario

Legend

- Reach Break and ID
- Watercourse
- Channel observed in field as ephemeral drainage features
- 0.25 m Contour
- Meander Belt Width
- Meander Belt Width (Off Property - Field Verification Required)
- Staked Wetland
- Staked Woodland
- Study Boundary

0 75 150

Metres

Imagery: Google Earth, 2018. Study Boundary, Watercourse: Weston Consulting, 2022. 0.25 m Contour: J.D. Barnes, 2022. Staked Wetland, Staked Woodland: Colville Consulting Inc., 2022. Meander Belt Width: GEO Morphix Ltd., 2022. Print Date: February 2023. PN22099. Drawn By: L.L., M.O.

GEO MORPHIX™

Meander Belt Width Delineation

Bronte Creek

Puslinch, Ontario

Legend

- Reach Break and ID
- Watercourse
- 0.25 m Contour
- Meander Belt Width
- Meander Belt Width (Off Property - Field Verification Required)
- Staked Wetland
- Staked Woodland
- Study Boundary

N

0 10 20

Metres

Imagery: Google Earth, 2018. Study Boundary, Watercourse: Weston Consulting, 2022. 0.25 m Contour: J.D. Barnes, 2022. Staked Wetland, Staked Woodland: Colville Consulting Inc., 2022. Meander Belt Width: GEO Morphix Ltd., 2022. Print Date: December 2022. PN22099. Drawn By: L.L., M.O.

GEO Morphix Ltd.

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December 21, 2023

Weston Consulting
286 Berkeley Street
Toronto, ON M5A 2X5

Attention: Paul Tobia, BURPL, MCIP, RPP
Senior Planner

Re: Bronte Creek Meander Belt Width Delineation – Updated Draft Plan
11 Main Street
Township of Puslinch, Ontario
GEO Morphix Project No. PN22099

GEO Morphix Ltd. was retained to complete a meander belt width assessment for two tributaries of Bronte Creek to support the proposed residential development at 11 Main Street in the Township of Puslinch, Ontario. One tributary was located within the western portion of the subject lands and flowed generally from northwest to southeast. A second tributary was situated in the eastern portion of the subject lands and flowed generally north to south. The tributary located within the eastern portion of the subject lands was determined to be a low order stream based on field investigations and aerial imagery and therefore, a meander belt width was not required.

Our finalized meander belt width report was submitted to Weston Consulting on February 17, 2023. A 38 m meander belt width based on the Toronto Region Conservation Authority (TRCA, 2004) empirical model was recommended for the reach within the western portion of the subject lands. We understand that the Draft Plan has been updated since our report submission. The updated draft plan does not result in any changes to our meander belt width assessment and a revised report is not required.

We trust this letter meets your requirements at this time. Should you have any questions, please contact the undersigned.

Respectfully submitted,

[redacted]

Paul Villard, Ph.D., P. Geo., CAN-CISEC, EP, CERP
Director, Principal Geomorphologist

[redacted]

Kat Woodrow, M.Sc.
Manager of Watershed Studies

Fluvial Geomorphological and Meander Belt Width Assessment

11 Main Street
Puslinch, Ontario

Prepared for:
Kayly Robbins
Weston Consulting
268 Berkeley St.
Toronto, ON

February 17th, 2023

GEO Morphix Project No. 22099

GEO MORPHIX
Geomorphology
Earth Science
Observations

Report Prepared by:	GEO Morphix Ltd. 36 Main Street North, PO Box 205 Campbellville, Ontario L0P 1B0
Report Title:	Fluvial Geomorphological and Meander Belt Width Assessment, 11 Main Street, Puslinch, Ontario
Project Number:	PN22099
Status:	Draft
First Submission Date:	February 17, 2023 (to consultant team)
Written by:	Kat Woodrow, M.Sc. Lucy Lu, M.Sc., G.I.T.
Approved by:	Paul Villard, Ph.D., P.Geo., CAN-CISEC
Approval Date:	February 17, 2023

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1 Introduction

GEO Morphix Ltd. was retained to complete a meander belt width assessment for two unnamed tributaries of Bronte Creek to support natural constraints delineation for the proposed development at 11 Main Street in the Town of Puslinch, Ontario. The property, herein referred to as the "subject site", contains two tributaries of Bronte Creek which flow north to south. Two environmental areas have been identified within the subject site, a wetland within the western portion of the subject site and a wooded area within the eastern portion of the subject site, both staked by North-South Environmental. The two tributaries of Bronte Creek flow through these environmental areas. We understand that Conservation Halton has requested a fluvial geomorphological assessment and meander belt width delineation to identify the potential erosion hazard limits related to the watercourses within the subject site.

To address Conservation Halton's concerns related to natural hazards, and identify the meander belt width associated with the subject site, the following activities were completed:

- Review available background reports and mapping (e.g., watershed/subwatershed reporting, geology, and topography) related to channel form and function and controlling factors related to fluvial geomorphology
- Delineate watercourse reaches based on a desktop assessment (to be confirmed during field reconnaissance)
- Review recent and historical aerial photographs of the site to understand historical changes in channel form and function, and measure meander amplitude and determine the limits of the meander belt width, where possible
- Complete rapid geomorphological field assessments such as Rapid Geomorphological Assessments (RGA) and Rapid Stream Assessment Protocol (RSAT) to characterize the watercourse and confirm reach delineation results of the desktop analysis

2 Watershed Characteristics

The subject site is located within the Bronte Creek watershed, the second largest watershed within Conservation Halton's jurisdiction. Within the subject site, the two tributaries of Bronte Creek flows from north to south. The tributary located within the eastern side of the subject site flows through a natural wooded area, whereas the tributary located within the western side of the subject site flows through a wetland. Both of these tributaries flow through identified environmental areas and converge south of the subject site. The dominant land use of the watershed is agricultural and rural residential, followed by approximately 29% forested land cover as determined by using the Ontario Watershed Information Tool (OWIT, 2022). The subject site is currently used as agriculture, directly adjacent to residential housing and a local park.

2.1 Geology and Physiography

Published mapping indicates the subject site is contained within two physiographic regions, where the contact of the two regions bisects the subject site in a southwest to northeast direction. The northern half of the subject site is contained within the Horseshoe Moraines, dominated by Till Moraine landforms. The subject site to the south is contained within the Flamborough Plains, dominated by limestone plains. Drumlin landforms are mapped directly south of the subject site (Chapman and Putnam, 2007). The quaternary geology of the entire subject site is dominated by Pleistocene Wentworth Till, which consist of highly calcareous clasts in a sandy silt to silt matrix (OGS, 2010). The eastern tributary of Bronte Creek flows parallel to the contact between the two physiographic regions for approximately 400 m through subject site. Contacts between different surficial bedrocks are more easily erodible and tend to form low points in the topography, where water may tend to collect and flow. Thus, it is possible the

observed low-grade channel and online wetland system within the study site are a result of this geological contact.

3 Study Area History

A series of historical aerial photographs were reviewed to determine changes to the channel and surrounding land use and land cover. This information, in part, provides an understanding of the historical factors that have contributed to current channel morphodynamics. Historical aerial photographs were obtained from the National Air Photo Library for the years 1945 (scale 1:25,000), 1965 (1:25,000), and 1972 (1:25,000), as well as recent digital imagery from Google Earth Pro (2004 through to 2018). Historical imagery is provided in **Appendix A** for reference.

In 1945, the predominant land use upstream and within the subject site is agriculture and rural residential. A small community of residential properties are adjacent to the subject site in the northwestern corner. The eastern wooded area is sparse and non-continuous, indicating possible forest clearing practices, perhaps for agricultural access or lumber. No tributary or watercourse is visible in the eastern wooded area, but any drainage feature there would be affected by the sparse riparian vegetation. Lands adjacent to the western tributary of Bronte Creek appear to be cultivated to the edges of the watercourse, with no evidence of natural woody riparian vegetation along the tributary within and upstream of the subject site. The lack of riparian vegetation for both western and eastern tributaries likely had a negative impact on channel form, water quality, and instream temperatures.

By 1965, the predominant land use within and adjacent to the subject site remains agricultural and rural residential. Construction of the baseball diamond began prior to 1965 in the northwestern section of the subject site. Riparian lands immediately adjacent to the western tributary of Bronte Creek remain cultivated to the edge of watercourse whereas the vegetation within the wooded area to the east has been permitted to grow and naturalize, enhancing the riparian vegetation along the eastern tributary.

There is little change in the land use, channel planform, or riparian vegetation of the subject site between 1965 and 1972. Between 1972 and 2004, the land use upstream of both tributaries becomes increasingly more residential, with the development of the lands north of Badenoch Street; however, agriculture is still the dominant land use in the area. The lands directly adjacent to the western tributary are no longer cultivated and grassy wetland vegetation is visible in the aerial imagery. By 1972, the wooded area appears as densely vegetated as it appears in aerial images from 2018. From 1945 to 2004, there has been no discernable change in planform of the western tributary while the eastern tributary remains non-visible in the aerial imagery.

In summary, there was limited change to land use within and upstream of the subject site over the period examined, with the exception of increasing residential development upstream of the tributaries in addition to the completion of a public park on the subject site. From a geomorphological perspective, the form and function of the Bronte Creek tributaries has been primarily impacted by agricultural practices, including riparian vegetation removal prior to 1945, but also the increased naturalization of riparian vegetation adjacent to both eastern and western tributaries post 1965. Throughout the period examined, the eastern tributaries remain non-visible in aerial imagery, while there has been no discernable change to the channel planform or size of the western tributary.

4 Reach Delineation

Reaches are homogeneous segments of channel used in geomorphological investigations. Reaches are studied semi-independently as each is expected to function in a manner that is at least slightly different from adjoining reaches. This method allows for a meaningful characterization of a watercourse as the

aggregate of reaches, or an understanding of a particular reach, for example, as it relates to a proposed activity.

Reaches are typically delineated based on changes in the following:

- Channel planform
- Channel gradient
- Physiography
- Land cover (land use or vegetation)
- Flow, due to tributary inputs
- Soil type and surficial geology
- Historical channel modifications

Reach delineation follows scientifically defensible methodology proposed by Montgomery and Buffington (1997), Richards et al. (1997), and the Toronto and Region Conservation Authority (2004) as well as others. Prior to the field assessment, four reaches were delineated for the subject site using a mapping stream layer provided by the project team. The reach delineation exercise was then confirmed in the field. Reach **TCB1** is located within the western portion of the study site and three reaches, **TCB3, TCB3a,** and **TCB2**, are located within the eastern portion of the study site. Reach breaks were determined based on changes in surficial geology and flow inputs from tributary confluences. Reach delineation is graphically defined in **Appendix B**.

5 Field Observations

Site observations of **Reaches TBC-1, TBC-2, TBC-3** and **TBC-3a** were collected on November 17th, 2022. Photographs are provided in **Appendix C** and field observations are provided in **Appendix D**.

Reach TBC-1 is located within the western portion of the subject site, oriented in a roughly north – south direction. The reach originates at Highway 6 where the watercourse is conveyed through an oblique concrete box culvert. Upstream (west) of the Highway 6 Road Culvert is a residential yard. At the time of assessment, there was no flowing water, but isolated pools of standing water were present within the subject site except for an area directly downstream of the Highway 6 road culvert. In general, the channels are poorly defined, with soft depressions and pools of water to indicate the flow pathway in some locations. Where discernable, the bankfull width ranged from 1.0 m to 2.0 m, and depth ranged from 0.2 m to 0.3 m. In some locations, multiple soft depressions and pools of water were observed, possibly indicating a multiple channel planform. However, for the majority of its length, the reach is an unconfined channel with no defined banks and heavy vegetation encroachment of wetland grasses. The bed and banks consist of silt and clay, except in the channel directly downstream of the road culvert, where fine gravel was observed in addition to silt and clay material.

Reach TBC-2 is located within the eastern portion of the subject site, along the southern property boundary. Field observations indicate that the portion of **Reach TBC-2** within the subject site contains no defined channel and is instead a swamp consisting of pools of water intermixed with trees, grassy hummocks, and woody debris.

Reach TBC-3 is also located within the eastern woodlot on the subject site. The drainage area for this feature consists of residential land use. This reach eventually converges with **Reach TBC-2** at the downstream extent of the subject site. The reach contains no defined channel or evidence of flow, with no discernable change in the landscape to indicate previous drainage. In several locations where the reach was located via GPS, isolated wetland pockets consisting of shallow pools of water were observed.

Reach TBC-3a is a tributary of **TBC-3** which flows through the wooded area located on the eastern portion of the subject site. The drainage area for this tributary includes residential land use. Field

observations indicate this reach contains no channel definition or flow, with no discernable change observed in the landscape.

Reaches TBC-2, **TBC-3**, and **TBC-3a** are all low-order streams with limited upstream drainage areas. As such, the reaches are likely ephemeral in nature and more indicative of a headwater drainage features rather than perennial watercourses. The reaches are graphically shown in **Appendix B**, for reference.

5.1 Rapid Geomorphological Assessments

Rapid geomorphological assessments were completed to identify dominant geomorphic processes, document stream health, and to identify any areas of concern regarding erosion or instability for watercourse features identified on site (**Reach TBC-1**). Channel instability was objectively quantified through the application of the Ontario Ministry of the Environment's (2003) Rapid Geomorphic Assessment (RGA). Observations were quantified using an index that identifies channel sensitivity based on evidence of aggradation, degradation, channel widening, and planimetric adjustment. The index produces values that indicate whether a channel is stable/in regime (score <0.20), stressed/transitional (score 0.21-0.40), or adjusting (score >0.41).

Typically, the Rapid Stream Assessment Technique (RSAT) is also applied to provide a broader view of the system as it considers the ecological function of the watercourse (Galli, 1996). Observations are made of channel stability, channel scouring or sediment deposition, instream and riparian habitats, and water quality. The RSAT score ranks the channel as maintaining a poor (<13), fair (13-24), good (25-34), or excellent (35-42) degree of stream health. A summary of the results of the rapid geomorphological assessments has been provided in **Table 1**. Given the poorly defined channel and limited presence of water or flow, the RSAT could not be applied to **Reach TBC-1**.

Table 1: Rapid Geomorphological Assessment Results for Reach TBC-1

Reach	RGA (MOE, 2003)			RSAT (Galli, 1996)*		
	Score	Condition	Dominant Systematic Adjustment	Score	Condition	Limiting Feature(s)
TBC-1	0.14	In regime	Aggradation, planimetric adjustment	N/A	N/A	N/A

**Limited presence of water or flow in Reach TBC-1 was observed at the time of rapid field assessments. RSAT is not fully applicable.*

The RGA score for **Reach TBC-1** was 0.14, indicating that the channel was in regime. The dominant systematic adjustments were equally aggradation and planimetric adjustment, namely due to deposition in the overbank zone and formation of multiple channels through the wetland riparian zone. However, the presence of these adjustment signs was extremely minor. The overall RGA score still indicates the channel is in a stable state, which is supported by additional field observations. There are no signs of erosion, either historical or active, or other geomorphological processes which could indicate potential system adjustments. The reach is also heavily encroached by grassy vegetation in the active channel which provides an additional control to potential erosion.

6 Meander Belt Width and Erosion Hazard Assessment

Most drainage features in southern Ontario have a natural tendency to develop and maintain a meandering planform, provided there are no spatial constraints. A meander belt width or erosion hazard

assessment estimates the lateral extent that a watercourse has historically occupied and will likely occupy in the future. This assessment is therefore useful for determining the potential hazard to proposed activities in the vicinity of a watercourse.

Channel planform is affected by a number of factors such as vegetation, gradient, and stream power. In the case of the western tributary within the study site, the channel is poorly defined and highly vegetated. The gradient is low, reducing the capacity of the drainage feature to develop single defined meanders. Within the eastern portion of the study site, there is no erosion, channel definition, or indicators of previous flow, making the formation of single defined meanders unlikely. The eastern features are ephemeral in nature with no potential for erosion. As such, a meander belt width is not applicable for the eastern features.

When defining the erosion hazard for a watercourse, the Ministry of Natural Resources and Forestry treat unconfined and confined systems differently. Unconfined systems are those with poorly defined valleys or slopes well outside where the channel could realistically migrate. Confined systems are those where the watercourse is contained within a defined valley, where valley wall contact is possible. Within the study site, **Reach TBC-1** is situated within an unconfined valley system.

In unconfined systems, the meander belt width can be determined through a detailed geomorphological study that examines the largest channel meanders observed through historical and recent aerial photo interpretation, to determine the meander migration rate within 100 years. The limit of the erosion hazard and migration potential can also be delineated based on the meander amplitude. Meander amplitude is defined by Leopold et al. (1964) as the lateral distance between tangential lines drawn to the center channel of two successive meander bends. This differs from meander belt, which is measured for a reach between lines drawn tangentially to the outside bends of the laterally extreme meander bends (TRCA, 2004). The meander migration rate, meander belt width, and amplitude quantify the lateral extent of a river's occupation on the floodplain (TRCA, 2004).

Reach TBC-1 was identified as unconfined and poorly defined, with no available reference reach to provide measurable meander amplitudes. Given these conditions, the reach was not traceable through aerial photo interpretation, and the calculation of the 100-year erosion rate was not possible. Instead, empirically based meander belt widths models were reviewed for the reach on the subject lands. These models are scientifically defensible and have been verified in past projects as suitable for use in Southern Ontario. The meander belt width was calculated using a suite of empirical models, outlined below, with a summary of the results outlined in **Table 2.**

The empirical relations from Williams (1986) were modified to include channel area and width, and applied using the bankfull channel dimensions such that:

$$B_w = 18A^{0.65} + W_b \quad \text{[Eq. 1]}$$

$$B_w = 4.3{W_b}^{1.12} + W_b \quad \text{[Eq. 2]}$$

where B_w is meander belt width (m), A is bankfull cross-sectional area (m^2), and Wb is bankfull channel width (m). An additional 20% buffer, or factor of safety, was applied to the computed belt width values. This addresses issues of under prediction and provides a factor of safety. The bankfull channel dimensions observed during field reconnaissance were used to inform both the Williams Area and Width (1986) models. As noted in the field observations, the reach is poorly defined, so the geometries collected are based on several spot measurements where a defined channel could be observed. As such, the geometries used for modelling are conservative compared to average conditions where there is poor channel definition.

A meander belt width was also calculated based on TRCA's (2004) empirical model:

$$B_w = -14.827 + 8.319\ln(\rho g Q S * DA) \quad \text{[Eq. 3]}$$

where ρ is water density (1000 kg/m^3), g is acceleration due to gravity (9.8 m/s^2), Q is discharge (m^3/s), S is channel slope (m/m), and DA is drainage area (km^2). The TRCA meander belt width values were determined using a drainage area of 1.35 km^2 for **TCB-1** as well as a 2-year discharge of 1.39 m^3/s. These values were based on information provided from the Ontario Watershed Information Tool (OWIT) and GEO Morphix's own flow modelling software. A channel gradient for each reach was also determined based on available elevation/contour data and OWIT. Results of the empirical modelling exercise are outlined in **Table 2**.

Table 2: Meander Belt Width Modelling Results for Reach TBC-1

Reach	Meander Belt Width (m)			Recommended Meander Belt Width (m)
	TRCA* (2004)	Modified Williams – Area** (1986)	Modified Williams – Width** (1986)	
TCB-1	38	10	9	38

**One standard deviation is included as a factor of safety in the TRCA meander belt width value*
***A 20% factor of safety has been included in the modified Williams (area and width) meander belt width value*

The Williams Area and Width models resulted in meander belt widths of 10 m and 9 m. Note that these models are based on bankfull channel geometries collected during field reconnaissance. The average bankfull channel geometries were collected in localized area where a defined channel could be discerned. However, this is not representative of average conditions along the reach given that the channel is generally poorly defined.

For **Reach TCB-1,** we recommend applying a meander belt width of 38 m, following the Toronto Region Conservation Agency (TRCA) model. The TRCA model considers contributing drainage area, flows, and local gradients rather than relying on bankfull channel geometry alone. The 38 m meander belt width is conservative in nature given that there is limited channel definition and very limited erosion potential along this reach. The recommended meander belt width also falls within the current staked wetland boundary and is therefore not a limiting constraint for the proposed development. A map of the meander belt width delineation is provided in **Appendix E**.

7 Summary and Recommendations

Two tributaries of Bronte Creek flow through the western and eastern portion of the subject site at 11 Main Street in Puslinch, Ontario. A desktop assessment was completed which included a review of existing watershed data and historical and recent aerial photographs. Field reconnaissance was also completed to document existing conditions, confirm results of the desktop assessment, and support erosion hazard delineation. This information, in part, will be used in the overall constraint plan to define the limit of development for proposed activities on site.

It was found that the drainage features to the east of the subject site are low-order streams that contain isolated and interspersed wetland pockets within a natural wooded area. No continuous defined stream could be located along each reach within the eastern staked wooded area. As such, there is no potential for erosion and a meander belt width is not applicable.

For **Reach TCB-1,** the watercourse flowing through the western portion of the subject site, a meander belt width of 38 m is recommended. The meander belt width was determined through an empirical modelling exercise. The final meander belt width is conservative given that the channel is small, poorly

defined, and shows limited evidence of erosion or adjustment. It should be noted that the meander belt width also sits within an existing staked wetland boundary and is not a limiting constraint on the proposed development.

We trust this report meets your requirements. Should you have any questions, please contact the undersigned.

Respectfully submitted,

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Manager of Watershed Studies

Lucy Lu, M.Sc., G.I.T.
River Scientist

8 References

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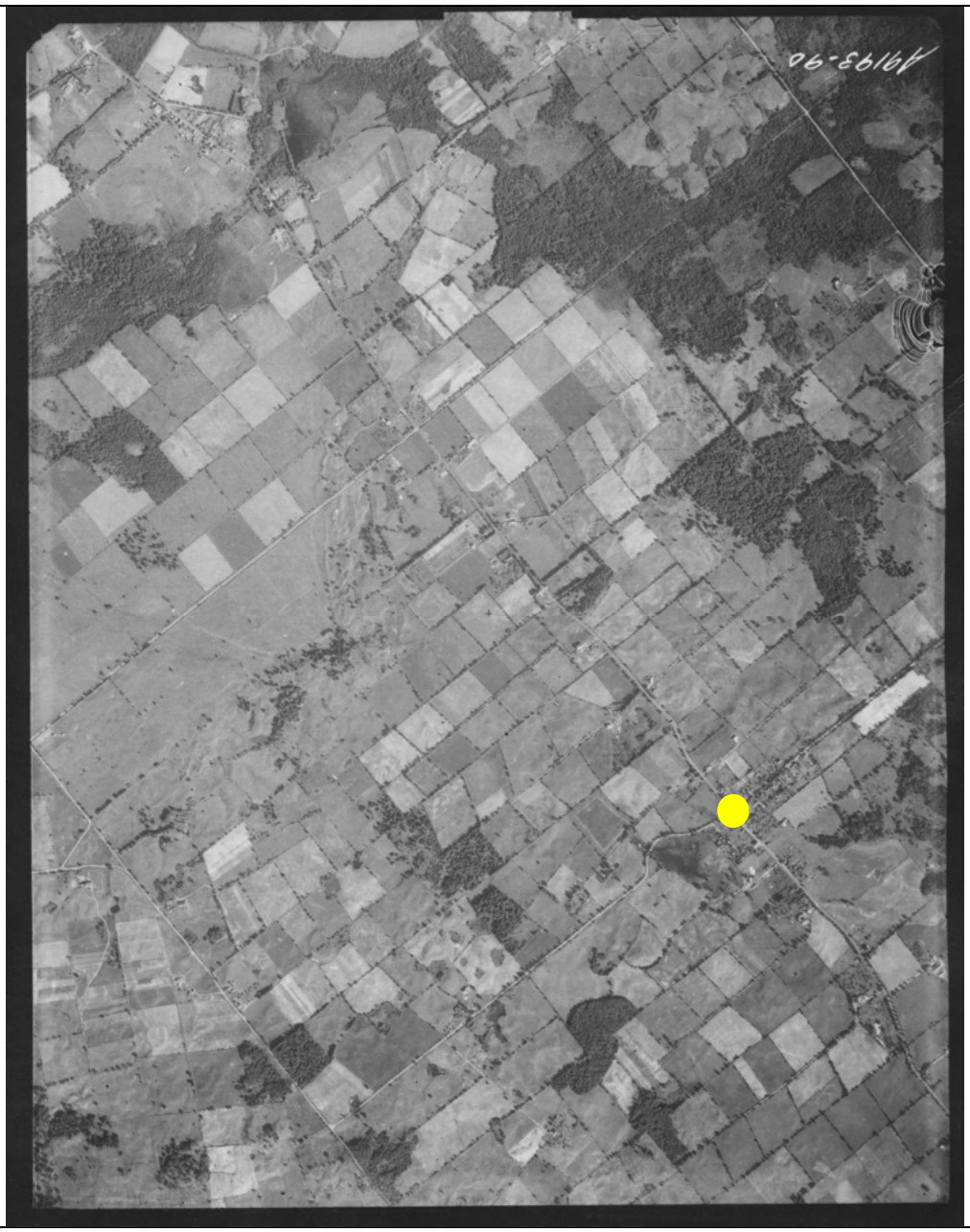
Appendix A
Historical Aerial Photographs



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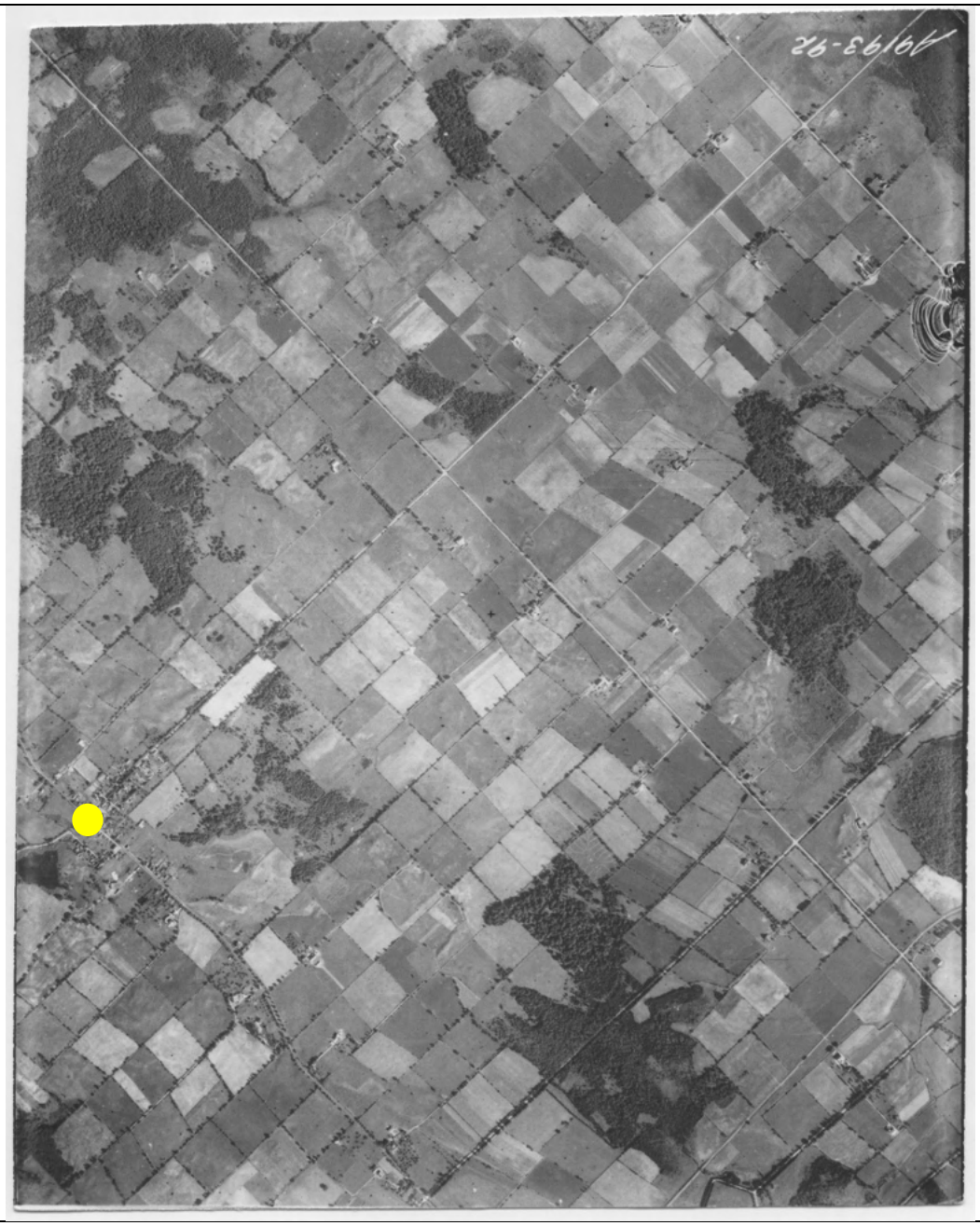
Year: 1945
Scale: 1:20,000
Source: National Air Photo Library



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Year: 1945
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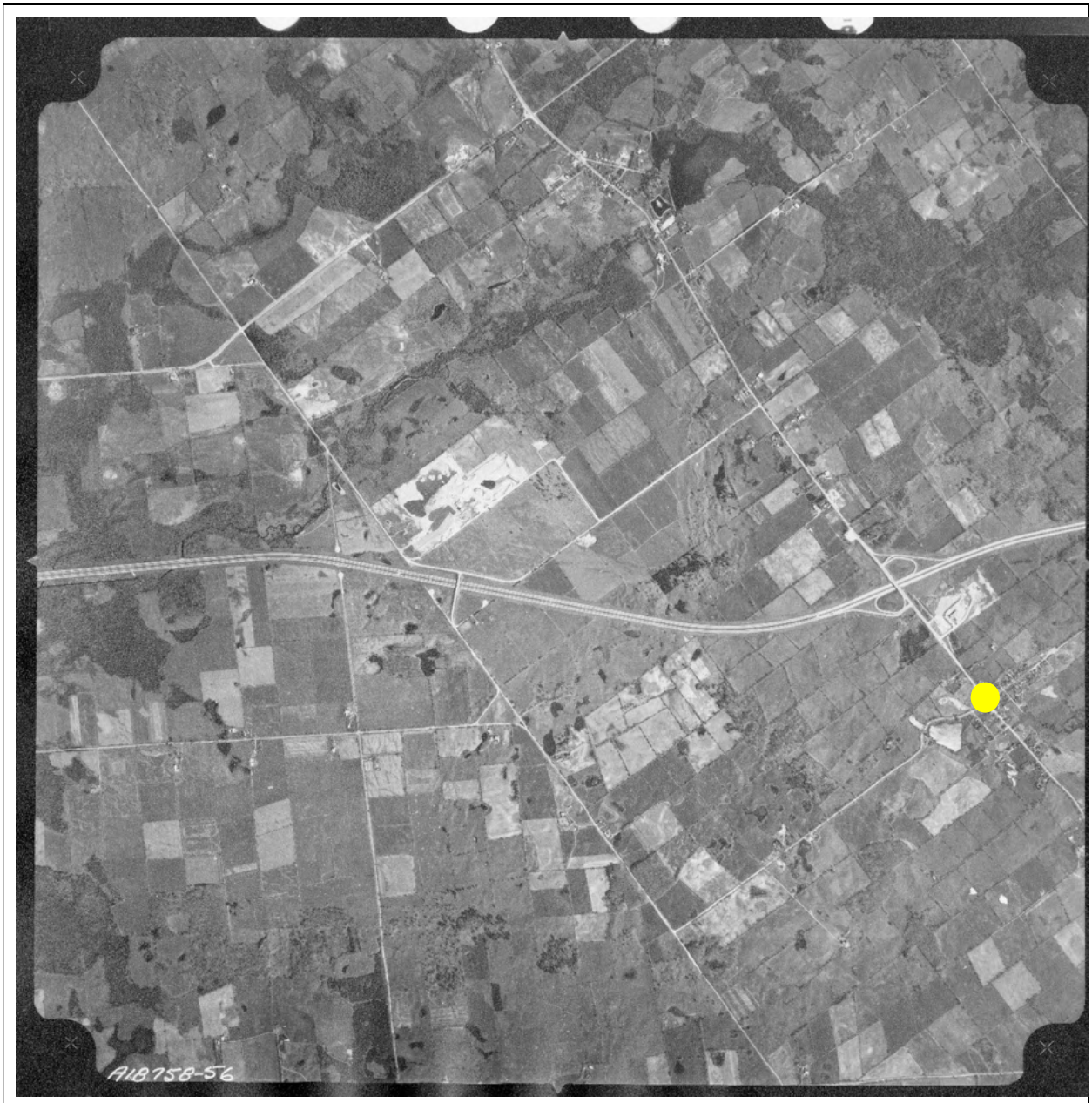
Source: National Air Photo Library



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Year: 1965
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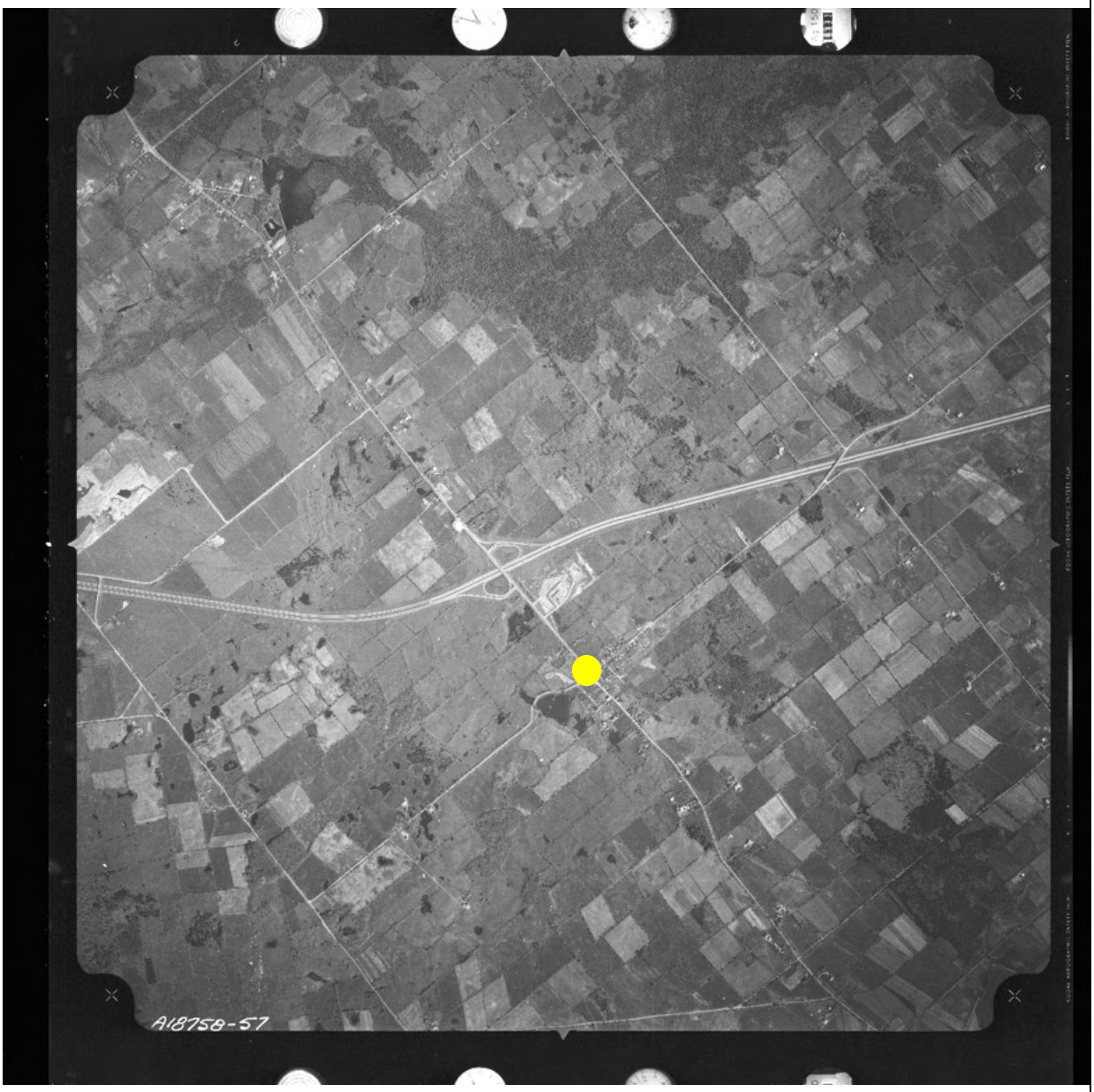
Source: National Air Photo Library



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Year: 1965
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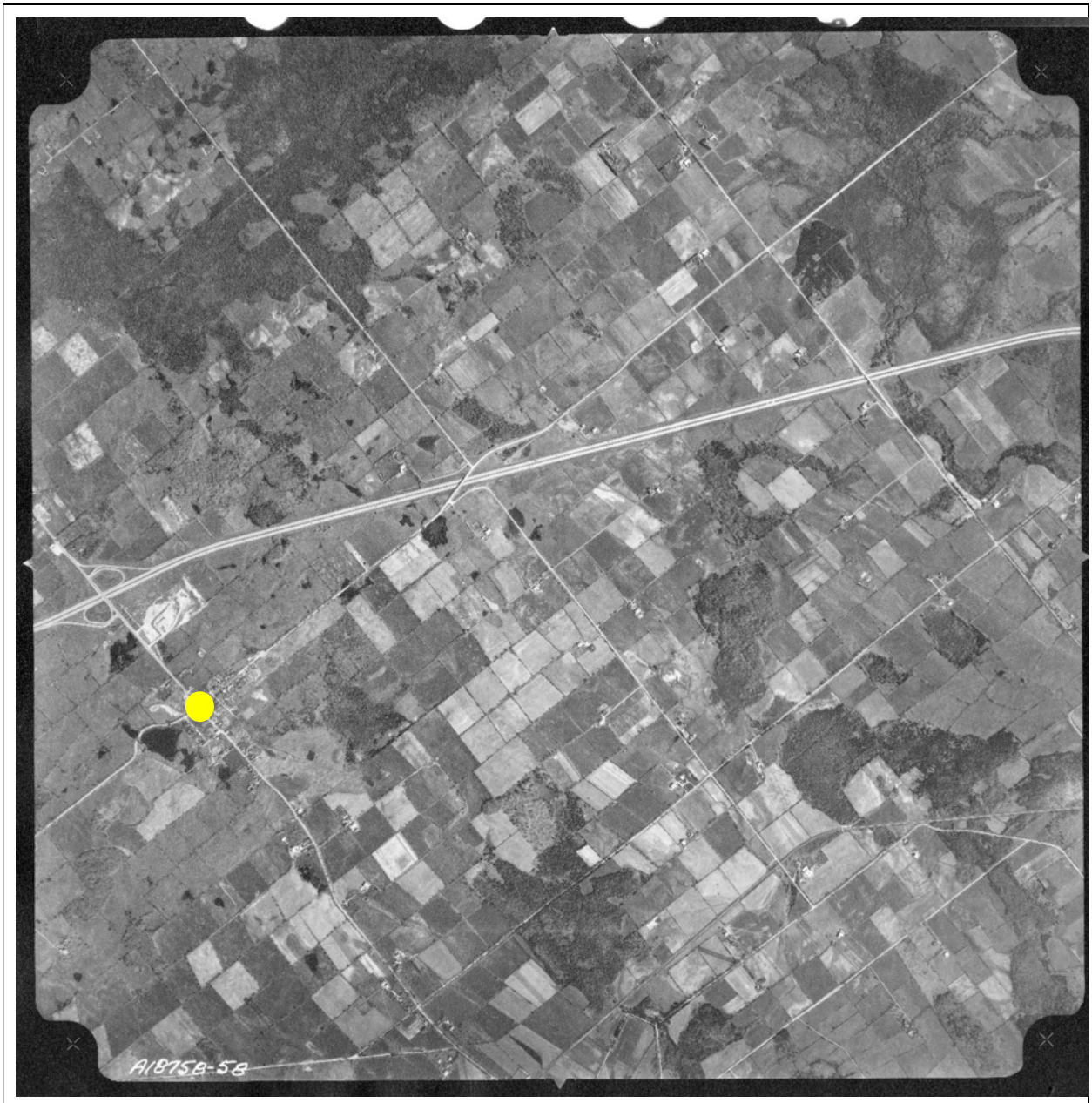
Source: National Air Photo Library



Location: Queen Street and Calfass Road, Town of Puslinch (Yellow Dot)
Year: 1965
Scale: 1:25,000
Source: National Air Photo Library

Location: Queen Street and Calfass Road, Town of Puslinch (Yellow Dot)
Year: 1972
Scale: 1:25,000
Source: National Air Photo Library

Appendix B
Reach Mapping

GEO MORPHIX™

Study Area

Bronte Creek

Puslinch, Ontario

Legend

- Reach Breaks and ID
- Watercourse
- Channel observed in field as ephemeral drainage features
- 0.25 m Contour
- Staked Wetland
- Staked Woodland
- Study Boundary

0 75 150

Metres

Imagery: Google Earth, 2018. Watercourse and Study Boundary: Weston Consulting, 2022. 0.25 m Contour: J.D. Barnes, 2022. Staked Wetland, Staked Woodland: Colville Consulting Inc., 2022. PN22099. Print Date: December 2022.Drawn By: L.L., M.O.

Appendix C
Field Sheets

GEO MORPHIX

General Site Characteristics

Project Code: 22099

Date:	OCT 17th, 2022	**Stream/Reach:**	TBC-1
Weather:	overcast	**Location:**	PUSLINCH
Field Staff:	MK, LL	**Watershed/Subwatershed:**	BRONTE CREEK

Features

- Reach break
- Cross-section
- Flow direction
- Riffle
- Pool
- Medial bar
- Eroded bank
- Undercut bank
- Rip rap/stabilization/gabion
- Leaning tree
- Fence
- Culvert/outfall
- Swamp/wetland
- Grasses
- Tree
- Instream log/tree
- Woody debris
- Station location
- Vegetated island

oblique Box Culvert
n: 0.6m
W. 2.7 m
U/S wetland, private development, box culvert
oily sheen on bedrock

Flow Type

H1	Standing water
H2	Scarcely perceptible flow
H3	Smooth surface flow
H4	Upwelling
H5	Rippled
H6	Unbroken standing wave
H7	Broken standing wave
H8	Chute
H9	Free fall

pooling adjacent to LHV trail organic. bkf measured to full width

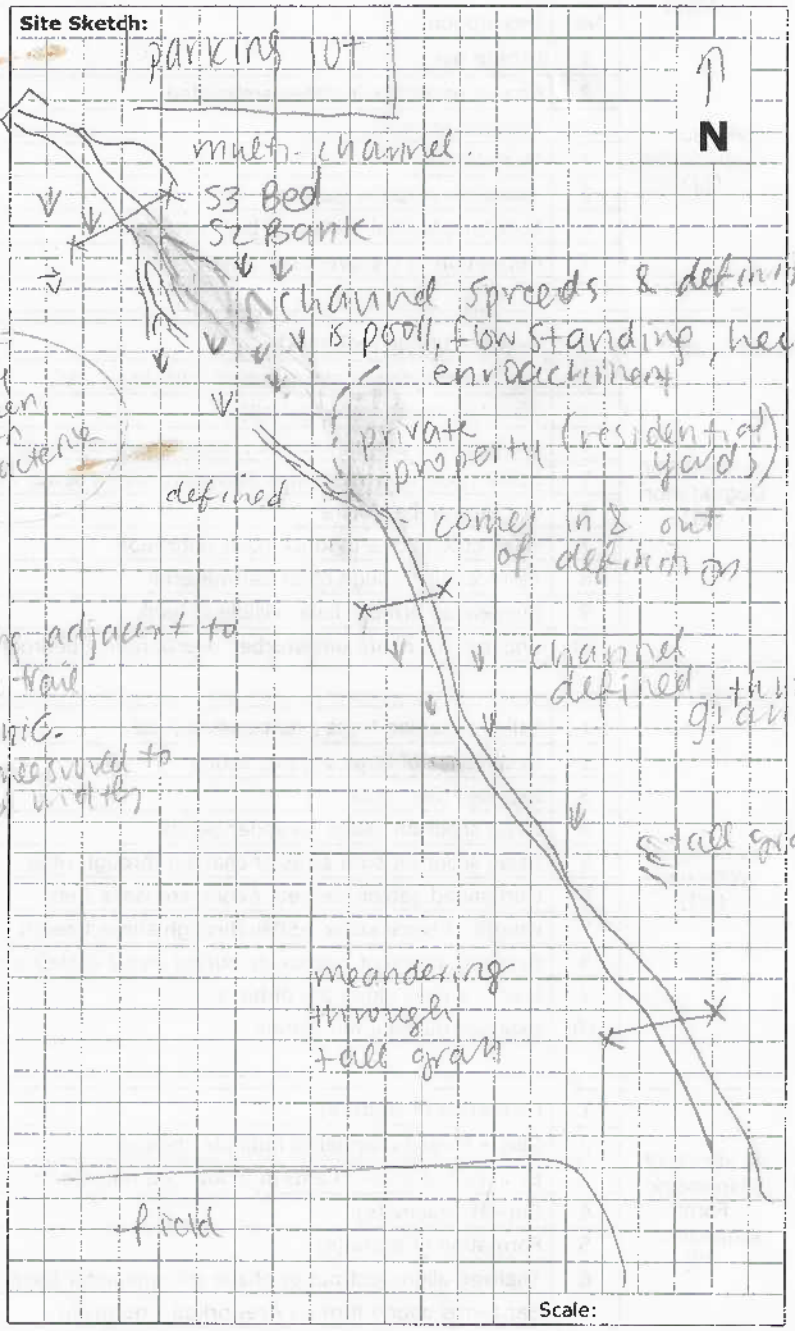
Substrate

S1	Silt	**S6**	Small boulder
S2	Sand	**S7**	Large boulder
S3	Gravel	**S8**	Bimodal
S4	Small cobble	**S9**	Bedrock/till
S5	Large cobble		

Other

BM	Benchmark	**EP**	Erosion pin
BS	Backsight	**RB**	Rebar
DS	Downstream	**US**	Upstream
WDJ	Woody debris jam	**TR**	Terrace
VWC	Valley wall contact	**FC**	Flood chute
BOS	Bottom of slope	**FP**	Flood plain
TOS	Top of slope	**KP**	Knick point

Site Sketch:



Additional Notes:

Completed by: LL Checked by: _____

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Rapid Geomorphic Assessment **Project Code:** PN22099

Date:	2022-10-17	**Stream/Reach:**	TCB-1
Weather:	OVERCAST	**Location:**	Puslinch
Field Staff:	MK LL	**Watershed/Subwatershed:**	Bronte

Process	Geomorphic Indicator		Present?		Factor Value
	No.	Description	Yes	No	
Evidence of Aggradation (AI)	1	Lobate bar		1	2/7
	2	Coarse materials in riffles embedded		1	
	3	Siltation in pools	1		
	4	Medial bars		1	
	5	Accretion on point bars		1	
	6	Poor longitudinal sorting of bed materials		1	
	7	Deposition in the overbank zone	1		
		Sum of indices =			0.29
Evidence of Degradation (DI)	1	Exposed bridge footing(s)	NA		0/7
	2	Exposed sanitary / storm sewer / pipeline / etc.	NA		
	3	Elevated storm sewer outfall(s)	NA	1	
	4	Undermined gabion baskets / concrete aprons / etc.	NA		
	5	Scour pools downstream of culverts / storm sewer outlets		1	
	6	Cut face on bar forms		1	
	7	Head cutting due to knick point migration		1	
	8	Terrace cut through older bar material		1	
	9	Suspended armour layer visible in bank		1	
	10	Channel worn into undisturbed overburden / bedrock		1	
		Sum of indices =			0
Evidence of Widening (WI)	1	Fallen / leaning trees / fence posts / etc.		1	0/7
	2	Occurrence of large organic debris		1	
	3	Exposed tree roots		1	
	4	Basal scour on inside meander bends		1	
	5	Basal scour on both sides of channel through riffle		1	
	6	Outflanked gabion baskets / concrete walls / etc.	NA		
	7	Length of basal scour >50% through subject reach		1	
	8	Exposed length of previously buried pipe / cable / etc.		1	
	9	Fracture lines along top of bank		1	
	10	Exposed building foundation	NA		
		Sum of indices =			0
Evidence of Planimetric Form Adjustment (PI)	1	Formation of chute(s)		1	2/7
	2	Single thread channel to multiple channel	1		
	3	Evolution of pool-riffle form to low bed relief form		1	
	4	Cut-off channel(s)		1	
	5	Formation of island(s)		1	
	6	Thalweg alignment out of phase with meander form		1	
	7	Bar forms poorly formed / reworked / removed	1		
		Sum of indices =			0.29

Additional notes:

Stability Index (SI) = (AI+DI+WI+PI)/4 = 0.14

Condition	In Regime	In Transition/Stress	In Adjustment
SI score =	☐ 0.00 - 0.20	☐ 0.21 - 0.40	☐ 0.41

Completed by: LL Checked by: _____

GEO | MORPHIX
Geomorphology Earth Science Observations

Reach Characteristics

Project Code/Phase: PN22099

Date:	2022-10-17	**Stream/Reach:**	TCB-1
Weather:	OVERCAST	**Location:**	PUSLINCH
Field staff:	MK LL	**Watershed/Subwatershed:**	BRONTE
UTM (Upstream)		**UTM (Downstream)**	

Land Use (Table 1): 7 | Valley Type (Table 2): 1 | Channel Type (Table 3): 12 | Channel Zone (Table 4): 1 | Flow Type (Table 5): 1 | ☐ Groundwater* | Evidence: _____

Riparian Vegetation

Dominant Type: (Table 6) 3/4 | Species: _____ _____

Coverage: ☐ None ☐ Fragmented ☒ Continuous

Channel widths: ☐ 1-4 ☐ 4-10 ☑ >10

Age Class (yrs): ☐ Immature (<5) ☑ Established (5-30) ☐ Mature (>30)

Encroachment: (Table 7) 3-4

Aquatic/Instream Vegetation

Type (Table8) 1 | Coverage of Reach (%) 20

Woody Debris: ☐ Present in Cutbank ☐ Present in Channel ☒ Not Present

Density of WD: N/A ☐ Low ☐ Moderate ☐ High

WDJ/50m: 0

Water Quality

Odour (Table 16): 6 organic

Turbidity (Table 17): 3/5

Channel Characteristics

Sinuosity (Type) (Table 9): 2 | Sinuosity (Degree) (Table 10): 1 | Gradient (Table 11): 1 | Number of Channels (Table 12): 2

Entrenchment (Table 13): 1 | Type of Bank Failure (Table 14): 1/N/D | Downs's Classification (Table 15): D

	Clay/Silt	Sand	Gravel	Cobble	Boulder	Parent	Rootlets
Riffle Substrate	☐	☒	☐	☐	☐	☐	☒
Pool Substrate	☒	☐	☐	☐	☐	☐	☐
Bank Material	☒	☐	☐	☐	☐	☐	☒

		*POOL			*POOL	
Bankfull Width (m)	1.0	2.00	1.00	Wetted Width (m)	0.62	0.75	0.48
Bankfull Depth (m)	0.30	0.20	0.20	Wetted Depth (m)	0.105	0.15	0.15

Riffle/Pool Spacing (m): poor RIP structure | % Riffles: | % Pools: | Meander Amplitude: 0

Pool Depth (m): 0.10 | Riffle Length (m): N/A | Undercuts (m): Ø | Comments:

Velocity (m/s): 0.013 | Ø standing water | 0.1 | Wiffle ball / ADV / Estimated

Bank Angle: ☒ 0 – 30 ☐ 30 – 60 ☐ 60 – 90 ☐ Undercut

Bank Erosion: ☒ < 5% ☐ 5 – 30% ☐ 30 – 60% ☐ 60 – 100%

Notes: WETLAND channel, goes in & out of definition, residential on one side, ~~as~~ park on other

Completed by: LL + MK | Checked by: _____

GEO MORPHIX

General Site Characteristics

Project Code: PN2100

Date:	2022-10-17	**Stream/Reach:**	TBC-2
Weather:	OVERCAST	**Location:**	PUSLINCH
Field Staff:	MK LL	**Watershed/Subwatershed:**	BRONTE

Features

- Reach break
- Cross-section
- Flow direction
- Riffle
- Pool
- Medial bar
- Eroded bank
- Undercut bank
- Rip rap/stabilization/gabion
- Leaning tree
- Fence
- Culvert/outfall
- Swamp/wetland
- Grasses
- Tree
- Instream log/tree
- Woody debris
- Station location
- Vegetated island

Flow Type

- **H1** Standing water
- **H2** Scarcely perceptible flow
- **H3** Smooth surface flow
- **H4** Upwelling
- **H5** Rippled
- **H6** Unbroken standing wave
- **H7** Broken standing wave
- **H8** Chute
- **H9** Free fall

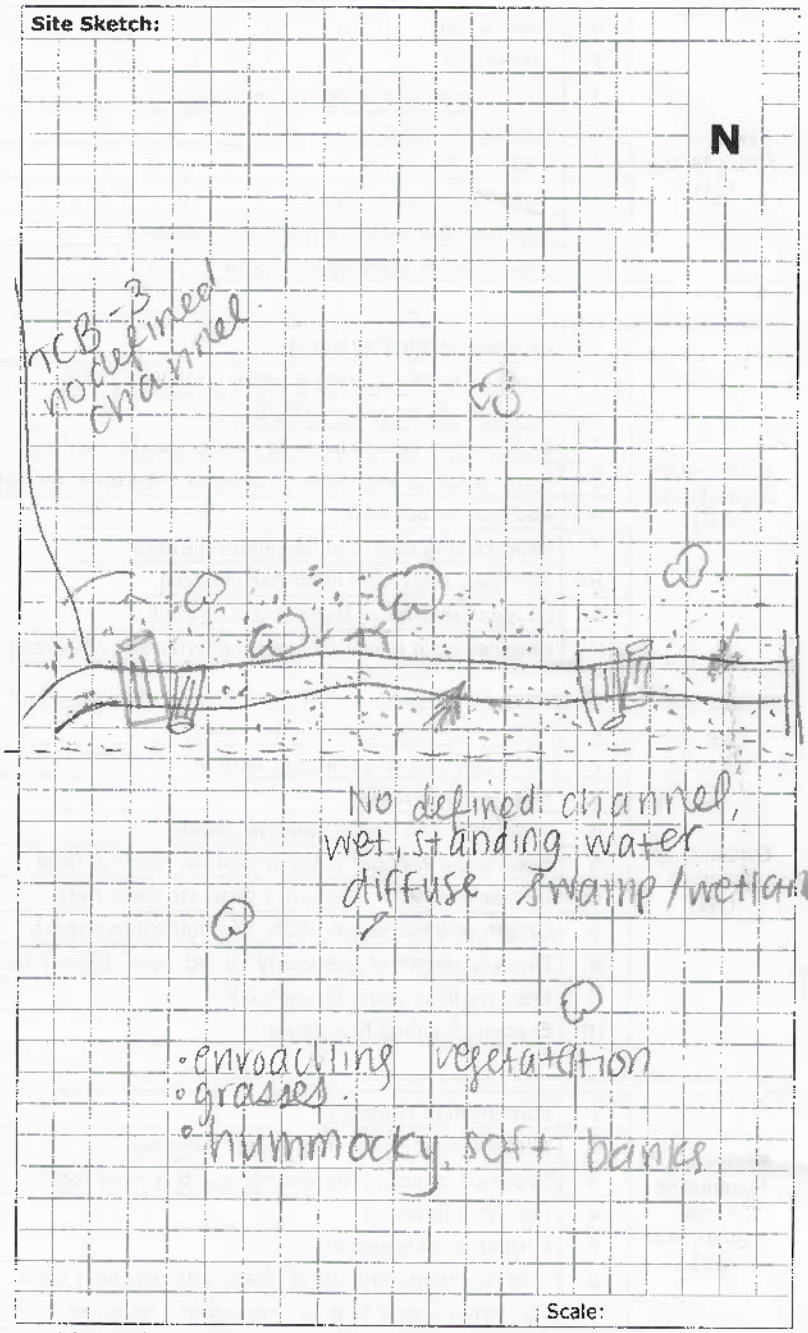
Substrate

S1	Silt	**S6**	Small boulder
S2	Sand	**S7**	Large boulder
S3	Gravel	**S8**	Bimodal
S4	Small cobble	**S9**	Bedrock/till
S5	Large cobble		

Other

BM	Benchmark	**EP**	Erosion pin
BS	Backsight	**RB**	Rebar
DS	Downstream	**US**	Upstream
WDJ	Woody debris jam	**TR**	Terrace
VWC	Valley wall contact	**FC**	Flood chute
BOS	Bottom of slope	**FP**	Flood plain
TOS	Top of slope	**KP**	Knick point

Site Sketch:



Additional Notes:

Completed by: LL Checked by: _____

GEO MORPHIX

General Site Characteristics

Project Code: PN22099

Date:	2022-10-17	**Stream/Reach:**	TBC-3
Weather:	OVERCAST	**Location:**	PUSLINCH
Field Staff:	MK LL	**Watershed/Subwatershed:**	BRONTE

Features

- Reach break
- Cross-section
- Flow direction
- Riffle
- Pool
- Medial bar
- Eroded bank
- Undercut bank
- Rip rap/stabilization/gabion
- Leaning tree
- Fence
- Culvert/outfall
- Swamp/wetland
- Grasses
- Tree
- Instream log/tree
- Woody debris
- Station location
- Vegetated island

Flow Type

H1	Standing water
H2	Scarcely perceptible flow
H3	Smooth surface flow
H4	Upwelling
H5	Rippled
H6	Unbroken standing wave
H7	Broken standing wave
H8	Chute
H9	Free fall

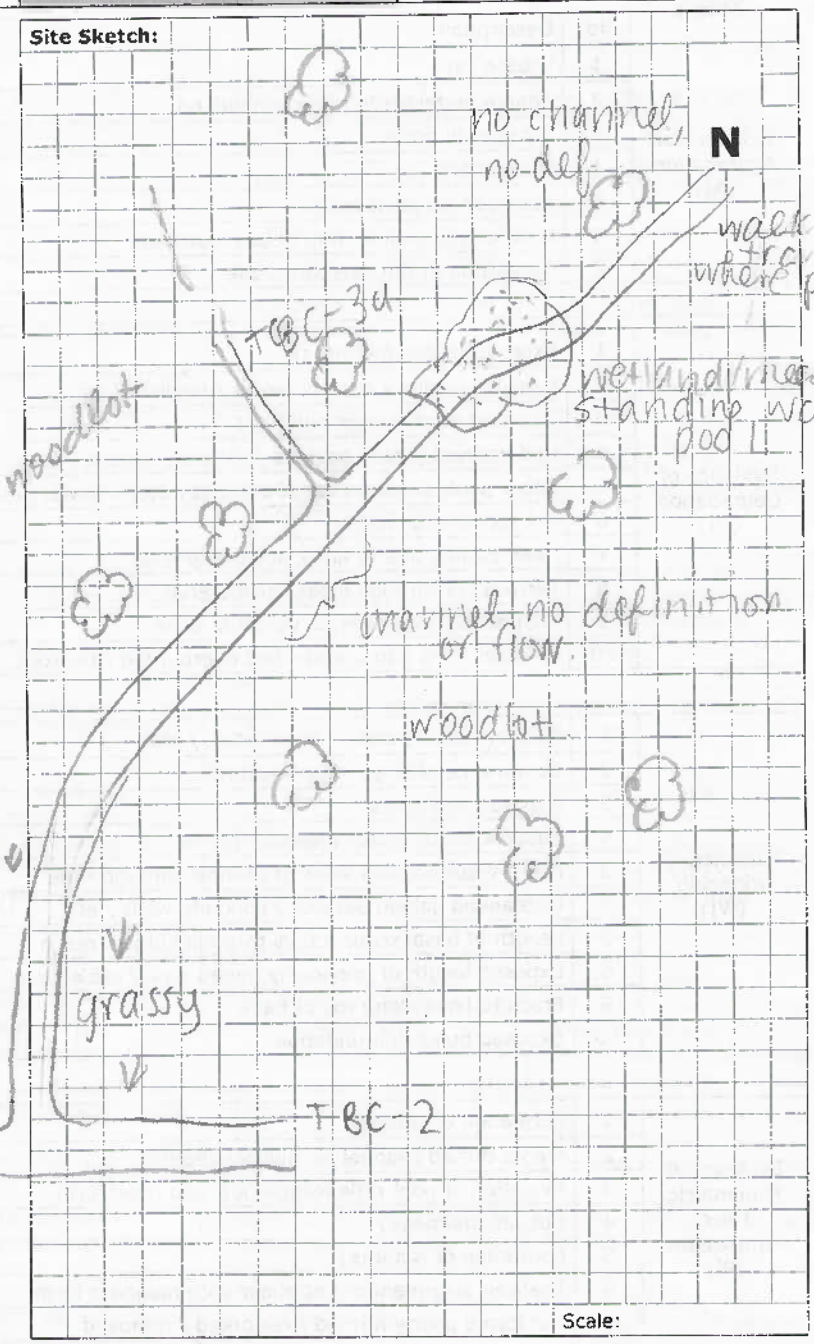
Substrate

S1	Silt	**S6**	Small boulder
S2	Sand	**S7**	Large boulder
S3	Gravel	**S8**	Bimodal
S4	Small cobble	**S9**	Bedrock/till
S5	Large cobble		

Other

BM	Benchmark	**EP**	Erosion pin
BS	Backsight	**RB**	Rebar
DS	Downstream	**US**	Upstream
WDJ	Woody debris jam	**TR**	Terrace
VWC	Valley wall contact	**FC**	Flood chute
BOS	Bottom of slope	**FP**	Flood plain
TOS	Top of slope	**KP**	Knick point

Site Sketch:



Scale:

Additional Notes:

Completed by: LL Checked by: _____

GEO MORPHIX

General Site Characteristics

Project Code: PN22099

Date:	OCT 17th	**Stream/Reach:**	TBC-3a
Weather:	OVERCAST	**Location:**	PUSLINCH
Field Staff:	MK LL	**Watershed/Subwatershed:**	BRONTE

Features

- Reach break
- Cross-section
- Flow direction
- Riffle
- Pool
- Medial bar
- Eroded bank
- Undercut bank
- Rip rap/stabilization/gabion
- Leaning tree
- Fence
- Culvert/outfall
- Swamp/wetland
- Grasses
- Tree
- Instream log/tree
- Woody debris
- Station location
- Vegetated island

Flow Type

H1	Standing water
H2	Scarcely perceptible flow
H3	Smooth surface flow
H4	Upwelling
H5	Rippled
H6	Unbroken standing wave
H7	Broken standing wave
H8	Chute
H9	Free fall

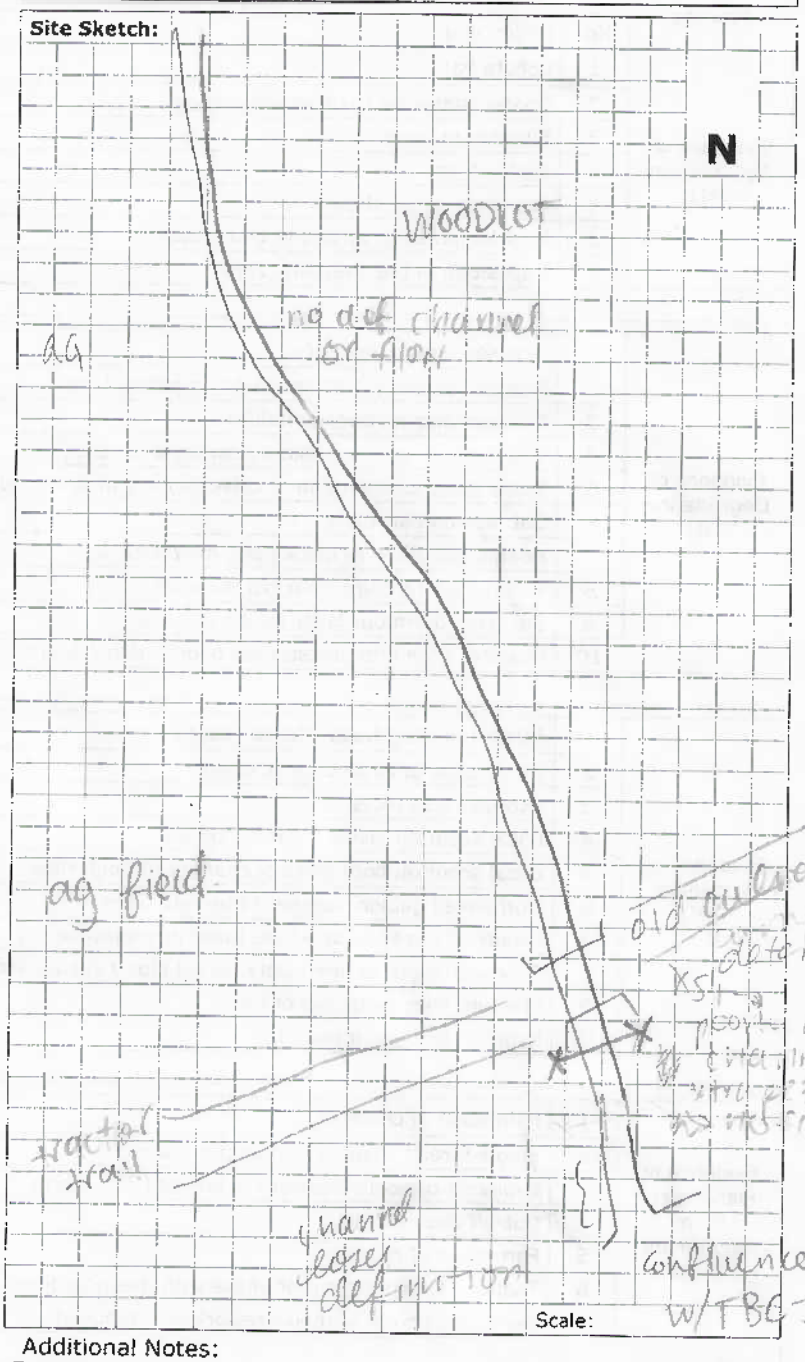
Substrate

S1	Silt	**S6**	Small boulder
S2	Sand	**S7**	Large boulder
S3	Gravel	**S8**	Bimodal
S4	Small cobble	**S9**	Bedrock/till
S5	Large cobble		

Other

BM	Benchmark	**EP**	Erosion pin
BS	Backsight	**RB**	Rebar
DS	Downstream	**US**	Upstream
WDJ	Woody debris jam	**TR**	Terrace
VWC	Valley wall contact	**FC**	Flood chute
BOS	Bottom of slope	**FP**	Flood plain
TOS	Top of slope	**KP**	Knick point

Site Sketch:



Additional Notes:

Completed by: LL Checked by: _____

Appendix D
Photo Observations

Tributary of Bronte Creek
Reach TBC-1
Photo 1

Highway 6 Concrete box culvert at the upstream extent of TBC-1

Tributary of Bronte Creek
Reach TBC-1
Photo 2

Defined bankfull conditions downstream of culvert. Metre stick for scale.

Tributary of Bronte Creek
Reach TBC-1
Photo 3

The riparian area consisted mainly of tall grasses with sparse herbaceous shrubs and trees. Bankfull channel was poorly defined throughout.

Tributary of Bronte Creek
Reach TBC-1
Photo 4

Downstream of reach as it continues to flow off property boundaries. Outside of pictured grassy riparian area is agricultural field.

Tributary of Bronte Creek Reach TBC-2 Photo 5	
	Hummocky areas with instream grasses and pooled, standing water is typical condition along Reach TBC-2
Tributary of Bronte Creek Reach TBC-2 Photo 6	
	Grassy hummocks and trees throughout pools of water. No defined bankfull channel present along Reach TBC-2

Tributary of Bronte Creek
Reach TBC-3
Photo 7

The riparian zone of Reach TBC-3 contained wooded area. No bankfull channel or flow paths observed in the upstream sections.

Tributary of Bronte Creek
Reach TBC-3
Photo 8

A minor flow path was observed in the very downstream extent of the study site, presumed to be associated with mapped stream Reach TBC-3.

Tributary of Bronte Creek
Reach TBC-3a
Photo 9

The riparian area consisted of wooded area. No defined flow path observed in association with mapped stream Reach TBC-3a

Appendix E
Meander Belt Width Delineation

GEO MORPHIX™

Meander Belt Width Delineation

Bronte Creek

Puslinch, Ontario

Legend

- Reach Break and ID
- Watercourse
- Channel observed in field as ephemeral drainage features
- 0.25 m Contour
- Meander Belt Width
- Meander Belt Width (Off Property - Field Verification Required)
- Staked Wetland
- Staked Woodland
- Study Boundary

0 75 150

Metres

Imagery: Google Earth, 2018. Study Boundary, Watercourse: Weston Consulting, 2022. 0.25 m Contour: J.D. Barnes, 2022. Staked Wetland, Staked Woodland: Colville Consulting Inc., 2022. Meander Belt Width: GEO Morphix Ltd., 2022. Print Date: February 2023. PN22099. Drawn By: L.L., M.O.

GEO MORPHIX™

Meander Belt Width Delineation

Bronte Creek

Puslinch, Ontario

Legend

- Reach Break and ID
- Watercourse
- 0.25 m Contour
- Meander Belt Width
- Meander Belt Width (Off Property - Field Verification Required)
- Staked Wetland
- Staked Woodland
- Study Boundary

N

0 10 20

Metres

Imagery: Google Earth, 2018. Study Boundary, Watercourse: Weston Consulting, 2022. 0.25 m Contour: J.D. Barnes, 2022. Staked Wetland, Staked Woodland: Colville Consulting Inc., 2022. Meander Belt Width: GEO Morphix Ltd., 2022. Print Date: December 2022. PN22099. Drawn By: L.L., M.O.

FUNCTIONAL SERVICING & PRELIMINARY STORMWATER MANAGEMENT REPORT

11 MAIN STREET
ESTATE RESIDENTIAL DEVELOPMENT

TOWNSHIP OF PUSLINCH
COUNTY OF WELLINGTON

PREPARED FOR:

WDD MAIN STREET

PREPARED BY:

C.F. CROZIER & ASSOCIATES INC.
55 WYNDHAM STREET NORTH SUITE 215
GUELPH, ON N1H 7T8

SEPTEMBER 2024

CFCA FILE NO. 2366-6537

The material in this report reflects best judgment in light of the information available at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. C.F. Crozier & Associates Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

CELEBRATING 20 YEARS SINCE 2004 CROZIER

Revision Number	Date	Comments
Rev. 0	February 2023	Issued for First Submission (ZBA)
Rev. 1	December 2023	Issued for Second Submission (ZBA)
Rev. 2	September 2024	Issued for Third Submission (ZBA)

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1.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) was retained by WDD Main Street (Owner) to prepare a Functional Servicing and Preliminary Stormwater Management Report in support of Draft Plan Approval for the estate residential development located at 11 Main Street in the Township of Puslinch (Site). The purpose of this report is to demonstrate the proposed development is feasible from a functional servicing and stormwater management perspective and conforms with the requirements of the Township of Puslinch (Town), County of Wellington (County), and Conservation Halton (Conservation Authority).

This report has been completed in accordance with the appropriate design guidelines and Township of Puslinch Pre-consultation Comment Summary dated October 21, 2022. The relevant background studies and reports used in preparation of this report include:

- Conservation Halton Guidelines for Stormwater Management Engineering Submissions (November 2021)
- Fluvial Geomorphological and Meander Belt Width Assessment (February 13, 2023)
- Geotechnical Investigation (Terraprobe Inc., October 3, 2023)
- Hydrogeological Assessment (EnGlobe, August 28, 2024)
- Ministry of the Environment Design Guidelines for Drinking-Water Systems (2008)
- Ministry of Environment Stormwater Management Planning and Design Manual (March 2003)
- The Ontario Geologic Survey (OGS) database, accessed February 2023
- The Ontario Building Code (OBC) (2012)
- The Township of Puslinch Municipal Development Standards (September 2019)
- Well Record Database, Ministry of the Environment, Conservation and Parks, accessed February 2023

This report has been prepared to address the first submission comments received from the reviewing agencies (April 24, 2023) and to support the second submission of the Zoning By-Law Amendment Application for the proposed development.

2.0 Site Description

The site encompasses an area of approximately 23.60 ha and currently consists of vacant agricultural fields and forested areas. Most of the site is designated as woodlot and wetlands which leaves approximately 5.98 ha of developable area. The site, located in a residential and agricultural area, is bounded by residential dwellings to the north and west, agricultural lands to the east, and forested and agricultural lands to the south.

According to the Development Concept prepared by Weston Consulting dated May 14, 2024, the proposed estate residential development will consist of the following elements:

- Twenty-one (21) estate residential lots with lot sizes ranging from 0.19 ha to 0.38 ha.
- A 20.0 m wide urban municipal right-of-way with road access to Ochs Street.
- Associated forest, landscaped, stormwater management and amenity areas.

The development limits for the proposed development were established based on the following environmental constraints:

- South-western channel 38 m meander belt per the Meander Belt Assessment prepared by Geo Morphix Ltd.
- 10 m offset from the woodlot, staked, and surveyed by Colville Consulting Inc. (September 20, 2022)
- 15 m offset from Regional Floodplain Limits per Conservation Halton HEC-RAS Modelling (BronteReach5, May 14, 2012)

3.0 Soil and Groundwater Conditions

EnGlobe (formerly Terraprobe) was retained by the Owner to complete a hydrogeological assessment for the proposed residential development. Five (5) boreholes were advanced across the site in August 2022. The boreholes were drilled to depths between 6.1 m and 8.1 m below ground surface (mbgs).

As reported by Terraprobe, the soils encountered consisted of earth fill materials, comprised of sand, with some gravel and trace amounts of rootlets to a depth of 0.8 mbgs.

Underlying the earth fill, silty sand to sand and silt deposits, with trace amounts of clay and gravel was encountered and extended to depths ranging from 0.8 mbgs to the full depth of the borehole. In BH1, a clayey silt deposit with trace amounts of sand was encountered beneath the silty sand to sand and silt layer between 6.1 and 6.6 mbgs. Refer to the Geotechnical Investigation (Terraprobe Inc., October 3, 2023) for the borehole logs and locations.

Referring to Supplementary Standard SB-6 of the 2012 Ontario Building Code (OBC) and the results of the grain size distribution analysis for the soil samples obtained from BH41, BH3, and BH5, the predominant soil is classified as SM-ML soil as described by the Unified Soil Classification System. An SM-ML soil is a silty sand, or sand silt mix with a percolation rate ranging from 8 min/cm to 50 min/cm. Based on the percentage of silt and clay in the soil samples, Crozier assigned a percolation rate of 30 min/cm for this sewage system design.

Monitoring wells were installed in four (4) of the five (5) borehole locations (BH1, BH2, BH3 and BH5) to allow for the measurement of the groundwater levels. Groundwater levels were measured between August 24, 2022 and September 19, 2022. The stabilized groundwater levels ranged from approximately 5.21 m to 6.76 mbgs (311.82 m to 311.42 m above sea level). Refer to the Hydrogeological Assessment (EnGlobe, August 28, 2024) for additional details.

4.0 Water Servicing

4.1 Water Supply

As the property is in a rural area, there is no municipal water infrastructure available to service the proposed development. The water servicing needs for the proposed development will be provided via private drilled drinking water wells. The depth, size, and locations of the wells will be determined during the detailed design of each individual lot. It should be noted that the groundwater in the area is mostly used by privately drilled groundwater wells.

4.2 Fire Flow Calculations

Preliminary calculations were completed to estimate the required fire storage volume for the proposed development, as there is no municipal water supply for firefighting purposes. The fire storage volume was calculated using the Ontario Fire Marshalls Fire Protection Water Supply Guideline (1999), as is required in Part 3 of the Ontario Building Code.

The fire storage volume was calculated assuming a maximum house footprint of 360 m^2, appropriate separation distances, and assuming a Group C (residential) occupancy. The largest calculated fire storage volume will be provided on-site. **Table 1** below summarizes the preliminary fire storage volumes calculated for the proposed development.

Table 1: Fire Storage Volume Requirements

Lot	Total Area[1] (m^2)	Height (m)	Volume (m^3)	K[1]	S_{side}[2]	Required Fire Storage Volume, Q (L)
Lot 19	360	6.0	5,400	23	1.8	89,400

1. K values for the proposed residential dwellings are assumed based on past similar residential projects.
2. S_{side} values determined from distance to other structures using Figure 1 in Section 6.3 of the Ontario Fire Marshalls Guidelines.

As can be seen from **Table 1**, a storage volume of 89,400 L is the required minimum fire storage volume, and it must be supplied at a rate of 45 L/s for a duration of 0.5 hours. Refer to **Appendix A** for preliminary fire storage volume calculations.

A fire cistern has been provided at this preliminary stage to meet the required fire storage volumes for the proposed development. The location and size of the fire cisterns can be refined throughout the design process through consultation with the Fire Chief and the Township. Refer to **Figure 1** for the location of the fire cistern.

5.0 Sanitary Servicing

The site located in a rural area that does not currently have municipal sanitary services available and the Township of Puslinch does not anticipate municipal sanitary servicing for this area in the near future. Therefore, the proposed development will be serviced by individual onsite sewage systems.

5.1 Sanitary Design Calculations

Referring to the Concept Plan prepared by Weston Consulting (October 3, 2023), it is understood the proposed development will consist of twenty-one (21) residential lots with private servicing. It is Crozier's understanding that the proposed residential dwellings will be three (3) to four (4) bedrooms. For the purpose of this assessment, preliminary sewage system design flows were calculated for a typical four (4) bedroom dwelling with 360 m^2 of finished floor area, three (3) bathroom groups and additional fixtures for a total of 45 fixture units.

The preliminary sewage system design flows were calculated in accordance with the Ontario Building Code, Part 8 and are presented below in **Table 2**. Detailed sanitary servicing calculations are found in **Appendix B**.

Table 2: Preliminary Sewage System Design Flows

Unit Type	**Number of Bedrooms**	**Floor Area** (m^2)	**Number of Fixture Units**	**Base Flow** (L/day)	**Additional Flow – Floor Area** (L/day)	**Additional Flow – Fixture Units** (L/day)	**Total Flow Per Unit** (L/day)
360 m^2 Residential Dwelling	4	360	45	2,000	1,600	1,250	3,600

As shown, the preliminary sewage system design flow for a typical unit will be approximately 3,600 L/day. These flows were calculated based on the information available at the time of this report. If details of the proposed dwellings change (e.g., number of bedrooms, fixtures, and floor area) during detailed design, the sewage system design flows might change, which may affect the size of the onsite sewage systems.

The detailed design of the onsite sewage systems will be confirmed during the building permit stage and building permits will be required for each sewage system prior to construction. Properties with a total daily design sanitary sewage flow exceeding 10,000 L/day are subject to Section 53 of the Ontario Water Resources Act and require an Environmental Compliance Approval (ECA) issued by the Ministry of Environment, Conservation and Parks. Given the preliminary sewage system design flow is less than 10,000 L/day per individual lot, an ECA is not required.

5.2 Proposed Individual Sanitary Servicing Strategy

Sanitary servicing for the proposed development will be provided through individual Class 4 onsite sewage systems. The onsite sewage system will consist of an advanced treatment unit discharging to a leaching bed constructed as a Type A dispersal bed.

5.3 Proposed Sewage System

Nitrate loading calculations were prepared by Terraprobe to determine the effluent concentration of nitrate-nitrogen each sewage system must achieve for the proposed development to meet MECP Guideline D-5-4. Terraprobe has indicated that at least a 62.5% reduction of nitrate-nitrogen (effluent concentration of 15 mg/L) is required. A typical conventional onsite sewage system produces an effluent concentration of nitrate-nitrogen of approximately 40 mg/L. This is insufficient to meet D-5-4 requirements, therefore, advanced treatment with denitrification will be required.

The proposed sewage system will consist of a Level IV treatment unit meeting the CAN/BNQ 3680-600 standard with 62.5% nitrate-nitrogen reduction, discharging treated effluent to a Type A dispersal bed. A Waterloo Biofilter system (or equivalent) with recirculation is proposed. Sewage will flow from the dwelling to a Waterloo Biofilter anaerobic digester tank. Effluent from the digester tank is pumped to the Waterloo Biofilter basket tank, which is equipped with a patented foam media that effectively treats wastewater prior to discharge to the leaching bed. A portion of the treated effluent is recirculated to the anaerobic digester, providing a 62.5% nitrate-nitrogen reduction. Refer to **Appendix C** for additional information and testing results for this technology.

Treated effluent from the Waterloo Biofilter will be discharged to a Type A dispersal bed sized in accordance with Section 8.7.7. of the OBC. The Type A dispersal bed consists of a stone layer equipped with perforated distribution pipe, underlain by a sand layer. **Table 3** summarizes the preliminary sizing of the Type A Dispersal Bed.

Table 3: Preliminary Type A Dispersal Bed Sizing

Unit Type	Total Flow Per Unit (L/day)	Minimum Stone Area (m^2)	Provided Stone Area (m^2)	Minimum Sand Area (m^2)	Provided Sand Area (m^2)
360 m^2 Residential Dwelling	3,600	72	72	180	368

The Preliminary Site Servicing Plans (**Figure 1** and **Figure 2**) illustrate the proposed onsite sewage servicing for the proposed development. The conceptual figure illustrates a Waterloo Biofilter configuration; however, it is noted that any treatment unit meeting CAN/BNQ certification requirements with 62.5% nitrate-nitrogen removal may be considered. The details, size, and location of the onsite sewage systems will be determined once individual home designs and building permit applications are prepared.

6.0 Drainage Conditions

The drainage conditions for the site in both pre-development and post-development conditions are outlined in the following sections.

6.1 Existing Drainage Conditions

According to the topographic survey (J.D. Barnes Limited, September 16, 2022) and site reconnaissance, the site currently consists of vacant agricultural fields and forested areas. The site has a drainage split which divides the site into an eastern and western catchment based on this topographic survey.

The western catchment (Catchment 101A) consists primarily of vacant agricultural lands and generally slopes northeast to southwest. Runoff from Catchment 101A is directed via sheet flow to a tributary of Bronte Creek located along the western development limits of the site.

The central catchment (Catchment 101B) consists primarily of vacant agricultural lands and generally slopes northwest to southeast. Runoff from Catchment 101B is directed via sheet flow to a tributary of Bronte Creek located along the western development limits of the site.

The eastern catchment (Catchment 102) consists primarily of vacant agricultural lands and generally slopes northwest to southeast. Runoff from Catchment 101A and 101B is directed via sheet flow to the eastern drainage feature. Correspondence with Geo Morphix (November 23, 2022) indicated the eastern drainage feature does not exhibit a defined channel and outlets to the Bronte Creek tributary located along the southern portion of the site.

There are two (2) external catchments that drain towards the site via overland flow from the north (Catchment EX1 and EX2). Catchment EX1 and EX2 consist of existing residential properties, roadways, landscaped areas, and Old Morriston Baseball Diamond (Catchment EX1 exclusively). Based on existing LiDAR contour mapping and a site visit complete on January 11, 2023, runoff from Catchment EX1 flows from north to south and is directed to a low-lying depression area located in the eastern corner of the Old Morriston Baseball Diamond. An earth berm along the south and east property limits of the baseball diamond allows stormwater to pond within the park limits. If the storage limits are reached, stormwater will drain southwest towards the Bronte Creek tributary via sheet flow. Runoff from Catchment EX2 runs from north to south and are directed to the eastern drainage feature via sheet flow through Catchment 102, ultimately outletting to the Bronte Creek tributary.

Table 4 summarizes the pre-development catchment areas and **Figure 6** illustrates the Pre-Development Drainage Plan.

Table 4: Pre-Development Catchment Areas and Percent Impervious

Catchment ID	Land-Use Description	Impervious Area[1] (ha)	Pervious Area (ha)	Total Area (ha)	Percent Impervious (%)	Outlet
101A	Vacant agricultural land and forested area	-	1.26	1.26	0	Bronte Creek Tributary
101B		-	0.76	0.76	0	
102		-	3.96	3.96	0	
Site Total		**-**	**5.98**	**5.98**	**0**	
EX1	Residential properties, roadways, landscaped areas, and a baseball diamond	1.55	3.62	5.17	30.0	Bronte Creek Tributary
EX2	Residential properties, roadways, and landscaped areas	0.52	0.89	1.41	37.2	
External Total		**2.07**	**4.51**	**6.58**	**31.5**	

Note: 1. Impervious area measurements based on Google Earth aerial imaging and is approximate only.

6.2 Proposed Drainage Conditions

Based on the Development Concept prepared by Weston Consulting (October 3, 2023), the proposed development will consist of twenty-one (21) estate residential lots, associated paved internal roadway, and landscaped areas. Access to the proposed development will be provided from the proposed entrance on Ochs Street.

The proposed site grading divides the site into two (2) internal and four (4) external post-development drainage catchment areas as shown on the Post-Development Drainage Plan (**Figure 7**). Details of each drainage catchment are provided in the following section.

- Catchment 201 (A = 3.50 ha) consists of drainage from the proposed building footprints, front yards fronting Street B, landscaped areas and the internal roadways (Street A and Street B). Storm events up to and including the 5-year event (minor storm events) will be collected and conveyed by the internal storm sewer system to the proposed stormwater management facility. Storm events greater than the 5-year event (major storm events) will be conveyed overland within the internal roadways (Street A and Street B) to the proposed stormwater management facility. The proposed stormwater management facility will provide quantity, quality, and erosion controls for the stormwater runoff from Catchment 201 prior to outletting to the Bronte Creek Tributary, consistent with existing conditions.

- Catchment 202 (A = 2.48 ha) consists of uncontrolled drainage from the proposed building footprints and rear yards along Street B. All storm events from this catchment are proposed to be conveyed uncontrolled via overland flow towards the Bronte Creek tributary south of the site, consistent with existing conditions.

- Catchment EX1 (A = 5.22 ha) consists of uncontrolled external drainage from the existing residential properties, roadways, landscaped areas, and a baseball diamond north of the site. All storm events from this catchment are directed to a low-lying depression area located in the eastern corner of the Old Morriston Baseball Diamond. An earth berm along the south and east property limits of the baseball diamond allows stormwater to pond within the park limits. If the storage limits are reached, stormwater will drain southwest between Lot 1 and Lot 2 towards the Bronte Creek tributary via sheet flow, consistent with existing conditions.

- Catchment EX2 and EX3 (A = 0.26 ha) consists of uncontrolled external drainage from the existing residential properties, roadways, and landscaped areas north of the site. All storm events from these catchments are conveyed by the proposed storm sewer infrastructure and internal roadway within the development towards the proposed stormwater management facility, ultimately outletting to the Bronte Creek tributary.

- Catchment EX4 (A = 0.46 ha) consists of uncontrolled external drainage from the existing residential properties, Ochs Street expansion, and landscaped areas north of the site. All storm events from this catchment are conveyed by the proposed storm sewer infrastructure and internal roadway within the Ochs Street expansion towards the existing stormwater sewer on Badenoch Street.

Under the proposed drainage conditions, all storm events up to the 100-year storm from Catchment 201 will be conveyed to the proposed stormwater management facility. Following quantity and quality control, stormwater is to be conveyed to the Bronte Creek Tributary.

Table 5 provides details of the catchment areas and percent imperviousness for the post-development conditions.

Table 5: Post-Development Catchment Areas and Percent Impervious

Catchment ID	Catchment Area (ha)	Land Use(s)	Percent Impervious	Outlet
201	3.50	Building footprints, front yards, and internal roadway	58.0	Bronte Creek Tributary
202	2.48	Building footprints and rear yards	36.7	
EXT1	5.22	Residential properties, roadways, landscaped areas, and a baseball diamond	30.0	
EXT2	0.26	Residential properties, roadways, and landscaped areas	42.0	
EXT3	0.26		30.8	
EXT4	0.46		30.4	

Refer to the Post-Development Drainage Plan (**Figure 7**) for proposed drainage conditions and the Preliminary Site Servicing and Preliminary Site Grading Plans (**Figures 1-4**) that illustrate the proposed preliminary site servicing and drainage designs.

7.0 Stormwater Management

Stormwater management and site drainage for the proposed development must adhere to the policies and standards of the Township of Puslinch, Conservation Halton, and Ministry of Environment, Conservation, and Parks (MECP).

The stormwater management criteria for the development have been summarized below:

Water Quantity Control

According to the Township of Puslinch Municipal Development Standards (September 2019), water quantity controls are required for the site. The water quantity requirements include controlling the post-development peak runoff rates to the pre-development peak runoff rates for storms up to and including the 100-year event (i.e., 2, 5, 10, 50, 100-year return periods).

Water Quality Control

At least 80% removal of Total Suspended Solids will be provided with "Enhanced Protection" as outlined in the Stormwater Management Planning and Design Manual (MOE, 2003).

Water Balance

Infiltration facilities shall be designed to ensure that, under post-development conditions, infiltration volumes match the pre-development condition.

Erosion Control

According to Conservation Halton Guidelines for Stormwater Management Engineering Submissions (November 2021), erosion control is recommended such that the 25 mm design storm is retained over at least a 24-hour period.

7.1 Stormwater Modelling Parameters

The Township of Puslinch stormwater management guidelines were referenced to determine the hydrologic parameters for the various catchment areas within the site. The topographic survey prepared by J.D. Barnes Limited (September 16, 2022) and the Hydrogeological Assessment prepared by EnGlobe (August 28, 2024) were referenced to confirm the land cover, drainage pattern, and on-site soil conditions.

Based on these sources, the hydrologic parameters for pre-development and post-development conditions were determined and are summarized in **Table 6** and **Table 7** below. The detailed hydrologic parameter sheets for each catchment area are included in **Appendix D**.

Table 6: Pre-Development Hydrologic Parameters

Catchment Description	101A[N]	101B[N]	102[N]	EX1[S]	EX2[S]	EX3[S]	EX4[S]
Drainage Area (ha)	1.26	0.76	3.96	5.22	0.26	0.26	0.46
Total Imperviousness (%)	-	-	-	30.0	42.0	30.8	30.4
Directly Connected Imperviousness (%)	-	-	-	20.7	31.0	15.4	21.7
Curve Number (CN)[1]	67.6	66.9	67.9	80.0	80.0	80.0	80.0
Time to Peak (hours)	0.14	0.05	0.08	-	-	-	-

1. Curve number presented as utilized in VO modeling. CN reflects composite curve number for rural catchments modeled using NASHYD routine and curve number for pervious areas only for urban catchments using STANDHYD routine.
2. Superscript N represents the catchment was modelled using a NASHYD and a superscript S, represents the catchment was modelled using a STANHYD.

Table 7: Post-Development Hydrologic Parameters

Catchment Description	201[S]	202[S]	EX1[S]	EX2[S]	EX3[S]	EX4[S]
Drainage Area (ha)	3.50	2.48	5.22	0.26	0.26	0.46
Total Imperviousness (%)	58.0	36.7	30.0	42.0	30.8	30.4
Directly Connected Imperviousness (%)	19.9	5.0	20.7	30.5	15.4	21.7
Curve Number (CN)[1]	80.0	80.0	80.0	80.0	80.0	80.0
Time to Peak (hours)	-	-	-	-	-	-

1. Curve number presented as utilized in VO modeling. CN reflects composite curve number for rural catchments modeled using NASHYD routine and curve number for pervious areas only for urban catchments using STANDHYD routine.
2. Superscript N represents the catchment was modelled using a NASHYD and a superscript S, represents the catchment was modelled using a STANDHYD.

7.2 Stormwater Quantity Control

As discussed in Section 7.0, stormwater quantity control requirements for the site include controlling the post-development peak runoff to the pre-development peak runoff for storm events up to and including the 100-year event. According to the Township of Puslinch Municipal Development Standards, the City of Guelph's intensity-duration-frequency data for a 2-year to 100-year Chicago Storm event must be used as the hydraulic parameters for stormwater management modelling with a duration of 3 hours.

Visual OTTHYMO (VO) was used to create pre-development, post-development, and post-development with mitigation scenarios to quantify the site's peak stormwater flows. The associated hydrologic parameters are outlined in **Table 6** and **Table 7**. The pre-development and post-development stormwater flows directed to the Bronte Creek Tributary and the storage requirements are summarized below in **Table 8**. The VO model schematics, modelling results, and output files are included in **Appendix E**.

Table 8: Peak Flows and Target Flows Summary (Discharge towards Bronte Creek Tributary)

Storm (Year)	**Pre-Dev. Peak Flow Rate[1]** (m^3/s)	**Post-Dev. Uncontrolled Peak Flow Rate[2]** (m^3/s)	**Post-Dev. Controlled Peak Flow Rate[2]** (m^3/s)	**Storage Volume Required** (m^3)	**Storage Volume Provided[3]** (m^3)
2	0.174	0.478	0.139	571	1,143
5	0.332	0.754	0.243	654	
10	0.456	0.967	0.322	735	
25	0.653	1.283	0.485	830	
50	0.797	1.511	0.633	903	
100	0.946	1.740	0.834	980	
Regional	0.688	0.922	0.921	1,127	

Notes: 1. Includes runoff from Catchment 101A, 101B, 102, and EX2.
2. Includes runoff from Catchment 201, 202, and EX2.
3. 1,143 m^3 of storage is available in the SWM facility.

A *RouteResevoir* component was used in Visual OTTHYMO to model the proposed stormwater management facility and determine the active storage volumes required to control the peak flows for the 2-year to 100-year storm events. The 3-hour Chicago design storm was modelled using the City of Guelph's IDF parameters. To meet quantity control criteria, 980 m^3 of active storage volume is required to control the 100-year 3-hour Chicago design storm. Required active storage volumes for each storm event are summarized above in **Table 8**. The total active storage provided in the stormwater management pond is 1,143 m^3, providing an additional 0.3 m of freeboard to the top of berm (not included in active storage). The Visual OTTHYMO input and output files and model schematics have been provided in **Appendix E**.

The proposed stormwater management facility will be a stormwater management dry pond located near the southeast corner of the proposed development and will control post-development peak flows to their pre-development levels or lower ('Post-to-Pre control'). The ultimate receiver of the stormwater from the proposed development is the Bronte Creek Tributary which is located east of the proposed development.

Catchment 202 will consist of rooftop and rear-yard drainage from the lots located along the southern and eastern property limits. Drainage from Catchment 201 will be overcontrolled to allow for Catchment 202 to drain uncontrolled to the Bronte Creek Tributary.

7.3 Stormwater Quality Control

Stormwater quality controls for the proposed development must incorporate measures to provide "enhanced protection" as outlined by the Township of Puslinch Municipal Development Standards. Enhanced water quality protection involves the removal of at least 80% of the total suspended solids (TSS) from 90% of the annual runoff volume.

Water quality control for Catchment 201 will be provided using an oil-grit separator (Stormceptor EFO8 or approved equivalent) and dry pond in series. The oil-grit-separator is located upstream of the proposed stormwater management dry pond to provide quality control for runoff before discharging into the pond. The proposed dry pond will provide 60% TSS removal. Together, the oil-grit separator and dry pond in series will provide 80% TSS removal. The water treatment train calculations can be found in **Appendix F**.

Catchment 202 will produce only clean runoff (i.e., landscaped and rooftop runoff). Therefore, quality controls are not proposed.

7.4 Stormwater Management Erosion Control

As outlined above, the proposed development is required to provide erosion control in the form of extended detention. The extended detention includes a minimum of 24-hour detention for the 25 mm storm event, per the Conservation Halton Stormwater Management Guidelines.

Erosion control for the proposed stormwater management facility is proposed to be provided by the active storage component of the proposed dry pond. A 25 mm 3-Hour Chicago storm event was executed in the proposed conditions VO model. The computed runoff depth and required extended detention volume for the SWM dry pond is summarized in **Table 9**.

Table 9: Required Extended Detention Volume

Stormwater Management Facility	**Total Contributing Drainage Area** (ha)	**Criteria**	**Required Volume** (m^3)	**Provided Volume** (m^3)
Dry Pond	3.50	MECP Extended Detention (40m^3/ha)	384	462
		Erosion Control (25mm Runoff Volume)	404	

Note: 1. Required storage volumes from Table 3.2 of MECP SWM Planning and Design Manual (2003) based on 40 m^3/ha for extended detention.
2. 25 mm runoff volume obtained from VO model

As presented in **Table 9**, the erosion control volume requirements exceed the MECP extended detention volume requirements. Therefore, the Conservation Halton Stormwater Management Guidelines standards govern the required volume for extended detention in the proposed stormwater management dry pond. The governing volume of 404 m^3 must be detained over a period of 24-hour to 48-hours. Drawdown calculations have been provided in **Appendix D**.

7.5 Stormwater Management Facility Design Requirements

The proposed stormwater management dry pond will provide stormwater quantity, quality, and erosion controls to meet the relevant stormwater criteria outlined in Section 7.0 for the proposed development. The dry pond will provide an active storage component equipped with an outlet structure sized to meet stormwater quantity control and erosion control criteria.

Preliminary stormwater pond design and grading was complete and can be referenced on. The pond design was prepared to achieve the following Ministry of Environment, Conservation, and Parks design requirements as outline in Table 4.8 of the MECP Stormwater Management Manual:

- The proposed pond will have 4:1 side slopes.
- Mean depth between 1 m – 3 m.
- A sediment drying area was not provided as the proposed oil-grit separator will provide TSS removal prior to stormwater entering the pond.
- The dry pond will be designed with an emergency overflow weir to direct flows towards the Bronte Creek tributary.

7.6 Stormwater Management Facility Operating Characteristics

Considering the presented design criteria, a preliminary stormwater management dry pond design has been completed, demonstrating that the stormwater management block is adequate in size and meets the requirements set by the various regulatory bodies. A summary of the preliminary stormwater management pond's characteristics is shown below in **Table 10**.

Table 10: Stormwater Management Pond Operating Characteristics

Component	Elevation (m)	Storage Required (m^3)	Storage Provided (m^3)
Bottom of Pond	312.35	-	-
Extended Detention	313.35	404	462
Regional High Water Level	314.05	1,127	1,143
Top of Berm	314.35	-	1,536

As shown above in **Table 10**, the stormwater management facility presented within this report is sufficiently sized to meet all design criteria. Refer to **Appendix D** for detailed stormwater management facility calculations.

7.7 Water Balance

The water balance parameters were established based on the climate data from various Kitchener-Waterloo Weather Stations near the Region of Waterloo International between 1990 – 2020, as well as site topography, soil type, and land cover infiltration factors. The results of the water balance indicate that there is an infiltration deficit of approximately 3,148 m^3/year (3.2 mm storm event) due to an increase in impervious surfaces.

Based on communications with the Hydrogeological Consultant (EnGlobe, formerly Terraprobe), when applying a safety factor of 2.5, the existing soils at the location of the end-of-pipe LID can

facilitate a preliminary infiltration rate of 30 mm/hr. The infiltration rate is to be confirmed with site testing (i.e., test pits and Guelph permeameter or double-ring infiltrometer testing) at the detailed design stage.

We are proposing an end-of-pipe LID feature to meet pre-development infiltration levels in the post-development condition. This end-of-pipe LID will be a 367 m^2 underground gravel infiltration trench with a depth of 1 m. This LID is designed to infiltrate 5,292 m^3/year (5 mm storm event), which is designed to infiltrate 34% of the average cumulative precipitation between the months of April and October. It has been assumed that the months of October to March are not conducive for infiltration due to frozen conditions. Refer to **Table 11** which outlines the storage volume requirements for each lot to meet the water balance requirements on the site should LIDs be required.

Table 11: Water Balance Volume Requirements

Storage Requirements	Gravel Diaphragm Area (m^2)	Void Ratio	Required Storage (m^3)	Provided Storage (m^3)
Water Balance	367	0.4	93	147

As outlined above in **Table 11**, if the Conservation Authority would like the water balance objectives to be met under post-development conditions, this will require an infiltration trench to store and infiltrate a volume of at least 93 m^3, whereas we have conservatively proposed a trench to infiltrate 147 m^3. The detailed water balance calculations can be referenced in **Appendix D**.

7.8 Floodplain Assessment

The Conservation Halton HEC-RAS floodplain modelling for the Bronte Creek Tributary (March 14, 2012) was obtained and reviewed by Crozier. Review of the modeling and the staked wetland and woodlot environmental constraints on the property ultimately determined the wetland and woodlot setbacks that govern the overall development limits for the site.

The Regional floodplain from the Conservation Halton HEC-RAS floodplain model has been delineated on the civil engineering drawings and a 15 m floodplain setback was established based on the Conservation Halton Policies and Guidelines for the Administration of Ontario Regulation 162/06 and Land Use Planning Policy Document April 27, 2006 (last amended, November 6, 2020). The wetland and woodlot were determined to be the governing development setbacks for the proposed development and, therefore, a detailed floodplain assessment has not been completed at this time. Furthermore, a meeting was held with Conservation Halton staff on July 4th to discuss if the Conservation Halton HEC-RAS floodplain model delineation was sufficient for the floodplain delineation for the proposed development. Following the meeting, it was noted the Conservation Halton HEC-RAS floodplain model delineation was sufficient for the proposed development. Email excerpts with Conservation Halton staff have been included in **Appendix F**.

8.0 Erosion and Sediment Controls During Construction

The design of the erosion and sediment controls will be completed during the detailed design of the proposed development. The erosion and sediment controls will be required to be installed prior to the beginning of any construction activities. They will be maintained until the site is stabilized or as directed by the Site Engineer and/or Township of Puslinch. Controls will be inspected after each significant rainfall event and maintained in proper working condition.

Further details on the erosion and control measures that may be implemented have been summarized below:

Sediment Control Silt Fence

Sediment Control Silt Fence will be installed on the perimeter of the site to intercept sheet flow. Additional Sediment Control Silt Fence may be added based on field decisions by the Site Engineer and Owner prior to, during, and following construction.

Rock Mud Mat

A rock mud mat will be installed at the entrance to the construction zone to prevent mud tracking from the site onto surrounding lands and the perimeter roadway network. All construction traffic will be restricted to this access only.

Rock Check Dams

Rock check dams installed according to OPSD 219.210 should be installed in the proposed swale to protect from erosion conveyance during construction.

The Removals, Erosion and Sediment Control Plan will be refined throughout the planning application process with consultation with the Township and Conservation Authority to ensure potential environmental hazards during construction are minimized.

9.0 Conclusions & Recommendations

This report was prepared in support of the Zoning By-Law Amendment Application for the property located at 11 Main Street in the Township of Puslinch. The proposed development can be serviced for sanitary, water, and stormwater management in accordance with the Township of Puslinch, County of Wellington, and Conservation Halton requirements and standards. Our conclusions and recommendations include:

Proposed Water and Sanitary Servicing

1. Municipal servicing infrastructure is not available for the Site, therefore, the proposed development will be serviced by individual onsite sewage systems and drilled wells.

2. On-site soils are primarily classified as silty sand to sand and silt deposits. The anticipated T-time for the soils is 30 min/cm. This T-time is an assumed average for the entire site based on the findings outlined in the Hydrogeological Assessment (EnGlobe, August 28, 2024). At detailed design, it is recommended that detailed groundwater studies are conducted to provide location specific T-Time estimates to support the detailed design of the sewage systems throughout the development. Groundwater was observed to be 5.21 mbgs to 6.76 mbgs. Additional groundwater information is provided in the Hydrogeological Assessment (EnGlobe, August 28, 2024).

3. The preliminary sewage system design flows are expected to be approximately 3,600 L/d for each lot. Given the preliminary sewage system design flow is less than 10,000 L/day per individual lot, an ECA issued by the MECP will not be required. Each onsite sewage system will consist of an advanced treatment unit discharging to a leaching bed constructed as a Type A dispersal bed with a footprint of approximately 368 m^2. The advanced treatment system will consist of a Level IV treatment unit meeting the CAN/BNQ 3680-600 standard and

must achieve the denitrification requirement of at least 62.5% nitrate-nitrogen reduction to meet MECP Guideline D-5-4.

4. Individual lots will be serviced with private drilled wells in accordance with O. Reg. 903 for potable water supply.

Stormwater Management

1. The site's stormwater runoff from the developable area (Catchment 201) will be collected and conveyed towards the proposed stormwater management facility by the proposed storm sewer network and internal road network. The proposed dry pond will control the post-development peak flows to the pre-development peak flows prior to outletting towards the Bronte Creek Tributary. Stormwater runoff the Catchment 202 will flow uncontrolled towards to the Bronte Creek Tributary.

2. Stormwater runoff from Catchment EX1 will continue to be directed around the proposed development towards the Bronte Creek Tributary and stormwater runoff from Catchment EX2 will be conveyed through the proposed development by the proposed storm sewer system and internal road network.

3. Stormwater quality controls for Catchment 201 will be provided by an oil-grit separator (Stormceptor EFO8 or approved equivalent) in series with the proposed dry bond to provide 80% TSS removal.

4. The stormwater management facility will be designed to meet the erosion control requirements and provide a minimum of 24-hour detention for the 25 mm storm event.

5. The preliminary infiltration rate for soils onsite is 30 mm/yr. Therefore, an underground gravel infiltration trench has been proposed with a storage of 147 m^3 per storm event, which exceeds the infiltration target of 3,148 m^3/year.

Erosion and Sediment Controls

1. Erosion and sediment controls will be implemented prior to construction and maintained to the satisfaction of the Township and Site Engineer until the site is stabilized.

Based on the above conclusions, we recommend the approval of the Zoning By-Law Amendment Application from the perspective of functional servicing and preliminary stormwater management.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

[redacted]

Trevor Fraser, P.Eng
Project Manager

C.F. CROZIER & ASSOCIATES INC.

[redacted]

Brendan Walton, P.Eng.
Project Manager

TF/tc:rl

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APPENDIX A

Fire Flow Calculations

CROZIER CONSULTING ENGINEERS

Project: 11 Main Street
Project NO.: 2366-6537
Date: 2023-01-09
Designed By: BP
Checked By: BW

Adequate Water Supply Calculations (OFM Version)
Part 3 Fire Protection, Occupant Safety and Accessibility of the Ontario Building Code

Building:	Type C (Residential)	360 m²	6 m

References

1. Part 3 of the Ontario Building Code (2012)
2. Fire Protection Water Supply Guideline For Part 3 Of The Ontario Building Code, TG-03-1999 (October 1999)
3. Draft Plan of Subdivision, Weston Consulting (February 6, 2023)

Equation

$$Q = KVS_{Total}$$

Q	Minimum supply of water in litres.
K	Water supply coefficient based upon building occupancy.
V	Total building volume in cubic metres.
S_{TOT}	Total of spatial coefficient values from property line exposures on all sides

Minimum Supply of Water

K =	23.0	C Classification	(reference 1.)
V =	2160 m³		
S_{TOT} =	1.8		

Exposure	Distance (m)	S_{side}
North	40.0	0.0
East	6.0	0.4
South	6.0	0.4
West	30.0	0.0

Q = 89,424 L

Minimum Water Flow Supply Flow Rate

Required minimum water supply flow rate (L/min) (reference 2.)

Floor area ≤ 600 m²:		Yes	
		2700 L/min	Required flow rate
		0.5 hr	Required duration
Q =	**81,000 L**		

Conclusion

Therefore, the minimum water supply for proposed Building Type C (Residential) is **89,424 L**

CROZIER CONSULTING ENGINEERS

Project: 11 Main Street, Puslinch
Project No.: 2366-6537
Created By: AL
Checked By: BW
Date: 2023.02.07
Updated: 2024-07-31

Domestic Water Demand - Ontario Building Code

Peak Sewage Flow	3,600	L/day	
Avg. Daily Demand =	450	L/day	
	0.31	**L/min**	
Peaking Factors			
Max Day =	8.0		
Peak Hour =	12.1		
Average Day =	**0.31**	L/min	
Max Day =	**2.50**	L/min	
Peak Hour =	**3.77**	L/min	

Notes & References

Ontario Building Code - Table 8.2.1.3.B

24-hr day

Based on MECP suggested factor from Table 3-3 MOE Design Guidelines for Drinking Water Systems fewer than 500 people (2008)

Max Day = (Average Day Demand) * (Max Day Factor)

Peak Hour = (Average Day Demand) * (Peak Hour Factor)

Criteria	Average Daily Water Demand (L/min)	Max Day Demand (L/min)	Peak Hourly Demand (L/min)
OBC and MECP Design Guidelines	0.31	2.50	3.77

CROZIER CONSULTING ENGINEERS

Project: 11 Main Street, Puslinch
Project No.: 2124-6029
Prepared By: BP
Checked By: BW
Date: 2022.05.11
Updated: 2024.07.31

WATER DEMAND CALCULATIONS

11 Main Street, Township of Puslinch

Note: Based on Development Concept prepared by Weston Consulting dated February 6, 2023

			References
Population Density	4	persons/unit	Per jobs of similar scope.
Number of Units	23		
Total Population	92	persons	
Average Daily Demand	450	L/cap/day	MOE Design Guidelines for Drinking Water Systems (2008), Section 3.4.2.
	41,400	L/day	
	0.48	**L/s**	
Maximum Daily Demand Peaking Factor	3.6		MOE Design Guidelines for Drinking Water Systems (2008), Section 3.4.5.1, Table 3-3.
Maximum Hourly Demand Peaking Factor	5.4		
Maximum Daily Flow	149,040	L/day	
	1.73	**L/s**	
Peak Hour Flow	223,560	L/day	
	2.59	**L/s**	
Maximum Daily per Unit	6,480	L/day	
	0.08	**L/s**	
Peak Hour Flow per Unit	9,720	L/day	
	0.11	**L/s**	

APPENDIX B

Sanitary Servicing Calculations

CROZIER CONSULTING ENGINEERS

ONSITE SEWAGE SYSTEM RESIDENTIAL CALCULATION SHEET

Project Name: 11 Main Street
Project Number: 2366-6537

Date: 2022-11-28
Designed By: AL
Checked By: KR

input required

Fixtures	Number of Fixtures	Fixture Units per Fixture	Total Fixture Units
Bathroom Group (flush tank)	3	6	18.0
2 Piece Bathroom	2	5.5	11.0
Basement Rough-in	0	6	0.0
Sinks (Domestic Lavatory w. 1/2" trap, kitchen sink, single compartment laundry tray)	5	1.5	7.5
Clothes Washer	1	1.5	1.5
Dishwasher (if not connected to kitchen sink)	1	1	1.0
Shower (from 1 head)	1	1.5	2
Floor drain	1	3	3
Laundry Tub	1	1.5	2
		Total Fixture Units	**45.0**

Assumed fixture units based on similar house sizes

ONSITE SEWAGE SYSTEM RESIDENTIAL CALCULATION SHEET

CROZIER CONSULTING ENGINEERS

Project Name: 11 Main Street
Project Number: 2366-6537
Date: 2022-11-28
Designed By: AL
Checked By: KR

input required

House Details: 4 bedroom
380.00 m2

References

Description		Number of Units	Additional Flow per Unit (L)	Total Flow (L/day)
Base Flow				2000
Additional Flow				
i) Each bedroom over 5		0	500	0
ii) Area over 200m^2,				
A) Each 10m^2 over 200m^2 to 400m^2		18	100	1800
B) Each 10m^2 over 400m^2 to 600m^2		0	75	0
C) Each 10m^2 over 600m^2		0	50	0
	Total Additional Sewage Flow from Area			1800
iii) Fixture Units over 20		25	50	1250
			Addition flow (greatest of i,ii,iii)	**1800**
			Total Daily Design Sanitary Sewage Flow (L/day):	**3800**

Pre-Treatment Options

Treatment: **WBP Model AD40**, 4000 L/d
Treatment: **ADIPC-11250**
Basket Biofilter Tank: **BT-11250**
Orangeville Precast Concrete Ltd.

Required septic tank size = 7600 L minimum

Propose Level IV Treatment (Y/N): Y

Native Percolation time, T = 20 min/cm

T-time estimated by Crozier

Imported Sand Percolation time = 20 min/cm

Option #1 - Type A Dispersal Bed

	Required		Provided	
Stone area =	76 m^2	(Q/50)	72 m^2	12m x 6m
Sand area =	190 m^2	(QT/400)	352 m^2	16m x 22m

APPENDIX C

Waterloo Biofilter Third-party Verification Studies

WaterNOx-LS Third Party Testing Summary

In the fall of 2016, Waterloo Biofilter Systems Inc. installed their WaterNOx-LS™ denitrification unit at the Bureau de Normalisation du Quebec (BNQ) test site located in Quebec City. The system underwent BNQ 3680-600 test protocol which includes two parts - Period A and Period B. Period A is based on the methodology of NSF/ANSI Standards 40 and 245, containing the same flow patterns and stress tests. Period B provides for a further 6 months of seasonal reliability testing to ensure that the test includes cold weather results.

The WaterNOx-LS is a passive autotrophic denitrification process using sulphur-limestone minerals in a submerged, up-flow configuration. The WaterNOx-LS, which was sized for 1,600 L/day (350 gpd) followed a Waterloo Biofilter nitrifying treatment unit.

Period A Test Results

During Period A wastewater is dosed according to the hydraulic loading specified in NSF-40. Period A includes the wash-day, working-parent, power failure, and vacation period stress tests. All sample results taken during stress tests are included in the analysis. Influent wastewater temperature values ranged from 10.0 °C (50 °F) to 16.5 °C (62 °F) with an average value of 13.3 °C (56 °F). Influent pH averaged 7.9 and effluent pH averaged 7.2.

Table 1 – Period A Results for the WaterNOx-LS

Parameters	Influent	Effluent	Removal
(c)BOD_5	260	6	97.6%
TSS	312	3	99.2%
Fecal Coliforms	2,403,000	4,900	99.8%
$NO_{2,3}$	-	0.20	-
TKN	57.1	4.6	92.0%
TN ($NO_{2,3}$ + TKN)	57.1	4.8	91.6%

n = 123; n = 357 for fecals
All parameters in mg/L except Fecal Coliforms in cfu/100mL
All values arithmetic averages except Fecal Coliforms in geometric average

Weekly influent total nitrogen concentrations ranged from 43.0 mg/L to 68.8 mg/L with a six-month average concentration of 57.1 mg/L.

Weekly effluent $NO_{2,3}$ concentrations ranged from < 0.02 mg/L to 3.33 mg/L with a six-month average of 0.20 mg/L. Weekly effluent TKN concentrations ranged from 1.5 mg/L to 16.9 mg/L with a six-month average of 4.6 mg/L. Weekly effluent total nitrogen concentrations ranged from 1.7 mg/L to 17.1 mg/L with a six-month average of 4.8 mg/L. The total nitrogen reduction over the six-month period was 91.6%.

65 Massey Road, Suite C, Guelph ON N1H 7M6 T: 519 856-0757 1-866-366-4329 F: 519 856-0759 www.waterloo-biofilter.com

Period B Test Results

Weekday hydraulic loading is modified during Period B to a strenuous 'working parent' schedule where 40% of the flow is delivered over three hours in the morning, and 60% is delivered over three hours in the evening. All samples taken during Period B are included in the analysis. Influent wastewater temperature values ranged from 10.1 °C (50 °F) to 15.8 °C (60 °F) with an average value of 12.3 °C (54 °F). Influent pH averaged 8.0 and effluent pH averaged 7.1.

Table 2 – Period B Results for the WaterNOx-LS

Parameters	Influent	Effluent	Removal
(c)BOD_5	248	4	98.2%
TSS	304	3	99.1%
Fecal Coliforms	2,142,000	2,800	99.9%
$NO_{2,3}$	-	3.38	-
TKN	60.3	8.5	85.9%
TN ($NO_{2,3}$ + TKN)	60.4	11.9	80.3%

n = 59; n = 118 for fecals
All parameters in mg/L except Fecal Coliforms in cfu/100mL
All values arithmetic averages except Fecal Coliforms in geometric average

Weekly influent total nitrogen concentrations ranged from 21.2 mg/L to 85.6 mg/L with a six-month average concentration of 60.4 mg/L.

Weekly effluent $NO_{2,3}$ concentrations ranged from < 0.04 mg/L to 15.2 mg/L with a six-month average of 3.38 mg/L. Weekly effluent TKN concentrations ranged from 1.2 mg/L to 21.2 mg/L with a weekly average of 8.5 mg/L. Weekly effluent total nitrogen concentrations ranged from 3.7 mg/L to 22.2 mg/L with a six-month average of 11.9 mg/L. The total nitrogen reduction over the six-month period was 80.3%.

Conclusion

In summary, the WaterNOx-LS system can successfully remove very high levels of total nitrogen passively, while buffering pH to neutral and keeping cBOD_5 and TSS levels below 10 mg/L.

APPENDIX D

Hydrologic Parameter Sheets & SWM Design

Project: 11 Main Street
Project No: 2366-6357
Modelled By: DK
Checked By:
Date: 2024.06.19

Water Budget Summary
Project Name: 11 Main Street
Water Balance/Water Budget Assessment

Characteristic	Site				
	Pre-Development	Post-Development	Post-Development *with Mitigation*	Change (Pre to Post)	Change (Pre to Post) *with Mitigation*
Inputs (Volumes)					
Precipitation (m^3/yr)	50872	50872	50872	0%	0%
Run-On (m^3/yr)	0	0	0	0%	0%
Other inputs (m^3/yr)	0	0	0	0%	0%
Total Inputs (m^3/yr)	**50872**	**50872**	**50872**	**0**	**0**
Outputs (Volumes)					
Runoff (m^3/yr)*	9603	24891	19599	15288	9996
Evapotranspiration (m^3/yr)	34867	22726	22726	-12140	-12140
Infiltration (m^3/yr)	6402	3254	3254	-3148	-3148
Soakaway Infiltration (m^3/yr)	0	0	**5292**	**0**	**5292**
Total Infiltration (m^3/yr)	**6402**	**3254**	**8547**	-3148	2145
Runoff Pervious Areas (m^3/yr)	9603	4882	4882	-4722	-4722
Runoff Impervious Areas (m^3/yr)	0	20010	14717	20010	14717
Total Runoff (m^3/yr)	9603	24891	19599	15288	9996
Total Outputs (m^3/yr)	**50872**	**50872**	**50872**	0%	0%

Project Name: 11 Main Street
Project No: 2366-6357
Modelled By: DK
Checked By:
Date: 2024.06.19

Climatic Water Budget - Thornthwaite Method
Project Name: 11 Main Street
*WATERLOO WELLINGTON A - Climate Normals 1971-2000 Station Data

	Degrees	Minutes	Seconds	
Insert Latitude:	43	27	0	*Only Applicable Between Latitudes 40° - 50°

Month	Mean Temperature (◦C)	Heat index	" a "	PET - Potential Evapotranspiration (mm)	Daily Correction Value	Adjusted PET - Potential Evapotranspiration (mm)	Total Precipitation (mm)	Surplus (mm)	Deficit (mm)
January	-6.3	0.0	0.49	0.0	0.77	0.0	66.3	66.3	0.0
February	-5.9	0.0	0.49	0.0	0.87	0.0	46.1	46.1	0.0
March	-0.8	0.0	0.49	0.0	0.99	0.0	57.0	57.0	0.0
April	5.9	1.3	0.52	27.0	1.11	30.1	81.2	51.1	0.0
May	12.6	4.1	0.56	60.9	1.23	74.8	80.2	5.4	0.0
June	17.8	6.8	0.61	88.3	1.29	113.7	80.5	0.0	33.2
July	20.2	8.3	0.64	101.1	1.26	127.8	96.2	0.0	31.6
August	19.1	7.6	0.62	95.2	1.17	111.4	67.2	0.0	44.2
September	15.2	5.4	0.59	74.5	1.05	78.0	75.2	0.0	2.8
October	8.8	2.4	0.53	41.5	0.92	38.2	71.0	32.8	0.0
November	2.6	0.4	0.50	11.2	0.81	9.1	74.9	65.8	0.0
December	-2.8	0.0	0.49	0.0	0.75	0.0	54.9	54.9	0.0
Totals		**36.2**	**1.07**			**583.1**	**850.7**	**379.5**	**111.8**

TOTAL WATER DEFICIT = **111.8 mm**
TOTAL WATER SURPLUS (SURPLUS - DEFICIT) = **267.6 mm**
Precipitation Adjustment Factor : **none**

NOTES:
1. Water budget adjusted for latitude and daylight.
2. (◦C) - Represents calculated mean of daily temperatures for the month.
3. Precipitation and Temperature data from the *WATERLOO WELLINGTON A (Station No.6149387) Environment Canada Station Data
4. Total Water Surplus (Thornthwaite, 1948) is calculated as total precipitation minus adjusted potential evapostranspiration.

Project: 11 Main Street
Project No: 2366-6357
Modelled By: DK
Date: 2024.06.19

Design Storm Determination
Project Name: 11 Main Street
Water Balance/Water Budget Assessment

Days with Precipitation (From Climate Data)

	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
>= 0.2 mm	13.0	12.3	12.0	11.8	11.0	11.5	14.1	86
>= 5 mm	5.0	4.8	5.1	4.5	4.0	4.8	4.5	33
>= 10 mm	2.4	2.8	2.6	3.0	2.4	2.7	2.6	19
>= 25 mm	0.3	0.4	0.3	1.0	0.5	0.6	0.3	3.45

Available Precipitation

Storm Event (mm)	Total Days Per Year	Incremental Precipitation (mm/yr)	Cumulative Precipitation (mm/yr)
0.2	86	17.1	17.1
5	33	163.2	180.4
10	19	186.1	366.5
25	3.45	86.3	452.8
Total	**140**	**452.8**	

Infiltration Target:	5292	m^3/year	
Contributing Area:	29402	m^2	Impervious Area
Infiltration Target:	107	mm/year	
Runoff Coefficient:	0.90		Impervious runoff coefficient
Design Precipitation:	119	mm/year	(Design Infiltration / Contributing RC)
Therefore Min. Design Storm:	3.2	mm	
Chosen Design Storm:	5	mm	
Required Storage:	147	m^3	Volume per Storm Event

CROZIER CONSULTING ENGINEERS

Project Name: 11 Main Street
Project No: 2366-6357
Modelled By: DK
Checked By:
Date: 2024.06.19

Water Budget - Post-Development *with Mitigation*
Project Name: 11 Main Street
Water Balance/Water Budget Assessment

Post-development pervious area.
Post-development impervious area.

Catchment Designation	Site - Post-Development		
	Pervious Area	Impervious Area	Totals
Area (m^2)	30398	29402	59800
Pervious Area (m^2)	30398	0	30398
Impervious Area (m^2)	0	29402	29402
Infiltration Factors			
Topography Infiltration Factor	0.10	0	
Soil Infiltration Factor	0.20	0	
Land Cover Infiltration Factor	0.10	0	
MOE Infiltration Factor	0.40	0.00	
Actual Infiltration Factor	0.40	0.00	
Run-off Coefficient	0.25	0.90	
Runoff from Impervious Surfaces *	0.00	1.00	
Inputs (per Unit Area)			
Precipitation (mm/yr)	851	851	851
Run-On (mm/yr)	0	0	0
Other Inputs (mm/yr)	0	0	0
Total Inputs (mm/yr)	**851**	**851**	**851**
Outputs (per Unit Area)			
Precipitation Surplus (mm/yr)	268	851	554
Net Surplus (mm/yr)	268	851	554
Evapotranspiration (mm/yr) *	583	170	380
Infiltration (mm/yr)	107	0	54
Soakaway Infiltration (mm/yr)	0	180	88
Total Infiltration (mm/yr)	107	180	143
Runoff Pervious Areas (mm/yr)	161	0	82
Runoff Impervious Areas (mm/yr)	0	501	246
Total Runoff (mm/yr)	161	501	328
Total Outputs (mm/yr)	**851**	**851**	**851**
Difference (Inputs- Outputs)	**0**	**0**	**0**
Inputs (Volumes)			
Precipitation (m^3/yr)	25860	25012	50872
Run-On (m^3/yr)	0	0	0
Other Inputs (m^3/yr)	0	0	0
Total Inputs (m^3/yr)	**25860**	**25012**	**50872**
Outputs (Volumes)			
Precipitation Surplus (m^3/yr)	8136	25012	33148
Net Surplus (m^3/yr)	8136	25012	33148
Evapotranspiration (m^3/yr) *	17724	5002	22726
Infiltration (m^3/yr)	3254	0	3254
Underground Storage Infiltration (m^3/yr)	0	5292	5292
Total Infiltration (m^3/yr)	3254	5292	8547
Runoff Pervious Areas (m^3/yr)	4882	0	4882
Runoff Impervious Areas (m^3/yr)	0	14717	14717
Total Runoff (m^3/yr)	4882	14717	19599
Total Outputs (m^3/yr)	**25860**	**25012**	**50872**
Difference (Inputs- Outputs)	**0**	**0**	**0**

5292 Proposed Infiltration via Mitigation

Pre-Development Total Infiltration:
107 mm/yr

Note:
0 mm
Precipitation available between Apr-Oct (non-winter months). Therefore available for infiltration into non-frozen soil

Pre-Development Total Infiltration:
6402 m3/yr

NOTES:
* Evaporation from impervious areas was assumed to be 20% of precipitation.

Project Name: 11 Main Street
Project No: 2366-6357
Modelled By: DK
Checked By:
Date: 2024.07.02

Water Budget - Post-Development *without Mitigation*
Project Name: 11 Main Street
Water Balance/Water Budget Assessment

Post-development pervious area.
Post-development impervious area.

Note: Site land use areas consistent with Post-Development SWM hydrologic modeling & calculations

Catchment Designation	Site - Post-Development		
	Pervious Area	Impervious Area	Totals
Area (m^2)	30398	29402	59800
Pervious Area (m^2)	30398	0	30398
Impervious Area (m^2)	0	29402	29402
Infiltration Factors			
Topography Infiltration Factor	0.10	0	
Soil Infiltration Factor	0.20	0	
Land Cover Infiltration Factor	0.10	0	
MOE Infiltration Factor	0.40	0.00	
Actual Infiltration Factor	0.40	0.00	
Run-off Coefficient	0.25	0.90	
Runoff from Impervious Surfaces *	0.00	1.00	
Inputs (per Unit Area)			
Precipitation (mm/yr)	851	851	851
Run-On (mm/yr)	0	0	0
Other Inputs (mm/yr)	0	0	0
Total Inputs (mm/yr)	**851**	**851**	**851**
Outputs (per Unit Area)			
Precipitation Surplus (mm/yr)	268	851	554
Net Surplus (mm/yr)	268	851	554
Evapotranspiration (mm/yr) *	583	170	380
Infiltration (mm/yr)	107	0	54
Soakaway Infiltration (mm/yr)	0	0	0
Total Infiltration (mm/yr)	107	0	54
Runoff Pervious Areas (mm/yr)	161	0	82
Runoff Impervious Areas (mm/yr)	0	681	335
Total Runoff (mm/yr)	161	681	416
Total Outputs (mm/yr)	**851**	**851**	**851**
Difference (Inputs- Outputs)	**0**	**0**	**0**
Inputs (Volumes)			
Precipitation (m^3/yr)	25860	25012	50872
Run-On (m^3/yr)	0	0	0
Other Inputs (m^3/yr)	0	0	0
Total Inputs (m^3/yr)	**25860**	**25012**	**50872**
Outputs (Volumes)			
Precipitation Surplus (m^3/yr)	8136	25012	33148
Net Surplus (m^3/yr)	8136	25012	33148
Evapotranspiration (m^3/yr) *	17724	5002	22726
Infiltration (m^3/yr)	3254	0	3254
Soakaway Infiltration (m^3/yr)	0	0	0
Total Infiltration (m^3/yr)	3254	0	3254
Runoff Pervious Areas (m^3/yr)	4882	0	4882
Runoff Impervious Areas (m^3/yr)	0	20010	20010
Total Runoff (m^3/yr)	4882	20010	24891
Total Outputs (m^3/yr)	**25860**	**25012**	**50872**
Difference (Inputs- Outputs)	**0**	**0**	**0**

Pre-Development Total Infiltration:
6402 m3/yr

NOTES:
* Evaporation from impervious areas was assumed to be 0% to be conservative, as there will be some evaporation.

Project Name: 11 Main Street
Project No: 2366-6357
Modelled By: DK
Checked By:
Date: 2024.07.02

Water Budget - Pre-Development
Project Name: 11 Main Street
Water Balance/Water Budget Assessment

Pre-development pervious area.
Pre-development impervious area.

Note: Site land use areas consistent with Pre-Development SWM hydrologic modeling & calculations

Catchment Designation	Site - Pre-Development		
	Pervious Area	Impervious	Totals
Area (m^2)	59800	0	59800
Pervious Area (m^2)	59800	0	59800
Impervious Area (m^2)	0	0	0
Infiltration Factors			
Topography Infiltration Factor	0.10	0	
Soil Infiltration Factor	0.20	0	
Land Cover Infiltration Factor	0.10	0	
MOE Infiltration Factor	0.40		
Actual Infiltration Factor	0.40	0	
Run-off Coefficient	0.25	0.90	
Runoff from Impervious Surfaces *	0	0.90	
Inputs (per Unit Area)			
Precipitation (mm/yr)	851	851	851
Run-On (mm/yr)	0	0	0
Other Inputs (mm/yr)	0	0	0
Total Inputs (mm/yr)	**851**	**851**	**851**
Outputs (per Unit Area)			
Precipitation Surplus (mm/yr)	268	766	268
Net Surplus (mm/yr)	268	766	268
Evapotranspiration (mm/yr) *	583	170	583
Infiltration (mm/yr)	107	0	107
Soakaway Infiltration (mm/yr)	0	0	0
Total Infiltration (mm/yr)	107	0	107
Runoff Pervious Areas (mm/yr)	161	0	161
Runoff Impervious Areas (mm/yr)	0	681	0
Total Runoff (mm/yr)	161	681	161
Total Outputs (mm/yr)	**851**	**851**	**851**
Difference (Inputs- Outputs)	**0**	**0**	**0**
Inputs (Volumes)			
Precipitation (m^3/yr)	50872	0	50872
Run-On (m^3/yr)	0	0	0
Other Inputs (m^3/yr)	0	0	0
Total Inputs (m^3/yr)	**50872**	**0**	**50872**
Outputs (Volumes)			
Precipitation Surplus (m^3/yr)	16005	0	16005
Net Surplus (m^3/yr)	16005	0	16005
Evapotranspiration (m^3/yr) *	34867	0	34867
Infiltration (m^3/yr)	6402	0	6402
Soakaway Infiltration (m^3/yr)	0	0	0
Total Infiltration (m^3/yr)	6402	0	6402
Runoff Pervious Areas (m^3/yr)	9603	0	9603
Runoff Impervious Areas (m^3/yr)	0	0	0
Total Runoff (m^3/yr)	9603	0	9603
Total Outputs (m^3/yr)	**50872**	**0**	**50872**
Difference (Inputs- Outputs)	**0**	**0**	**0**

CROZIER CONSULTING ENGINEERS

Project: 11 Main Street
Project No.: 2366-6537
Created By: D.K.
Checked By:
Date: 2024.06.27

Erosion Control Volume Calculations (MECP)

Area Name	**Drainage Area**			
Area to Pond =	3.50	ha	Percent Impervious	41.6%
Extended detention (MECP) =	404	m^3	Percent Pervious	58.4%

Extended Detention Volume:

Greater of :	Dry Pond Detention:	V =	110 m^3 / ha	(MECP requirement)
		V =	384 m^3	
	Detention of 25mm Runoff:	Depth =	11.53	(from VO model)
	(Runoff volume based on 25mm VO Model)	V =	404 m^3	

Required Extended Detention Volume = 404 m^3

CROZIER CONSULTING ENGINEERS

Project No:	2366-6537
Project:	11 Main Street
File:	Extended Detention
Design by:	D.K.
Checked by:	
Date:	2024.06.27

Extended Detention Specifications

(Per MECP)

Extended Detention Volume (Area x runoff from 25mm event)		404
t (drawdown time - seconds, *hours in italics*)	*24.0*	86400
Ao (cross section area of orifice - sqm)		0.0020
h (maximum water elevation above orifice for extended detention- m)		1.00
C (discharge coefficient)		0.64
Ap (average surface area for extended detention - sqm)		468

t = 2*Ap*(h^0.5)/(C*Ao*(g*2)^0.5)

Ao = 0.004 sqm d = 70 mm

Extended Detention Orifice Diameter (as designed) d = **50** mm

ACTUAL DRAWDOWN TIME

* Neglecting tailwater conditions*

Extended Detention Volume Used	462
d (orifice diameter, mm)	50
h (maximum head acting on orifice for extended detention, m)	1.00
Ao (cross section area of orifice, m^2)	0.0020
C (discharge coefficient)	0.64
Ap (average surface area for extended detention, m^2)	496

t = 2*Ap*(h^0.5)/(C*Ao*(g*2)^0.5)

t (hours) 50

Project Name: 11 Main Street
Project Number: 2366-6537
Date: 2022-10-12
By: BP/PR

D.A. NAME **101**
D.A. AREA (ha) **2.02**

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment 101

Curve Number Calculation

Soil Types Present per Wellington County Soils Map (1962):				
Type	ID	Hydrologic Group	% Area	Area
Dumfries Sandy Loam*	DUF	A	100	2.02
				0
				0
				0
Total Area				2.02

Note: RC and CN values obtained from the MTO Drainage Management Manual Part 4 (1995)
*On-site soils silty sand with poor hydraulic conductivity per Terraprobe Hydrogeological Assessment (February 2023)

Impervious Landuses Present:												
	Gravel		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0		0		0		0		0		0	0
Subtotal	0		0		0		0		0			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.16	36	0.00	30	0		0		1.86	70	2.02	136.01
Subtotal	0.16		0.00		0		0		1.86			

Composite Area Calculations		
	Total Pervious Area	2.02
	Total Impervious Area	0.00
	% Impervious	0.00%
	Composite Curve Number	67.3
	Total Area Check	2.02

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
				Dumfries Sandy Loam*								
Landuse	IA (mm)	Area (ha)	A * IA	RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0.16	1.59	0.30	0.16		0		0		0	0.05
Meadow	8	0	0		0.00		0		0		0	0
Wetland	16	0	0		0.00		0		0		0	0
Lawn	5	0	0		0.00		0		0		0	0
Cultivated	7	1.86	13.03	0.45	1.86		0		0		0	0.84
Impervious	2	0	0		0.00		0		0		0	0
Composite		2.02	7.24	Composite Runoff Coefficient								0.44

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
Sheet Flow	111	6.70	6.04%	2.7	0.66	0.05	0.03	0.03	0.07	0.05	0.21	0.14

Appropriate calculated time to peak:	0.14	Appropriate Method:	Airport

Project Name: 11 Main Street
Project Number: 2366-6537
Date: 2024.04.30
By: DK/TF

D.A. NAME **101A**
D.A. AREA (ha) **0.76**

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment 101A

Curve Number Calculation

Soil Types Present per Wellington County Soils Map (1962):				
Type	ID	Hydrologic Group	% Area	Area
Dumfries Sandy Loam*	DUF	AB	100	0.76
				0
				0
				0
Total Area				0.76

Note: RC and CN values obtained from the MTO Drainage Management Manual Part 4 (1995)
*On-site soils silty sand with poor hydraulic conductivity per Terraprobe Hydrogeological Assessment (February 2023)

Impervious Landuses Present:												
	Gravel		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0		0		0		0		0		0	0
Subtotal	0		0		0		0		0			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.07	36	0		0		0		0.69	70	0.76	50.82
Subtotal	0.07		0		0		0		0.69			

Composite Area Calculations		
	Total Pervious Area	0.76
	Total Impervious Area	0.00
	% Impervious	0.00%
	Composite Curve Number	66.9
	Total Area Check	0.76

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
				Dumfries Sandy Loam*								
Landuse	IA (mm)	Area (ha)	A * IA	RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0.07	0.70	0.30	0.07		0		0		0	0.02
Meadow	8	0	0		0.00		0		0		0	0
Wetland	16	0	0		0.00		0		0		0	0
Lawn	5	0	0		0.00		0		0		0	0
Cultivated	7	0.69	4.83	0.45	0.69		0		0		0	0.31
Impervious	2	0	0		0.00		0		0		0	0
Composite		0.76	7.28	Composite Runoff Coefficient								0.44

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
Sheet Flow	103	4.40	4.27%	2.7	0.56	0.05	0.03	0.03	0.08	0.05	0.23	0.15

Appropriate calculated time to peak:	0.05	Appropriate Method:	Bransby Williams

Project Name: 11 Main Street
Project Number: 2366-6537
Date: 2022-10-12
By: BP/PR

D.A. NAME **102**
D.A. AREA (ha) **3.96**

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment 102

Curve Number Calculation

Soil Types Present per Wellington County Soils Map (1962):				
Type	ID	Hydrologic Group	% Area	Area
Dumfries Sandy Loam*	DUF	A	100	3.96
				0
				0
				0
Total Area				3.96

Note: RC and CN values obtained from the MTO Drainage Management Manual Part 4 (1995)
*On-site soils silty sand with poor hydraulic conductivity per Terraprobe Hydrogeological Assessment (February 2023)

Impervious Landuses Present:												
	Gravel		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0		0		0		0		0		0	0
Subtotal	0.00		0		0		0.00		0			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.25	36	0		0		0		3.71	70	3.96	268.79
Subtotal	0.25		0		0		0		3.71			

Composite Area Calculations		
	Total Pervious Area	3.96
	Total Impervious Area	0.00
	% Impervious	0.00%
	Composite Curve Number	67.9
	Total Area Check	3.96

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
Landuse	IA (mm)	Area (ha)	A * IA	Dumfries Sandy Loam*								
				RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0.25	2.48	0.30	0.25		0		0		0	0.07
Meadow	8	0	0		0.00		0		0		0	0.00
Wetland	16	0	0		0		0		0		0	0.00
Lawn	5	0	0		0		0		0		0	0.00
Cultivated	7	3.71	25.99	0.45	3.71		0		0		0	1.67
Impervious	1.5	0	0		0		0		0		0	0.00
Composite		3.96	7.19	Composite Runoff Coefficient								0.44

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
Sheet Flow	165	13.00	7.88%	2.7	0.76	0.06	0.04	0.04	0.09	0.06	0.23	0.16

Appropriate calculated time to peak:	0.06	Appropriate Method:	Bransby Williams

Project Name: 11 Main Street
Project Number: 2366-6537
Date: 2023-11-28
By: DK

D.A. NAME **201**
D.A. AREA (ha) **3.50**

Hydrologic Parameters: CALIB STANDHYD Command
Post Development Drainage Area: Catchment 201

Curve Number Calculation

Soil Types Present per Wellington County Soils Map (1962):				
Type	ID	Hydrologic	% Area	Area
Dumfries Sandy Loam*	DUF	A	100	3.50
				0
				0
				0
Total Area Check				3.50

Note: RC and CN values obtained from the MTO Drainage Management Manual Part 4 (1995)
*On-site soils silty sand with poor hydraulic conductivity per Terraprobe Hydrogeological Assessment (February 2023)

Impervious Landuses Present:												
	Roadway		Driveway		Sidewalk		Building		SWM Pond		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.48	98	0.25	98	0.07	98	0.83	98	0.15	50	1.78	167.2
Subtotal Area	0.48		0.25		0.07		0.83		0.15			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.00		0.00		0.00		1.72	50	0.00		1.72	86.1
Subtotal Area	0.00		0.00		0.00		1.72		0.00			

Pervious Area Calculations	Total Pervious Area	1.72
	Composite Pervious Curve Number	50
Impervious Area Calculations	Total Directly Connected Area	0.70
	Total Indirectly Connected Area	1.08
	Total Impervious Area	1.78
	% X imp	19.9
	% T imp	50.8
	Total Area Check	3.50

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0	0
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	1.72	8.61
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	4.00%	20	0.25
Impervious	1.5	4.00%	153	0.013

$$A = 1.5LGI^2$$

Note: LGI formula retrieved from Visual OTTHYMO Reference Manual (pg. 7)

where LGI represents impervious length (m)

Project Name: 11 Main Street
Project Number: 2366-6537
Date: 2024.05.07
By: DK

D.A. NAME **202**
D.A. AREA (ha) **2.48**

Hydrologic Parameters: CALIB STANDHYD Command
Post Development Drainage Area: Catchment 202

Curve Number Calculation

Soil Types Present per Wellington County Soils Map (1962):				
Type	ID	Hydrologic Group	% Area	Area
Dumfries Sandy Loam*	DUF	A	86%	2.12
Parkhill Loam	PLL	C	14%	0.36
				0
				0
Total Area Check				2.48

Note: RC and CN values obtained from the MTO Drainage Management Manual Part 4 (1995)
*On-site soils silty sand with poor hydraulic conductivity per Terraprobe Hydrogeological Assessment (February 2023)

Impervious Landuses Present:

	Roadway		Gravel		Driveway		Building		SWM Pond		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.00	98	0.00	98	0.00	98	0.83	98		39	0.83	81.2
PLL							0.08	98			0.08	7.9
Subtotal Area	0.00		0.00		0.00		0.91		0.00		0.91	

Pervious Landuses Present:

	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.00		0.00		0.00		1.29	50	0.00		1.29	64.6
PLL	0.00		0.00		0.00		0.28	74	0.00		0.28	20.5
Subtotal Area	0.00		0.00		0.00		1.57		0.00			

	Pervious Area Calculations	Total Pervious Area	1.57
		Composite Pervious Curve Number	54.2
	Impervious Area Calculations	Total Directly Connected Area	0.00
		Total Indirectly Connected Area	0.91
		Total Impervious Area	0.91
		% X imp	0.0
		% T imp	36.7
		Total Area Check	2.48

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0	0
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	1.57	7.85
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	4.00%	30	0.25
Impervious	1.0	2.00%	129	0.013

$$A = 1.5LGI^2$$

Note: LGI formula retrieved from Visual OTTHYMO Reference Manual (pg. 7)

where LGI represents impervious length (m)

Project Name: 11 Main Street
Project Number: 2366-6537
Date: 2022-10-12
By: BP/PR

D.A. NAME **EX1**
D.A. AREA (ha) **5.22**

Hydrologic Parameters: CALIB STANDHYD Command
External Drainage Area: Catchment EX1

Curve Number Calculation

Soil Types Present per Wellington County Soils Map (1962):				
Type	ID	Hydrologic	% Area	Area
Dumfries Sandy Loam*	DUF	A	100	5.22
				0
				0
				0
Total Area Check				5.22

Note: RC and CN values obtained from the MTO Drainage Management Manual Part 4 (1995)
*External soils assumed to be silty sand with poor hydraulic conductivity.

Impervious Landuses Present:												
	Roadway		Gravel		Driveway		Building		SWM Pond		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.21	98	0.35	91	0.52	98	0.49	98	0.00	98	1.57	150.9
Subtotal Area	0.21		0.35		0.52		0.49		0.00		1.57	

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.00		0.00		0.00		3.66	50	0.00		3.66	182.8
Subtotal Area	0.00		0.00		0.00		3.66		0.00			

Pervious Area Calculations	Total Pervious Area		3.66
	Composite Pervious Curve Number		50
Impervious Area Calculations	Total Directly Connected Area		1.08
	Total Indirectly Connected Area		0.49
	Total Impervious Area		1.57
	% X imp		20.7
	% T imp		30.0
	Total Area Check		5.22

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0	0
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	3.66	18.28
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	10.00%	30	0.25
Impervious	1.5	10.00%	187	0.013

$$A = 1.5LGI^2$$

Note: LGI formula retrieved from Visual OTTHYMO Reference Manual (pg. 7)

where LGI represents impervious length (m)

Project Name: 11 Main Street
Project Number: 2366-6537
Date: 2022-10-12
By: BP/PR

D.A. NAME **EX2**
D.A. AREA (ha) **0.26**

Hydrologic Parameters: CALIB STANDHYD Command
External Drainage Area: Catchment EX2

Curve Number Calculation

Soil Types Present per Wellington County Soils Map (1962):				
Type	ID	Hydrologic	% Area	Area
Dumfries Sandy Loam*	DUF	A	100	0.26
				0
				0
				0
Total Area Check				0.26

Note: RC and CN values obtained from the MTO Drainage Management Manual Part 4 (1995)
*External soils assumed to be silty sand with poor hydraulic conductivity.
**Roadway includes driveways.

Impervious Landuses Present:												
	Roadway		Gravel		Driveway		Building		SWM Pond		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.08	98	0.00	91	0.00	98	0.03	98	0.00	98	0.11	10.7
Subtotal Area	0.08		0.00		0.00		0.03		0.00		0.11	

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.00		0.00		0.00		0.15	50	0.00		0.15	7.5
Subtotal Area	0.00		0.00		0.00		0.15		0.00			

Pervious Area Calculations	Total Pervious Area	0.15
	Composite Pervious Curve Number	50
Impervious Area Calculations	Total Directly Connected Area	0.08
	Total Indirectly Connected Area	0.03
	Total Impervious Area	0.11
	% X imp	30.5
	% T imp	42.0
	Total Area Check	0.26

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0	0
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	0.15	0.75
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	6.00%	20	0.25
Impervious	1.5	6.00%	42	0.013

$$A = 1.5LGI^2$$

Note: LGI formula retrieved from Visual OTTHYMO Reference Manual (pg. 7)

where LGI represents impervious length (m)

Project Name: 11 Main Street
Project Number: 2366-6537
Date: 2022-10-12
By: BP/PR

D.A. NAME **EX3**
D.A. AREA (ha) **0.26**

Hydrologic Parameters: CALIB STANDHYD Command
External Drainage Area: Catchment EX3

Curve Number Calculation

Soil Types Present per Wellington County Soils Map (1962):				
Type	ID	Hydrologic	% Area	Area
Dumfries Sandy Loam*	DUF	A	100	0.26
				0
				0
				0
Total Area Check				0.26

Note: RC and CN values obtained from the MTO Drainage Management Manual Part 4 (1995)
*External soils assumed to be silty sand with poor hydraulic conductivity.
**Roadway includes driveways.

Impervious Landuses Present:												
	Roadway		Gravel		Driveway		Building		SWM Pond		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.04	98	0.00	91	0.00	98	0.04	98	0.00	98	0.08	7.8
Subtotal Area	0.04		0.00		0.00		0.04		0.00		0.08	

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.00		0.00		0.00		0.18	50	0.00		0.18	9.0
Subtotal Area	0.00		0.00		0.00		0.18		0.00			

Pervious Area Calculations	Total Pervious Area	0.18
	Composite Pervious Curve Number	50
Impervious Area Calculations	Total Directly Connected Area	0.04
	Total Indirectly Connected Area	0.04
	Total Impervious Area	0.08
	% X imp	15.4
	% T imp	30.8
	Total Area Check	0.26

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0	0
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	0.18	0.90
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	10.00%	30	0.25
Impervious	1.5	4.00%	42	0.013

$$A = 1.5LGI^2$$

Note: LGI formula retrieved from Visual OTTHYMO Reference Manual (pg. 7)

where LGI represents impervious length (m)

Project Name: 11 Main Street
Project Number: 2366-6537
Date: 2022-10-12
By: BP/PR

D.A. NAME **EX4**
D.A. AREA (ha) **0.46**

Hydrologic Parameters: CALIB STANDHYD Command
External Drainage Area: Catchment EX4

Curve Number Calculation

Soil Types Present per Wellington County Soils Map (1962):				
Type	ID	Hydrologic	% Area	Area
Dumfries Sandy Loam*	DUF	A	100	0.46
				0
				0
				0
Total Area Check				0.46

Note: RC and CN values obtained from the MTO Drainage Management Manual Part 4 (1995)
*External soils assumed to be silty sand with poor hydraulic conductivity.
**Roadway includes driveways.

Impervious Landuses Present:												
	Roadway		Gravel		Driveway		Building		SWM Pond		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.10	98	0.00	91	0.00	98	0.04	98	0.00	98	0.14	13.7
Subtotal Area	0.10		0.00		0.00		0.04		0.00		0.14	

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.00		0.00		0.00		0.32	50	0.00		0.32	16.0
Subtotal Area	0.00		0.00		0.00		0.32		0.00			

Pervious Area Calculations	Total Pervious Area	0.32
	Composite Pervious Curve Number	50
Impervious Area Calculations	Total Directly Connected Area	0.10
	Total Indirectly Connected Area	0.04
	Total Impervious Area	0.14
	% X imp	21.7
	% T imp	30.4
	Total Area Check	0.46

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0	0
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	0.32	1.60
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	4.00%	20	0.25
Impervious	1.5	2.00%	55	0.013

$$A = 1.5LGI^2$$

Note: LGI formula retrieved from Visual OTTHYMO Reference Manual (pg. 7)

where LGI represents impervious length (m)

CROZIER CONSULTING ENGINEERS

Project No:	11 Main Street
Project:	2366-6537
File:	Stage-Storage-Discharge
Design by:	D.K.
Checked by:	
Date:	2024.06.27

Storage - Outflow Calculations

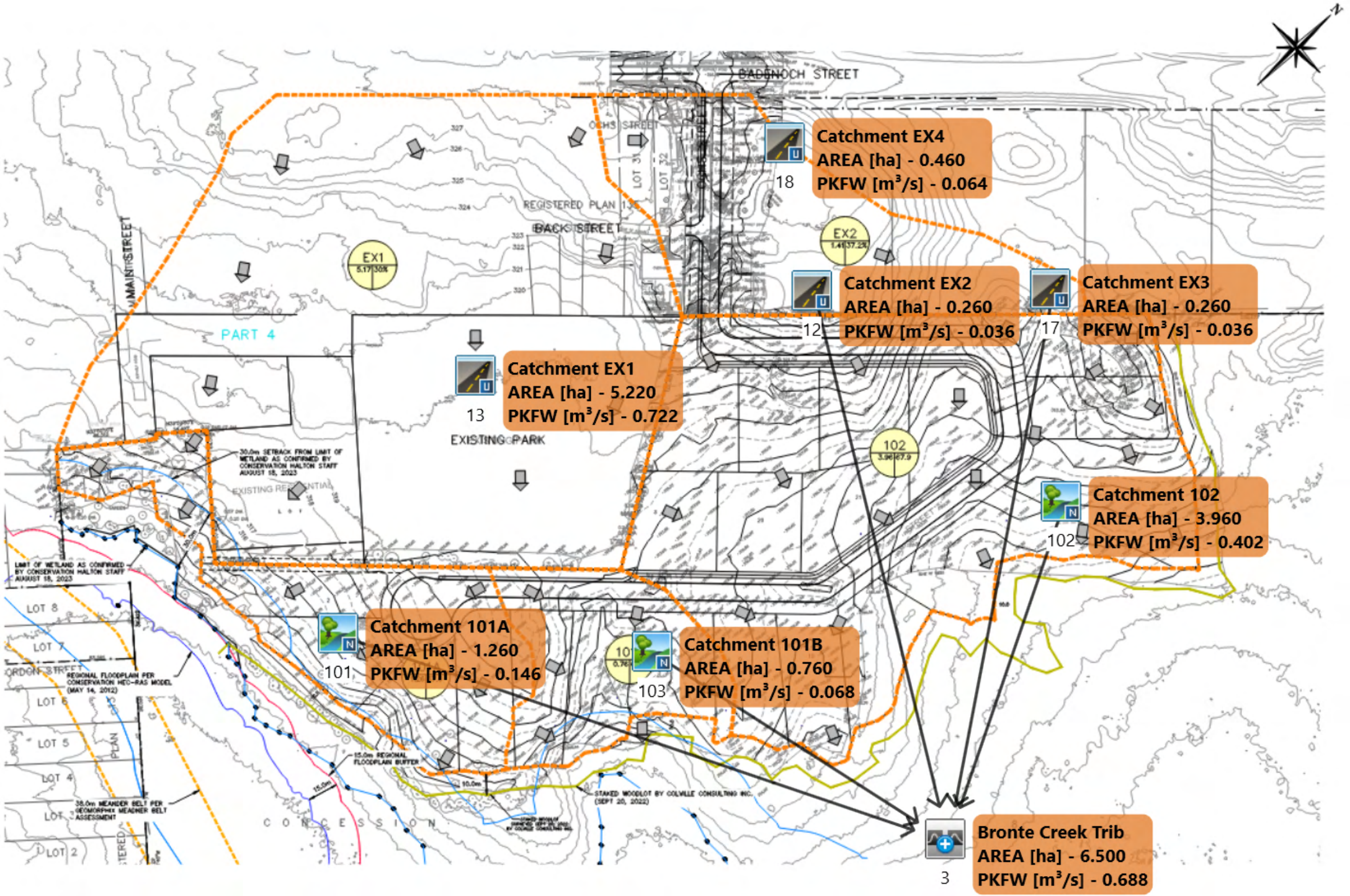
Outlet Structure			**Main Cell Spillway**		
E.D. Orifice Diameter:	0.05	m	Emergency Spill Elev.	314.05	m
E.D. Orifice Invert Elevation:	312.35	m	Emerg Spill Bot. Width	2	m
V-notch angle	N/A	degrees	Trap. Side Slopes	3	:1
V-notch constant	N/A	const			
V-notch invert	N/A	m			
Rect weir length	0.900	m			
Rect weir invert	313.50	m			
Extended Detention Depth:	1.00	m			

Pond Dimensions				Total	Outlet Structure			Cell Spillway			
Elev.	Depth Above PP	Area	Storage Volume	Storage Volume	ED Orifice Discharge	V-notch Discharge	Rect. Weir Discharge	Emerg. Weir Ave. Width	Emerg. Weir Discharge	Total Discharge	Storage
(m)	(m)	(sqm)	(cu.m)	(cu.m)	(cu.m/s)	(cu.m/s)	(cu.m/s)	(m)	(cu.m/s)	(cu.m/s)	(ha-m)
312.35	0.00	243	0	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
312.45	0.10	256	16	16	0.002	0.000	0.000	0.000	0.000	0.002	0.002
312.55	0.20	306	44	44	0.002	0.000	0.000	0.000	0.000	0.002	0.004
312.65	0.30	357	77	77	0.003	0.000	0.000	0.000	0.000	0.003	0.008
312.75	0.40	410	116	116	0.003	0.000	0.000	0.000	0.000	0.003	0.012
312.85	0.50	463	159	159	0.004	0.000	0.000	0.000	0.000	0.004	0.016
312.95	0.60	518	208	208	0.004	0.000	0.000	0.000	0.000	0.004	0.021
313.05	0.70	575	263	263	0.005	0.000	0.000	0.000	0.000	0.005	0.026
313.15	0.80	633	323	323	0.005	0.000	0.000	0.000	0.000	0.005	0.032
313.25	0.90	692	390	390	0.005	0.000	0.000	0.000	0.000	0.005	0.039
313.35	1.00	752	462	462	0.005	0.000	0.000	0.000	0.000	0.005	0.046
313.45	1.10	814	540	540	0.006	0.000	0.000	0.000	0.000	0.006	0.054
313.55	1.20	876	625	625	0.006	0.000	0.019	0.000	0.000	0.025	0.062
313.65	1.30	939	715	715	0.006	0.000	0.096	0.000	0.000	0.102	0.072
313.75	1.40	1002	812	812	0.007	0.000	0.207	0.000	0.000	0.214	0.081
313.85	1.50	1067	916	916	0.007	0.000	0.343	0.000	0.000	0.350	0.092
313.90	1.55	1100	976	976	0.007	0.000	0.419	0.000	0.000	0.426	0.098
313.95	1.60	1134	1026	1026	0.007	0.000	0.500	2.000	0.000	0.507	0.103
314.05	1.70	1202	1143	1143	0.007	0.000	0.675	0.000	0.000	0.683	0.114
314.15	1.80	1271	1266	1266	0.007	0.000	0.868	0.300	0.017	0.893	0.127
314.25	1.90	1341	1397	1397	0.008	0.000	1.076	0.900	0.148	1.231	0.140
314.35	2.00	1478	1536	1536	0.008	0.000	1.298	1.800	0.544	1.850	0.154

APPENDIX E

VO Modelling

Pre-Development Visual OTTHYMO Schematic



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        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\dkovacs\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\4227
4741-4732-42f8-9e02-c7d2a17e9282\scen
  Summary filename:
C:\Users\dkovacs\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\4227
4741-4732-42f8-9e02-c7d2a17e9282\scen


DATE: 07-31-2024                          TIME: 03:42:13

USER:



COMMENTS: _____________________________________________________________


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  ************************************************
  ** SIMULATION : Hurricane Hazel (Regional)    **
  ************************************************


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|    READ STORM    |    Filename: C:\Users\dkovacs\AppD
|                  |              ata\Local\Temp\
```

```
|                  |              e95d6617-594d-4500-821a-2387120dfdc5\eeae85f6
| Ptotal=212.00 mm |    Comments: Hazel
-------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.00    6.00 |  3.00   13.00 |  6.00   23.00 |  9.00   53.00
               1.00    4.00 |  4.00   17.00 |  7.00   13.00 | 10.00   38.00
               2.00    6.00 |  5.00   13.00 |  8.00   13.00 | 11.00   13.00

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| CALIB            |
| NASHYD   (  0101)|   Area    (ha)=   1.26   Curve Number   (CN)= 67.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.21   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.14

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
               2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

    Unit Hyd Qpeak  (cms)=   0.344

    PEAK FLOW       (cms)=   0.146 (i)
    TIME TO PEAK    (hrs)=  10.000
    RUNOFF VOLUME    (mm)= 127.476
    TOTAL RAINFALL   (mm)= 212.000
    RUNOFF COEFFICIENT   =   0.601

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
| NASHYD   (  0102)|   Area    (ha)=   3.96   Curve Number   (CN)= 67.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.19   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.06

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
               2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

    Unit Hyd Qpeak  (cms)=   2.521

    PEAK FLOW       (cms)=   0.402 (i)
    TIME TO PEAK    (hrs)=  10.000
    RUNOFF VOLUME    (mm)= 110.787
    TOTAL RAINFALL   (mm)= 212.000
    RUNOFF COEFFICIENT   =   0.523

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
| NASHYD   (  0103)|   Area    (ha)=   0.76   Curve Number   (CN)= 66.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.28   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.05

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
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0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.581

PEAK FLOW (cms)= 0.068 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 96.784
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.457

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0012)	Area (ha)=	0.26	
ID= 1 DT= 5.0 min	Total Imp(%)=	42.00	Dir. Conn.(%)= 31.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.11	0.15
Dep. Storage	(mm)=	1.50	5.00
Average Slope	(%)=	6.00	6.00

Length (m)= 41.63 20.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)= 53.00 58.81
over (min) 5.00 10.00
Storage Coeff. (min)= 1.14 (ii) 5.28 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00

			TOTALS
Unit Hyd. peak (cms)=	0.34	0.16	
PEAK FLOW (cms)=	0.01	0.02	0.036 (iii)
TIME TO PEAK (hrs)=	9.33	10.00	10.00
RUNOFF VOLUME (mm)=	210.50	165.33	179.32
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	0.99	0.78	0.85

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0017)	Area (ha)=	0.26	
ID= 1 DT= 5.0 min	Total Imp(%)=	30.80	Dir. Conn.(%)= 15.40

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.08	0.18
Dep. Storage	(mm)=	1.50	5.00
Average Slope	(%)=	4.00	10.00
Length	(m)=	41.63	30.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)= 53.00 60.61
over (min) 5.00 10.00
Storage Coeff. (min)= 1.28 (ii) 5.76 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.33 0.15

			TOTALS
PEAK FLOW (cms)=	0.01	0.03	0.036 (iii)
TIME TO PEAK (hrs)=	9.33	10.00	10.00
RUNOFF VOLUME (mm)=	210.50	166.35	173.14
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	0.99	0.78	0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0003)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)

```
       ID1= 1 (  0101):     1.26   0.146    10.00   127.48
     + ID2= 2 (  0102):     3.96   0.402    10.00   110.79
       ================================================
       ID = 3 (  0003):     5.22   0.547    10.00   114.82

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0003)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0003):     5.22   0.547    10.00   114.82
     + ID2= 2 (  0103):     0.76   0.068    10.00    96.78
       ================================================
       ID = 1 (  0003):     5.98   0.615    10.00   112.52

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0003):     5.98   0.615    10.00   112.52
     + ID2= 2 (  0012):     0.26   0.036    10.00   179.32
       ================================================
       ID = 3 (  0003):     6.24   0.651    10.00   115.31

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0003)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0003):     6.24   0.651    10.00   115.31
     + ID2= 2 (  0017):     0.26   0.036    10.00   173.14
       ================================================
       ID = 1 (  0003):     6.50   0.688    10.00   117.62

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0018)|   Area    (ha)=   0.46
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.40   Dir. Conn.(%)=  21.70
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14         0.32
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         4.00
     Length            (m)=      55.38        20.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
               2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        55.26
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.88 (ii)    6.67 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.14
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.05          0.064 (iii)
     TIME TO PEAK    (hrs)=       9.50        10.00          10.00
     RUNOFF VOLUME    (mm)=     210.50       163.18         173.44
     TOTAL RAINFALL   (mm)=     212.00       212.00         212.00
     RUNOFF COEFFICIENT   =       0.99         0.77           0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0013)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.57         3.65
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=      10.00        10.00
     Length            (m)=     186.55        30.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
               2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        55.69
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.40 (ii)    7.03 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.30         0.14
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.16         0.56          0.722 (iii)
     TIME TO PEAK    (hrs)=       9.67        10.00          10.00
     RUNOFF VOLUME    (mm)=     210.50       163.45         173.19
     TOTAL RAINFALL   (mm)=     212.00       212.00         212.00
     RUNOFF COEFFICIENT   =       0.99         0.77           0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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 FINISH
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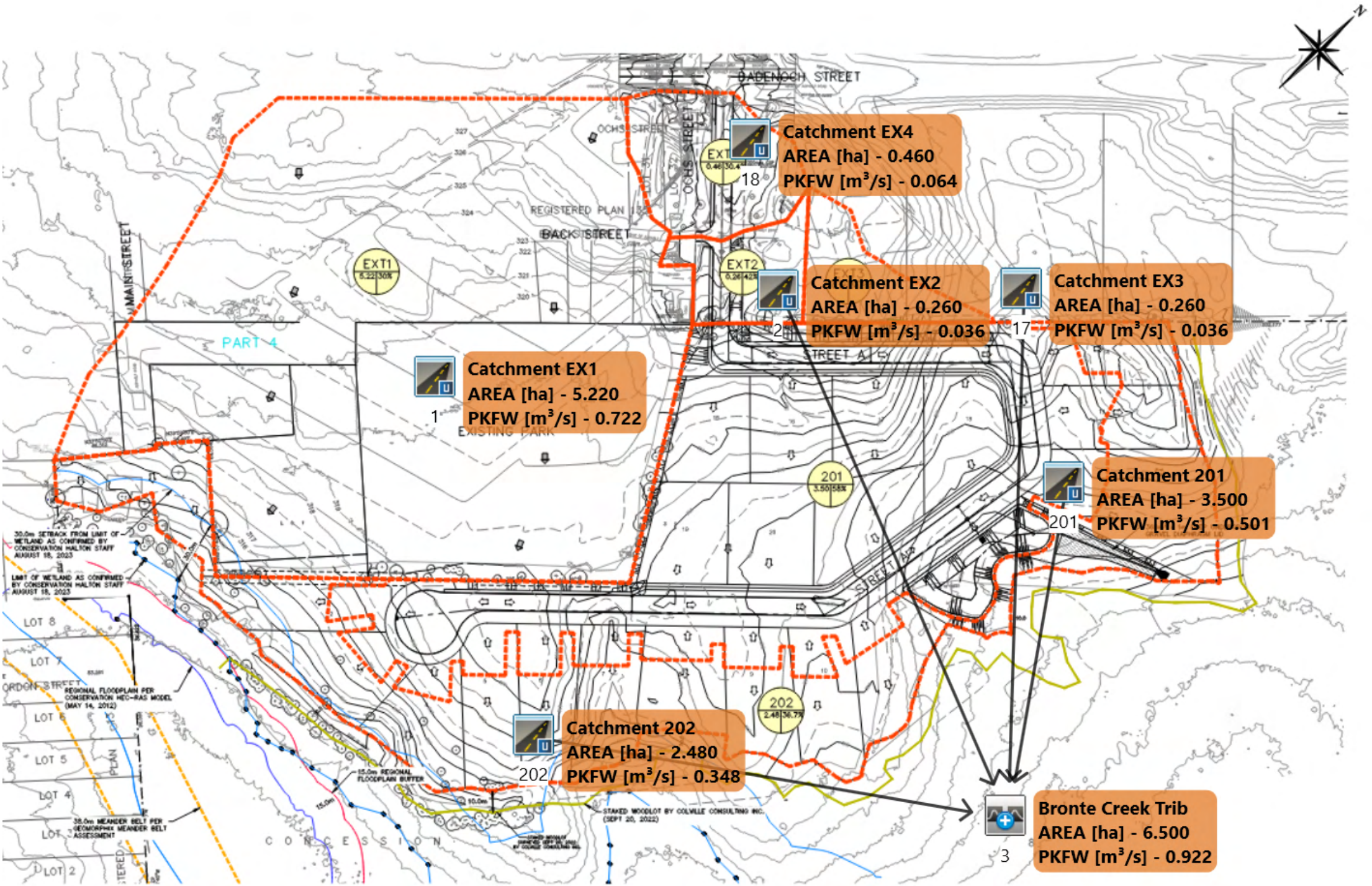
Post-Development Uncontrolled Visual OTTHYMO Schematic



```
================================================================================
========================

       V    V   I    SSSSS  U   U    A    L             (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\dkovacs\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\62e3
3252-a280-4d2a-b193-1efad2d2103a\scen
  Summary filename:
C:\Users\dkovacs\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\62e3
3252-a280-4d2a-b193-1efad2d2103a\scen


DATE: 07-31-2024                          TIME: 03:43:19

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
------------------------
  ************************************************
  ** SIMULATION : Hurricane Hazel (Regional)    **
  ************************************************


--------------------
|    READ STORM    |    Filename: C:\Users\dkovacs\AppD
|                  |              ata\Local\Temp\
```

```
|                  |              bd8561e7-d45f-4506-a8f7-db49311747c3\eeae85f6
| Ptotal=212.00 mm |    Comments: Hazel
-------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.00    6.00 |  3.00   13.00 |  6.00   23.00 |  9.00   53.00
               1.00    4.00 |  4.00   17.00 |  7.00   13.00 | 10.00   38.00
               2.00    6.00 |  5.00   13.00 |  8.00   13.00 | 11.00   13.00

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--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   3.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.00   Dir. Conn.(%)=  19.90
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.03         1.47
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       4.00         4.00
     Length            (m)=     152.75        20.00
     Mannings n             =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
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               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
               2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00       97.88
               over (min)        5.00       10.00
     Storage Coeff.  (min)=      2.80 (ii)    6.62 (ii)
     Unit Hyd. Tpeak (min)=      5.00       10.00
     Unit Hyd. peak  (cms)=      0.28        0.14
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.10        0.40         0.501 (iii)
     TIME TO PEAK    (hrs)=      9.75       10.00        10.00
     RUNOFF VOLUME    (mm)=    210.50      180.65       186.59
     TOTAL RAINFALL   (mm)=    212.00      212.00       212.00
     RUNOFF COEFFICIENT   =      0.99        0.85         0.88

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0002)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  31.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.11         0.15
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       6.00         6.00
     Length            (m)=      41.63        20.00
     Mannings n             =      0.013        0.250
```

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         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
               2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00       58.81
               over (min)        5.00       10.00
     Storage Coeff.  (min)=      1.14 (ii)    5.28 (ii)
     Unit Hyd. Tpeak (min)=      5.00       10.00
     Unit Hyd. peak  (cms)=      0.34        0.16
                                                    *TOTALS*
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     PEAK FLOW      (cms)=       0.01         0.02          0.036 (iii)
     TIME TO PEAK   (hrs)=       9.33        10.00          10.00
     RUNOFF VOLUME   (mm)=     210.50       165.33         179.32
     TOTAL RAINFALL  (mm)=     212.00       212.00         212.00
     RUNOFF COEFFICIENT  =       0.99         0.78           0.85

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0202)|   Area    (ha)=   2.48
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.70   Dir. Conn.(%)=   0.50
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.91         1.57
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         4.00
     Length            (m)=     128.58        30.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                        ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
              0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
              0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
              0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
              0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
              0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
              0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
              0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
              0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
              0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
              0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
              1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
              1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
              1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
              1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
              1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
              1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
              1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
              1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
              1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
              1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
              1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
              1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
              2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
              2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
              2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
              2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
              2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
              2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
              2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
              2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
              2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
              2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
              2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
              2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
              3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        79.69
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      3.11 (ii)    8.39 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.27         0.12
                                                        *TOTALS*
     PEAK FLOW      (cms)=       0.00         0.35          0.348 (iii)
     TIME TO PEAK   (hrs)=       9.58        10.00          10.00
     RUNOFF VOLUME   (mm)=     211.00       174.97         175.15
     TOTAL RAINFALL  (mm)=     212.00       212.00         212.00
     RUNOFF COEFFICIENT  =       1.00         0.83           0.83

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0017)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.80   Dir. Conn.(%)=  15.40
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.08         0.18
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     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       4.00        10.00
     Length            (m)=      41.63        30.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                        ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
              0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
              0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
              0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
              0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
              0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
              0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
              0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
              0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
              0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
              0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
              1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
              1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
              1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
              1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
              1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
              1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
              1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
              1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
              1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
              1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
              1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
              1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
              2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
              2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
              2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
              2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
              2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
              2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
              2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
              2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
              2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
              2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
              2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
              2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
              3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        60.61
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      1.28 (ii)    5.76 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.33         0.15
                                                        *TOTALS*
     PEAK FLOW      (cms)=       0.01         0.03          0.036 (iii)
     TIME TO PEAK   (hrs)=       9.33        10.00          10.00
     RUNOFF VOLUME   (mm)=     210.50       166.35         173.14
     TOTAL RAINFALL  (mm)=     212.00       212.00         212.00
     RUNOFF COEFFICIENT  =       0.99         0.78           0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0017):     0.26   0.036    10.00   173.14
      + ID2= 2 (  0002):     0.26   0.036    10.00   179.32
        ==========================================================
        ID = 3 (  0003):     0.52   0.073    10.00   176.23

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0003)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0003):     0.52   0.073    10.00   176.23
      + ID2= 2 (  0201):     3.50   0.501    10.00   186.59
        ==========================================================
        ID = 1 (  0003):     4.02   0.574    10.00   185.25

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
```

```
   ID1= 1 (  0003):     4.02   0.574    10.00   185.25
 + ID2= 2 (  0202):     2.48   0.348    10.00   175.15
   ================================================
   ID = 3 (  0003):     6.50   0.922    10.00   181.40

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.57         3.65
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=      10.00        10.00
     Length            (m)=     186.55        30.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                        ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
              0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
              0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
              0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
              0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
              0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
              0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
              0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
              0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
              0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
              0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
              1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
              1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
              1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
              1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
              1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
              1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
              1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
              1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
              1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
              1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
              1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
              1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
              2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
              2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
              2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
              2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
              2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
              2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
              2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
              2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
              2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
              2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
              2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
              2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
              3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

    Max.Eff.Inten.(mm/hr)=      53.00        55.69
              over (min)        5.00        10.00
    Storage Coeff.  (min)=      2.40 (ii)    7.03 (ii)
    Unit Hyd. Tpeak (min)=      5.00        10.00
    Unit Hyd. peak  (cms)=      0.30         0.14
                                                    *TOTALS*
    PEAK FLOW       (cms)=      0.16         0.56          0.722 (iii)
    TIME TO PEAK    (hrs)=      9.67        10.00          10.00
    RUNOFF VOLUME    (mm)=    210.50       163.45         173.19
    TOTAL RAINFALL   (mm)=    212.00       212.00         212.00
    RUNOFF COEFFICIENT   =      0.99         0.77           0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
| STANDHYD (  0018)|   Area    (ha)=   0.46
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.40   Dir. Conn.(%)=  21.70
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14         0.32
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         4.00
     Length            (m)=      55.38        20.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                        ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
```

```
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
              0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
              0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
              0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
              0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
              0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
              0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
              0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
              0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
              0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
              0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
              1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
              1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
              1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
              1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
              1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
              1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
              1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
              1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
              1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
              1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
              1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
              1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
              2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
              2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
              2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
              2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
              2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
              2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
              2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
              2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
              2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
              2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
              2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
              2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
              3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

    Max.Eff.Inten.(mm/hr)=      53.00        55.26
              over (min)        5.00        10.00
    Storage Coeff.  (min)=      1.88 (ii)    6.67 (ii)
    Unit Hyd. Tpeak (min)=      5.00        10.00
    Unit Hyd. peak  (cms)=      0.32         0.14
                                                    *TOTALS*
    PEAK FLOW       (cms)=      0.01         0.05          0.064 (iii)
    TIME TO PEAK    (hrs)=      9.50        10.00          10.00
    RUNOFF VOLUME    (mm)=    210.50       163.18         173.44
    TOTAL RAINFALL   (mm)=    212.00       212.00         212.00
    RUNOFF COEFFICIENT   =      0.99         0.77           0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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 FINISH
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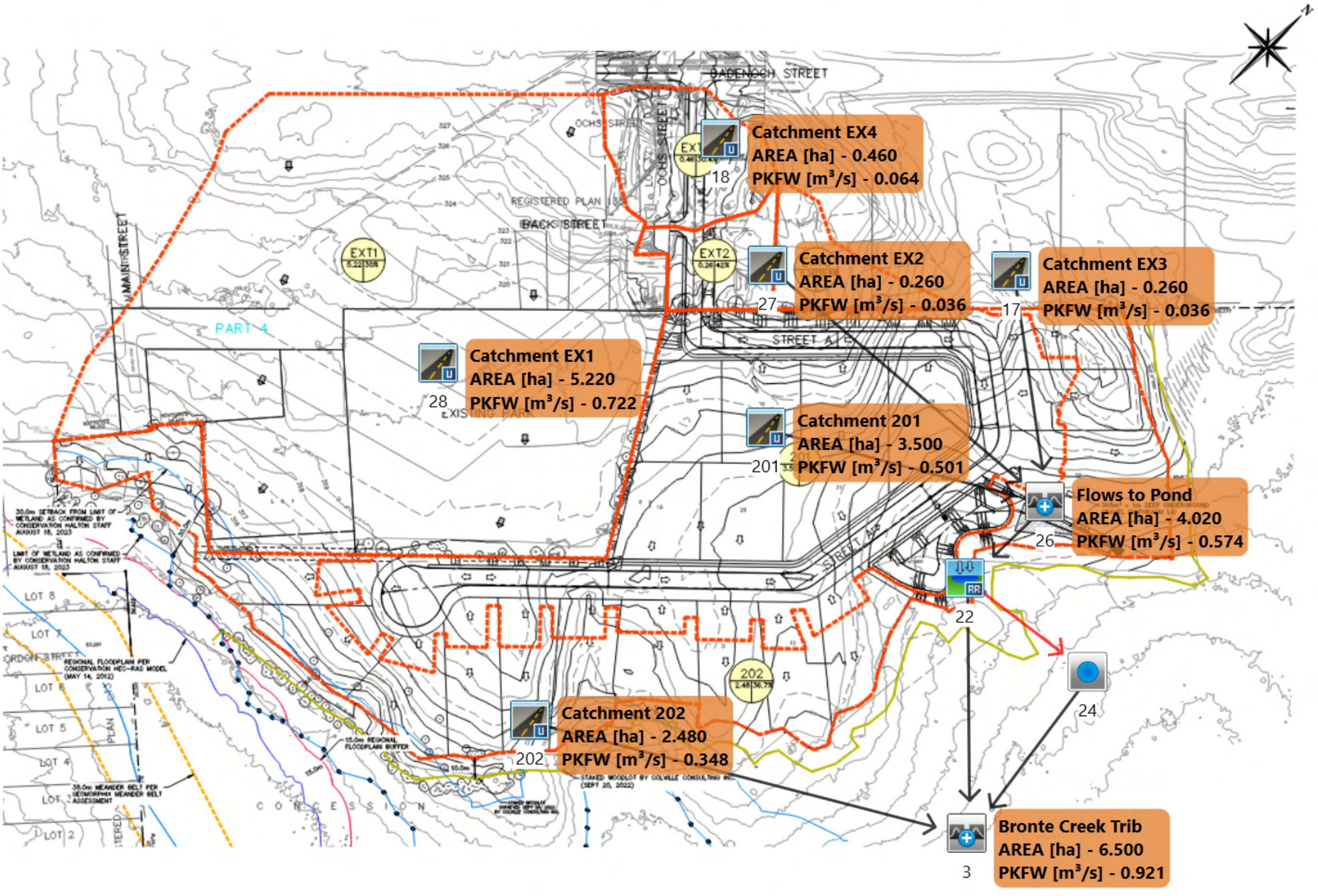
Post-Development Controlled Visual OTTHYMO Schematic



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================================================================================
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       V    V   I    SSSSS  U   U    A    L             (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\dkovacs\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\10e3
ea0a-1664-425c-b499-68a0346db47e\scen
  Summary filename:
C:\Users\dkovacs\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\10e3
ea0a-1664-425c-b499-68a0346db47e\scen


DATE: 07-31-2024                          TIME: 03:43:47

USER:



COMMENTS: _____________________________________________________________


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  ************************************************
  ** SIMULATION : Hurricane Hazel (Regional)    **
  ************************************************


--------------------
|    READ STORM    |    Filename: C:\Users\dkovacs\AppD
|                  |              ata\Local\Temp\
|                  |              1385a6d2-b673-4209-8527-b455afc3f0a9\eeae85f6
| Ptotal=212.00 mm |    Comments: Hazel
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.00    6.00 |  3.00   13.00 |  6.00   23.00 |  9.00   53.00
               1.00    4.00 |  4.00   17.00 |  7.00   13.00 | 10.00   38.00
               2.00    6.00 |  5.00   13.00 |  8.00   13.00 | 11.00   13.00

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--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   3.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.00   Dir. Conn.(%)=  19.90
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.03         1.47
     Dep. Storage     (mm)=       1.70         5.00
     Average Slope     (%)=       4.00         4.00
     Length            (m)=     152.75        20.00
     Mannings n            =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
               2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00       97.88
               over (min)        5.00       10.00
     Storage Coeff.  (min)=      2.80 (ii)   6.62 (ii)
     Unit Hyd. Tpeak (min)=      5.00       10.00
     Unit Hyd. peak  (cms)=      0.28        0.14
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.10        0.40         0.501 (iii)
     TIME TO PEAK    (hrs)=      9.75       10.00        10.00
     RUNOFF VOLUME    (mm)=    210.30      180.65       186.55
     TOTAL RAINFALL   (mm)=    212.00      212.00       212.00
     RUNOFF COEFFICIENT   =      0.99        0.85         0.88

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0027)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  30.50
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.11         0.15
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       6.00         6.00
     Length            (m)=      41.63        20.00
     Mannings n            =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
               2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00       59.28
               over (min)        5.00       10.00
     Storage Coeff.  (min)=      1.14 (ii)   5.27 (ii)
     Unit Hyd. Tpeak (min)=      5.00       10.00
     Unit Hyd. peak  (cms)=      0.34        0.16
                                                    *TOTALS*
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     PEAK FLOW       (cms)=       0.01         0.02          0.036 (iii)
     TIME TO PEAK    (hrs)=       9.33        10.00         10.00
     RUNOFF VOLUME    (mm)=     210.50       165.60        179.29
     TOTAL RAINFALL   (mm)=     212.00       212.00        212.00
     RUNOFF COEFFICIENT   =       0.99         0.78          0.85

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0017)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.80   Dir. Conn.(%)=  15.40
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.08         0.18
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       4.00        10.00
     Length            (m)=      41.63        30.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                         ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
               2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        60.61
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.28 (ii)    5.76 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.03          0.036 (iii)
     TIME TO PEAK    (hrs)=       9.33        10.00         10.00
     RUNOFF VOLUME    (mm)=     210.50       166.35        173.14
     TOTAL RAINFALL   (mm)=     212.00       212.00        212.00
     RUNOFF COEFFICIENT   =       0.99         0.78          0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0026)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):     0.26   0.036    10.00   173.14
     + ID2= 2 (  0201):     3.50   0.501    10.00   186.55
       ==================================================
       ID = 3 (  0026):     3.76   0.538    10.00   185.62

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0026)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0026):     3.76   0.538    10.00   185.62
     + ID2= 2 (  0027):     0.26   0.036    10.00   179.29
       ==================================================
       ID = 1 (  0026):     4.02   0.574    10.00   185.21

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0022)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.0060     0.0540
                          0.0020     0.0020   |   0.1020     0.0720
                          0.0040     0.0160   |   0.4260     0.0980
                          0.0040     0.0210   |   0.5480     0.1030
                          0.0050     0.0260   |   0.9450     0.1140
                          0.0050     0.0390   |   4.4160     0.1540

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0026)     4.020     0.574     10.00     185.21
   OUTFLOW: ID= 1 (  0022)     4.020     0.573     10.00     185.15
   OVERFLOW:ID= 3 (  0003)     0.000     0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 99.82
                  TIME SHIFT OF PEAK FLOW         (min)=  0.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1127

--------------------------------------------------------------------------------

  --------------------------
  | Junction Command(0024) |
  --------------------------

                         AREA     QPEAK   TPEAK     R.V.
                         (ha)     (cms)    (hrs)     (mm)
   INFLOW : ID= 3(  0022)    0.00     0.00    0.00     0.00
   OUTFLOW: ID= 2(  0024)    0.00     0.00    0.00     0.00

  --------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0202)|   Area    (ha)=   2.48
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.70   Dir. Conn.(%)=   0.50
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.91         1.57
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         4.00
     Length            (m)=     128.58        30.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                         ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
```

2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	79.69	
over (min)	5.00	10.00	
Storage Coeff. (min)=	3.11 (ii)	8.39 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.27	0.12	
			TOTALS
PEAK FLOW (cms)=	0.00	0.35	0.348 (iii)
TIME TO PEAK (hrs)=	9.58	10.00	10.00
RUNOFF VOLUME (mm)=	211.00	174.97	175.15
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	1.00	0.83	0.83

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0003)					
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 1 (0202):	2.48	0.348	10.00	175.15	
+ ID2= 2 (0022):	4.02	0.573	10.00	185.15	
ID = 3 (0003):	6.50	0.921	10.00	181.33	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0003)				
3 + 2 = 1	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)

*** W A R N I N G : HYDROGRAPH 0024 <ID= 2> IS DRY.
*** W A R N I N G : HYDROGRAPH 0001 = HYDROGRAPH 0003

ID1= 3 (0003):	6.50	0.921	10.00	181.33
+ ID2= 2 (0024):	0.00	0.000	0.00	0.00
ID = 1 (0003):	6.50	0.921	10.00	181.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB		
STANDHYD (0018)	Area (ha)=	0.46
ID= 1 DT= 5.0 min	Total Imp(%)=	30.40 Dir. Conn.(%)= 21.70

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.14	0.32
Dep. Storage	(mm)=	1.50	5.00
Average Slope	(%)=	2.00	4.00
Length	(m)=	55.38	20.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	55.26	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.88 (ii)	6.67 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.32	0.14	
			TOTALS
PEAK FLOW (cms)=	0.01	0.05	0.064 (iii)
TIME TO PEAK (hrs)=	9.50	10.00	10.00
RUNOFF VOLUME (mm)=	210.50	163.18	173.44
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	0.99	0.77	0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB		
STANDHYD (0028)	Area (ha)=	5.22
ID= 1 DT= 5.0 min	Total Imp(%)=	30.00 Dir. Conn.(%)= 20.70

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.57	3.65
Dep. Storage	(mm)=	1.50	5.00
Average Slope	(%)=	10.00	10.00
Length	(m)=	186.55	30.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	55.69	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.40 (ii)	7.03 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.30	0.14	
			TOTALS
PEAK FLOW (cms)=	0.16	0.56	0.722 (iii)
TIME TO PEAK (hrs)=	9.67	10.00	10.00
RUNOFF VOLUME (mm)=	210.50	163.45	173.19
TOTAL RAINFALL (mm)=	212.00	212.00	212.00

```
     RUNOFF COEFFICIENT    =       0.99         0.77           0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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 FINISH
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APPENDIX F

Water Treatment Train Calculations

Project: 11 Main Street
Project No.: 2366-6537
Prepared By: BP
Date: 20234.03.08

WATER QUALITY CALCULATIONS (TREATMENT TRAIN)			
Catchment ID	LID	TSS removal	Combined TSS Removal
1	EF08 SYSTEM	50.0	80.0
	Dry Pond	60.0	

Note: The TSS removal values were calculated using the New Jersey Treatment train equation. Although the EF08 system is designed to provide higher treatment rates than those shown above the rates shown above are representative of the long term treatment provided by these systems.

Treatment Train Approach:

$$R = A + B - [(A \times B) / 100] \qquad \text{(Equation 4-1)}$$

Where:

R = Total TSS Removal Rate
A = TSS Removal Rate of the First or Upstream BMP
B = TSS Removal Rate of the Second or Downstream BMP

*Per 'New Jersey Stormwater Best Management Practices Manual' Equation 4-1 (February 2004)

TSS Removal:

EF08 (Rate 1) =	50	%
Dry Pond (Rate 2) =	60	%

Removal at end of treatment train:

R_3 = Rate 1 + Rate 2 - [(Rate 1 x Rate 2)/100]

R_{total} = 80.0 %

*It should be noted that following treatment from the OGS and Dry Pond the runoff will outlet through a level spreader and then travel 30 meters overland which will provide additional TSS removal.

APPENDIX G

Conservation Halton Email Excerpts

Daniel Caberlin

From: Ola Panczyk <opanczyk@hrca.on.ca>
Sent: August 1, 2023 2:57 PM
To: Brendan Walton; Janet Engel
Cc: Kayly Robbins; Brett Pond
Subject: RE: [EXTERNAL]11 Main Street, Morriston | Floodplain Study Follow-up (CFCA 2366-6537)

Follow Up Flag: Follow up
Flag Status: Completed

Categories: Filed to Sharepoint

Hi Brendan,

Thank you for your patience while we reviewed the overlay in relation to CH's hydraulic model.

For this specific site, based on the quality of the existing model and the location of the proposed development, CH has no objection to the use of CH's HEC-RAS model for the purposes of delineating the flood hazard limit. Please ensure a topographic survey is included in the future submission, which delineates the flood hazard based on the elevations from the HEC-RAS model.

Please note that any changes to the location of the proposed development may require updated flood hazard modelling.

If you have any questions, please let me know.

Thank you,
Ola

Ola Panczyk
Environmental Planner

2596 Britannia Road West, Burlington, ON L7P 0G3
905.336.1158 ext.2279 | opanczyk@hrca.on.ca
conservationhalton.ca

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From: Brendan Walton <bwalton@cfcrozier.ca>
Sent: Tuesday, July 18, 2023 1:31 PM
To: Ola Panczyk <opanczyk@hrca.on.ca>; Janet Engel <jengel@hrca.on.ca>
Cc: Kayly Robbins <krobbins@westonconsulting.com>; Brett Pond <bpond@cfcrozier.ca>
Subject: RE: [EXTERNAL]11 Main Street, Morriston | Floodplain Study Follow-up (CFCA 2366-6537)

Hi Ola,

Thank you for confirming. We look forward to CH's feedback next week.

Kind regards,

Brendan

Brendan Walton, P.Eng.
Project Manager, Land Development
Office: 548.708.0022
Collingwood | Milton | Toronto | Bradford | Guelph

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LINKEDIN | INSTAGRAM | FACEBOOK | TWITTER

From: Ola Panczyk <opanczyk@hrca.on.ca>
Sent: Monday, July 17, 2023 10:37 AM
To: Brendan Walton <bwalton@cfcrozier.ca>; Janet Engel <jengel@hrca.on.ca>
Cc: Kayly Robbins <krobbins@westonconsulting.com>; Brett Pond <bpond@cfcrozier.ca>
Subject: RE: [EXTERNAL]11 Main Street, Morriston | Floodplain Study Follow-up (CFCA 2366-6537)

Hi Brendan,

Confirming receipt of your email. Thanks for providing the overlay. We will take a look and discuss internally. We will aim to get back to you next week.

Kind regards,
Ola

Ola Panczyk
Environmental Planner

2596 Britannia Road West, Burlington, ON L7P 0G3
905.336.1158 ext.2279 | opanczyk@hrca.on.ca
conservationhalton.ca

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From: Brendan Walton <bwalton@cfcrozier.ca>
Sent: Wednesday, July 12, 2023 1:13 PM
To: Ola Panczyk <opanczyk@hrca.on.ca>; Janet Engel <jengel@hrca.on.ca>
Cc: Kayly Robbins <krobbins@westonconsulting.com>; Brett Pond <bpond@cfcrozier.ca>
Subject: [EXTERNAL]11 Main Street, Morriston | Floodplain Study Follow-up (CFCA 2366-6537)

Good afternoon Ola, Janet,

Thank you again for meeting with us last week regarding this project. It was nice catching up with each of you!

As requested, please see attached overlay figure that outlines the Regional floodplain and 15.0 m set-back near Highway 6 on a satellite image. As discussed on the call, we believe a detailed hydrologic/hydraulic floodplain assessment for the proposed development is not required considering the floodplain (dark blue solid line) and associated set-back (red solid line) are sufficiently far enough away from the proposed dwellings and building envelopes (black dashed lines). There are also environmental features (i.e., wetland, woodlot) located outside of the floodplain that further increase the separation distance from the Regional floodplain.

Upon your review, please let us know if you have any questions or would like to discuss. We are happy to have a follow up discussion too if helpful.

Kind regards,

Brendan
Brendan Walton, P.Eng.
Project Manager, Land Development
Office: 548.708.0022
Collingwood | Milton | Toronto | Bradford | Guelph

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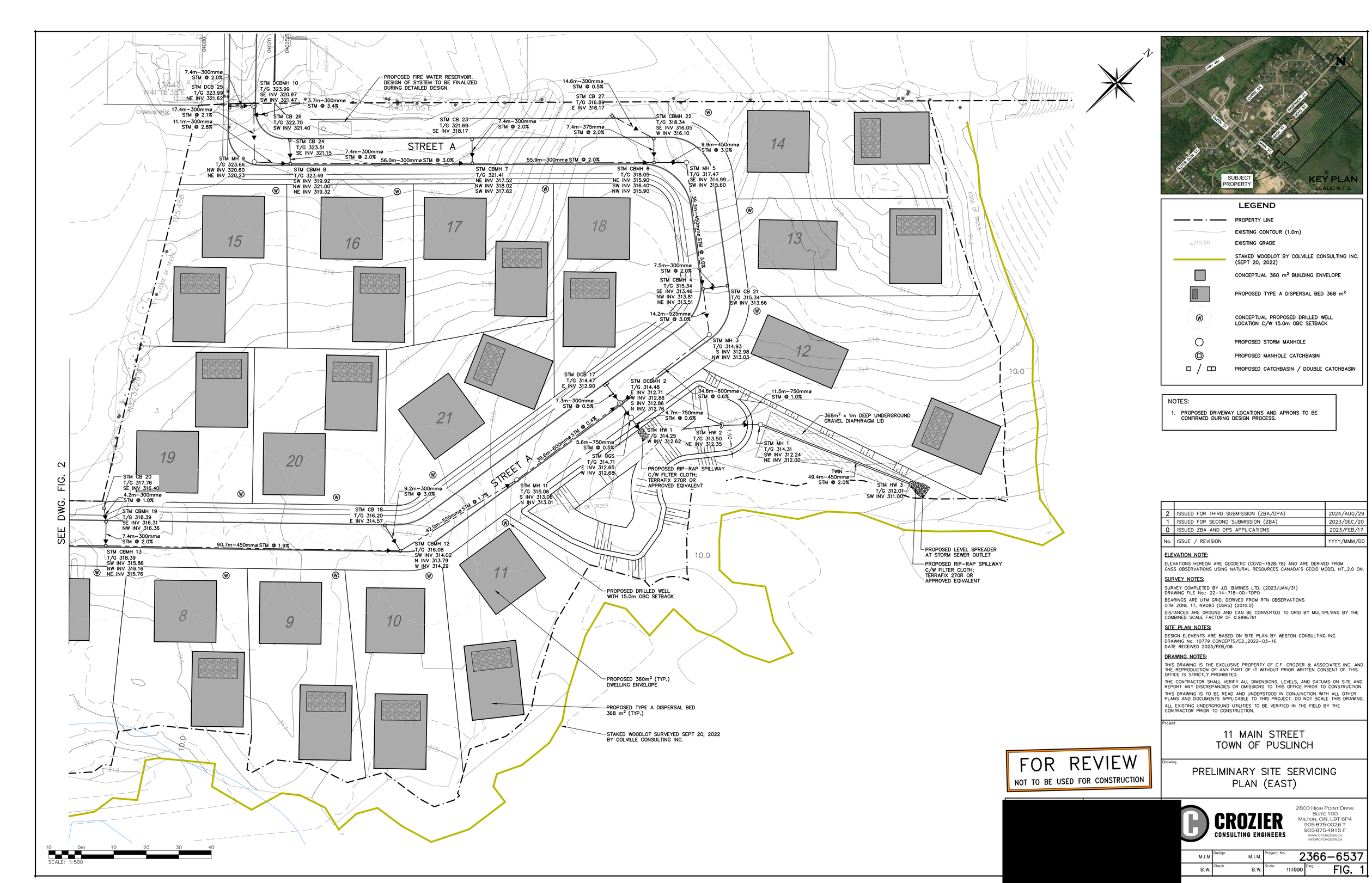
FIGURES



KEY PLAN
SCALE: N.T.S.

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (1.0m)
- x215.00 EXISTING GRADE
- STAKED WOODLOT BY COLVILLE CONSULTING INC. (SEPT 20, 2022)
- CONCEPTUAL 360 m² BUILDING ENVELOPE
- PROPOSED TYPE A DISPERSAL BED 368 m²
- (W) CONCEPTUAL PROPOSED DRILLED WELL LOCATION C/W 15.0m OBC SETBACK
- PROPOSED STORM MANHOLE
- PROPOSED MANHOLE CATCHBASIN
- PROPOSED CATCHBASIN / DOUBLE CATCHBASIN

NOTES:

1. PROPOSED DRIVEWAY LOCATIONS AND APRONS TO BE CONFIRMED DURING DESIGN PROCESS.

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0	ISSUED ZBA AND DPS APPLICATIONS	2023/FEB/17

ELEVATION NOTE:

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SURVEY NOTES:

SURVEY COMPLETED BY J.D. BARNES LTD. (2023/JAN/31)
DRAWING FILE No.: 22–14–718–00–TOPO

BEARINGS ARE UTM GRID, DERIVED FROM RTN OBSERVATIONS
UTM ZONE 17, NAD83 (CSRS) (2010.0)

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.9996781

SITE PLAN NOTES:

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DRAWING No. 10779 CONCEPTS/C2_2022–03–16
DATE RECEIVED 2023/FEB/06

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FOR REVIEW
NOT TO BE USED FOR CONSTRUCTION

[redacted]

Project

11 MAIN STREET
TOWN OF PUSLINCH

Drawing

PRELIMINARY SITE SERVICING PLAN (EAST)

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON. L9T 6P4
905 875 0026 T
905 875 4915 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

M.I.M	Design M.I.M.	Project No.	2366–6537
B.W.	Check B.W.	Scale 1:500	Dwg. FIG. 1

J:\2300\2366 - WDD Main Street\6537 - 11 Main Street\CAD\Civil_Sheets\6537_FIG 1.dwg, FIG 1, 2024-09-03 3:11:10 PM, hwilkinson

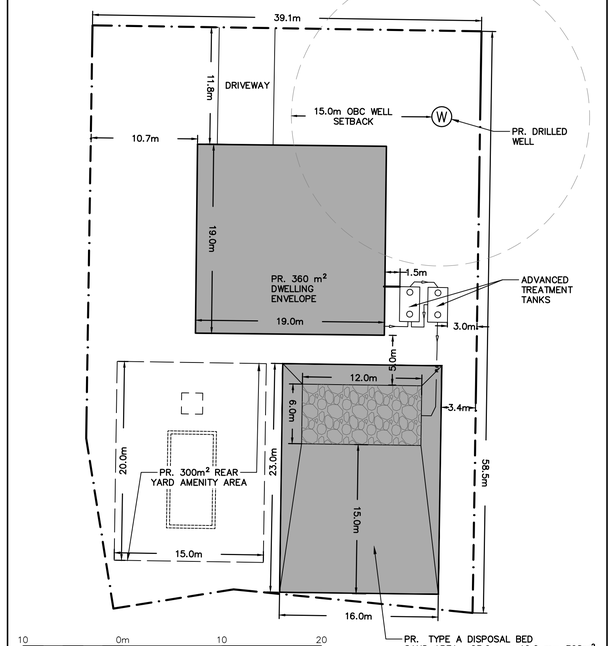
SEWAGE SYSTEM NOTES

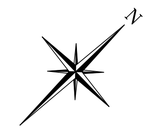
1. PROPOSED SEWAGE SYSTEM CONSTRUCTION TO BE UNDERTAKEN IN ACCORDANCE WITH THE ONTARIO BUILDING CODE, ONTARIO MINISTRY OF ENVIRONMENT, AND THE MANUFACTURER'S RECOMMENDATIONS.
2. INSTALLATION OF ALL COMPONENTS OF THE SEWAGE SYSTEM TO BE COMPLETED BY A LICENSED AND REGISTERED ONSITE SEWAGE SYSTEM INSTALLER IN THE PROVINCE OF ONTARIO.
3. THE CONTRACTOR SHALL COORDINATE AND PAY FOR ALL NECESSARY INSPECTIONS WITH THE TOWN AND OTHER AUTHORITIES PERTAINING TO THE INSTALLATION OF THEIR WORK.
4. CONTRACTOR TO LOCATE ALL UNDERGROUND UTILITIES AND EXISTING SEWAGE WORKS PRIOR TO CONSTRUCTION.
5. ALL COMPONENT LOCATIONS SHALL BE FIELD VERIFIED WITH THE ENGINEER PRIOR TO INSTALLATION.
6. ALL EARTHWORKS, INCLUDING PLACEMENT OF FILL ARE TO BE UNDERTAKEN WITH TRACK MOUNTED EQUIPMENT TO KEEP COMPACTION TO A MINIMUM. KEEP ALL TRAFFIC IN THE AREA OF THE PROPOSED LEACHING BED TO A MINIMUM.
7. ALL TOPSOIL AND ORGANICS TO BE REMOVED FROM LEACHING BED AREA.
8. IF HIGH GROUNDWATER CONDITIONS ARE EVIDENT AT THE TIME OF CONSTRUCTION, THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY. ALL VERTICAL CLEARANCE DISTANCES AS REQUIRED BY THE ONTARIO BUILDING CODE MUST BE MAINTAINED.
9. GRAVITY SEWERS TO HAVE MINIMUM 0.6 M COVER AND SHALL BE INSULATED WHERE LESS THAN 1.0M COVER IS PROVIDED. FORCEMAIN SHALL BE INSULATED WHERE LESS THAN 1.5 M COVER IS PROVIDED. BEDDING, COVER AND BACKFILL TO BE IN ACCORDANCE WITH OPSS.
10. UNLESS OTHERWISE NOTED PE FORCEMAIN TO BE HDPE SERIES 100 OR DR 13.5 PE AND PVC FORCEMAIN TO BE SCHEDULE 40. GRAVITY SEWERS TO BE SDR-35. FORCE MAIN TO BE PROVIDED WITH TRACER WIRE, SECURED TO THE TOP OF THE PIPE WITH WATER PROOF TAPE OR ZIP TIES.
11. ALL PIPES SUBJECT TO VEHICULAR TRAFFIC SHALL BE ADEQUATELY PROTECTED.
12. ALL METAL IN TANKS OR PUMP CHAMBERS TO BE GLAVANIZED OR STAINLESS STEEL
13. ALL JOINTS BELOW THE HIGH WATER LEVEL IN PRECAST TANKS TO BE SEALED WITH MASTIC SEALANT IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS FOR WATERTIGHT SEAL. ALL TANK INLETS AND OUTLETS TO BE EQUIPPED WITH CAST IN RUBBER BOOT FOR WATER TIGHT SEAL. UNLESS OTHERWISE NOTED ALL TANK INLETS AND OUTLETS TO BE EQUIPPED WITH TEES.
14. ALL TANKS TO BE PROVIDED WITH PRECAST CONCRETE OR PVC ACCESS RISERS TO GRADE. HATCHES TO BE BOLTED AND GASKETED AND ACCESSIBLE AT GRADE. ALL CIRCULAR HATCHES TO BE 600 MM DIAMETER POLYLOK RISER WITH CAST IN ADAPTOR. ALL SQUARE ACCESS OPENINGS TO BE EQUIPPED WITH CONCRETE RISERS. VENTED HATCHES TO BE PROVIDED ON TANKS CONTAINING PUMPS.
15. EXISTING SOILS SHALL BE SCARIFIED AT A RIGHT ANGLE TO THE DIRECTION OF LATERAL SEWAGE FLOW IN THE LEACHING BED PRIOR TO IMPORTING FILL OR INSTALLING DISTRIBUTION PIPE STONE LAYER.
16. WHEN THE IMPORTATION OF FILL IS REQUIRED, FILL SHOULD BE END-DUMPED AND GRADED PROGRESSIVELY OVER THE PREPARED SITE AREA WITH TRACK MOUNTED EQUIPMENT.
17. ALL ELEVATIONS TO BE VERIFIED PRIOR TO BACKFILL
18. ALL FILL MATERIAL PLACED BENEATH TANKS TO BE COMPACTED TO 95%.
19. ALL DISTURBED AREAS TO BE TOPSOILED (100MM MINIMUM) AND SEEDED COMPLETE WITH FERTILIZER AND MULCH IN ACCORDANCE WITH OPSS
20. THE INSTALLING CONTRACTOR SHALL INSTALL THE SEWAGE SYSTEM USING A TRANSIT/LEVEL AND SHALL PROVIDE SAME FOR INSPECTION OF ANY COMPONENT.
21. MAXIMUM BURIAL DEPTH OF TANKS NOT TO EXCEED TO MANUFACTURERS RECOMMENDATIONS
22. CLEARANCE DISTANCES FROM PROPERTY LINES, STRUCTURES, WELLS, AND SURFACE WATER WILL ADHERE TO THE REQUIREMENTS OF OBC 8.2.1.6.A
23. A LEACHING BED SHALL NOT BE LOCATED ON AN AREA WITH A SLOPE OF GREATER THAN 4 UNITS HORIZONTALLY TO 1 UNIT VERTICALLY.
24. THE HEADER LINE, DISTRIBUTION PIPES AND LEACHING BED SHALL BE EQUIPPED WITH MEANS OF DETECTION AS REQUIRED BY OBC 8.7.2.2. (2). LIGHT COLOURED PLASTIC COATED 14 GAUGE TRACER WIRE OR EPOXY COATED, 10m REBAR LAID HORIZONTALLY AT EACH CORNER OF THE BED IS ACCEPTABLE.
25. STONE TRENCH OR LAYER TO BE COVERED WITH PERMEABLE GEOTEXTILE PRIOR TO BACKFILL.
26. STONE TO CONFORM WITH OBC 8.7.3.3.
27. ALL IMPORTED SAND FILL TO HAVE A T-TIME OF 6 TO 10 MIN/CM AND A SILT/CLAY CONTENT OF NO MORE THAN 5% AND SHALL BE VERIFIED IN WRITING BY A SOIL TESTING FIRM AND APPROVED BY THE ENGINEER PRIOR TO PLACEMENT.
28. ANAEROBIC DIGESTER AND BIOFILTER BASKET PUMPS AS DESIGNED AND SUPPLIED BY WATERLOO BIOFILTER.
29. PUMP CHAMBER TO BE VENTED AND EQUIPPED WITH AUDIBLE AND VISUAL HIGH LEVEL ALARM
30. ALL VALVES TO PROVIDE NO OBSTRUCTION TO FLOW WHEN FULLY OPENED. ALL VALVES AND COUPLINGS TO BE ACCESSIBLE AT GRADE.
31. ALL PUMP FLOATS TO BE SECURED TO A REMOVABLE PVC FLOAT TREE
32. ALL PUMP CONTROL PANELS TO BE EQUIPPED WITH SEPARATE CIRCUIT BREAKERS FOR PUMP CIRCUIT
33. NO JUNCTION BOXES IN RISERS
34. ALL BURIED ELECTRICAL WIRING TO BE IN PVC CONDUIT
35. PRIOR TO ACCEPTANCE CONTRACTOR TO PROVIDE DOCUMENTATION THAT ALL ELECTRICAL WORK HAS BEEN INPSECTED AND APPROVED BY THE ELECTRICAL AUTHORITY HAVING JURISDICTION

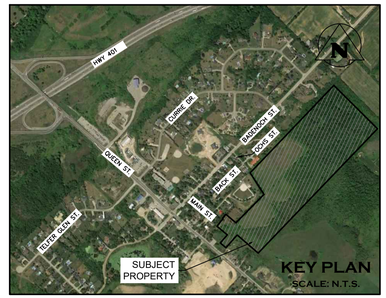
ONSITE SEWAGE SYSTEM DESIGN TYPICAL LOT NOTES	
PROPOSED 4 BEDROOM, 360 m² HOME WITH FORTY-FIVE (45) FIXTURE UNITS	BASE FLOW (4 BEDROOMS)= 2,000 L/DAY ADDITIONAL FLOOR AREA (160 m2)= 1,600 L/DAY ADDITIONAL FIXTURE UNITS (25)= 1,250 L/DAY Q TOTAL (2,000+1,600)= 3,600 L/DAY
SOIL PERCOLATION RATE	T = 30 min/cm (ESTIMATED BY C.F. CROZIER)
PROPOSED TREATMENT UNIT	WATERLOO BIOFILTER AD-BA40
TYPE A DISPERSAL BED STONE AREA	MINIMUM SIZE=Q/50=3,600/50 = 72 m² PROVIDED 12m x 6m = 72 m²
TYPE A DISPERSAL BED SAND AREA	MINIMUM SIZE=QT/400= 3,600*30/400= 270 m² PROVIDED 23m x 16m = 368 m²

TYPICAL LOT SCHEMATIC (LOT 8)

SCALE: 1:300







LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (1.0m)
- ×215.00 EXISTING GRADE
- REGIONAL FLOODPLAIN (CONSERVATION HALTON)
- REGIONAL FLOODPLAIN 15.0m BUFFER
- STAKED WOODLOT BY COLVILLE CONSULTING INC. (SEPT 20, 2022)
- LIMIT OF WETLAND AS CONFIRMED BY CONSERVATION HALTON STAFF (AUGUST 18, 2023)
- 30.0m SETBACK FROM LIMIT OF WETLAND AS CONFIRMED BY CONSERVATION HALTON STAFF AUGUST 18, 2023
- MEANDER BELT 38m BUFFER (19m EACH SIDE)
- CONCEPTUAL 360 m² BUILDING ENVELOPE
- PROPOSED TYPE A DISPERSAL BED 368 m²
- W CONCEPTUAL PROPOSED DRILLED WELL LOCATION C/W 15.0m OBC SETBACK
- PROPOSED STORM MANHOLE
- PROPOSED MANHOLE CATCHBASIN
- PROPOSED CATCHBASIN / DOUBLE CATCHBASIN

NOTES:

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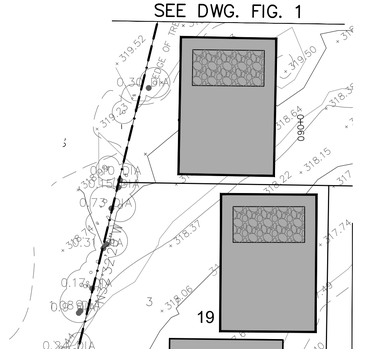
0	ISSUED ZBA AND DPS APPLICATIONS	2023/FEB/17

SEE DWG. FIG. 1



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SURVEY NOTES:

SURVEY COMPLETED BY J.D. BARNES LTD. (2023/JAN/31)
DRAWING FILE No.: 22-14-718-00-TOPO

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SITE PLAN NOTES:

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DRAWING No. 10779 CONCEPTS/C2_2022-03-16
DATE RECEIVED 2023/FEB/06

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Project

11 MAIN STREET
TOWN OF PUSLINCH

Drawing

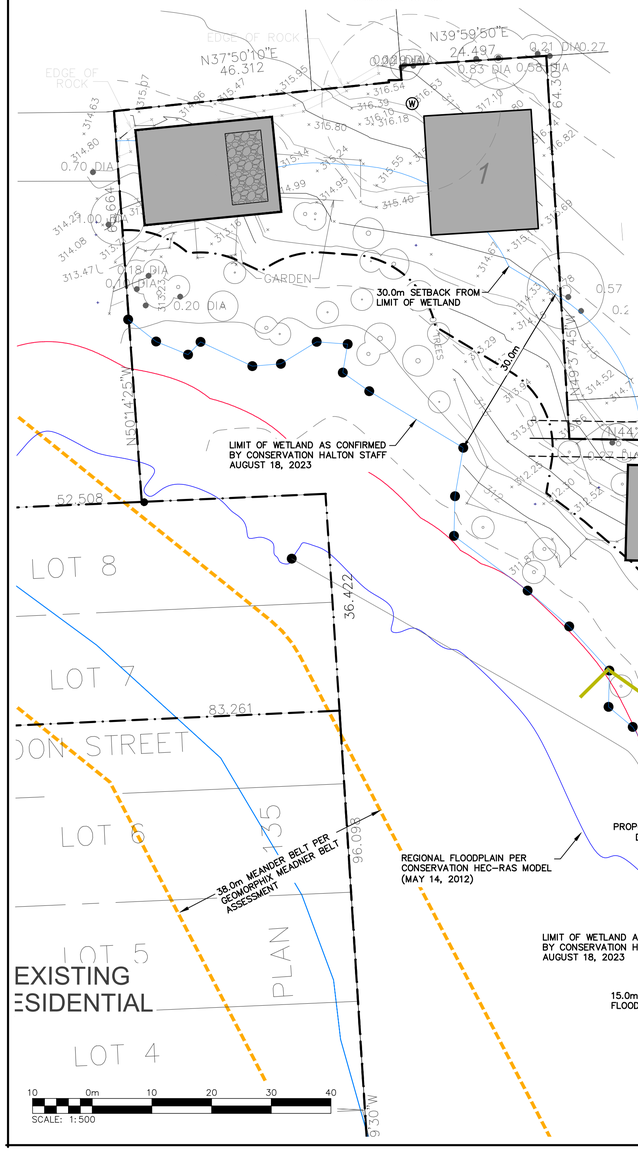
PRELIMINARY SITE SERVICING PLAN (WEST)

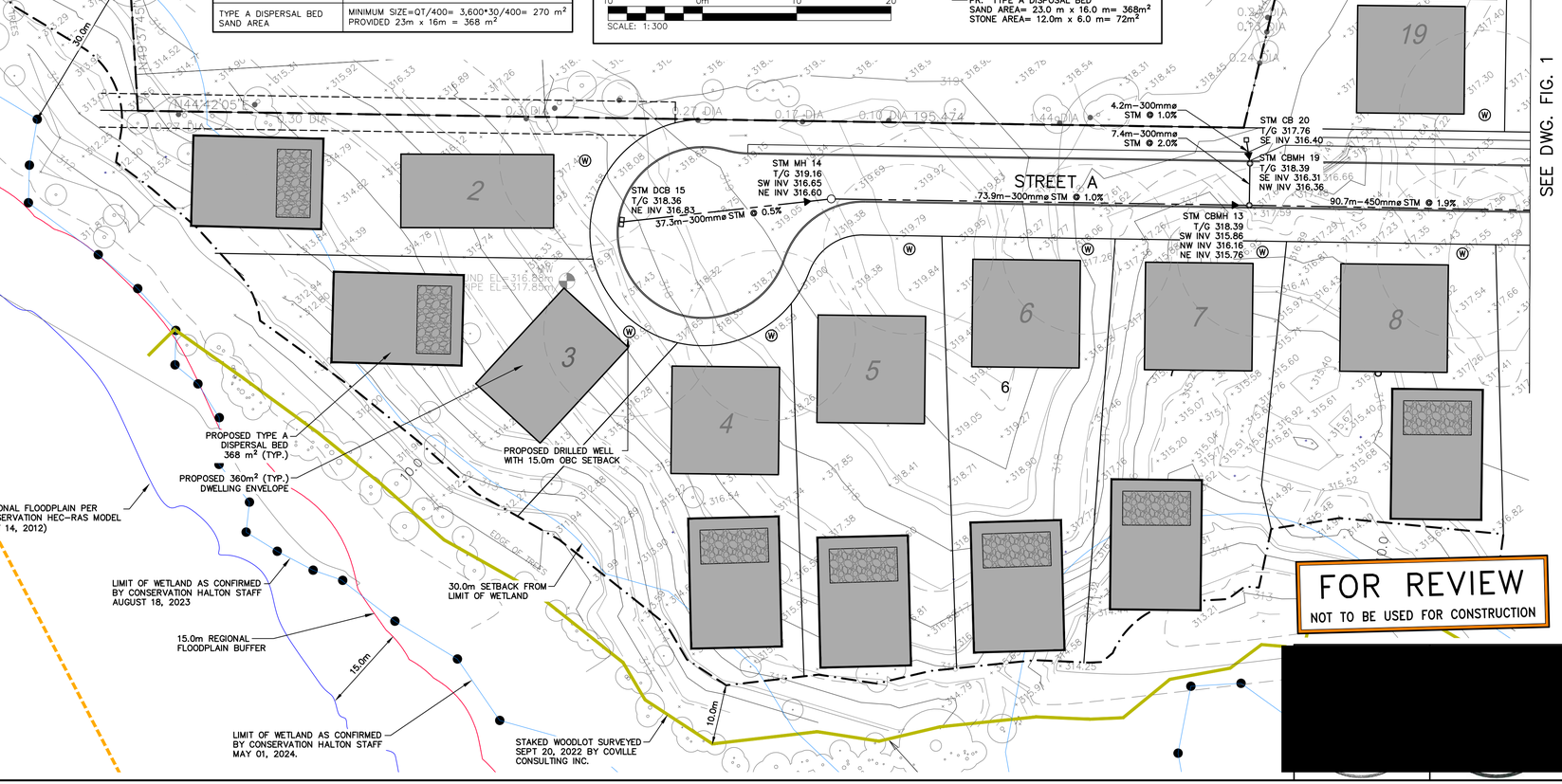
FOR REVIEW
NOT TO BE USED FOR CONSTRUCTION

[redacted]

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON, L9T 6P4
905.875.0026 T
905.875.4915 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

M.I.M	Design	M.I.M.	Project No.	2366-6537
B.W.	Check	B.W.	Scale 1:500	Dwg. FIG. 2





SEE DWG. FIG. 5

SEE DWG. FIG. 4

MATCH EXISTING GRADE AT PROPERTY LINE (TYP)

EX. LOCALIZED LOW AREA TO BE ADDRESSED DURING DETAILED DESIGN

STM CB 27 T/G 316.89

STM CB 26 T/G 322.70

STM DCB 25 T/G 323.99

STM DCBMH 10 T/G 323.99

STM CB 23 T/G 321.69

STM CBMH 22 T/G 318.34

STREET A

STM MH 9 T/G 323.66

STM CB 24 T/G 323.51

STM CBMH 8 T/G 323.49

STM CBMH 7 T/G 321.41

STM CBMH 6 T/G 318.05

STM MH 5 T/G 317.47

MATCH EXISTING GRADE AT PROPERTY LINE (TYP)

MATCH EXISTING GRADE AT PROPERTY LINE (TYP)

STM CBMH 4 T/G 315.34

STM CB 21 T/G 315.34

STM MH 3 T/G 314.93

STM DCB 17 T/G 314.47

STM DCBMH 2 T/G 314.48

STM OGS T/G 314.71

STM HW 1 T/G 313.63

STM MH 1 T/G 314.31

STM HW 2 T/G 312.76

STM HW 3 T/G 312.01

STREET A

STM MH 11 T/G 315.06

PR. RIP-RAP SPILLWAY

MATCH EXISTING GRADE AT PROPERTY LINE (TYP)

PR. RIP-RAP SPILLWAY AND LEVEL SPREADER

EXTENDED DETENTION WATER LEVEL ELEVATION=313.35

REGIONAL WATER LEVEL ELEVATION=314.05

STM CB 20 T/G 317.76

STM CBMH 19 T/G 318.39

STM CB 18 T/G 316.20

STM CBMH 13 T/G 318.39

STM CBMH 12 T/G 316.08

30.0m SETBACK FROM LIMIT OF WETLAND AS CONFIRMED BY CONSERVATION HALTON STAFF AUGUST 18, 2023

MATCH EXISTING GRADE AT PROPERTY LINE (TYP)

LIMIT OF WETLAND AS CONFIRMED BY CONSERVATION HALTON STAFF AUGUST 18, 2023

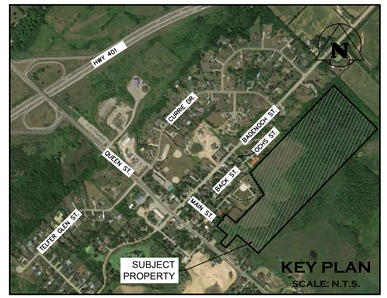
4:1 MAX.

3:1 MAX.

EDGE OF TREES

10 0m 10 20 30 40

SCALE: 1:500



KEY PLAN
SCALE: N.T.S.

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.50m)
- EXISTING CONTOUR (1.0m)
- ×215.00 EXISTING GRADE
- ×215.00 PROPOSED GRADE
- ×215.00 PROPOSED GRADE (TO MATCH EXISTING)
- 2.0% PROPOSED MINOR FLOW DIRECTION
- PROPOSED SLOPE (3:1 MAX.)
- PROPOSED MAJOR OVERLAND FLOW DIRECTION
- STAKED WOODLOT BY COLVILLE CONSULTING INC.
- PROPOSED STORM MANHOLE
- PROPOSED MANHOLE CATCHBASIN
- PROPOSED CATCHBASIN / DOUBLE CATCHBASIN

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FOR REVIEW
NOT TO BE USED FOR CONSTRUCTION

[redacted]

Project

11 MAIN STREET
TOWN OF PUSLINCH

Drawing

SITE GRADING PLAN (EAST)

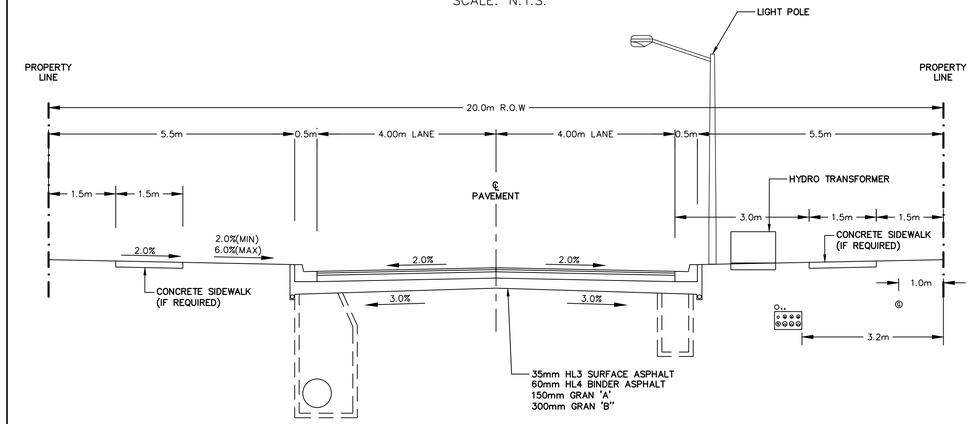
CROZIER CONSULTING ENGINEERS
2800 High Point Drive
Suite 100
Milton, ON, L9T 6P4
905 875 0026 T
905 875 4915 F
www.cfcrozier.ca
info@cfcrozier.ca

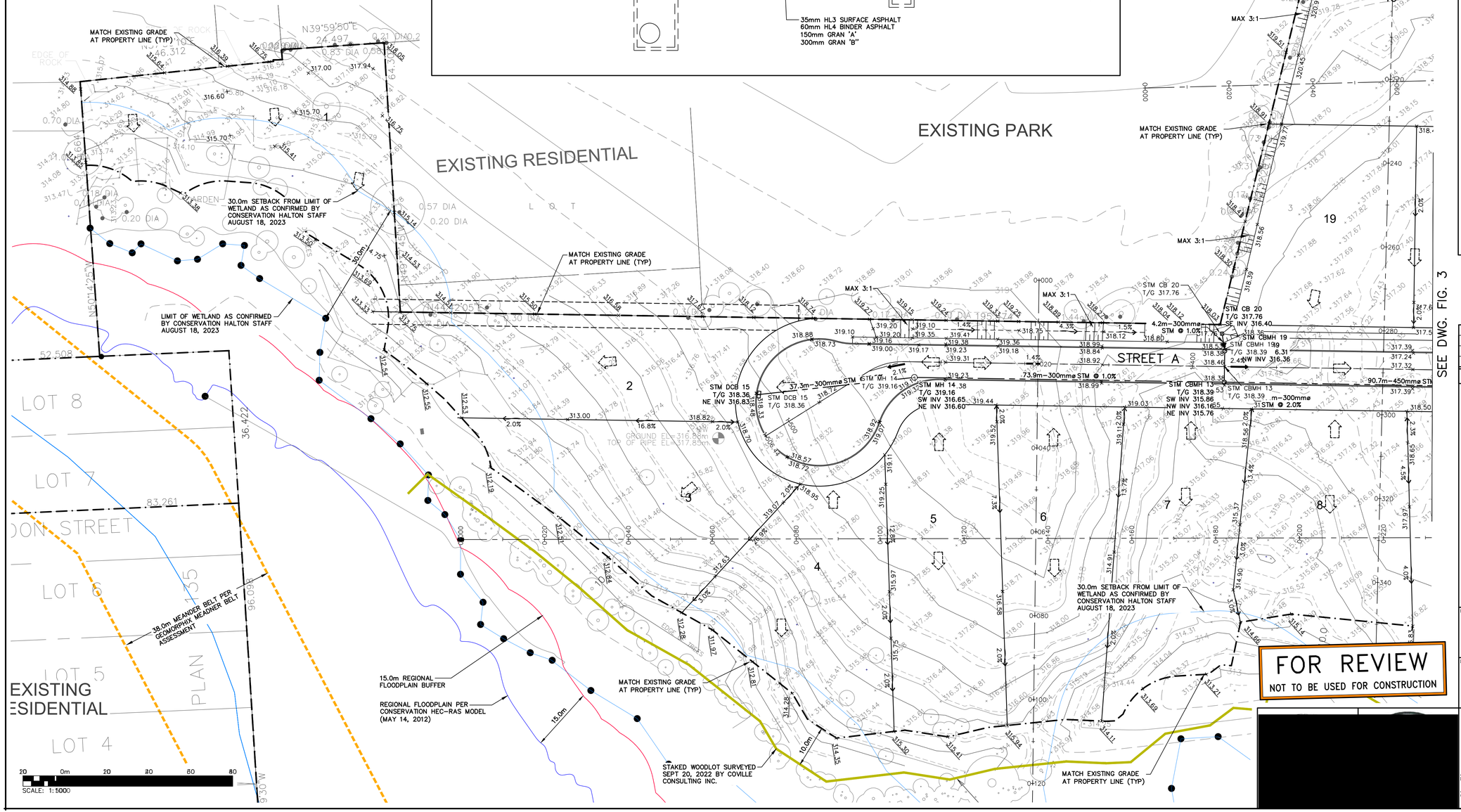
Drawn	Design	Project No.	
M.I.M	M.I.M.		2366-6537
Check	Check	Scale	Dwg.
B.W.	B.W.	1:500	FIG. 3

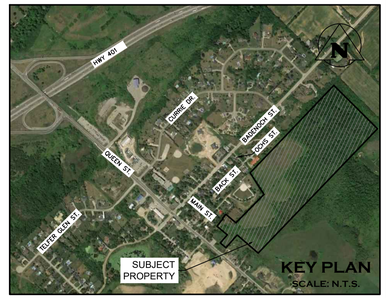
J:\2300\2366 - WDD Main Street\6537 - 11 Main Street\CAD\Civil_Sheets\6537_FIG 3.dwg, FIG. 3, 2024-09-03 3:07:31 PM, hwilkinson

TYPICAL ROAD SECTION

SCALE: N.T.S.







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- EXISTING CONTOUR (1.0m)
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- ×215.00 PROPOSED GRADE
- ×215.00 PROPOSED GRADE (TO MATCH EXISTING)
- 2.0% PROPOSED MINOR FLOW DIRECTION
- PROPOSED SLOPE (3:1 MAX.)
- PROPOSED MAJOR OVERLAND FLOW DIRECTION
- STAKED WOODLOT BY COLVILLE CONSULTING INC. (SEPT 20, 2022)
- LIMIT OF WETLAND AS CONFIRMED BY CONSERVATION HALTON STAFF (AUGUST 18, 2023)
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- REGIONAL FLOODPLAIN 15.0m BUFFER
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- PROPOSED CATCHBASIN

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Project

11 MAIN STREET
TOWN OF PUSLINCH

Drawing

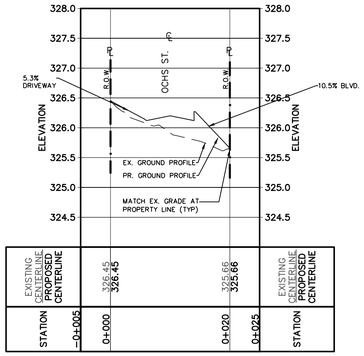
SITE GRADING PLAN (WEST)

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON, L9T 6P4
905 875 0026 T
905 875 4915 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn	M.I.M	Design	M.I.M.	Project No.	2366-6537
Check	B.W.	Check	B.W.	Scale	1:500
				Dwg.	FIG. 4

J:\2300\2366 - WDD Main Street\6537 - 11 Main Street\CAD\Civil_Sheets\6537_FIG 4.dwg, FIG. 4, 2024-09-03 3:03:44 PM, hwilkinson

SECTION A



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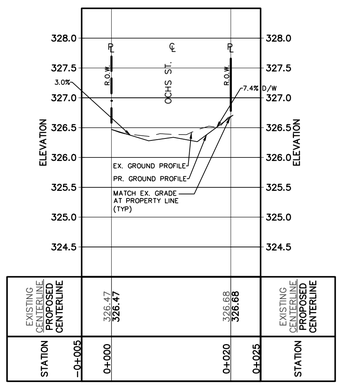

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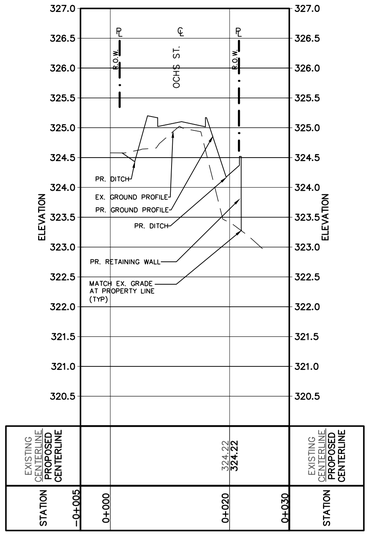
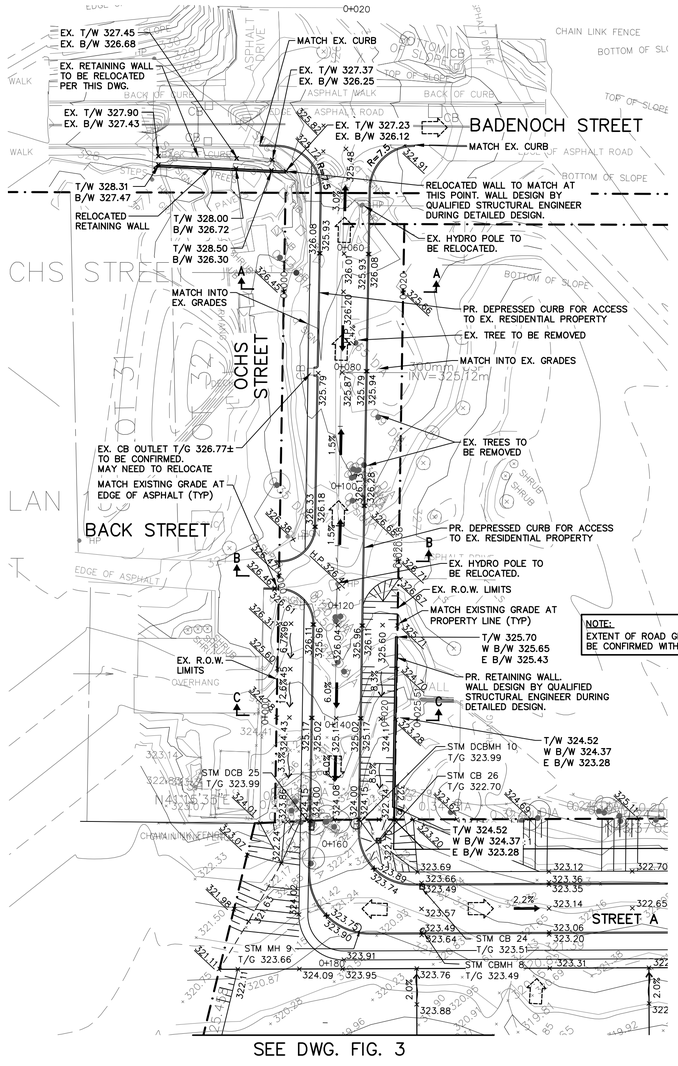
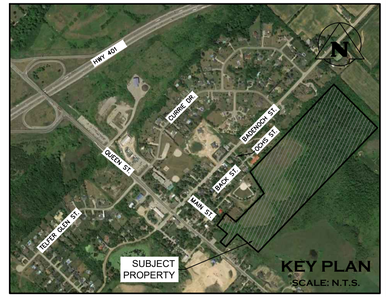




SEE DWG. FIG. 3



LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.50m)
- EXISTING CONTOUR (1.0m)
- ×215.00 EXISTING GRADE
- ×215.00 PROPOSED GRADE
- ×215.00 PROPOSED GRADE (TO MATCH EXISTING)
- 2.0% PROPOSED MINOR FLOW DIRECTION
- PROPOSED SLOPE (3:1 MAX.)
- PROPOSED MAJOR OVERLAND FLOW DIRECTION

NOTE:

EXTERNAL OF OCHS STREET IS FOR SCHEMATIC PURPOSES ONLY. DETAILED DESIGN OF OCHS STREET TO BE COMPLETED THROUGH CONSULTATION WITH THE TOWNSHIP DURING SUBSEQUENT PLANNING APPLICATION.

EXTERNAL DRAINAGE FROM PRIVATE LOTS TO BE CONVEYED AS PART OF THESE ROAD IMPROVEMENTS.

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[redacted]

Project

11 MAIN STREET
TOWN OF PUSLINCH

Drawing

EXTERNAL GRADING PLAN (OCHS STREET)

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON, L9T 6P4
905 875-0026 T
905 875-4915 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn	M.I.M	Design	M.I.M.	Project No.	2366-6537
Check	B.W.	Check	B.W.	Scale	1:500
				Dwg.	FIG. 5

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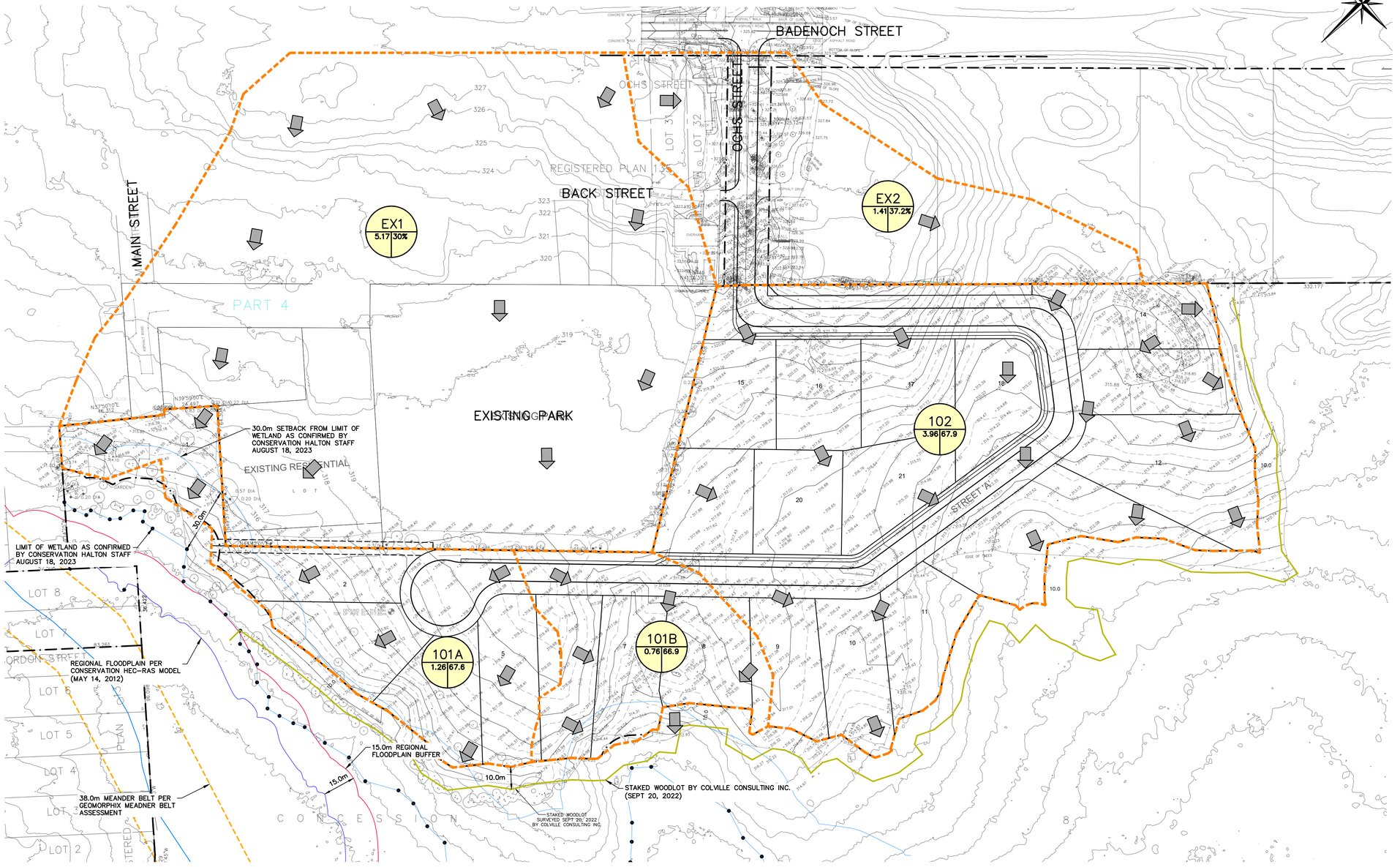

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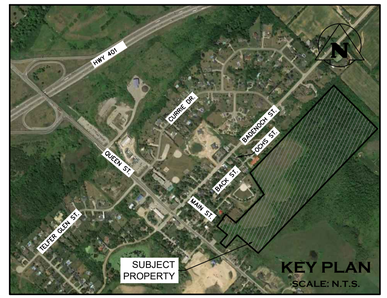

LEGEND

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- EXISTING CONTOUR (1.0m)
- EXISTING DITCH
- EXISTING OVERLAND FLOW DIRECTION
- PRE-DEVELOPMENT STORM DRAINAGE CATCHMENT
- REGIONAL FLOODPLAIN (CONSERVATION HALTON)
- REGIONAL FLOODPLAIN 15.0m BUFFER
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- MEANDER BELT 38m BUFFER (19m EACH SIDE)
- ID / A | %IMP — CATCHMENT I.D.; AREA (ha) | PERCENT IMPERVIOUS
- ID / A | RC — CATCHMENT I.D.; AREA (ha) | RUNOFF CO-EFFICIENT

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FOR REVIEW
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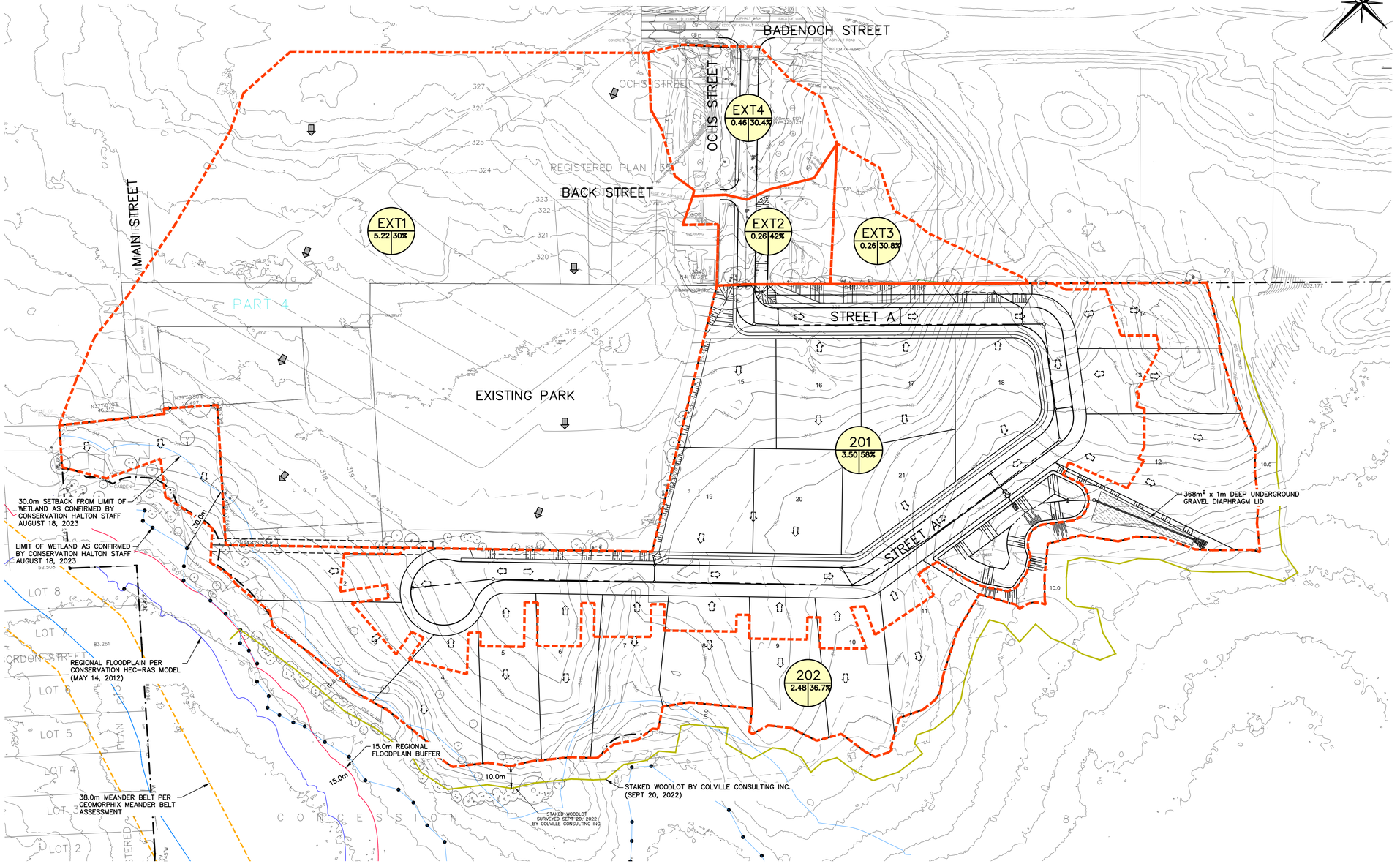
[redacted]

Project
11 MAIN STREET
TOWN OF PUSLINCH

Drawing
PRE-DEVELOPMENT
DRAINAGE PLAN

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON, L9T 6P4
905 875 0026 T
905 875 4915 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn	M.I.M	Design	M.I.M.	Project No.	2366-6537
Check	B.W.	Check	B.W.	Scale	1:1000
				Dwg.	FIG. 6



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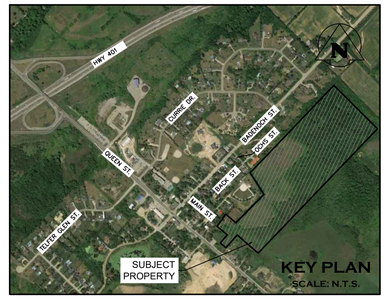

LEGEND

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- EXISTING CONTOUR (1.0m)
- EXISTING DITCH
- x 215.00 EXISTING GRADE
- EXISTING OVERLAND FLOW DIRECTION
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- PROPOSED STORM SEWER & MANHOLE
- PROPOSED SINGLE / DOUBLE CATCHBASIN
- PROPOSED SINGLE CATCHBASIN MANHOLE
- ID / A (ha) | %IMP CATCHMENT I.D. / AREA (ha) | PERCENT IMPERVIOUS

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Project

11 MAIN STREET
TOWN OF PUSLINCH

Drawing

POST-DEVELOPMENT DRAINAGE PLAN

FOR REVIEW
NOT TO BE USED FOR CONSTRUCTION

[redacted]

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON, L9T 6P4
905875-0026 T
905875-4915 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn	Design	Project No.	
M.I.M	M.I.M.		2366-6537
Check	Check	Scale	Dwg.
B.W.	B.W.	1:1000	FIG. 7

J:\2300\2366 - WDD Main Street\6537 - 11 Main Street\CAD\Civil_Sheets\6537_FIG 7.dwg, FIG7, 2024-09-03 2:55:59 PM, hwilkinson

Traffic Impact Study

Part of Lots 7 & 8 North of Queen Street and Part of Lot 31 Concession Road 8

WDD Main Street

28 June 2024

→ The Power of Commitment

Executive Summary

GHD Limited is pleased to provide the following updated Traffic Impact Study in support of the proposed residential development located on part of lots 7 & 8 North of Queen Street and Part of lot 31 Concession 8, located generally southeast of the intersection of Highway 6 and Badenoch Street in the Township of Puslinch. This updated report addresses comments received from the second submission.

This report determines the site related traffic and subsequent traffic related impacts on the adjacent road network during the weekday a.m. and p.m. peak hours. These impacts are based on the projected future background traffic and road network conditions derived for a 2024, 2029 and 2034 future planning horizon year.

The proposed Draft Plan of Subdivision has been prepared by Weston Consulting and consists of 21 detached dwelling units.

Access to the development is proposed via an extension of Ochs Street, providing a direct connection to Badenoch Street at an existing full moves unsignalized intersection.

The study intersections included in the analysis include:

- Highway 6 and Badenoch Street/Calfass Road
- Badenoch Street and Ochs Street
- Ochs Street and Back Street

Based on ITE Trip Generation rates, the proposed development is expected to generate a total of 20 new two-way trips during the weekday a.m. peak hour consisting of 5 inbound and 15 outbound trips and 25 new two-way trips during the weekday p.m. peak hour consisting of 16 inbound and 9 outbound trips.

Under existing conditions, all study intersections are operating with acceptable v/c ratios and delays.

The planned Morriston Bypass was not included in the analysis of future traffic scenarios, as a result, the analysis presented in this report is conservative as it does not account for any reduction in traffic volumes along the existing Highway 6 alignment that will occur once the new alignment is completed.

In the future 2024, 2029 and 2034 horizon years, the intersections continue to operate at mostly satisfactory levels with the intersection of Hwy 6 and Badenoch Street/Calfass Road operating with some critical movements however all movements operating with v/c ratios of less 1.0. The unsignalized intersections of Badenoch Street with Ochs Street and Ochs Street with Back Street are reported to operate with low v/c ratios and delays and no critical movements up to the 2034 horizon year.

The overall impact of the development generated traffic was found to be negligible to the operation of the study area intersections and traffic flow along Highway 6 and Badenoch Street. The site traffic does not result in any turning movements increasing to critical levels, all critical movements under the future traffic scenarios are a result of the assumed corridor growth rate.

Application of the current Township of Puslinch's Comprehensive Zoning By-Law parking rates to the subject site results in a requirement of a minimum of 2 parking spaces per dwelling unit. The minimum By-law parking requirement of 2 spaces per dwelling unit will be satisfied with the provision of garage and driveway parking.

A sightline assessment of vehicles exiting from Och Street onto Badenoch Street was completed in the field, it confirmed that there is sufficient sightlines to satisfy the TAC requirements for a 60 km/h design speed for passenger vehicles and snowplow vehicles. A speed study was completed along Badenoch Street in the general vicinity of the crest of the road to the west of Ochs Street and the results indicated that the eastbound direction had an 85th percentile speed of 61 km/h.

The existing intersection of Badenoch Street and Och Street has an existing retaining wall within the County right-of-way that limits sightline visibility for outbound traffic exiting Och Street to see an oncoming vehicle travelling

eastbound on Badenoch Street. It is recommended that the retaining wall be relocated to provide the required sightline. A design for the relocation of the retaining wall has been prepared by Crozier Consulting Engineers.

The subject site proposes to generally use the Township's 20-metre Urban cross-section along Street "A".

We trust that this satisfies your requirements, but do not hesitate to contact the undersigned if you have any questions.

Sincerely,

GHD

William Maria, P. Eng.

Transportation Planning Lead

Contents

Table Index

Figure Index

Appendices

1. Introduction

1.1 Retainer and Objective

GHD Limited was retained to prepare a Traffic Impact Study in support of the proposed residential development located on part of lots 7 & 8 North of Queen Street and Part of lot 31 Concession 8, located generally southeast of the intersection of Highway 6 and Badenoch Street in the Township of Puslinch.

The updated TIS report, dated June 2024, is in response to comments provided by the Township of Puslinch from their review of the second submission, dated December 2023. The Township expressed concern with having the site's access on Ochs Street due to potential sightline concerns at the intersection of Badenoch Street and Ochs Street. The TIS has also been updated to address the concern related to the sightline issues at the existing intersection. The response to the comments from the previous submission are provided in **Appendix F.**

The site location is illustrated in **Figure 1**.

The purpose of this study is to:

- Establish baseline traffic conditions for the study area in 2023 and determine future background operating conditions for a future planning horizon in 2024, 2029, and 2034.
- Utilize Institute of Transportation Engineer's (ITE) Trip Generation data and first principles to estimate the site trips generated by the proposed development and distribute the traffic to the adjacent road network.
- Determine future operating traffic conditions during the weekday peek periods through intersection capacity analysis.

1.2 Study Team

The GHD team involved in the preparation of the study are:

- William Maria, P. Eng., Transportation Planning Lead
- Rafael Andrenacci, B.Eng., Transportation Planner

Figure 1 Site Location

2. Site Characteristics

2.1 Study Area

The following intersections were included in the study area:

- Highway 6 and Badenoch Street/Calfass Road
- Badenoch Street and Ochs Street
- Ochs Street and Back Street

2.2 Proposed Development Content

A draft plan of subdivision was prepared by Weston Consulting, dated May 2024 and is shown in **Figure 2**. The proposed residential development consists of 21 single detached lots.

Access to the proposed development is proposed primarily an extension of Ochs Street south of its intersection with Back Street. Lot 1 will be the only lot that will have a connection onto Main Street.

rr

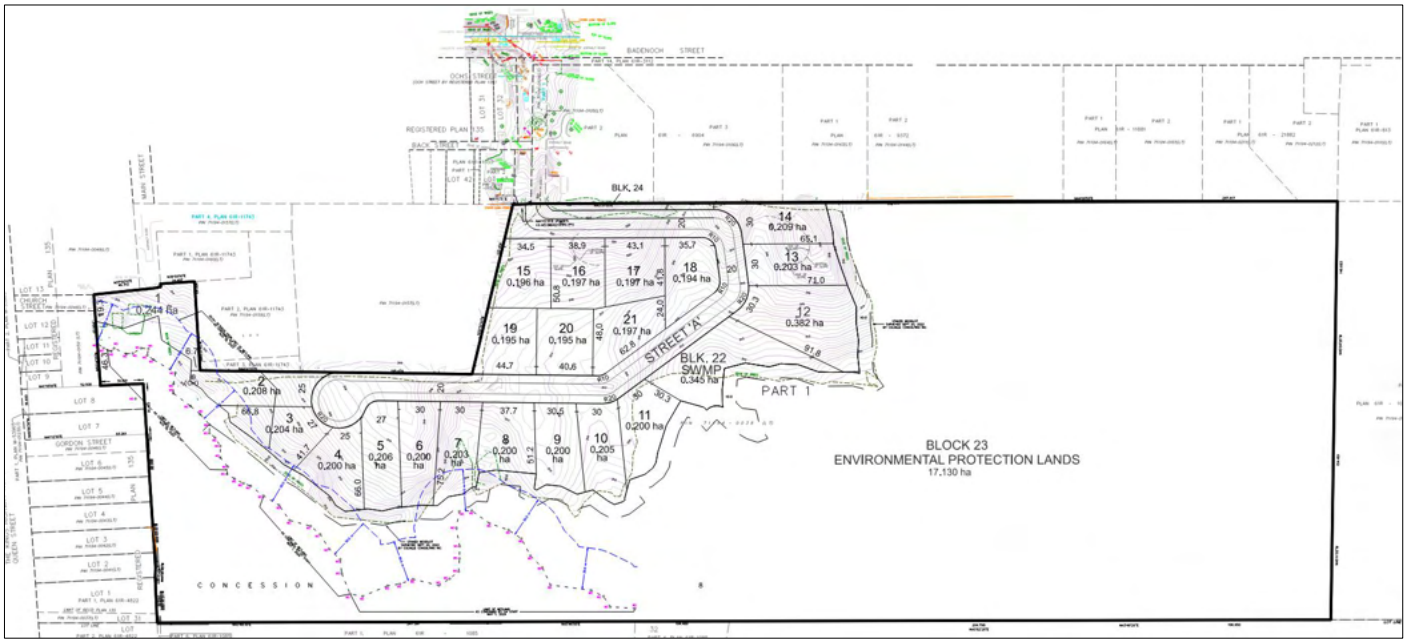


Figure 2 Proposed Draft Plan

3. Existing Conditions

3.1 Existing Road Network

Highway 6 is a north/south 2B arterial road under the jurisdiction of the Ministry of Transportation. Within the study area it has a three-lane cross-section north of its intersection with Badenoch Street/Calfass Road and a two-lane cross-section south of it, with the three-lane cross-section including a two-way left-turn lane in the centre lane. Its intersection with Badenoch Street/Calfass Road is signalized, with an auxiliary left-turn lane in both the northbound and southbound directions. Within the study area, Highway 6 has a posted speed limit of 50 km/h.

Badenoch Street (Wellington Road 36) is an east/west County Road under the jurisdiction of the County of Wellington. Within the study area it has a two-lane cross-section. Its intersection with Highway 6 is signalized with an auxiliary right-turn lane provided in the westbound direction. Its intersection with Ochs Street is unsignalized with the stop-control only provided on the minor approach onto Badenoch Street. West of its intersection with Highway 6, Badenoch Street continues as Calfass Road. The posted speed limit along Badenoch Street is 50 km/h.

Ochs Street is a north/south local road under the jurisdiction of the Township of Puslinch with a two-lane cross-section within the study area. Its intersection with Badenoch Street is unsignalized with the stop-control only provided on the minor approach onto Badenoch Street. Ochs Street currently terminates in the south at Back Street and continues towards the west as Back Street with no stop-controls. The assumed posted speed limit along Ochs Street is 50 km/h.

Back Street is an east/west local road under the jurisdiction of the Township of Puslinch with a two-lane cross-section within the study area. Back Street terminates in the west at Ochs Street and continues towards the north along Ochs Street with no stop-controls at the intersection of Ochs Street and Back Street. The assumed posted speed limit along Back Street is 50 km/h.

The existing lane configuration within the study area is shown in the figure below

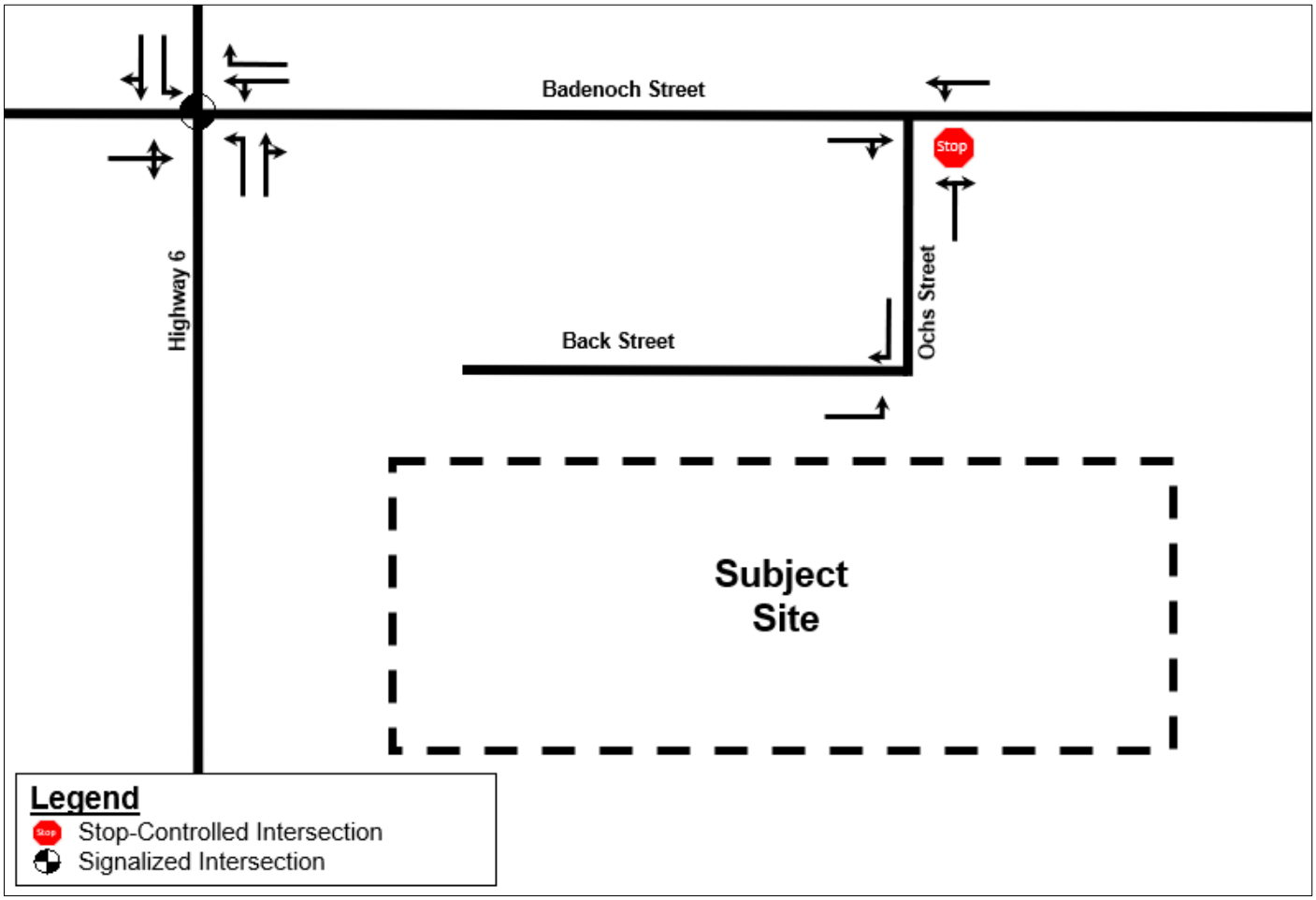


Figure 3 Existing Lane Configuration

3.2 Existing Pedestrian and Cycling Network

Pedestrian sidewalks are available along Highway 6, Badenoch Street, and Calfass Road within the study area.

- Highway 6
  - West side of Highway 6, from Calfass Road to Church Street
  - East side of Highway 6, from approximately 100 metres north of Badenoch Street and continues towards the south beyond the study area.
- Badenoch Street
  - Along both sides of the road from Highway 6 to Ochs Street
- Calfass Road
  - Along the south side of the road from Victoria Street to Highway 6

There are currently no cycling provisions within the study area.

All existing pedestrian and cycling amenities within the study area are shown on **Figure 4**.

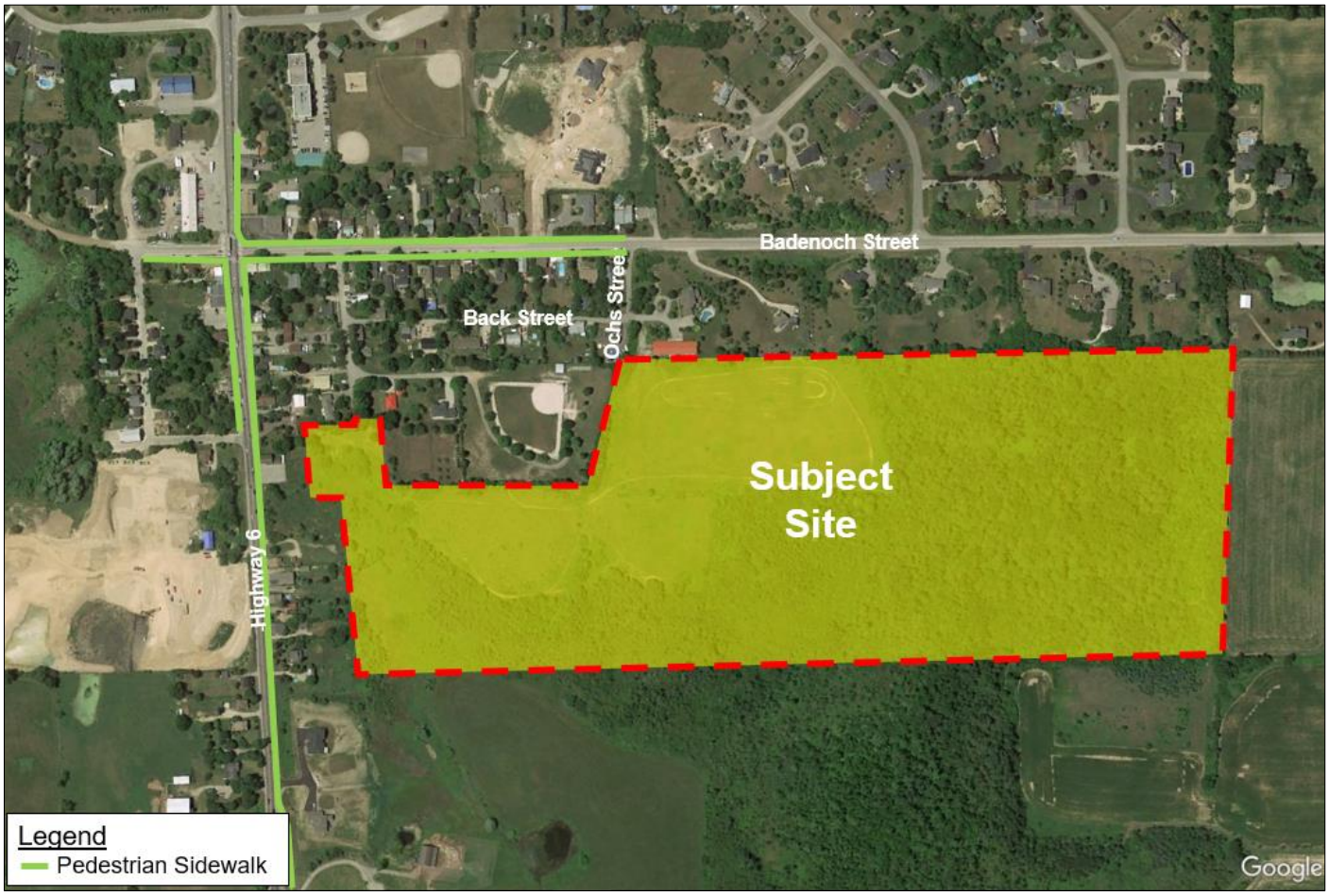


Figure 4 Existing Sidewalk

3.3 Existing Transit Service

With the study area there is currently no public transit service available. However, on October 1, 2019, Wellington County initiated a county-wide demand-responsive public transit service available to all inhabitants and visitors. This project is a pilot service sponsored by the Ontario Government and provides a safe and cost-effective means of transportation throughout the County. The pilot program has been granted two additional years of funding and is expected to conclude in 2025.

RIDE WELL is a public transit service that utilizes a rideshare operational model that uses software to optimize shared rides to ensure that as many individuals as possible are transported to their destination in a reliable manner with minimal vehicles. It provides an alternative means of transportation for regular needs in rural settings and for those who are unable to access personal vehicles.

The service runs from Monday to Friday between 6:00am and 7:00pm. Bookings can be made from or to any location within Wellington County or Guelph.

3.4 Existing Traffic Data

GHD contracted Spectrum Traffic Solutions Inc. to collect turning movement counts at the existing study intersections, with the counts completed in February 2023.

The existing 2023 traffic volumes for the a.m. and p.m. peak hours are summarized in **Figure 5** with the full turning movement count data provided in **Appendix A**.

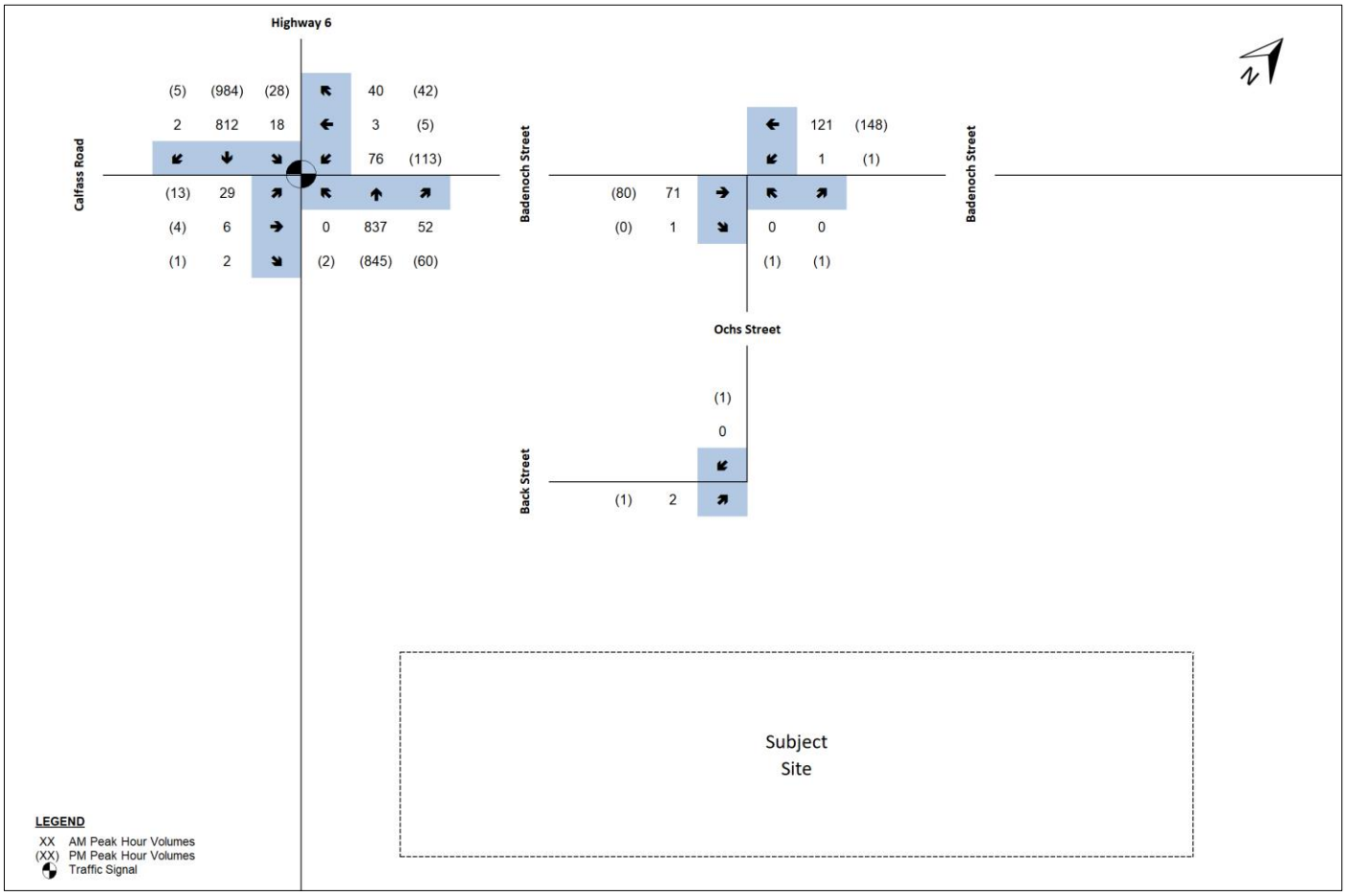


Figure 5 Existing 2022 Traffic Volumes

4. Future Background Traffic

4.1 Study Horizon Year

The future horizon years selected for analysis includes the full build-out year in 2024 along with 5- and 10-years post build-out corresponding to a 2029 and 2034 planning horizon years. This is also consistent with the MTO's Traffic Impact Study Guidelines.

4.2 Road Network Improvements

An environmental assessment was completed and approved by the provincial government for improvements within the Highway 401 and Highway 6 corridor in 1995, with a Notice of Approval to Proceed with the Undertaking being granted in 2009. The proposal included the Morriston Bypass, which will consist of a new four-lane alignment of Highway 6 west of the current alignment from Highway 401 in the north to Maddaugh Road in the south. The new four-lane alignment will provide additional capacity within the corridor with the current alignment through Morriston being restrained to a two-lane cross-section as a result of no additional space to widen the road.

In May 2022, the Ontario government announced that they will be moving forward with the construction of the new interchange and the re-alignment of Highway 6 with the earliest completion date set for 2025 for the interchange.

The updated plan for the project is provided in **Figure 6** below, and identifies the current location of Highway 6, the new alignment of Highway 6, and the location of the subject site with respect to the study area.

Once this road project is constructed, a reduction of vehicular traffic is expected along the current Highway 6 alignment through the study area with the Morriston Bypass providing a new connection from Highway 401 to the southern portion of Highway 6 towards Hamilton.

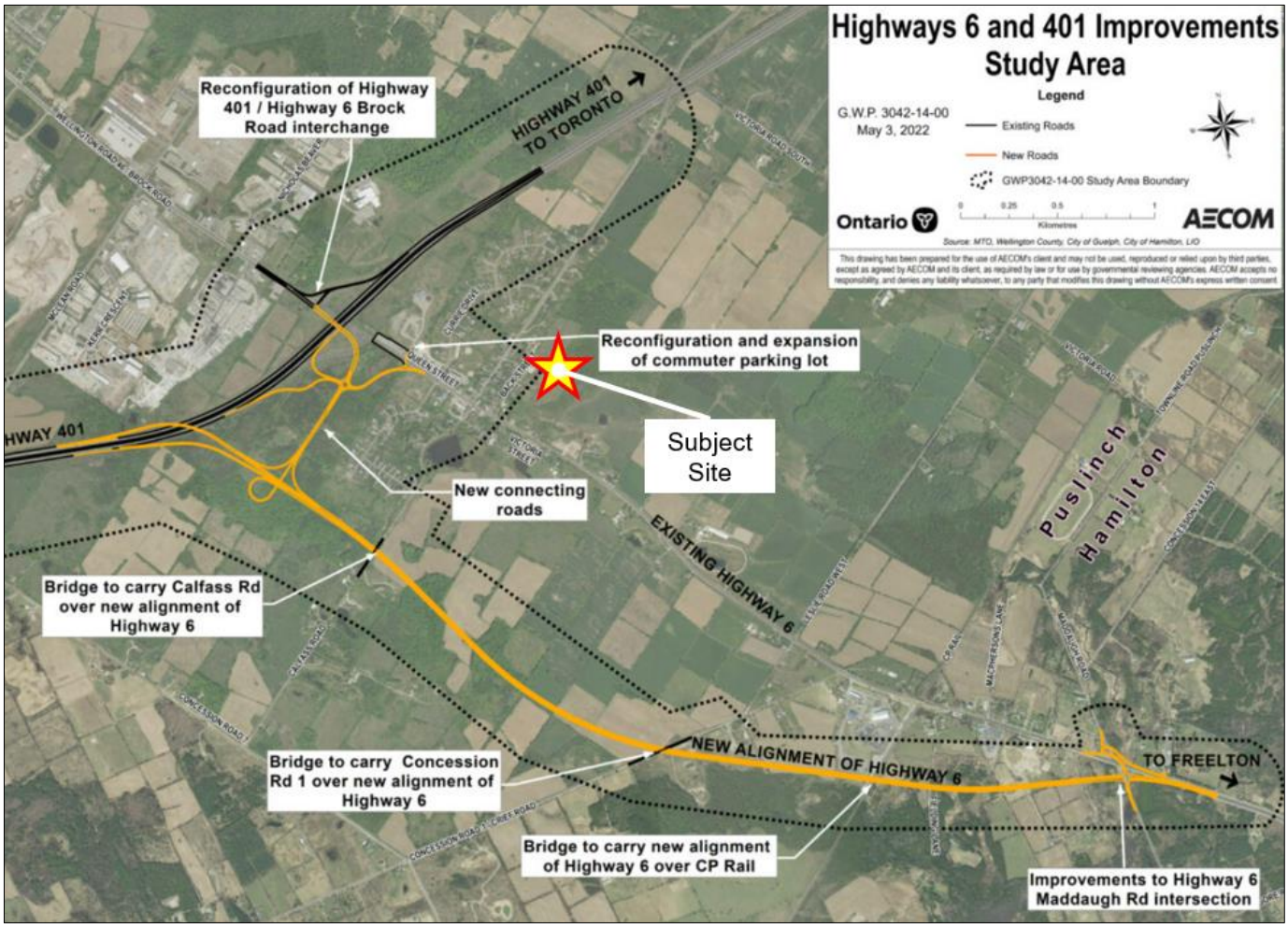


Figure 6 Morriston Bypass (highways6and401hamiltontoguelph.ca)

The Wellington County Road Master Action Plan, dated December 2021, has included an assessment of Badenoch Street within the study area that included a recommendation to consider urbanizing the road between Back Street and Ochs Drive. It is also suggested that a cycling facility assessment be completed prior to the urbanization of the road.

For the purpose of this report, neither of these road improvements have been assumed to be in place by the 2034 horizon year, as a result the analysis presented in this report is conservative as it does not account for any reduction in traffic volumes along the existing Highway 6 alignment that will occur once the new alignment is completed.

4.3 Corridor Growth

GHD applied a 2% per annum growth rate along all study area roads, consistent with the growth rate typically provided by the MTO for roadways under their jurisdiction.

4.4 Background Developments

No background developments were identified near the site that would contribute to additional traffic along the study area roads.

4.5 Future Background Traffic Volumes

The background traffic volumes for the 2024, 2029, and 2034 horizon years were derived by applying the 2% per annum corridor growth rate to the baseline 2023 traffic volumes.

The resulting 2024, 2029, and 2034 future background traffic volumes are summarized in **Figure 7**, **Figure 8**, and **Figure 9**..

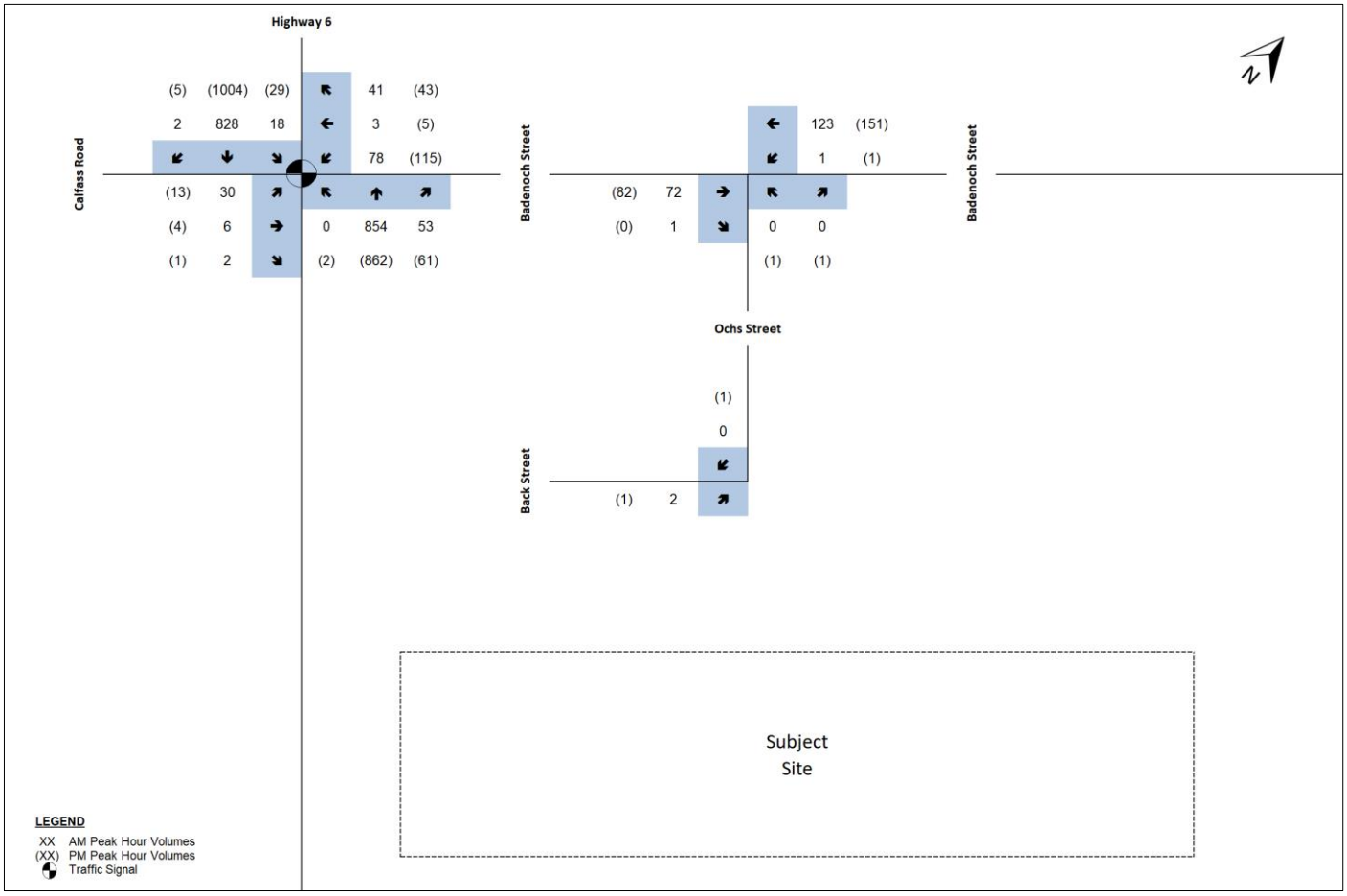


Figure 7 2024 Future Background Traffic Volumes

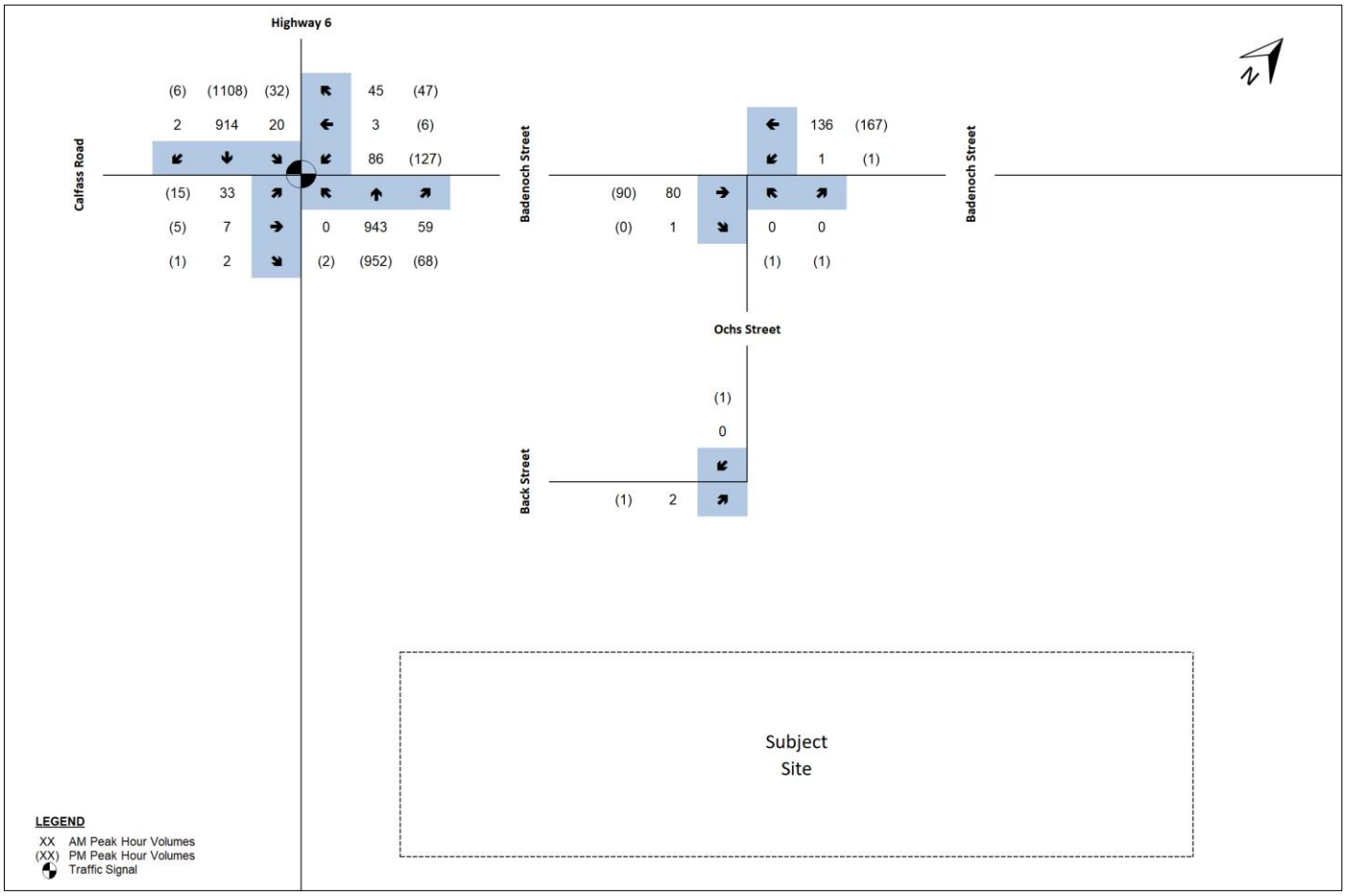


Figure 8 2029 Future Background Traffic Volumes

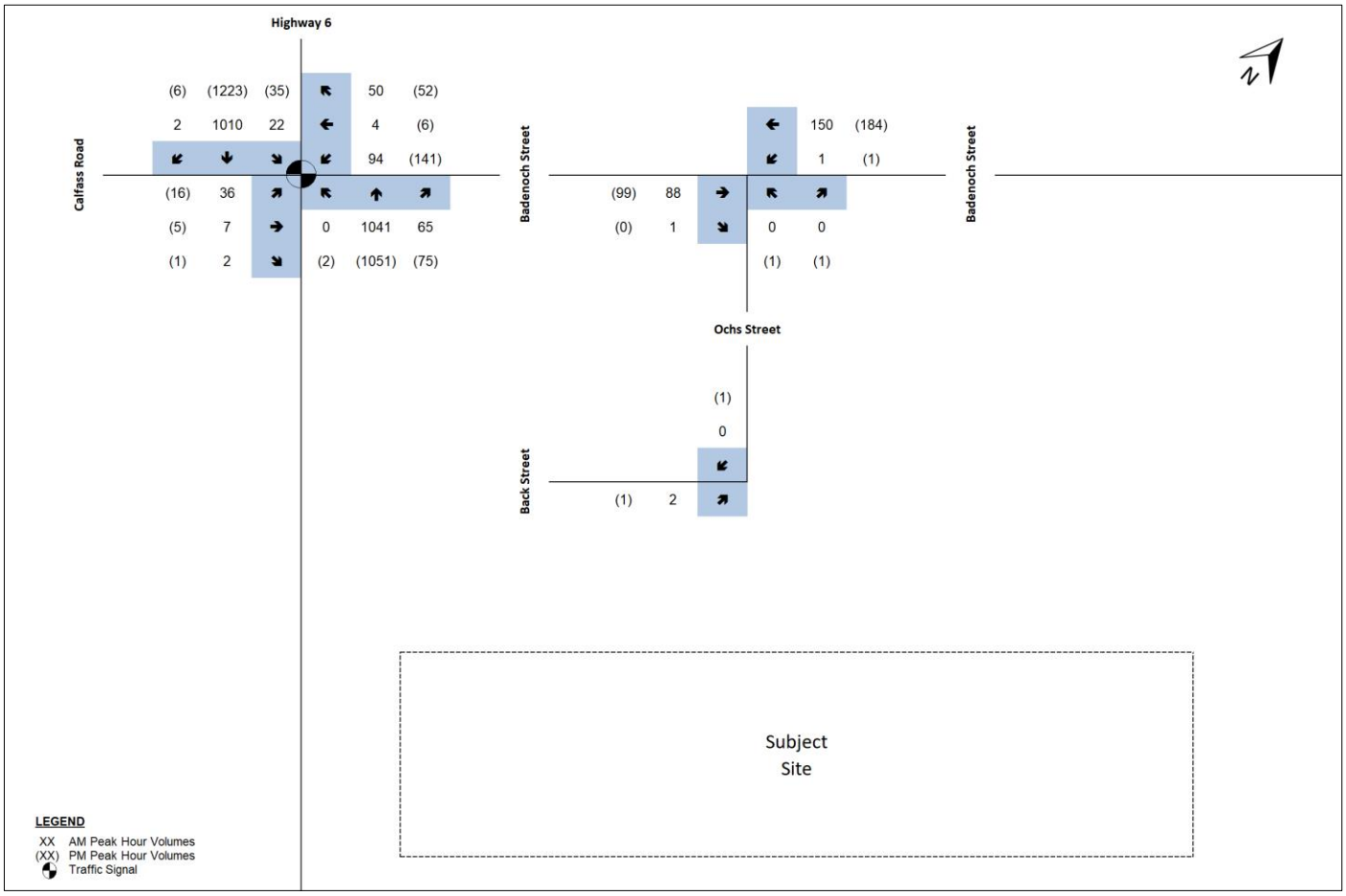


Figure 9 2034 Future Background Traffic Volumes

5. Site Generated Traffic

5.1 Site Traffic Generation

The subject site consists of a total of 21 detached residential lots.

Estimates of trip generation were calculated using rates provided in the Institute of Transportation Engineer's (ITE) Trip Generation Manual, 11th Edition using Land Use Code (LUC) 210 (Single-Family Detached Housing).

GHD compared the average rates to the fitted curve equation and adopted the rate that generated the highest volume of site trips for a more conservative analysis.

No transit modal split reduction was applied to the ITE trip rates given the lack of transit options available in the area.

Table 1 below summarizes the estimated trip generation for the proposed subdivision.

Table 1 Estimated Site Trips

Land Uses	Dwelling Units	Parameters	Peak Hour					
			Weekday AM			Weekday PM		
			In	Out	Total	In	Out	Total
Detached Units (LUC 215)	21 units	Trip Ratio	25%	75%	100%	63%	37%	100%
		Gross Trips	5	15	20	16	9	25
Total Primary Trips			***5***	***15***	***20***	***16***	***9***	***25***

The proposed residential development is expected to generate a total of 20 new two-way trips during the weekday a.m. peak hour consisting of 5 inbound and 11 outbound trips and 25 new two-way trips during the weekday p.m. peak hour consisting of 16 inbound and 9 outbound trips.

5.2 Site Traffic Distribution and Assignment

The distribution of the site-generated traffic was based primarily on a review of the existing travel patterns along the study area roadways and the 2016 Transportation Tomorrow Survey (TTS). Due to a low number of survey results within the subject site's zone (8315) and the next nearest zone with a considerable number of dwelling units (8307), the existing travel patterns derived from the turning movement counts provided a better representation of travel patterns to be used by future residents within the study area.

It was assumed that the Morriston Bypass would not have an impact on the site traffic distribution once constructed with site generated traffic continuing to use the current Highway 6 alignment to access Highway 401 and Guelph to the north or Hamilton, Highway 403 and the Queen Elizabeth Way to the south.

The proposed trip distribution is summarized in **Table 2** below.

Table 2 Trip Distribution

Origin/Destination	AM Peak Hour		PM Peak Hour	
	Percentage of Inbound Trips	Percentage of Outbound Trips	Percentage of Inbound Trips	Percentage of Outbound Trips
North (Highway 6)	45%	45%	45%	45%
South (Highway 6)	45%	45%	45%	45%
East (Badenoch Street)	10%	10%	10%	10%
Total	**100%**	**100%**	**100%**	**100%**

The estimated site trips generated by the proposed development and distributed to the study area road network for the weekday a.m. and p.m. peak hours is shown in **Figure 10**.

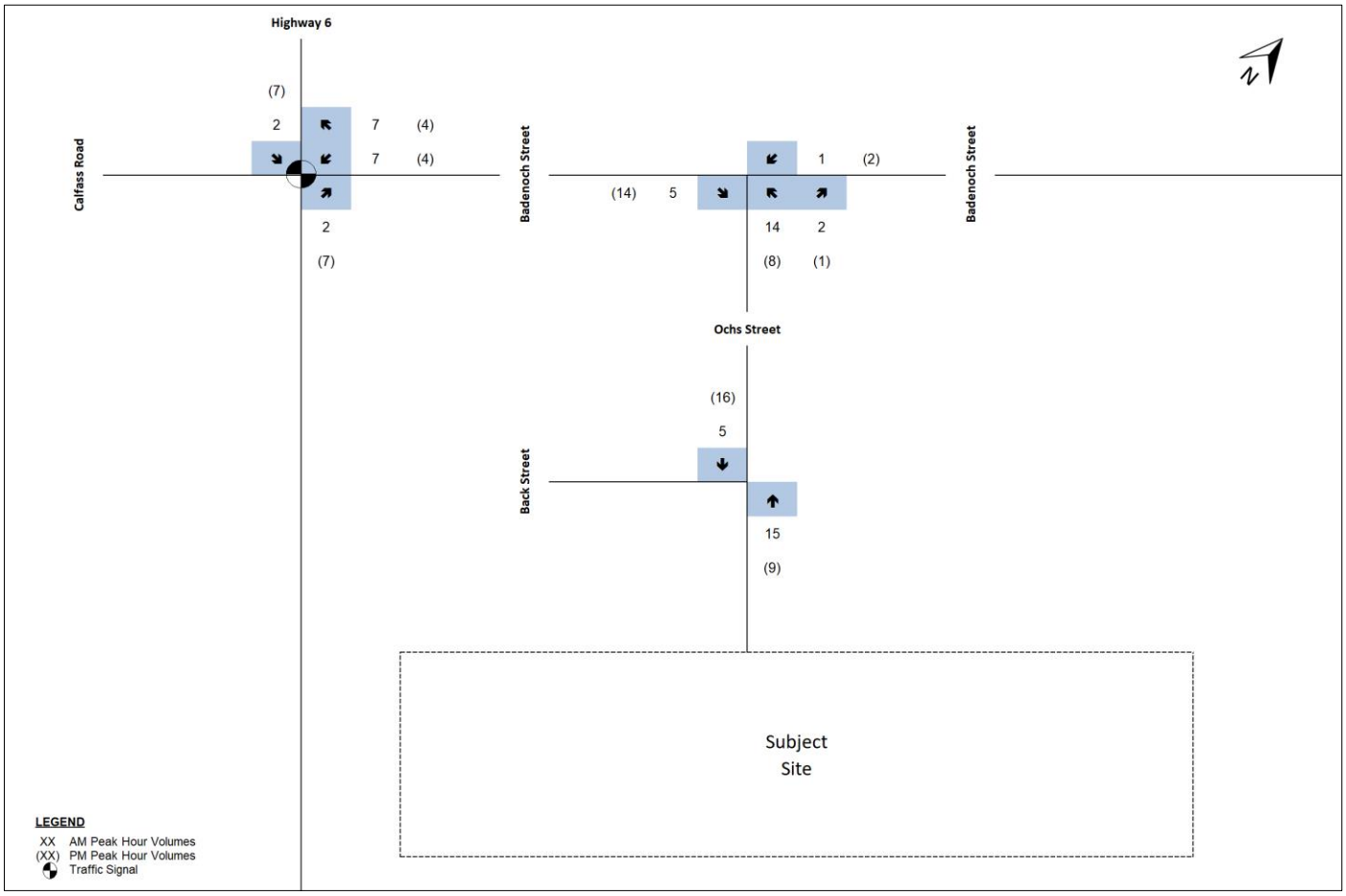


Figure 10 Total Site Trips

6. Future Total Traffic

The future total traffic conditions in the weekday a.m. and p.m. peak hours for the 2024, 2029, and 2034 planning horizons were derived by combining the projected future background traffic with the corresponding estimated site generated traffic. The resulting traffic volumes are presented in **Figure 11**, **Figure 12**, and **Figure 13**.

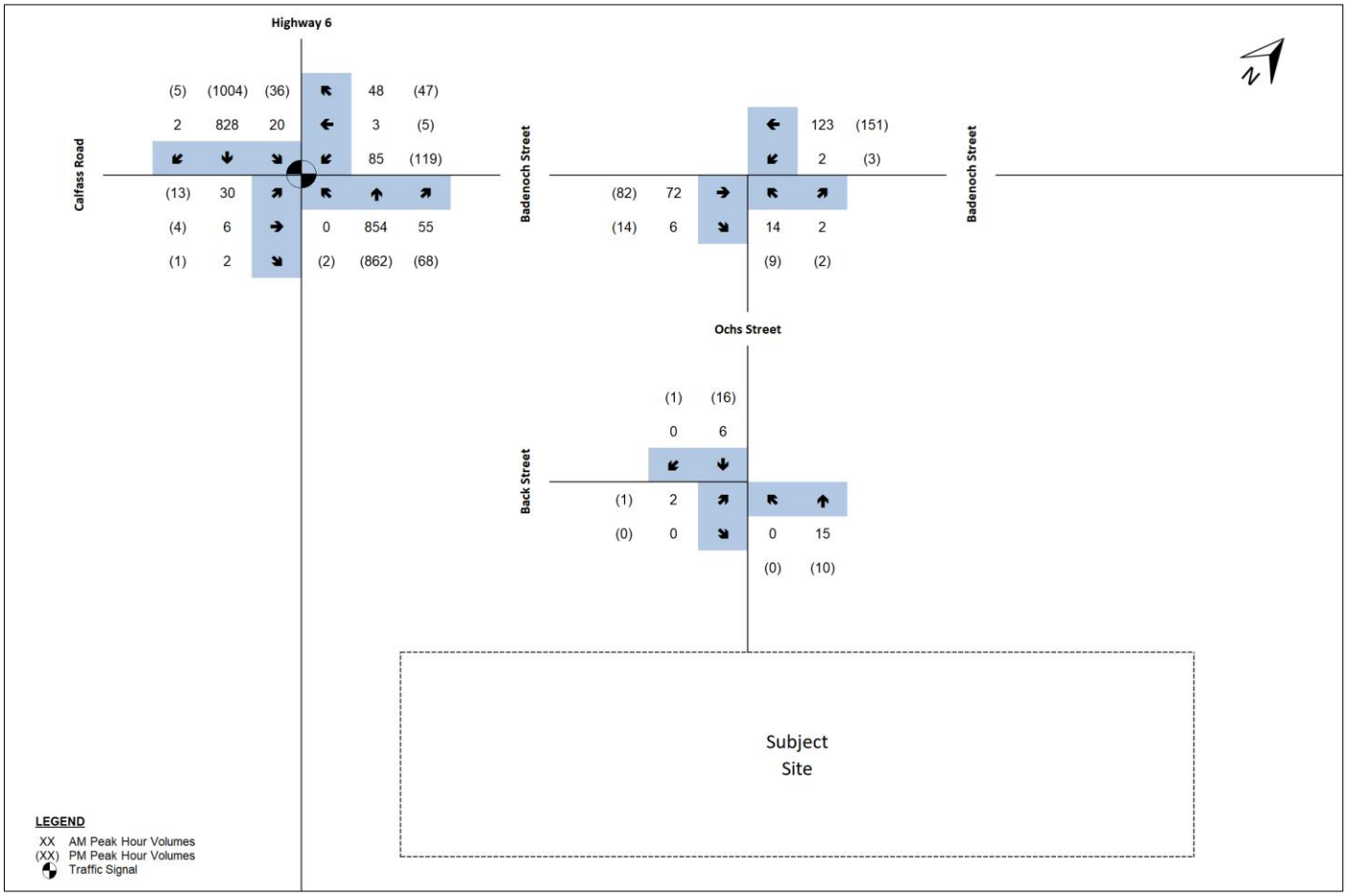


Figure 11 2024 Future Total Traffic Volumes

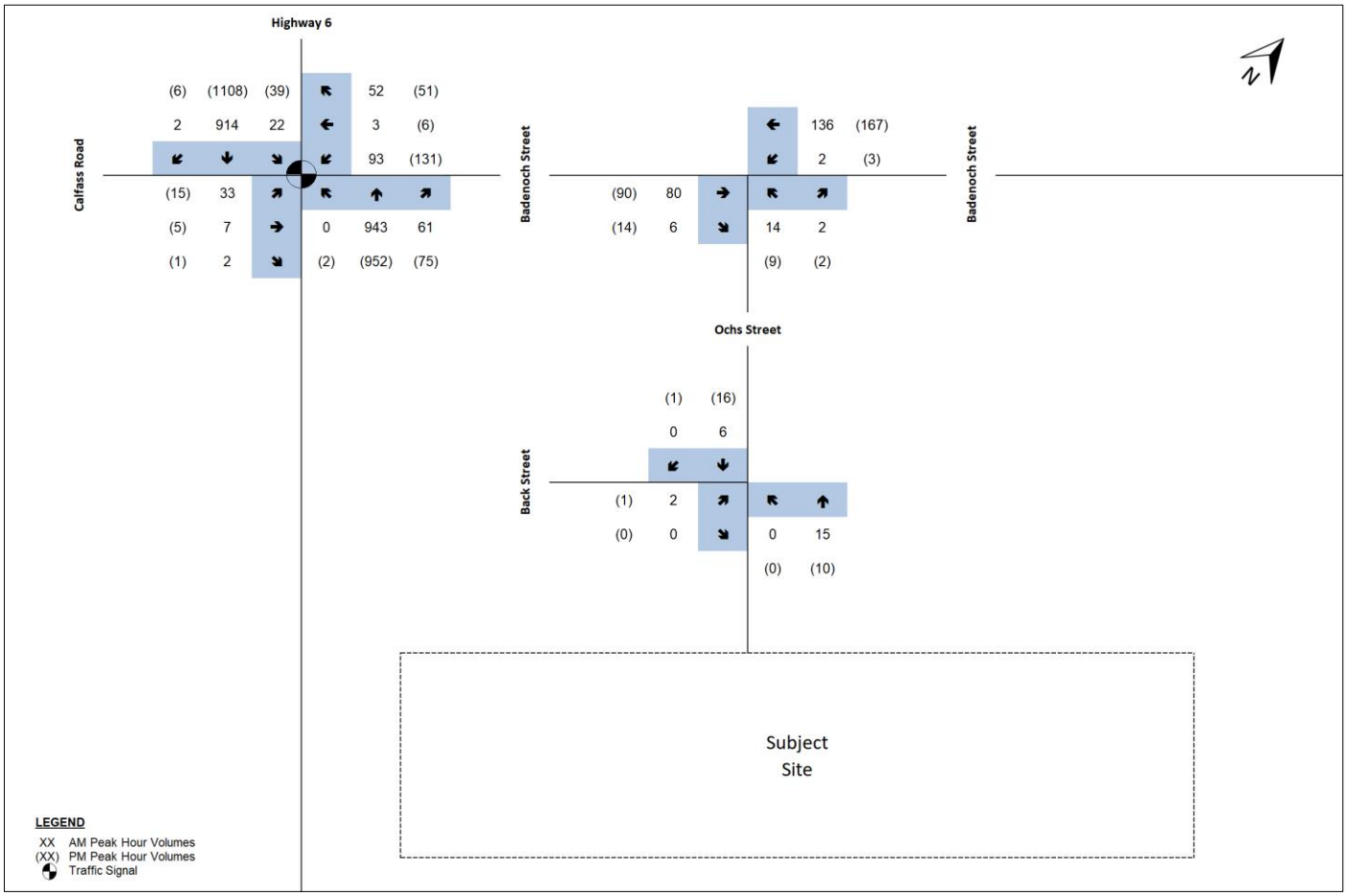


Figure 12 2029 Future Total Traffic Volumes

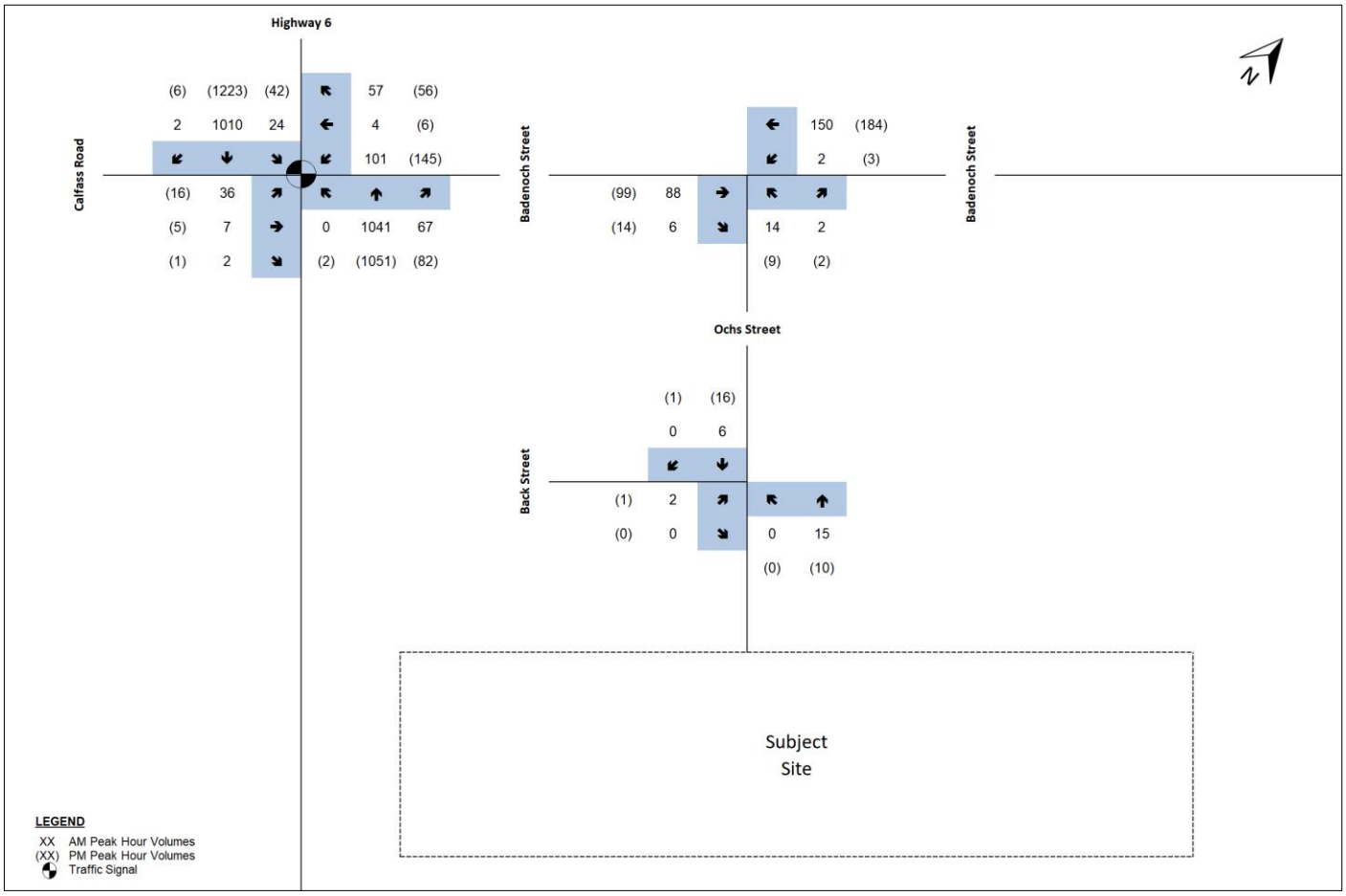


Figure 13 2034 Future Total Traffic Volumes

7. Capacity Analysis

The capacity analysis identifies how well the intersections and driveways are operating. The analysis contained within this report utilized the Highway Capacity Manual (HCM) 2000 procedure within the Synchro Version 10 Software package. The reported intersection volume-to-capacity ratios (v/c) are a measure of the saturation volume for each turning movement, while the levels-of-service (LOS) are a measure of the average delay for each turning movement. Queuing characteristics are reported as the predicted 95th percentile queue for each turning movement. Both pedestrian crossing volumes and heavy vehicle proportions are included in the analyses. The peak hour factors from the traffic counts were used to analyze existing and future traffic conditions.

The analysis includes identification and required modifications and improvements (if any) at intersections where the addition of background growth or background growth plus site-generated traffic volumes causes the following:

'Critical' intersections and movements for a signalized intersection include:

- V/C ratios for overall intersections operations, through movements, or shared through/turning movements increase to 0.85 or above;
- V/C ratios for exclusive movements increase to 0.90 or above; or
- 95th percentile queue length for individual movements that are projected to, or exceed, the storage length.

'Critical' intersections and movements for an unsignalized intersection include:

- Level of Services (LOS), based on average delay per vehicle, on individual movements exceeds LOS "D",
- Queue length for individual movements that exceeds the lesser of 5 vehicles or the available queue storage.

For signalized intersections under the jurisdiction of the MTO, movements with v/c ratios greater than 0.85 are deemed to be "critical".

The following tables summarize the HCM capacity results for the study intersections during the weekday a.m. and p.m. peak hours under existing (2023), future background (2024, 2029 & 2034) and future total (2024, 2029 & 2034) traffic conditions. The detailed calculation sheets are provided in **Appendix B**.

7.1 Highway 6 and Badenoch Street/Calfass Road

Capacity analysis at this intersection during the weekday a.m. and p.m. peak hours for the existing, future background, and future total traffic condition are summarized in the following table.

Table 3 Capacity analysis of Highway 6 and Badenoch Street/Calfass Road

Scenario	AM Peak Hour		PM Peak Hour	
	V/C (LOS) seconds	95th % Que.	V/C (LOS) seconds	95th % Que
Existing 2023	Overall: 0.70 (B) 14 EBTLR = 0.21 (D) 37 WBTL = 0.45 (D) 44 WBR = 0.03 (C) 34 NBL = 0 (A) 0 NBTR = 0.75 (B) 12 SBL = 0.08 (A) 4 SBTR = 0.73 (B) 12	 EBTLR = 15 m WBTL = 30 m WBR = 10 m NBL = 0 m NBTR = 135 m SBL = 5 m SBTR = 120 m	Overall: 0.79 (B) 16 EBTLR = 0.08 (C) 30 WBTL = 0.57 (D) 36 WBR = 0.03 (C) 30 NBL = 0.01 (A) 4 NBTR = 0.8 (B) 13 SBL = 0.12 (A) 5 SBTR = 0.84 (B) 15	 EBTLR = 10 m WBTL = 50 m WBR = 10 m NBL = 5 m NBTR = 170 m SBL = 5 m SBTR = 200 m
Future Background 2024	Overall: 0.71 (B) 13 EBTLR = 0.24 (D) 40 WBTL = 0.54 (D) 50 WBR = 0.03 (D) 36 NBL = 0 (A) 0	 EBTLR = 15 m WBTL = 30 m WBR = 10 m NBL = 0 m	Overall: 0.77 (B) 16 EBTLR = 0.1 (D) 46 WBTL = 0.71 (E) 62 WBR = 0.03 (D) 45 NBL = 0.01 (A) 3	 EBTLR = 10 m WBTL = 50 m WBR = 10 m NBL = 5 m

Scenario	AM Peak Hour		PM Peak Hour	
	V/C (LOS) seconds	95th % Que.	V/C (LOS) seconds	95th % Que
	NBTR = 0.74 (B) 11 SBL = 0.08 (A) 4 SBTR = 0.72 (B) 10	NBTR = 125 m SBL = 5 m SBTR = 115 m	NBTR = 0.74 (B) 11 SBL = 0.09 (A) 4 SBTR = 0.77 (B) 12	NBTR = 180 m SBL = 5 m SBTR = 210 m
Future Total 2024	Overall: 0.72 (B) 14 EBTLR = 0.25 (D) 40 WBTL = 0.59 (D) 53 WBR = 0.03 (D) 36 NBL = 0 (A) 0 NBTR = 0.74 (B) 11 SBL = 0.08 (A) 4 SBTR = 0.72 (B) 10	 EBTLR = 15 m WBTL = 35 m WBR = 10 m NBL = 0 m NBTR = 125 m SBL = 5 m SBTR = 115 m	Overall: 0.77 (B) 16 EBTLR = 0.1 (D) 46 WBTL = 0.73 (E) 64 WBR = 0.03 (D) 45 NBL = 0.01 (A) 4 NBTR = 0.74 (B) 12 SBL = 0.12 (A) 4 SBTR = 0.78 (B) 13	 EBTLR = 10 m WBTL = 50 m WBR = 10 m NBL = 5 m NBTR = 185 m SBL = 5 m SBTR = 210 m
Future Background 2029	Overall: 0.79 (B) 16 EBTLR = 0.27 (D) 41 WBTL = 0.6 (D) 54 WBR = 0.03 (D) 36 NBL = 0 (A) 0 NBTR = 0.82 (B) 14 SBL = 0.11 (A) 4 SBTR = 0.8 (B) 13	 EBTLR = 15 m WBTL = 35 m WBR = 10 m NBL = 0 m NBTR = 165 m SBL = 5 m SBTR = 150 m	Overall: 0.84 (B) 20 EBTLR = 0.1 (D) 46 WBTL = 0.77 (E) 68 WBR = 0.05 (D) 45 NBL = 0.01 (A) 4 NBTR = 0.82 (B) 15 SBL = 0.13 (A) 5 **SBTR = 0.86 (B) 17**	 EBTLR = 15 m WBTL = 60 m WBR = 15 m NBL = 5 m NBTR = 225 m SBL = 5 m SBTR = 275 m
Future Total 2029	Overall: 0.80 (B) 16 EBTLR = 0.27 (D) 41 WBTL = 0.64 (E) 57 WBR = 0.04 (D) 36 NBL = 0 (A) 0 NBTR = 0.82 (B) 14 SBL = 0.12 (A) 4 SBTR = 0.8 (B) 13	 EBTLR = 15 m WBTL = 40 m WBR = 10 m NBL = 0 m NBTR = 165 m SBL = 5 m SBTR = 150 m	Overall: **0.85** (C) 20 EBTLR = 0.1 (D) 46 WBTL = 0.78 (E) 69 WBR = 0.05 (D) 45 NBL = 0.01 (A) 4 NBTR = 0.82 (B) 15 SBL = 0.17 (A) 6 **SBTR = 0.86 (B) 17**	 EBTLR = 15 m WBTL = 60 m WBR = 15 m NBL = 5 m NBTR = 230 m SBL = 10 m SBTR = 275 m
Future Background 2034	Overall: **0.87** (C) 22 EBTLR = 0.31 (D) 42 WBTL = 0.66 (E) 58 WBR = 0.03 (D) 36 NBL = 0 (A) 0 **NBTR = 0.91 (C) 20** SBL = 0.17 (A) 6 **SBTR = 0.88 (B) 18**	 EBTLR = 20 m WBTL = 40 m WBR = 10 m NBL = 0 m NBTR = 265 m SBL = 5 m SBTR = 240 m	Overall: **0.93** (C) 27 EBTLR = 0.13 (D) 46 **WBTL = 0.87 (F) 85** WBR = 0.08 (D) 46 NBL = 0.02 (A) 4 **NBTR = 0.90 (C) 20** SBL = 0.2 (A) 7 **SBTR = 0.94 (C) 26**	 EBTLR = 15 m WBTL = 75 m WBR = 15 m NBL = 5 m NBTR = 340 m SBL = 10 m SBTR = 380 m
Future Total 2034	Overall: **0.88** (C) 22 EBTLR = 0.31 (D) 42 WBTL = 0.71 (E) 62 WBR = 0.04 (D) 36 NBL = 0 (A) 0 NBTR = **0.91** (C) 20 SBL = 0.18 (A) 6 SBTR = **0.88** (B) 18	 EBTLR = 20 m WBTL = 45 m WBR = 10 m NBL = 0 m NBTR = 265 m SBL = 5 m SBTR = 240 m	Overall: **0.94** (C) 28 EBTLR = 0.13 (D) 46 **WBTL = 0.89 (F) 90** WBR = 0.09 (D) 46 NBL = 0.02 (A) 4 NBTR = **0.90** (C) 21 SBL = 0.25 (A) 8 SBTR = **0.94** (C) 26	 EBTLR = 15 m WBTL = 75 m WBR = 15 m NBL = 5 m NBTR = 345 m SBL = 10 m SBTR = 380 m

Under existing conditions, the intersection of Highway 6 and Badenoch Street is operating at acceptable levels with an overall v/c ratio of 0.70 LOS B and 0.79 LOS B during the a.m. and p.m. peak hours, respectively. The longest delays are observed in the westbound through-left movement, reporting delays of 44 and 36 seconds during the a.m. and p.m. peak hours, respectively.

Under the 2024 future background horizon year, including the addition of corridor growth and signal timing improvements to minimize delays, the intersection continues to operate at satisfactory levels with overall v/c ratios of 0.71 LOS B and 0.77 LOS B during the a.m. and p.m. peak hours, respectively. The westbound through-left movement continues to operate with the longest delays with a 50 second delay during the a.m. peak hour and 62 seconds during the p.m. peak hour.

Under the 2024 future total traffic condition, with the addition of the site generated traffic, the overall intersection continues to operate at a satisfactory level with a slight increase to the overall v/c ratio from 0.71 to 0.72 LOS B during the a.m. peak hour and remains unchanged at 0.77 LOS during the p.m. peak hour. With the addition of the site traffic, the delays to the westbound through/left movements reports a nominal increase of 3 seconds during the a.m. peak hour and 2 seconds during the p.m. peak hour.

Under the 2029 future background scenario, which includes corridor growth and signal improvements, the intersection continues to operate at satisfactory levels with an overall v/c ratio of 0.79 LOS B during the a.m. peak hour and 0.84 LOS B during the p.m. peak hour. The delays along the westbound through-left movement have increased to 54 and 68 seconds during the a.m. and p.m. peak hour, respectively, as a result of corridor growth.

With the addition of site generated traffic under the 2029 future total scenario, the overall v/c ratios of the intersection continue to operate satisfactorily and an increase of 0.01 to 0.80 LOS B during the a.m. peak hour and 0.01 to 0.85 LOS C during the p.m. peak hour. With the addition of the proposed development site traffic, the delays along the westbound through-left movement increase by 3 seconds and 1 second during the a.m. and p.m. peak hour, respectively.

Under the 2034 future background scenario, which includes corridor growth and signal improvements, the intersection continues to operate at satisfactory levels with an overall v/c ratio of 0.87 LOS C during the a.m. peak hour and 0.93 LOS C during the p.m. peak hour. The westbound through-left movement continues to operate with the longest delays with a 58 second delay during the a.m. peak hour and 85 second delay during the p.m. peak hour.

With the addition of site generated traffic under the 2034 future total scenario, the overall v/c ratios of the intersection continue to operate satisfactorily and an increase of 0.01 to 0.88 LOS C during the a.m. peak hour and 0.01 to 0.94 LOS C during the p.m. peak hours. The reported delays to the westbound through-left movement increase by 4 seconds to 62 seconds during the a.m. peak hour and 5 seconds to 90 seconds during the p.m. peak hour.

No improvements are recommended at this intersection as a result of the proposed development. The majority of the intersection capacity issues are a result of the 2034 horizon year and are a result of the assumed corridor growth rate along Highway 6. Furthermore, there are limited options to improve the geometry of the intersection given the available right-of-way, proximity to existing buildings and unique configuration of the intersection. The delays are expected to be significantly reduced once the Morriston Bypass is constructed and volumes along the existing Highway 6 alignment are reduced through the study area.

7.1.1 Queuing Analysis – Left-Turn Lane, MTO Protocol

As requested by the MTO, a queueing analysis was completed at the intersection of Highway 6 and Badenoch Street/Calfass Road based on the MTO's Protocol using the MTO's Geometric Design Standards.

The findings are summarized in the table below and are based on the Future Total 2034 volumes for the auxiliary southbound left-turn. The recommended storage length (in vehicles) has been retrieved from the MTO's Geometric Design Standards for Ontario Highways, Chapter B, Table B7-5 for urban/commuter intersections.

Table 4 MTO Queuing Protocol - Highway 6 and Badenoch Street/Calfass Road (FB 2034)

Lane	Future Background Volumes (2034)	Heavy Vehicle%	PCU	Cycle Length (in seconds)	Arrival Rate (vehicles/cycle)	Recommended Storage, MTO Table B7-5 (vehicles)	Recommended Storage (in metres, 7.5 m/vehicle)	Available Storage (metres)
AM Peak Hour								
SBL	22	27.8%	28	91	0.8	2	15	40
NBL	14	0%	14	91	0.4	2	15	20
PM Peak Hour								
SBL	35	0%	35	120	1.2	3	22.5	40
NBL	2	0%	2	120	0.1	1	7.5	20

Table 5 MTO Queuing Protocol - Highway 6 and Badenoch Street/Calfass Road (FT 2034)

Lane	Future Total Volumes (2034)	Heavy Vehicle%	PCU	Cycle Length (in seconds)	Arrival Rate (vehicles/cycle)	Recommended Storage, MTO Table B7-5 (vehicles)	Recommended Storage (in metres, 7.5 m/vehicle)	Available Storage (metres)
AM Peak Hour								
SBL	24	27.8%	31	91	0.8	2	15	40
NBL	14	0%	14	91	0.4	2	15	20
PM Peak Hour								
SBL	42	0%	42	120	1.4	4	30	40
NBL	2	0%	2	120	0.1	1	7.5	20

As summarized in the table above, under the Future Total 2034 scenario, the auxiliary southbound left-turn and would have a recommended storage length of 30 metres based on the MTO's protocol. The southbound left-turn lane has 40 metres of available storage satisfying the recommended storage length. The northbound left-turn lane has a recommended storage length of 15 and 7.5 metres during the a.m. and p.m. peak hours, respectively, during both peak hours. The northbound left-turn lane has 20 metres of available storage satisfying the recommended storage length

As a result, no improvements are recommended for the southbound left-turn lane at this intersection as a result of the proposed development.

7.1.2 Queuing Analysis – Right-Turn Lane, MTO Protocol

As directed by MTO staff, the right-turn lane queuing assessment was completed based methodology provided from MTO staff based on Chapter 9 of TAC's Geometric Design Guide for Canadian Roads. The queueing assessment was completed as follows:

- For right-turn movements do not convert trucks to passenger vehicles, use VPH only.
- For right-turn taper with auxiliary lanes at signalized intersections, the storage lane length should accommodate:
    - 1.5 times the average number of passenger vehicles to be stored per cycle for roadway design speed <= 60kph
    - 2 times the number of pass vehicles for design speed >= 60kph

- For right-turn storage length calculations based on TAC Chapter 9, use 90 sec signal cycle length.

The right-turn lane queueing analysis is summarized in the table below.

Table 6 MTO Queuing Protocol - Right-Turn Lane at Highway 6 and Badenoch Street/Calfass Road

Design Speed	Scenario	Lane	Future Volumes (2034)	Cycle Length (in seconds)	Arrival Rate (vehicles/cycle)	Recommended Storage (2x arrival rate, 7.5 metre vehicle)	Available Storage (metres)
60 km/h	**AM Peak Hour**						
	FB2034	**WBR**	50	90	1.3	19	30
	FT2034	**WBR**	57	90	1.4	22	30
	PM Peak Hour						
	FB2034	**WBR**	52	90	1.3	20	30
	FT2034	**WBR**	56	90	1.4	21	30

As summarized in the table above, the auxiliary westbound right-turn lane would have a recommended storage length of 10 and 11 metres under future background and future total 2034 volumes, respectively based on the MTO's protocol. The westbound right-turn lane has 30 metres of available storage satisfying the recommended storage length.

7.1.3 Queuing Analysis – SimTraffic

GHD also completed a SimTraffic analysis of the intersection using a 15-minute seed time, 60-minute run time, and an average of 5 runs. The results of the analysis are provided in the table below.

Table 7 Highway 6 and Badenoch Street/Calfass Road SimTraffic Queueing Analysis (2034)

Scenario	SimTraffic 95th Percentile Queue Length	
	AM Peak Hour	PM Peak Hour
Future Background 2034	EBTLR = 22 m WBTL = 44 m WBR = 25 m NBL = 0 m NBTR = 213 m SBL = 25 m SBTR = 126 m	EBTLR = 14 m WBTL = 66 m WBR = 28 m NBL = 3 m NBTR = 242 m SBL = 27 m SBTR = 125 m
Future Total 2034	EBTLR = 27 m WBTL = 46 m WBR = 26 m NBL = 0 m NBTR = 231 m SBL = 28 m SBTR = 122 m	EBTLR = 14 m WBTL = 68 m WBR = 27 m NBL = 3 m NBTR = 276 m SBL = 40 m SBTR = 120 m

As summarized in the table above, the westbound right-turn lane operates with a 95th percentile queue length of 25 metres during the a.m. peak hour and 28 metres during the p.m. peak hour under the 2034 future background conditions.

With the addition of site generated traffic under the 2034 future total condition, the queuing in the westbound right-turn lane is reported to increase by one 1 metre during the a.m. peak hour to 26 metres and is not reported to increase during the p.m. peak hour.

There is approximately 30 metres of available storage for the westbound right turn lane on Badenoch Street, as a result, no improvements are recommended for the westbound right-turn lane at this intersection as a result of the proposed development.

7.2 Badenoch Street and Ochs Street

Capacity analysis for this intersection during the weekday a.m. and p.m. peak hours for the existing, future background, and future total traffic conditions out are summarized in the following table.

Table 8 Capacity analysis of Badenoch Street and Ochs Street

Scenario	AM Peak Hour		PM Peak Hour	
	V/C (LOS) seconds	95th % Que.	V/C (LOS) seconds	95th % Que
Existing 2023	EBTR = 0.05 (A) 0 WBTL = 0 (A) 0 NBLR = 0 (A) 0	EBTR = 0 m WBTL = 0 m NBLR = 0 m	EBTR = 0.05 (A) 0 WBTL = 0 (A) 0 NBLR = 0 (A) 9	EBTR = 0 m WBTL = 0 m NBLR = 5 m
Future Background 2024	EBTR = 0.05 (A) 0 WBTL = 0 (A) 0 NBLR = 0.02 (A) 0	EBTR = 0 m WBTL = 0 m NBLR = 0 m	EBTR = 0.05 (A) 0 WBTL = 0 (A) 0 NBLR = 0 (A) 9	EBTR = 0 m WBTL = 0 m NBLR = 5 m
Future Total 2024	EBTR = 0.05 (A) 0 WBTL = 0 (A) 0 NBLR = 0.02 (A) 10	EBTR = 0 m WBTL = 0 m NBLR = 5 m	EBTR = 0.06 (A) 0 WBTL = 0 (A) 0 NBLR = 0.02 (A) 10	EBTR = 0 m WBTL = 0 m NBLR = 5 m
Future Background 2029	EBTR = 0.05 (A) 0 WBTL = 0 (A) 0 NBLR = 0 (A) 0	EBTR = 0 m WBTL = 0 m NBLR = 0 m	EBTR = 0.06 (A) 0 WBTL = 0 (A) 0 NBLR = 0 (A) 9	EBTR = 0 m WBTL = 0 m NBLR = 5 m
Future Total 2029	EBTR = 0.06 (A) 0 WBTL = 0 (A) 0 NBLR = 0.02 (A) 10	EBTR = 0 m WBTL = 0 m NBLR = 5 m	EBTR = 0.07 (A) 0 WBTL = 0 (A) 0 NBLR = 0.02 (A) 10	EBTR = 0 m WBTL = 0 m NBLR = 5 m
Future Background 2034	EBTR = 0.06 (A) 0 WBTL = 0 (A) 0 NBLR = 0 (A) 0	EBTR = 0 m WBTL = 0 m NBLR = 0 m	EBTR = 0.06 (A) 0 WBTL = 0 (A) 0 NBLR = 0 (A) 10	EBTR = 0 m WBTL = 0 m NBLR = 5 m
Future Total 2034	EBTR = 0.06 (A) 0 WBTL = 0 (A) 0 NBLR = 0.02 (B) 10	EBTR = 0 m WBTL = 0 m NBLR = 5 m	EBTR = 0.07 (A) 0 WBTL = 0 (A) 0 NBLR = 0.02 (B) 10	EBTR = 0 m WBTL = 0 m NBLR = 5 m

Under existing conditions, the intersection of Badenoch Street and Ochs Street is operating at acceptable levels with no delays during the a.m. peak hour and a 9 second delay during the p.m. peak hour along the northbound approach.

Under all three future background conditions, with the addition of corridor growth along Badenoch Street, the northbound approach from Ochs Street continues to operate with only a 9 second delay during the p.m. peak hour and increases to 10 seconds during the 2034 horizon year.

With the addition of site generated traffic under the three future horizon years, nominal changes to the intersection delays are reported with the northbound approach showing a maximum delay of ten seconds during both the a.m. and p.m. peak hours.

No improvements are recommended at this intersection as a result of the proposed development.

7.3 Ochs Street and Back Street

Capacity analysis for this intersection during the weekday a.m. and p.m. peak hours for the existing, future background, and future total traffic conditions are summarized in the following table.

Table 9 Capacity analysis of Ochs Street and Back Street

Scenario	AM Peak Hour		PM Peak Hour	
	V/C (LOS) seconds	95th % Que.	V/C (LOS) seconds	95th % Que
Future Total 2024	EBLR = 0 (A) 9 NBTL = 0 (A) 0 SBTR = 0 (A) 0	EBLR = 0 m NBTL = 0 m SBTR = 0 m	EBLR = 0 (A) 9 NBTL = 0 (A) 0 SBTR = 0.01 (A) 0	EBLR = 0 m NBTL = 0 m SBTR = 0 m
Future Total 2029	EBLR = 0 (A) 9 NBTL = 0 (A) 0 SBTR = 0 (A) 0	EBLR = 0 m NBTL = 0 m SBTR = 0 m	EBLR = 0 (A) 9 NBTL = 0 (A) 0 SBTR = 0.01 (A) 0	EBLR = 0 m NBTL = 0 m SBTR = 0 m
Future Total 2034	EBLR = 0 (A) 9 NBTL = 0 (A) 0 SBTR = 0 (A) 0	EBLR = 0 m NBTL = 0 m SBTR = 0 m	EBLR = 0 (A) 9 NBTL = 0 (A) 0 SBTR = 0.01 (A) 0	EBLR = 0 m NBTL = 0 m SBTR = 0 m

With the addition of the south leg and site generated traffic under all three future total scenarios, a maximum delay of 9 seconds is expected along the eastbound approach during each peak hour.

No improvements are recommended at this intersection as a result of the proposed development as the subject site is expected to introduce a very low volume of additional traffic to this intersection.

8. Parking Provision

Application of the current Township of Puslinch's Comprehensive Zoning By-Law parking rates to the subject site results in a requirement of a minimum of 2 parking spaces per dwelling unit. The minimum By-law parking requirement of 2 spaces per dwelling unit will be satisfied with the provision of garage and driveway parking.

The subject site proposes to generally use the Township's 20-metre urban cross-section along Street "A" as discussed in **Section 10** with an 8-metre pavement width. The proposed cross-section provides two travel lanes and on-street parking.

9. Sightline Assessment

Adjacent to the proposed site, Badenoch Street has a posted speed limit of 50 km/h with a crest in the road located between Main Street and Ochs Street. For the purpose of Stopping Sight Distance requirements a design speed of 60 km/h was used for the assessment on Badenoch Street based on the 50 km/h posted speed limit. Per Transportation Association of Canada's Geometric Design Guide for Canadian Roads (TAC GDGCR) Table 2.5.2, the minimum stopping sight-distance for level roadways with a design speed of 60 km/h is 85 metres for level roadways.

A speed study was completed along Badenoch Street along the crest in the roadway to the west of Och Street in the general location of Ikondar Place. The speed study was undertaken during a 24-hour period on Thursday, March 21st, 2024, in both the eastbound and westbound directions. A driver looking towards the crest in the road to the west is observing vehicles travelling in the eastbound direction, with the results of the speed study indicating that the 85th percentile speed in that direction is 61 km/h and generally consistent with the assumed design speed based on the posted speed limit. The results of the speed study are provided in **Appendix E**.

Section 9.9 of the TAC GDCR provides intersection sight distances for different scenarios, with the following scenarios used to complete the intersection sight distance analysis:

- Case B1 – Left turn from the minor road
- Case B2 – Right turn from the minor road

- Case F – Left turns from the major road

For the purpose of the assessment, the minor road is assumed to be Ochs Street for the assessment. A vehicle entering the major road (Badenoch Street) from Ochs Street is assumed to stop a distance of approximately 4.5 to 5.4 metres to the pavement edge of Badenoch Street as recommended by TAC. In this stopped position, the driver will be required to look left and right in order to perceive and react to approaching vehicles prior to initiating a turning movement onto the intersecting drive aisle.

The required intersection sight distances are provided in TAC GDGCR Tables 9.9.4, 9.9.6 and 9.9.12 for passenger vehicles turning left from stop, turning right from stop, or turning left from the major road, respectively, and are summarized in the following table. The required intersection sight distances summarized in the tables below are based on a 60 km/h design speed along the major road. As requested by Township and County staff, the assessment was completed for both passenger vehicles and single unit trucks in order to complete an assessment of a snowplow entering Badenoch Street from Ochs Street.

Table 10 Intersection Sight Distance Requirement

Case (Design Speed of 60 km/h)	Required Intersection Sight Distance for Passenger Cars (TAC 2017)	Required Intersection Sight Distance for Single Unit Trucks (TAC 2017)	TAC Reference
B1: Vehicles turning left from stop	125.1 m	158.4 m	Table 9.9.4
B2: Vehicles turning right from stop	108.4 m	141.8 m	Table 9.9.6
F: Left turns from the major road	91.7 m	108.4.5 m	Table 9.9.12

The required intersection sight distance is calculated from the equation:

$$ISD = 0.278\, V_{major}\, t_g$$

Where:

$$ISD = intersection\ sight\ distance$$

$$V_{major} = design\ speed\ of\ the\ major\ road\ \left(\frac{km}{h}\right)$$

$$t_g = time\ gap\ for\ the\ minor\ road\ vehicle\ to\ enter\ the\ major\ road\ (s)$$

The intersection sight distance requirement for passenger cars was determined by the equation above, where the time gap for the minor road vehicle to enter the major road for trucks is 7.5 seconds for vehicles turning left from stop, 6.5 seconds for vehicles turning right from a stop and 5.5 seconds for left turns from the major road.

The intersection sight distance requirement for trucks was determined by the equation above, where the time gap for the minor road vehicle to enter the major road for trucks is 9.5 seconds for vehicles turning left from stop, 8.5 seconds for vehicles turning right from a stop and 6.5 seconds for left turns from the major road.

The available sight distances along Badenoch Street to the west of Ochs Street meet the minimum required stopping sight distance for a 60 km/h design speed. Due to the crest in the road along Badenoch Street located between Main Street and Ochs Street, the sightline assessment was completed using the vertical profile for Badenoch Street contained within the “Approved for Construction” drawings which was provided by the County and was confirmed through measurements taken on site.

The use of the vertical profile drawings is considered less accurate as it is based on “Approved Construction Drawings” and not “As Builts” which measure the actual vertical profile of what was constructed in the field which can differ significantly. Based on the vertical profile, there should be 129 metres of sightline available, however, the sightline measured in the field confirmed that there is currently 136.5 metres of available sight distance looking to the west from Och Street, satisfying the required intersection sight distance requirement for passenger vehicles.

The sightline assessment was also completed for a single unit truck to consider a snowplow truck exiting onto Badenoch Street. Township staff confirmed that the heigh of the driver's eye for the snowplow truck is 2.6 metres.

Based on the vertical profile, there should be 165 metres of sightline available, satisfying the required intersection sight distance requirement for snowplow vehicles.

The sightline assessment completed using the vertical profile drawings in provided in **Appendix D**, while the results from the field observations are provided in **Figure 14**.

Figure 14 Field Observations

As can be seen in **Figure 14**, the existing retaining wall in the southwest corner of the intersection is located within the right-of-way and limits the sightline visibility along Badenoch Street. To provide the required sightline measured 4.4 metres back from the edge of pavement, it is recommended that the existing retaining wall on the west side of the intersection be shifted to be further away from sidewalk as illustrated in **Figure 15**. The assessment using the requirement for Scenario B1 in **Table 10** is provided in **Appendix D**.

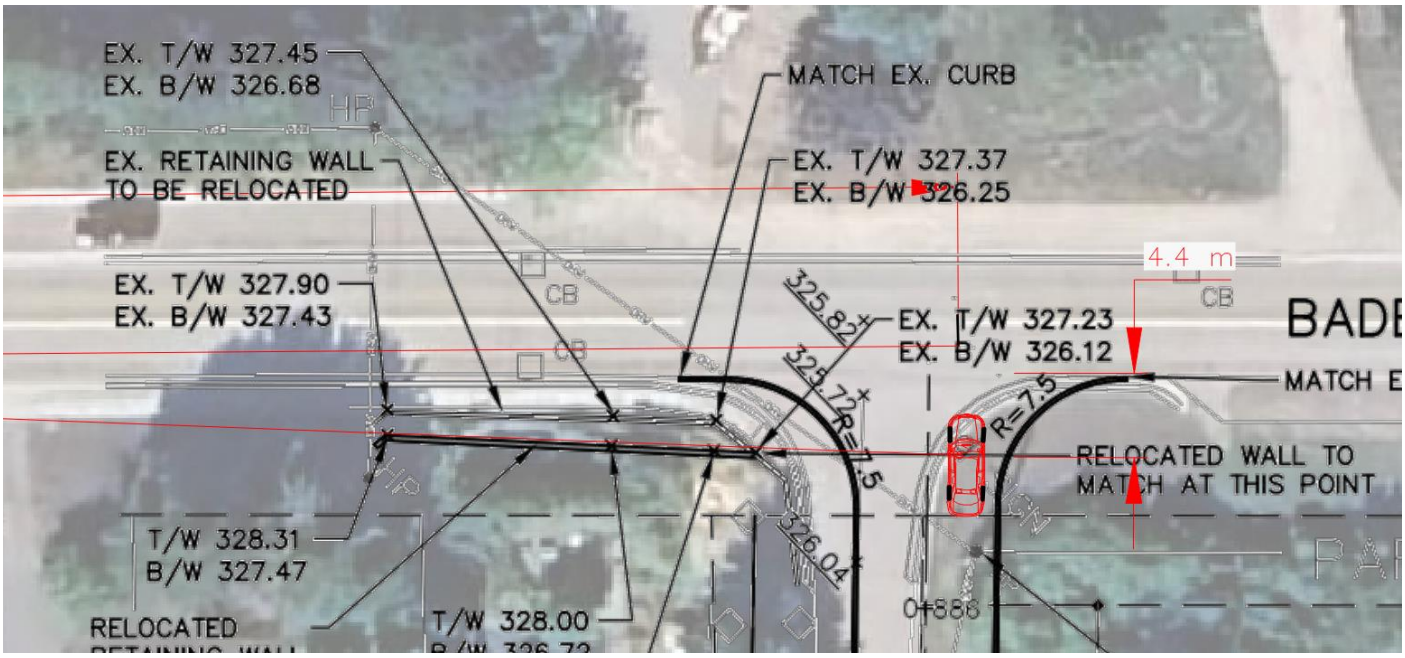


Figure 15 Recommended Retaining Wall Relocation

10. Internal Road Geometric Review

The subject site proposes to use the Township's 20-metre wide urban cross-section along Street "A". The 20-metre right-of-way includes a pavement width of 8 metres and allows for on-street parking. The 20-metre right-of-way includes a 1.5 metre sidewalk on each side of the road, however it is proposed to only provide a sidewalk on the west side of the road due to the small number of units and limited sidewalk connectivity.

The Township's 20-metre wide cross-section is provided in **Figure 16.**

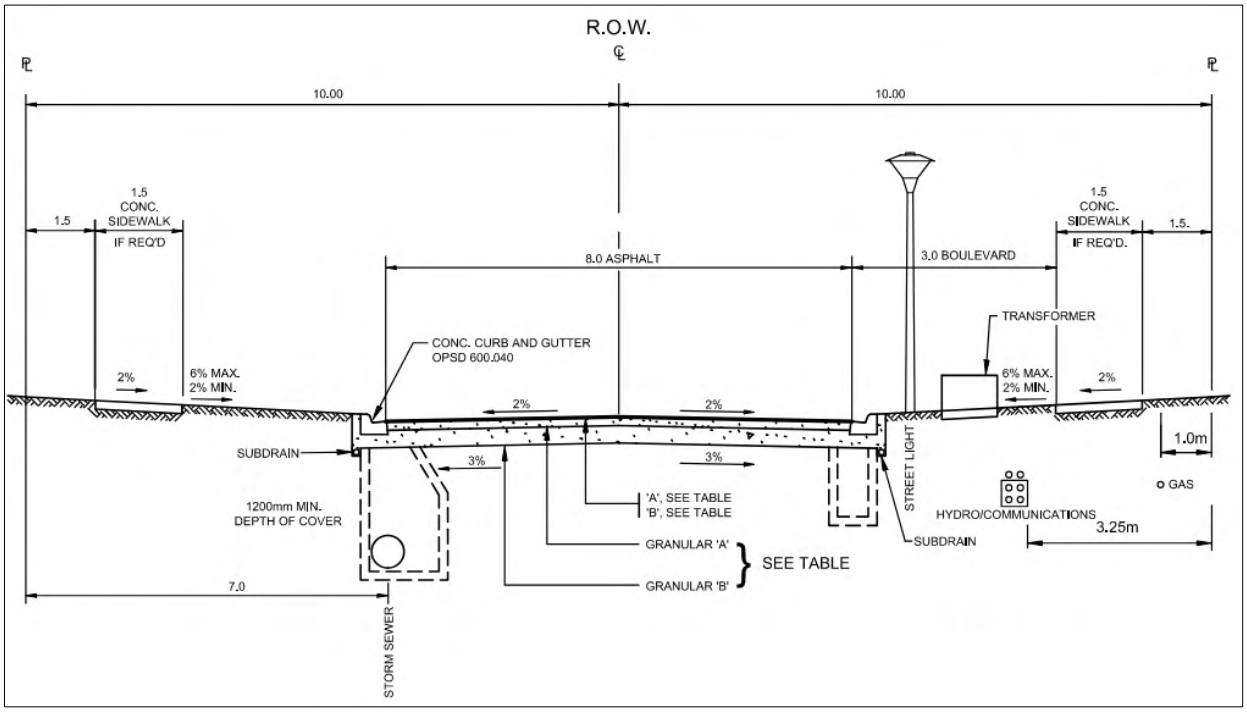


Figure 16 Township of Puslinch 20-metre Urban Cross-Section

11. Conclusion

The proposed Draft Plan of Subdivision has been prepared by Weston Consulting and consists of 21 detached dwelling units.

Access to the development is proposed via an extension of Ochs Street to the south from Back Street and provides access to Badenoch Street and the external road network.

The proposed development is expected to generate a total of 20 new two-way trips during the weekday a.m. peak hour consisting of 5 inbound and 15 outbound trips and 25 new two-way trips during the weekday p.m. peak hour consisting of 16 inbound and 9 outbound trips.

Access to the development is proposed via an extension of Ochs Street, providing a direct connection to Badenoch Street at an existing full moves unsignalized intersection.

The study intersections included in the analysis include:

- Highway 6 and Badenoch Street/Calfass Road
- Badenoch Street and Ochs Street
- Ochs Street and Back Street

Based on ITE Trip Generation rates, the proposed development is expected to generate a total of 20 new two-way trips during the weekday a.m. peak hour consisting of 5 inbound and 15 outbound trips and 25 new two-way trips during the weekday p.m. peak hour consisting of 16 inbound and 9 outbound trips.

Under existing conditions, all study intersections are operating with acceptable v/c ratios and delays.

In the future 2024, 2029 and 2034 horizon years, the intersections continue to operate at mostly satisfactory levels with the intersection of Hwy 6 and Badenoch Street/Calfass Road operating with some critical movements however all movements operating with v/c ratios of less 1.0. The unsignalized intersections of Badenoch Street with Ochs Street and Ochs Street with Back Street are reported to operate with low v/c ratios and delays and no critical movements up to the 2034 horizon year.

The overall impact of the development generated traffic was found to be negligible to the operation of the study area intersections and traffic flow along Highway 6 and Badenoch Street. The site traffic does not result in any turning movements increasing to critical levels, all critical movements under the future traffic scenarios are a result of the assumed corridor growth rate.

Application of the current Township of Puslinch's Comprehensive Zoning By-Law parking rates to the subject site results in a requirement of a minimum of 2 parking spaces per dwelling unit. The minimum By-law parking requirement of 2 spaces per dwelling unit will be satisfied with the provision of garage and driveway parking.

A sightline assessment of vehicles exiting from Och Street onto Badenoch Street was completed in the field, it confirmed that there is sufficient sightlines to satisfy the TAC requirements for a 60 km/h design speed for passenger vehicles and snowplow vehicles. The 60 km/h design speed was confirmed through a speed study conducted along Badenoch Street in the general vicinity of the crest in the road.

The existing intersection of Badenoch Street and Och Street has an existing retaining wall within the County right-of-way that limits sightline visibility for outbound traffic exiting Och Street to see an oncoming vehicle travelling eastbound on Badenoch Street. It is recommended that the retaining wall be relocated to provide the required sightline. A design for the relocation of the retaining wall has been prepared by Crozier Consulting Engineers.

The subject site proposes to generally use the Township's 20-metre Urban cross-section along Street "A".

Appendices

Appendix A

Traffic Data

GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Turning Movement Count (1 . BADENOCH ST & OCHS ST)

Start Time	E Approach BADENOCH ST					S Approach OCHS ST					W Approach BADENOCH ST					Int. Total (15 min)	Int. Total (1 hr)
	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	UTurn W:W	Peds W:	Approach Total		
07:00:00	32	0	0	0	32	0	0	0	0	0	0	12	0	0	12	44	
07:15:00	30	0	0	0	30	1	0	0	0	1	1	11	0	0	12	43	
07:30:00	18	0	0	0	18	0	0	0	0	0	0	18	0	0	18	36	
07:45:00	30	1	0	0	31	0	0	0	0	0	1	24	0	0	25	56	179
08:00:00	23	0	0	0	23	0	0	0	0	0	0	16	0	0	16	39	174
08:15:00	38	0	0	0	38	0	0	0	0	0	0	16	0	0	16	54	185
08:30:00	30	0	0	0	30	0	0	0	0	0	0	15	0	0	15	45	194
08:45:00	18	0	0	0	18	0	0	0	1	0	0	13	0	0	13	31	169
BREAK																	
16:00:00	36	0	0	0	36	0	0	0	0	0	1	21	0	0	22	58	
16:15:00	34	1	0	0	35	1	0	0	0	1	0	18	0	0	18	54	
16:30:00	34	0	0	0	34	0	1	0	0	1	0	18	0	0	18	53	
16:45:00	38	0	0	0	38	0	0	0	0	0	0	23	0	0	23	61	226
17:00:00	42	0	0	1	42	0	0	0	1	0	0	21	0	0	21	63	231
17:15:00	26	0	0	0	26	0	1	0	0	1	0	18	0	0	18	45	222
17:30:00	18	0	0	0	18	0	0	0	0	0	1	24	0	0	25	43	212
17:45:00	27	0	0	0	27	0	0	0	0	0	0	24	0	0	24	51	202
Grand Total	474	2	0	1	476	2	2	0	2	4	4	292	0	0	296	**776**	-
Approach%	99.6%	0.4%	0%		-	50%	50%	0%		-	1.4%	98.6%	0%		-	**-**	-
Totals %	61.1%	0.3%	0%		61.3%	0.3%	0.3%	0%		0.5%	0.5%	37.6%	0%		38.1%	**-**	-
Heavy	14	1	0		-	0	0	0		-	1	13	0		-	**-**	-
Heavy %	3%	50%	0%		-	0%	0%	0%		-	25%	4.5%	0%		-	**-**	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-

GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Peak Hour: 07:45 AM - 08:45 AM Weather: Overcast Clouds (-2.89 °C)

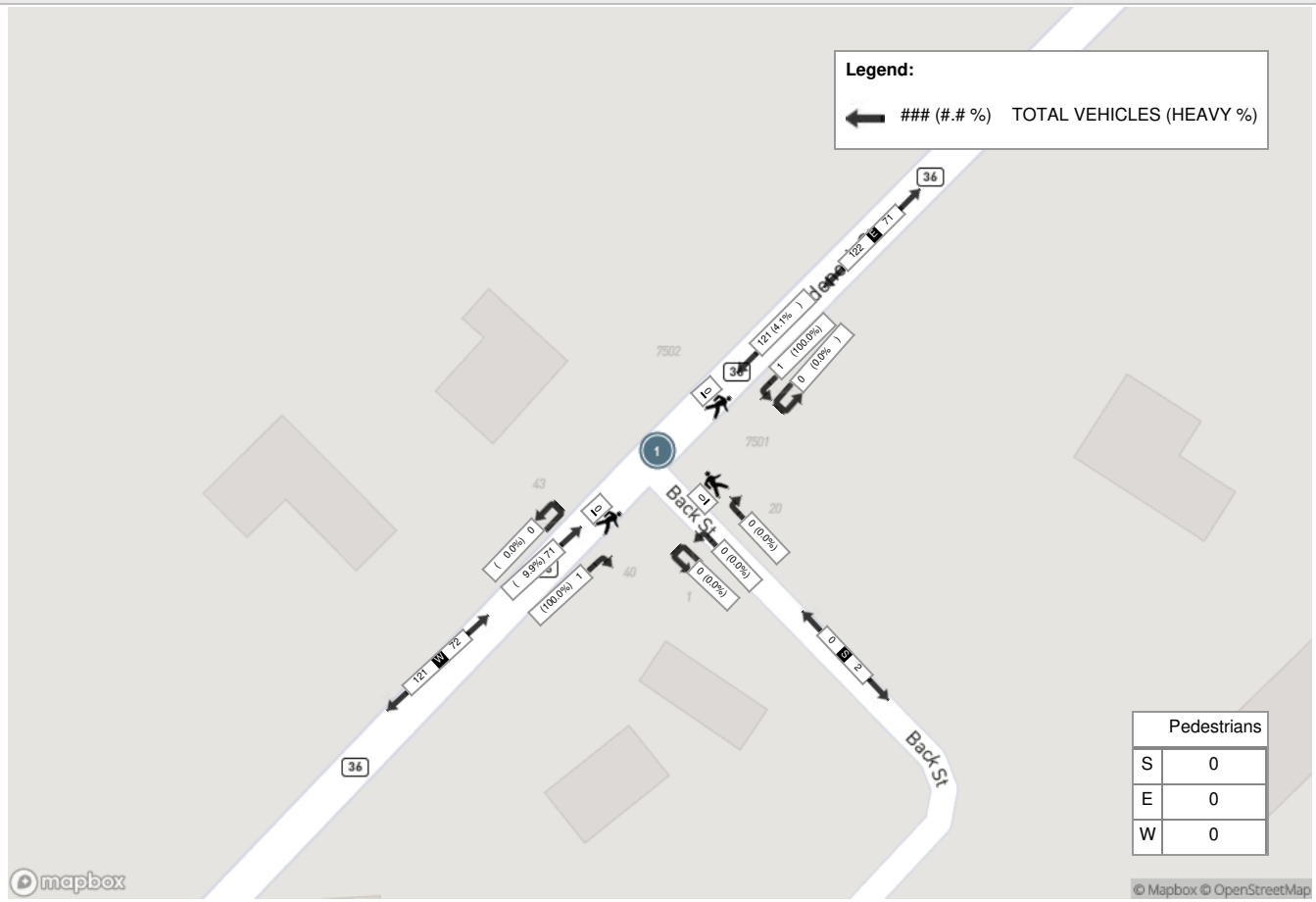
Start Time	E Approach BADENOCH ST					S Approach OCHS ST					W Approach BADENOCH ST					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
07:45:00	30	1	0	0	31	0	0	0	0	0	1	24	0	0	25	56
08:00:00	23	0	0	0	23	0	0	0	0	0	0	16	0	0	16	39
08:15:00	38	0	0	0	38	0	0	0	0	0	0	16	0	0	16	54
08:30:00	30	0	0	0	30	0	0	0	0	0	0	15	0	0	15	45
Grand Total	121	1	0	0	122	0	0	0	0	0	1	71	0	0	72	**194**
Approach%	99.2%	0.8%	0%		-	0%	0%	0%		-	1.4%	98.6%	0%		-	**-**
Totals %	62.4%	0.5%	0%		62.9%	0%	0%	0%		0%	0.5%	36.6%	0%		37.1%	**-**
PHF	0.8	0.25	0		0.8	0	0	0		0	0.25	0.74	0		0.72	**-**
Heavy	5	1	0		6	0	0	0		0	1	7	0		8	**-**
Heavy %	4.1%	100%	0%		4.9%	0%	0%	0%		0%	100%	9.9%	0%		11.1%	**-**
Lights	116	0	0		116	0	0	0		0	0	64	0		64	**-**
Lights %	95.9%	0%	0%		95.1%	0%	0%	0%		0%	0%	90.1%	0%		88.9%	**-**
Single-Unit Trucks	3	0	0		3	0	0	0		0	0	2	0		2	**-**
Single-Unit Trucks %	2.5%	0%	0%		2.5%	0%	0%	0%		0%	0%	2.8%	0%		2.8%	**-**
Buses	2	1	0		3	0	0	0		0	1	5	0		6	**-**
Buses %	1.7%	100%	0%		2.5%	0%	0%	0%		0%	100%	7%	0%		8.3%	**-**
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Peak Hour: 04:15 PM - 05:15 PM Weather: Overcast Clouds (6.07 °C)

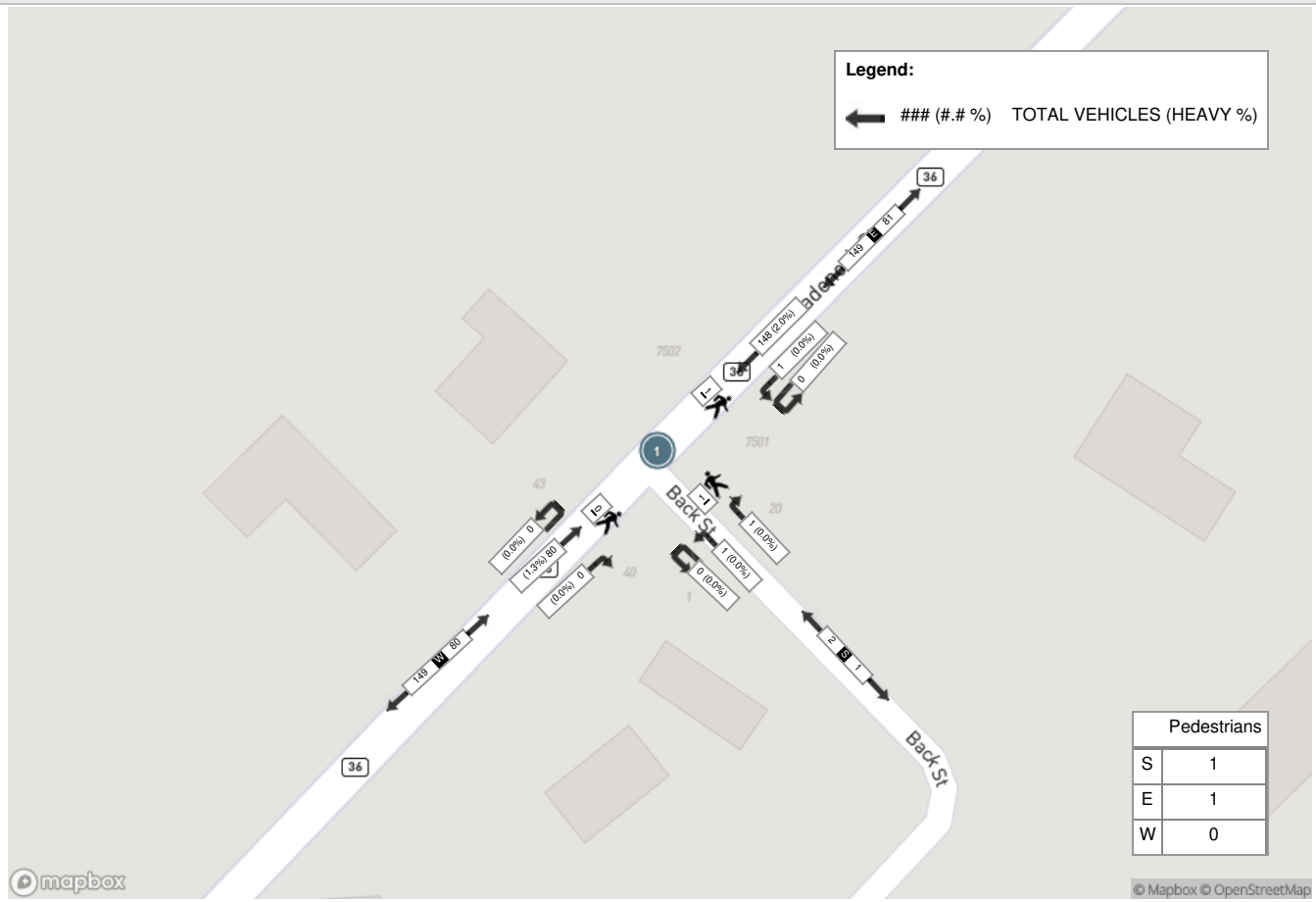
Start Time	E Approach BADENOCH ST					S Approach OCHS ST					W Approach BADENOCH ST					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
16:15:00	34	1	0	0	35	1	0	0	0	1	0	18	0	0	18	54
16:30:00	34	0	0	0	34	0	1	0	0	1	0	18	0	0	18	53
16:45:00	38	0	0	0	38	0	0	0	0	0	0	23	0	0	23	61
17:00:00	42	0	0	1	42	0	0	0	1	0	0	21	0	0	21	63
Grand Total	148	1	0	1	149	1	1	0	1	2	0	80	0	0	80	**231**
Approach%	99.3%	0.7%	0%		-	50%	50%	0%		-	0%	100%	0%		-	**-**
Totals %	64.1%	0.4%	0%		64.5%	0.4%	0.4%	0%		0.9%	0%	34.6%	0%		34.6%	**-**
PHF	0.88	0.25	0		0.89	0.25	0.25	0		0.5	0	0.87	0		0.87	**-**
Heavy	3	0	0		3	0	0	0		0	0	1	0		1	**-**
Heavy %	2%	0%	0%		2%	0%	0%	0%		0%	0%	1.3%	0%		1.3%	**-**
Lights	145	1	0		146	1	1	0		2	0	79	0		79	**-**
Lights %	98%	100%	0%		98%	100%	100%	0%		100%	0%	98.8%	0%		98.8%	**-**
Single-Unit Trucks	1	0	0		1	0	0	0		0	0	0	0		0	**-**
Single-Unit Trucks %	0.7%	0%	0%		0.7%	0%	0%	0%		0%	0%	0%	0%		0%	**-**
Buses	2	0	0		2	0	0	0		0	0	1	0		1	**-**
Buses %	1.4%	0%	0%		1.3%	0%	0%	0%		0%	0%	1.3%	0%		1.3%	**-**
Pedestrians	-	-	-	1	-	-	-	-	1	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	50%		-	-	-	50%		-	-	-	0%		**-**

Peak Hour: 07:45 AM - 08:45 AM Weather: Overcast Clouds (-2.89 °C)



	Pedestrians
S	0
E	0
W	0

Peak Hour: 04:15 PM - 05:15 PM Weather: Overcast Clouds (6.07 °C)



Spectrum

Turning Movement Count
Location Name: HWY 6 & CALFASS RD / BADENOCH ST
Date: Tue, Feb 07, 2023 Deployment Lead: Walter Fugaj

GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Turning Movement Count (3 . HWY 6 & CALFASS RD / BADENOCH ST)

Start Time	N Approach HWY 6						E Approach BADENOCH ST						S Approach HWY 6						W Approach CALFASS RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	1	179	3	0	0	183	7	1	28	0	0	36	7	156	0	0	0	163	0	1	2	0	0	3	385	
07:15:00	0	187	0	0	0	187	13	1	19	0	0	33	10	187	0	0	0	197	0	2	1	0	0	3	420	
07:30:00	0	202	7	0	0	209	10	0	13	0	0	23	11	226	0	0	2	237	1	0	2	0	0	3	472	
07:45:00	1	192	3	0	0	196	5	0	25	0	0	30	13	189	0	0	0	202	1	5	14	0	0	20	448	1725
08:00:00	1	210	5	0	1	216	11	1	11	0	0	23	13	208	0	0	2	221	0	0	6	0	1	6	466	1806
08:15:00	0	208	3	0	0	211	14	2	27	0	0	43	15	214	0	0	0	229	0	1	7	0	0	8	491	1877
08:30:00	1	219	2	0	0	222	12	1	18	0	0	31	11	193	0	0	0	204	0	0	2	0	0	2	459	1864
08:45:00	1	191	7	0	0	199	7	1	15	0	0	23	9	174	0	0	2	183	1	0	3	0	1	4	409	1825
BREAK																										
16:00:00	6	207	10	0	0	223	12	2	16	0	0	30	15	185	1	0	1	201	1	1	1	0	1	3	457	
16:15:00	0	244	6	0	0	250	11	1	22	0	0	34	18	204	1	0	2	223	0	0	6	0	1	6	513	
16:30:00	4	260	9	0	1	273	10	2	32	0	0	44	9	225	0	0	0	234	0	2	2	0	0	4	555	
16:45:00	0	251	7	0	0	258	9	0	27	0	0	36	14	230	1	0	0	245	0	2	4	0	1	6	545	2070
17:00:00	1	229	6	0	0	236	12	2	32	0	0	46	19	186	0	0	0	205	1	0	1	0	0	2	489	2102
17:15:00	5	248	9	0	0	262	12	1	14	0	0	27	15	188	0	0	0	203	0	1	2	0	0	3	495	2084
17:30:00	3	247	8	0	0	258	4	1	15	0	0	20	16	174	1	0	0	191	0	1	3	0	1	4	473	2002
17:45:00	2	252	13	0	0	267	7	2	15	0	0	24	11	176	0	0	0	187	0	0	2	0	0	2	480	1937
Grand Total	26	3526	98	0	2	3650	156	18	329	0	0	503	206	3115	4	0	9	3325	5	16	58	0	6	79	**7557**	-
Approach%	0.7%	96.6%	2.7%	0%		-	31%	3.6%	65.4%	0%		-	6.2%	93.7%	0.1%	0%		-	6.3%	20.3%	73.4%	0%		-	**-**	-
Totals %	0.3%	46.7%	1.3%	0%		48.3%	2.1%	0.2%	4.4%	0%		6.7%	2.7%	41.2%	0.1%	0%		44%	0.1%	0.2%	0.8%	0%		1%	**-**	-
Heavy	0	459	5	0		-	3	1	9	0		-	3	372	0	0		-	3	4	1	0		-	**-**	-
Heavy %	0%	13%	5.1%	0%		-	1.9%	5.6%	2.7%	0%		-	1.5%	11.9%	0%	0%		-	60%	25%	1.7%	0%		-	**-**	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-

Peak Hour: 07:30 AM - 08:30 AM Weather: Overcast Clouds (-2.89 °C)

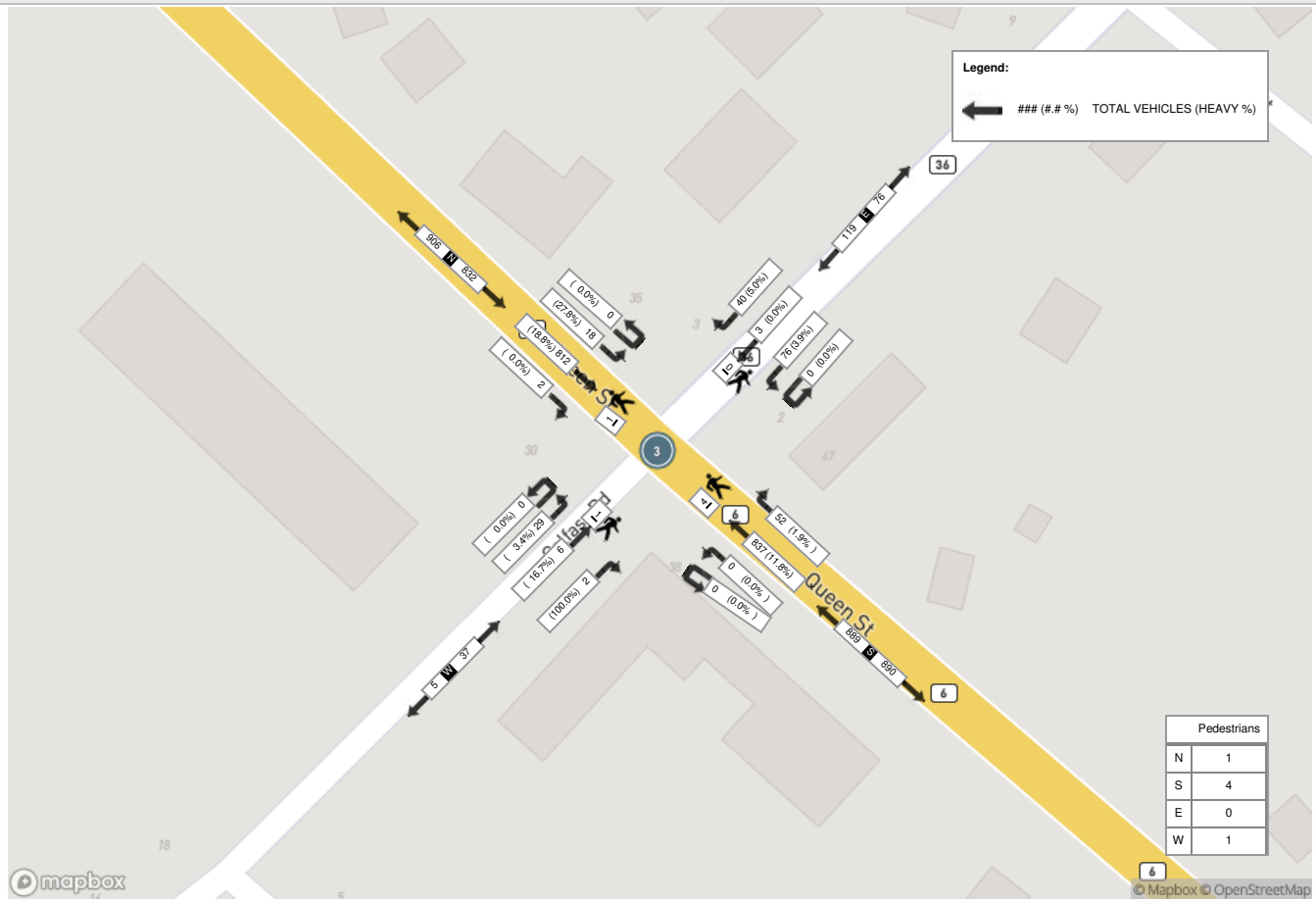
Start Time	N Approach HWY 6						E Approach BADENOCH ST						S Approach HWY 6						W Approach CALFASS RD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
07:30:00	0	202	7	0	0	209	10	0	13	0	0	23	11	226	0	0	2	237	1	0	2	0	0	3	472
07:45:00	1	192	3	0	0	196	5	0	25	0	0	30	13	189	0	0	0	202	1	5	14	0	0	20	448
08:00:00	1	210	5	0	1	216	11	1	11	0	0	23	13	208	0	0	2	221	0	0	6	0	1	6	466
08:15:00	0	208	3	0	0	211	14	2	27	0	0	43	15	214	0	0	0	229	0	1	7	0	0	8	491
Grand Total	2	812	18	0	1	832	40	3	76	0	0	119	52	837	0	0	4	889	2	6	29	0	1	37	**1877**
Approach%	0.2%	97.6%	2.2%	0%		-	33.6%	2.5%	63.9%	0%		-	5.8%	94.2%	0%	0%		-	5.4%	16.2%	78.4%	0%		-	**-**
Totals %	0.1%	43.3%	1%	0%		44.3%	2.1%	0.2%	4%	0%		6.3%	2.8%	44.6%	0%	0%		47.4%	0.1%	0.3%	1.5%	0%		2%	**-**
PHF	0.5	0.97	0.64	0		0.96	0.71	0.38	0.7	0		0.69	0.87	0.93	0	0		0.94	0.5	0.3	0.52	0		0.46	**-**
Heavy	0	153	5	0		158	2	0	3	0		5	1	99	0	0		100	2	1	1	0		4	**-**
Heavy %	0%	18.8%	27.8%	0%		19%	5%	0%	3.9%	0%		4.2%	1.9%	11.8%	0%	0%		11.2%	100%	16.7%	3.4%	0%		10.8%	**-**
Lights	2	659	13	0		674	38	3	73	0		114	51	738	0	0		789	0	5	28	0		33	**-**
Lights %	100%	81.2%	72.2%	0%		81%	95%	100%	96.1%	0%		95.8%	98.1%	88.2%	0%	0%		88.8%	0%	83.3%	96.6%	0%		89.2%	**-**
Single-Unit Trucks	0	44	2	0		46	0	0	2	0		2	0	27	0	0		27	0	0	0	0		0	**-**
Single-Unit Trucks %	0%	5.4%	11.1%	0%		5.5%	0%	0%	2.6%	0%		1.7%	0%	3.2%	0%	0%		3%	0%	0%	0%	0%		0%	**-**
Buses	0	0	3	0		3	2	0	1	0		3	1	1	0	0		2	2	1	1	0		4	**-**
Buses %	0%	0%	16.7%	0%		0.4%	5%	0%	1.3%	0%		2.5%	1.9%	0.1%	0%	0%		0.2%	100%	16.7%	3.4%	0%		10.8%	**-**
Articulated Trucks	0	109	0	0		109	0	0	0	0		0	0	71	0	0		71	0	0	0	0		0	**-**
Articulated Trucks %	0%	13.4%	0%	0%		13.1%	0%	0%	0%	0%		0%	0%	8.5%	0%	0%		8%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	1	-	**-**
Pedestrians%	-	-	-	-	16.7%		-	-	-	-	0%		-	-	-	-	66.7%		-	-	-	-	16.7%		**-**

Peak Hour: 04:15 PM - 05:15 PM Weather: Overcast Clouds (6.07 °C)

Start Time	N Approach HWY 6						E Approach BADENOCH ST						S Approach HWY 6						W Approach CALFASS RD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:15:00	0	244	6	0	0	250	11	1	22	0	0	34	18	204	1	0	2	223	0	0	6	0	1	6	513
16:30:00	4	260	9	0	1	273	10	2	32	0	0	44	9	225	0	0	0	234	0	2	2	0	0	4	555
16:45:00	0	251	7	0	0	258	9	0	27	0	0	36	14	230	1	0	0	245	0	2	4	0	1	6	545
17:00:00	1	229	6	0	0	236	12	2	32	0	0	46	19	186	0	0	0	205	1	0	1	0	0	2	489
Grand Total	5	984	28	0	1	1017	42	5	113	0	0	160	60	845	2	0	2	907	1	4	13	0	2	18	**2102**
Approach%	0.5%	96.8%	2.8%	0%		-	26.3%	3.1%	70.6%	0%		-	6.6%	93.2%	0.2%	0%		-	5.6%	22.2%	72.2%	0%		-	**-**
Totals %	0.2%	46.8%	1.3%	0%		48.4%	2%	0.2%	5.4%	0%		7.6%	2.9%	40.2%	0.1%	0%		43.1%	0%	0.2%	0.6%	0%		0.9%	**-**
PHF	0.31	0.95	0.78	0		0.93	0.88	0.63	0.88	0		0.87	0.79	0.92	0.5	0		0.93	0.25	0.5	0.54	0		0.75	**-**
Heavy	0	72	0	0		72	1	0	2	0		3	1	94	0	0		95	0	0	0	0		0	**-**
Heavy %	0%	7.3%	0%	0%		7.1%	2.4%	0%	1.8%	0%		1.9%	1.7%	11.1%	0%	0%		10.5%	0%	0%	0%	0%		0%	**-**
Lights	5	912	28	0		945	41	5	111	0		157	59	751	2	0		812	1	4	13	0		18	**-**
Lights %	100%	92.7%	100%	0%		92.9%	97.6%	100%	98.2%	0%		98.1%	98.3%	88.9%	100%	0%		89.5%	100%	100%	100%	0%		100%	**-**
Single-Unit Trucks	0	21	0	0		21	0	0	1	0		1	0	36	0	0		36	0	0	0	0		0	**-**
Single-Unit Trucks %	0%	2.1%	0%	0%		2.1%	0%	0%	0.9%	0%		0.6%	0%	4.3%	0%	0%		4%	0%	0%	0%	0%		0%	**-**
Buses	0	4	0	0		4	1	0	1	0		2	1	2	0	0		3	0	0	0	0		0	**-**
Buses %	0%	0.4%	0%	0%		0.4%	2.4%	0%	0.9%	0%		1.3%	1.7%	0.2%	0%	0%		0.3%	0%	0%	0%	0%		0%	**-**
Articulated Trucks	0	47	0	0		47	0	0	0	0		0	0	56	0	0		56	0	0	0	0		0	**-**
Articulated Trucks %	0%	4.8%	0%	0%		4.6%	0%	0%	0%	0%		0%	0%	6.6%	0%	0%		6.2%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	2	-	**-**
Pedestrians%	-	-	-	-	20%		-	-	-	-	0%		-	-	-	-	40%		-	-	-	-	40%		**-**

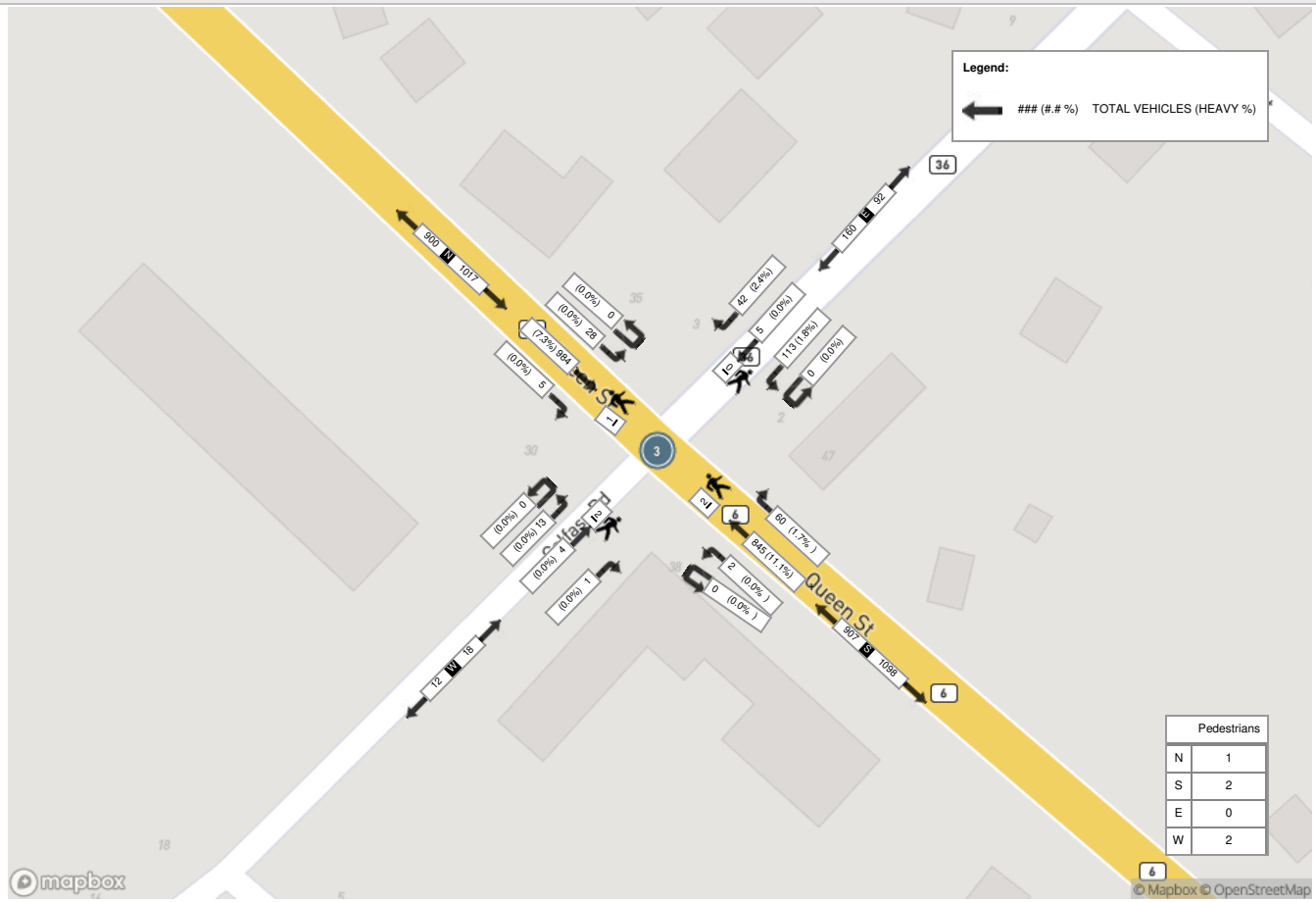
GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Peak Hour: 07:30 AM - 08:30 AM **Weather: Overcast Clouds (-2.89 °C)**



GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Peak Hour: 04:15 PM - 05:15 PM **Weather: Overcast Clouds (6.07 °C)**



Spectrum

Turning Movement Count
Location Name: OCHS ST & BACK ST
Date: Tue, Feb 07, 2023 Deployment Lead: Walter Fugaj

GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Turning Movement Count (2 . OCHS ST & BACK ST)

Start Time	N Approach OCHS ST							E Approach BACK ST							S Approach OCHS ST							W Approach BACK ST							SE Approach SOUTHEAST DRIVEWAY							Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Bear Left N:SE	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	Hard Left E:SE	UTurn E:E	Peds E:	Approach Total	Hard Right S:SE	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Bear Right W:SE	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total	Hard Right SE:E	Bear Right SE:N	Bear Left SE:W	Hard Left SE:S	UTurn SE:SE	Peds SE:	Approach Total		
07:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:15:00	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
07:30:00	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	
07:45:00	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4
08:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
08:15:00	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
08:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
08:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BREAK																																					
16:00:00	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
16:15:00	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
16:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	
16:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
17:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
17:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	2
17:30:00	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
17:45:00	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3
Grand Total	5	1	0	1	0	4	7	1	0	0	0	0	0	1	0	0	1	0	0	4	1	0	0	0	2	0	0	2	0	0	0	0	0	4	0	**11**	-
Approach%	71.4%	14.3%	0%	14.3%	0%		-	100%	0%	0%	0%	0%		-	0%	0%	100%	0%	0%		-	0%	0%	0%	100%	0%		-	0%	0%	0%	0%	0%		-	**-**	-
Totals %	45.5%	9.1%	0%	9.1%	0%		63.6%	9.1%	0%	0%	0%	0%		9.1%	0%	0%	9.1%	0%	0%		9.1%	0%	0%	0%	18.2%	0%		18.2%	0%	0%	0%	0%	0%		0%	**-**	-
Heavy	2	0	0	0	0		-	0	0	0	0	0		-	0	0	0	0	0		-	0	0	0	0	0		-	0	0	0	0	0		-	**-**	-
Heavy %	40%	0%	0%	0%	0%		-	0%	0%	0%	0%	0%		-	0%	0%	0%	0%	0%		-	0%	0%	0%	0%	0%		-	0%	0%	0%	0%	0%		-	**-**	-
Bicycles	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	**-**	-
Bicycle %	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		-	**-**	-

Spectrum

Turning Movement Count
Location Name: OCHS ST & BACK ST
Date: Tue, Feb 07, 2023 Deployment Lead: Walter Fugaj

GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Peak Hour: 07:15 AM - 08:15 AM Weather: Overcast Clouds (-2.89 °C)

Start Time	N Approach OCHS ST							E Approach BACK ST							S Approach OCHS ST							W Approach BACK ST							SE Approach SOUTHEAST DRIVEWAY							Int. Total (15 min)
	Right	Thru	Bear Left	Left	UTurn	Peds	Approach Total	Right	Thru	Left	Hard Left	UTurn	Peds	Approach Total	Hard Right	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Bear Right	Thru	Left	UTurn	Peds	Approach Total	Hard Right	Bear Right	Bear Left	Hard Left	UTurn	Peds	Approach Total	
07:15:00	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
07:30:00	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
07:45:00	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
08:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	2	1	0	0	0	2	3	1	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	**4**
Approach%	66.7%	33.3%	0%	0%	0%		-	100%	0%	0%	0%	0%		-	0%	0%	0%	0%	0%		-	0%	0%	0%	0%	0%		-	0%	0%	0%	0%	0%		-	**-**
Totals %	50%	25%	0%	0%	0%		75%	25%	0%	0%	0%	0%		25%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	**-**
PHF	0.25	0.25	0	0	0		0.38	0.25	0	0	0	0		0.25	0	0	0	0	0		0	0	0	0	0	0		0	0	0	0	0	0		0	**-**
Heavy	2	0	0	0	0		2	0	0	0	0	0		0	0	0	0	0	0		0	0	0	0	0	0		0	0	0	0	0	0		0	**-**
Heavy %	100%	0%	0%	0%	0%		66.7%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	**-**
Lights	0	1	0	0	0		1	1	0	0	0	0		1	0	0	0	0	0		0	0	0	0	0	0		0	0	0	0	0	0		0	**-**
Lights %	0%	100%	0%	0%	0%		33.3%	100%	0%	0%	0%	0%		100%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	**-**
Buses	2	0	0	0	0		2	0	0	0	0	0		0	0	0	0	0	0		0	0	0	0	0	0		0	0	0	0	0	0		0	**-**
Buses %	100%	0%	0%	0%	0%		66.7%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	-	2	-	-	-	-	-	-	0	-	-	-	-	-	-	2	-	-	-	-	-	-	0	-	-	-	-	-	-	2	-	**-**
Pedestrians%	-	-	-	-	-	33.3%		-	-	-	-	-	0%		-	-	-	-	-	33.3%		-	-	-	-	-	0%		-	-	-	-	-	-	33.3%		**-**

GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Peak Hour: 04:00 PM - 05:00 PM Weather: Overcast Clouds (6.07 °C)

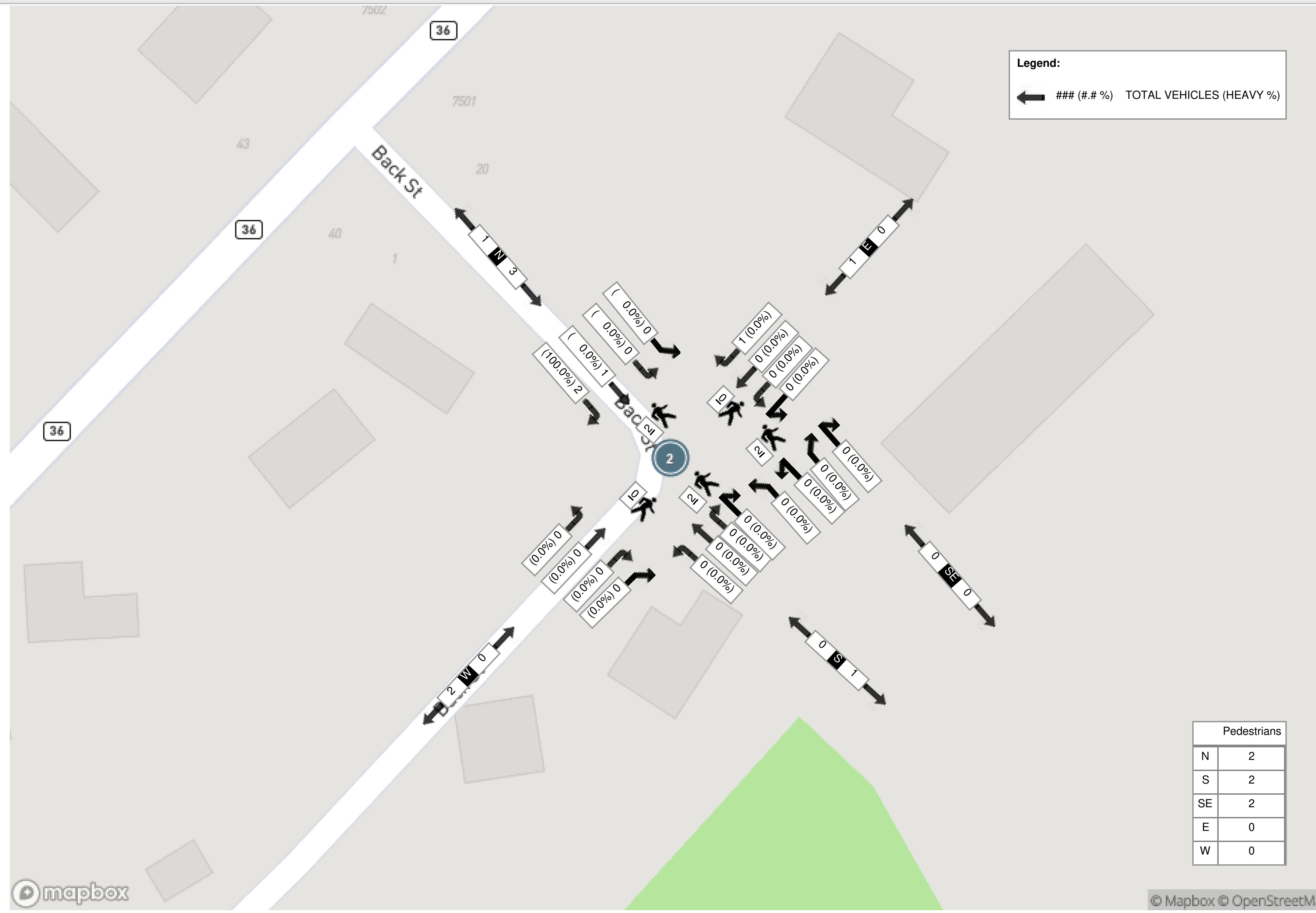
Start Time	N Approach OCHS ST							E Approach BACK ST							S Approach OCHS ST							W Approach BACK ST							SE Approach SOUTHEAST DRIVEWAY							Int. Total (15 min)
	Right	Thru	Bear Left	Left	UTurn	Peds	Approach Total	Right	Thru	Left	Hard Left	UTurn	Peds	Approach Total	Hard Right	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Bear Right	Thru	Left	UTurn	Peds	Approach Total	Hard Right	Bear Right	Bear Left	Hard Left	UTurn	Peds	Approach Total	
16:00:00	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
16:15:00	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
16:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1
16:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	1	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	**4**
Approach%	50%	0%	0%	50%	0%		-	0%	0%	0%	0%	0%		-	0%	0%	100%	0%	0%		-	0%	0%	0%	100%	0%		-	0%	0%	0%	0%	0%		-	**-**
Totals %	25%	0%	0%	25%	0%		50%	0%	0%	0%	0%	0%		0%	0%	0%	25%	0%	0%		25%	0%	0%	0%	25%	0%		25%	0%	0%	0%	0%	0%		0%	**-**
PHF	0.25	0	0	0.25	0		0.5	0	0	0	0	0		0	0	0	0.25	0	0		0.25	0	0	0	0.25	0		0.25	0	0	0	0	0		0	**-**
Heavy	0	0	0	0	0		0	0	0	0	0	0		0	0	0	0	0	0		0	0	0	0	0	0		0	0	0	0	0	0		0	**-**
Heavy %	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	**-**
Lights	1	0	0	1	0		2	0	0	0	0	0		0	0	0	1	0	0		1	0	0	0	1	0		1	0	0	0	0	0		0	**-**
Lights %	100%	0%	0%	100%	0%		100%	0%	0%	0%	0%	0%		0%	0%	0%	100%	0%	0%		100%	0%	0%	0%	100%	0%		100%	0%	0%	0%	0%	0%		0%	**-**
Buses	0	0	0	0	0		0	0	0	0	0	0		0	0	0	0	0	0		0	0	0	0	0	0		0	0	0	0	0	0		0	**-**
Buses %	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	-	0%		-	-	-	-	-	0%		-	-	-	-	-	0%		-	-	-	-	-	0%		-	-	-	-	-	0%		**-**

Spectrum

Turning Movement Count
Location Name: OCHS ST & BACK ST
Date: Tue, Feb 07, 2023   Deployment Lead: Walter Fugaj

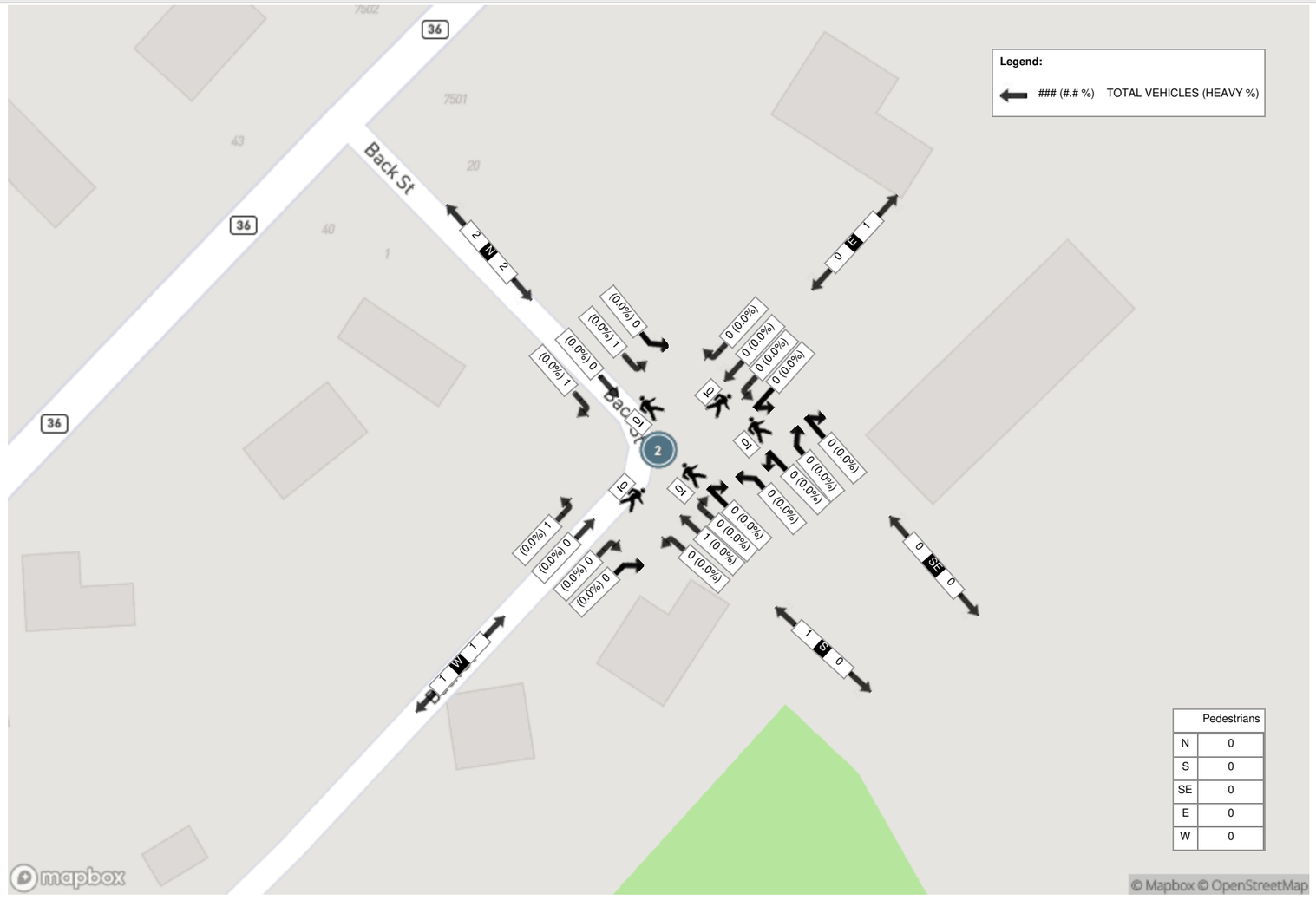
GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Peak Hour: 07:15 AM - 08:15 AM   Weather: Overcast Clouds (-2.89 °C)



GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

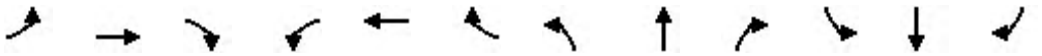
Peak Hour: 04:00 PM - 05:00 PM Weather: Overcast Clouds (6.07 °C)



	Pedestrians
N	0
S	0
SE	0
E	0
W	0

Appendix B

Synchro Outputs

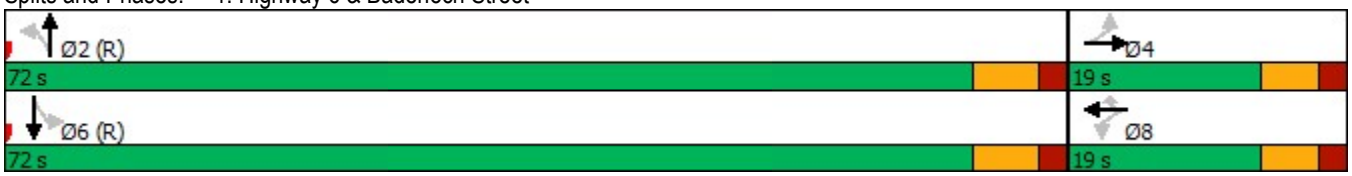


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	6	2	76	3	40	0	837	52	18	812	2
Future Volume (vph)	29	6	2	76	3	40	0	837	52	18	812	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		20.0	15.0		0.0	40.0		0.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.98	0.98					1.00	
Frt		0.993				0.850		0.991				
Flt Protected		0.962			0.954					0.950		
Satd. Flow (prot)	0	1660	0	0	1765	1555	1921	1709	0	1426	1615	0
Flt Permitted		0.723			0.706					0.222		
Satd. Flow (perm)	0	1244	0	0	1286	1518	1921	1709	0	333	1615	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				42		9				
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		77.1			379.9			297.6			102.6	
Travel Time (s)		5.8			28.5			22.3			7.7	
Confl. Peds. (#/hr)	1		4	4		1	1					1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	3%	17%	100%	4%	0%	5%	0%	12%	2%	28%	19%	0%
Adj. Flow (vph)	30	6	2	79	3	42	0	872	54	19	846	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	38	0	0	82	42	0	926	0	19	848	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	17.0	17.0		17.0	17.0	17.0	57.5	57.5		57.5	57.5	
Total Split (s)	19.0	19.0		19.0	19.0	19.0	72.0	72.0		72.0	72.0	
Total Split (%)	20.9%	20.9%		20.9%	20.9%	20.9%	79.1%	79.1%		79.1%	79.1%	
Maximum Green (s)	13.0	13.0		13.0	13.0	13.0	65.5	65.5		65.5	65.5	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5		4.5	4.5	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.5	6.5		6.5	6.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)		13.0			13.0	13.0		65.5		65.5	65.5	
Actuated g/C Ratio		0.14			0.14	0.14		0.72		0.72	0.72	
v/c Ratio		0.21			0.45	0.17		0.75		0.08	0.73	
Control Delay		36.5			44.4	12.8		12.6		4.7	12.3	
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	
Total Delay		36.5			44.4	12.8		12.6		4.7	12.3	
LOS		D			D	B		B		A	B	
Approach Delay		36.5			33.7			12.6			12.1	
Approach LOS		D			C			B			B	

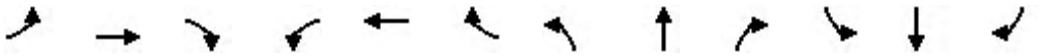
Intersection Summary			
Area Type:	Other		
Cycle Length: 91			
Actuated Cycle Length: 91			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 14.2		Intersection LOS: B	
Intersection Capacity Utilization 81.0%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Highway 6 & Badenoch Street



Lane Group	EBT	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	38	82	42	926	19	848
v/c Ratio	0.21	0.45	0.17	0.75	0.08	0.73
Control Delay	36.5	44.4	12.8	12.6	4.7	12.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.5	44.4	12.8	12.6	4.7	12.3
Queue Length 50th (m)	5.6	13.3	0.0	82.3	0.8	73.5
Queue Length 95th (m)	14.7	27.4	8.8	131.9	2.9	118.4
Internal Link Dist (m)	53.1	355.9		273.6		78.6
Turn Bay Length (m)			20.0		40.0	
Base Capacity (vph)	179	183	252	1232	239	1162
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.45	0.17	0.75	0.08	0.73

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	6	2	76	3	40	0	837	52	18	812	2
Future Volume (vph)	29	6	2	76	3	40	0	837	52	18	812	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0	6.0		6.5		6.5	6.5	
Lane Util. Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.98		1.00		1.00	1.00	
Flpb, ped/bikes		1.00			0.98	1.00		1.00		1.00	1.00	
Frt		0.99			1.00	0.85		0.99		1.00	1.00	
Flt Protected		0.96			0.95	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		1655			1738	1518		1709		1426	1614	
Flt Permitted		0.72			0.71	1.00		1.00		0.22	1.00	
Satd. Flow (perm)		1245			1286	1518		1709		333	1614	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	30	6	2	79	3	42	0	872	54	19	846	2
RTOR Reduction (vph)	0	2	0	0	0	36	0	3	0	0	0	0
Lane Group Flow (vph)	0	36	0	0	82	6	0	923	0	19	848	0
Confl. Peds. (#/hr)	1		4	4		1	1					1
Heavy Vehicles (%)	3%	17%	100%	4%	0%	5%	0%	12%	2%	28%	19%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		13.0			13.0	13.0		65.5		65.5	65.5	
Effective Green, g (s)		13.0			13.0	13.0		65.5		65.5	65.5	
Actuated g/C Ratio		0.14			0.14	0.14		0.72		0.72	0.72	
Clearance Time (s)		6.0			6.0	6.0		6.5		6.5	6.5	
Lane Grp Cap (vph)		177			183	216		1230		239	1161	
v/s Ratio Prot								c0.54			0.53	
v/s Ratio Perm		0.03			c0.06	0.00				0.06		
v/c Ratio		0.21			0.45	0.03		0.75		0.08	0.73	
Uniform Delay, d1		34.4			35.7	33.6		7.8		3.8	7.5	
Progression Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2		2.6			7.7	0.2		4.2		0.6	4.1	
Delay (s)		37.0			43.5	33.8		12.0		4.4	11.6	
Level of Service		D			D	C		B		A	B	
Approach Delay (s)		37.0			40.2			12.0			11.4	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	71	1	1	121	0	0
Future Volume (vph)	71	1	1	121	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998					
Flt Protected						
Satd. Flow (prot)	1743	0	0	1846	1921	0
Flt Permitted						
Satd. Flow (perm)	1743	0	0	1846	1921	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	379.9			142.3	69.0	
Travel Time (s)	28.5			10.7	5.2	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	10%	10%	10%	4%	0%	0%
Adj. Flow (vph)	82	1	1	139	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	83	0	0	140	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 10.5%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	71	1	1	121	0	0
Future Volume (Veh/h)	71	1	1	121	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	82	1	1	139	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	380					
pX, platoon unblocked						
vC, conflicting volume			83		224	82
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			83		224	82
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1465		769	983

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	83	140	0
Volume Left	0	1	0
Volume Right	1	0	0
cSH	1700	1465	1700
Volume to Capacity	0.05	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.1	0.0
Lane LOS		A	A
Approach Delay (s)	0.0	0.1	0.0
Approach LOS			A

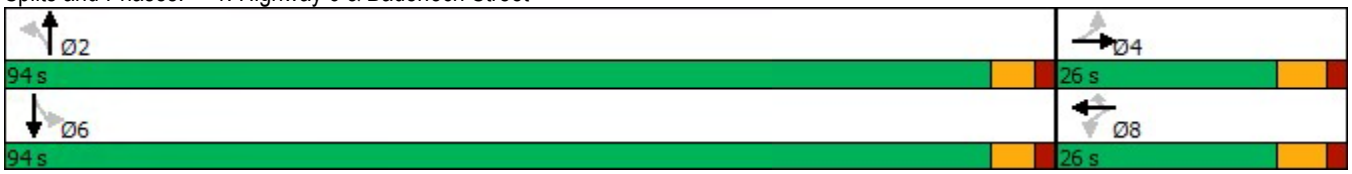
Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		10.5%	ICU Level of Service
Analysis Period (min)		15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	4	1	113	5	42	2	845	60	28	984	5
Future Volume (vph)	13	4	1	113	5	42	2	845	60	28	984	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		20.0	15.0		0.0	40.0		0.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.99	0.97					1.00	
Frt		0.993				0.850		0.990			0.999	
Flt Protected		0.964			0.954		0.950			0.950		
Satd. Flow (prot)	0	1836	0	0	1798	1601	1825	1723	0	1825	1794	0
Flt Permitted		0.758			0.721		0.141			0.189		
Satd. Flow (perm)	0	1439	0	0	1345	1560	271	1723	0	363	1794	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				44		8			1	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		77.1			379.9			297.6			102.6	
Travel Time (s)		5.8			28.5			22.3			7.7	
Confl. Peds. (#/hr)	1		2	2		1	2					2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	0%	11%	2%	0%	7%	0%
Adj. Flow (vph)	14	4	1	119	5	44	2	889	63	29	1036	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	19	0	0	124	44	2	952	0	29	1041	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	25.0	25.0		25.0	25.0	
Minimum Split (s)	17.5	17.5		17.5	17.5	17.5	57.5	57.5		57.5	57.5	
Total Split (s)	26.0	26.0		26.0	26.0	26.0	94.0	94.0		94.0	94.0	
Total Split (%)	21.7%	21.7%		21.7%	21.7%	21.7%	78.3%	78.3%		78.3%	78.3%	
Maximum Green (s)	19.5	19.5		19.5	19.5	19.5	88.0	88.0		88.0	88.0	
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.5			6.5	6.5	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)		13.8			13.8	13.8	58.7	58.7		58.7	58.7	
Actuated g/C Ratio		0.16			0.16	0.16	0.68	0.68		0.68	0.68	
v/c Ratio		0.08			0.57	0.15	0.01	0.81		0.12	0.85	
Control Delay		37.1			48.9	13.9	4.5	15.7		5.9	18.0	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		37.1			48.9	13.9	4.5	15.7		5.9	18.0	
LOS		D			D	B	A	B		A	B	
Approach Delay		37.1			39.8			15.7			17.7	
Approach LOS		D			D			B			B	

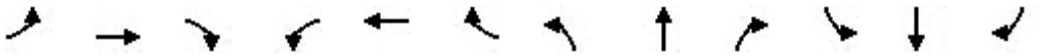
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 85.7			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 18.7		Intersection LOS: B	
Intersection Capacity Utilization 80.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Highway 6 & Badenoch Street



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	19	124	44	2	952	29	1041
v/c Ratio	0.08	0.57	0.15	0.01	0.81	0.12	0.85
Control Delay	37.1	48.9	13.9	4.5	15.7	5.9	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	48.9	13.9	4.5	15.7	5.9	18.0
Queue Length 50th (m)	2.3	17.2	0.0	0.1	86.3	1.3	101.6
Queue Length 95th (m)	10.6	47.4	10.3	0.8	168.5	4.8	198.5
Internal Link Dist (m)	53.1	355.9			273.6		78.6
Turn Bay Length (m)			20.0	15.0		40.0	
Base Capacity (vph)	347	324	409	250	1590	335	1655
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.38	0.11	0.01	0.60	0.09	0.63

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	4	1	113	5	42	2	845	60	28	984	5
Future Volume (vph)	13	4	1	113	5	42	2	845	60	28	984	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.5			6.5	6.5	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			0.99	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.96			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1833			1786	1563	1825	1723		1825	1794	
Flt Permitted		0.76			0.72	1.00	0.14	1.00		0.19	1.00	
Satd. Flow (perm)		1440			1349	1563	271	1723		363	1794	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	14	4	1	119	5	44	2	889	63	29	1036	5
RTOR Reduction (vph)	0	1	0	0	0	37	0	2	0	0	0	0
Lane Group Flow (vph)	0	18	0	0	124	7	2	950	0	29	1041	0
Confl. Peds. (#/hr)	1		2	2		1	2					2
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	0%	11%	2%	0%	7%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		13.8			13.8	13.8	58.7	58.7		58.7	58.7	
Effective Green, g (s)		13.8			13.8	13.8	58.7	58.7		58.7	58.7	
Actuated g/C Ratio		0.16			0.16	0.16	0.69	0.69		0.69	0.69	
Clearance Time (s)		6.5			6.5	6.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		233			219	253	187	1189		250	1238	
v/s Ratio Prot								0.55			c0.58	
v/s Ratio Perm		0.01			c0.09	0.00	0.01			0.08		
v/c Ratio		0.08			0.57	0.03	0.01	0.80		0.12	0.84	
Uniform Delay, d1		30.2			32.8	30.0	4.1	9.1		4.4	9.7	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			3.3	0.0	0.0	3.8		0.2	5.3	
Delay (s)		30.3			36.2	30.0	4.1	12.9		4.6	15.0	
Level of Service		C			D	C	A	B		A	B	
Approach Delay (s)		30.3			34.6			12.9			14.7	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

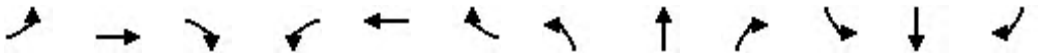
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	80	0	1	148	1	1
Future Volume (vph)	80	0	1	148	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.932	
Flt Protected					0.976	
Satd. Flow (prot)	1902	0	0	1884	1748	0
Flt Permitted					0.976	
Satd. Flow (perm)	1902	0	0	1884	1748	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	379.9			142.3	69.0	
Travel Time (s)	28.5			10.7	5.2	
Confl. Peds. (#/hr)		1	1			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	2%	0%	0%
Adj. Flow (vph)	87	0	1	161	1	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	87	0	0	162	2	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	18.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	80	0	1	148	1	1
Future Volume (Veh/h)	80	0	1	148	1	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	0	1	161	1	1
Pedestrians				1	1	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	380					
pX, platoon unblocked						
vC, conflicting volume			88		251	89
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			88		251	89
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1519		741	973

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	87	162	2
Volume Left	0	1	1
Volume Right	0	0	1
cSH	1700	1519	841
Volume to Capacity	0.05	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.1
Control Delay (s)	0.0	0.1	9.3
Lane LOS		A	A
Approach Delay (s)	0.0	0.1	9.3
Approach LOS			A

Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		18.9%	ICU Level of Service
Analysis Period (min)		15	

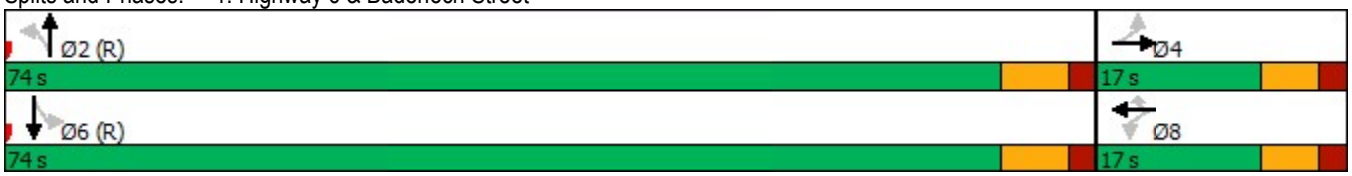


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	6	2	77	3	40	0	853	53	18	828	2
Future Volume (vph)	29	6	2	77	3	40	0	853	53	18	828	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		20.0	15.0		0.0	40.0		0.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.98	0.98					1.00	
Frt		0.993				0.850		0.991				
Flt Protected		0.962			0.954					0.950		
Satd. Flow (prot)	0	1660	0	0	1765	1555	1921	1709	0	1426	1615	0
Flt Permitted		0.716			0.706					0.226		
Satd. Flow (perm)	0	1232	0	0	1286	1518	1921	1709	0	339	1615	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				42		9				
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		77.1			379.9			297.6			102.6	
Travel Time (s)		5.8			28.5			22.3			7.7	
Confl. Peds. (#/hr)	1		4	4		1	1					1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	3%	17%	100%	4%	0%	5%	0%	12%	2%	28%	19%	0%
Adj. Flow (vph)	30	6	2	80	3	42	0	889	55	19	863	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	38	0	0	83	42	0	944	0	19	865	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	17.0	17.0		17.0	17.0	17.0	57.5	57.5		57.5	57.5	
Total Split (s)	17.0	17.0		17.0	17.0	17.0	74.0	74.0		74.0	74.0	
Total Split (%)	18.7%	18.7%		18.7%	18.7%	18.7%	81.3%	81.3%		81.3%	81.3%	
Maximum Green (s)	11.0	11.0		11.0	11.0	11.0	67.5	67.5		67.5	67.5	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5		4.5	4.5	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.5	6.5		6.5	6.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)		11.0			11.0	11.0		67.5		67.5	67.5	
Actuated g/C Ratio		0.12			0.12	0.12		0.74		0.74	0.74	
v/c Ratio		0.25			0.54	0.19		0.74		0.08	0.72	
Control Delay		39.6			51.2	13.9		11.3		4.1	11.0	
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	
Total Delay		39.6			51.2	13.9		11.3		4.1	11.0	
LOS		D			D	B		B		A	B	
Approach Delay		39.6			38.7			11.3			10.8	
Approach LOS		D			D			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 91			
Actuated Cycle Length: 91			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 13.3		Intersection LOS: B	
Intersection Capacity Utilization 81.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Highway 6 & Badenoch Street



Lane Group	EBT	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	38	83	42	944	19	865
v/c Ratio	0.25	0.54	0.19	0.74	0.08	0.72
Control Delay	39.6	51.2	13.9	11.3	4.1	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.6	51.2	13.9	11.3	4.1	11.0
Queue Length 50th (m)	5.8	13.9	0.0	77.0	0.8	69.1
Queue Length 95th (m)	15.2	#29.1	9.1	124.1	2.6	111.8
Internal Link Dist (m)	53.1	355.9		273.6		78.6
Turn Bay Length (m)			20.0		40.0	
Base Capacity (vph)	150	155	220	1269	251	1197
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.54	0.19	0.74	0.08	0.72

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	6	2	77	3	40	0	853	53	18	828	2
Future Volume (vph)	29	6	2	77	3	40	0	853	53	18	828	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0	6.0		6.5		6.5	6.5	
Lane Util. Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.98		1.00		1.00	1.00	
Flpb, ped/bikes		1.00			0.98	1.00		1.00		1.00	1.00	
Frt		0.99			1.00	0.85		0.99		1.00	1.00	
Flt Protected		0.96			0.95	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		1655			1738	1518		1709		1426	1614	
Flt Permitted		0.72			0.71	1.00		1.00		0.23	1.00	
Satd. Flow (perm)		1232			1286	1518		1709		339	1614	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	30	6	2	80	3	42	0	889	55	19	862	2
RTOR Reduction (vph)	0	2	0	0	0	37	0	2	0	0	0	0
Lane Group Flow (vph)	0	36	0	0	83	5	0	942	0	19	865	0
Confl. Peds. (#/hr)	1		4	4		1	1					1
Heavy Vehicles (%)	3%	17%	100%	4%	0%	5%	0%	12%	2%	28%	19%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		11.0			11.0	11.0		67.5		67.5	67.5	
Effective Green, g (s)		11.0			11.0	11.0		67.5		67.5	67.5	
Actuated g/C Ratio		0.12			0.12	0.12		0.74		0.74	0.74	
Clearance Time (s)		6.0			6.0	6.0		6.5		6.5	6.5	
Lane Grp Cap (vph)		148			155	183		1267		251	1197	
v/s Ratio Prot								c0.55			0.54	
v/s Ratio Perm		0.03			c0.06	0.00				0.06		
v/c Ratio		0.24			0.54	0.03		0.74		0.08	0.72	
Uniform Delay, d1		36.2			37.6	35.3		6.8		3.2	6.5	
Progression Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2		3.9			12.6	0.3		4.0		0.6	3.8	
Delay (s)		40.1			50.2	35.6		10.7		3.8	10.3	
Level of Service		D			D	D		B		A	B	
Approach Delay (s)		40.1			45.3			10.7			10.2	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

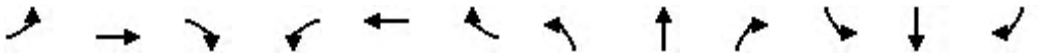
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	72	1	1	123	0	0
Future Volume (vph)	72	1	1	123	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998					
Flt Protected						
Satd. Flow (prot)	1743	0	0	1846	1921	0
Flt Permitted						
Satd. Flow (perm)	1743	0	0	1846	1921	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	379.9			142.3	69.0	
Travel Time (s)	28.5			10.7	5.2	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	10%	10%	10%	4%	0%	0%
Adj. Flow (vph)	83	1	1	141	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	84	0	0	142	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 10.6%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	72	1	1	123	0	0
Future Volume (Veh/h)	72	1	1	123	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	83	1	1	141	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	380					
pX, platoon unblocked						
vC, conflicting volume			84		226	84
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			84		226	84
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1464		766	981

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	84	142	0
Volume Left	0	1	0
Volume Right	1	0	0
cSH	1700	1464	1700
Volume to Capacity	0.05	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.1	0.0
Lane LOS		A	A
Approach Delay (s)	0.0	0.1	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	10.6%	ICU Level of Service	A
Analysis Period (min)	15		

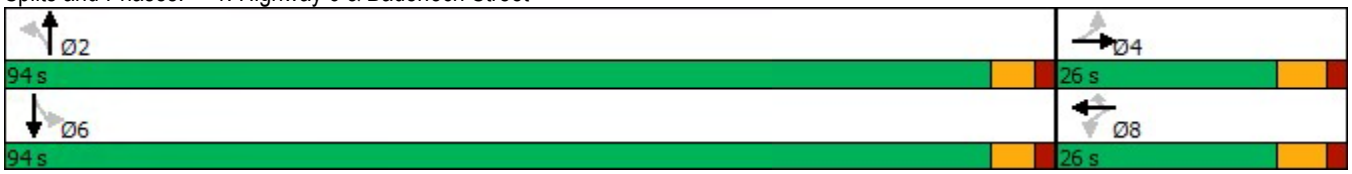


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	4	1	115	5	42	2	861	61	28	1003	5
Future Volume (vph)	13	4	1	115	5	42	2	861	61	28	1003	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		20.0	15.0		0.0	40.0		0.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.99	0.97					1.00	
Frt		0.993				0.850		0.990			0.999	
Flt Protected		0.964			0.954		0.950			0.950		
Satd. Flow (prot)	0	1836	0	0	1798	1601	1825	1723	0	1825	1794	0
Flt Permitted		0.755			0.721		0.177			0.218		
Satd. Flow (perm)	0	1433	0	0	1345	1560	340	1723	0	419	1794	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				44		8			1	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		77.1			379.9			297.6			102.6	
Travel Time (s)		5.8			28.5			22.3			7.7	
Confl. Peds. (#/hr)	1		2	2		1	2					2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	0%	11%	2%	0%	7%	0%
Adj. Flow (vph)	14	4	1	121	5	44	2	906	64	29	1056	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	19	0	0	126	44	2	970	0	29	1061	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	25.0	25.0		25.0	25.0	
Minimum Split (s)	17.5	17.5		17.5	17.5	17.5	57.5	57.5		57.5	57.5	
Total Split (s)	26.0	26.0		26.0	26.0	26.0	94.0	94.0		94.0	94.0	
Total Split (%)	21.7%	21.7%		21.7%	21.7%	21.7%	78.3%	78.3%		78.3%	78.3%	
Maximum Green (s)	19.5	19.5		19.5	19.5	19.5	88.0	88.0		88.0	88.0	
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.5			6.5	6.5	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max		Max	Max	
Walk Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)		15.7			15.7	15.7	91.1	91.1		91.1	91.1	
Actuated g/C Ratio		0.13			0.13	0.13	0.76	0.76		0.76	0.76	
v/c Ratio		0.10			0.71	0.18	0.01	0.74		0.09	0.78	
Control Delay		43.1			70.8	14.4	4.5	12.6		5.1	14.0	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		43.1			70.8	14.4	4.5	12.6		5.1	14.0	
LOS		D			E	B	A	B		A	B	
Approach Delay		43.1			56.2			12.6			13.8	
Approach LOS		D			E			B			B	

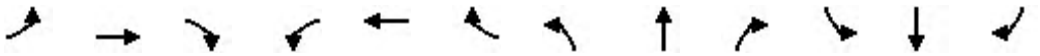
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 119.3			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 16.7		Intersection LOS: B	
Intersection Capacity Utilization 81.6%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Highway 6 & Badenoch Street



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	19	126	44	2	970	29	1061
v/c Ratio	0.10	0.71	0.18	0.01	0.74	0.09	0.78
Control Delay	43.1	70.8	14.4	4.5	12.6	5.1	14.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.1	70.8	14.4	4.5	12.6	5.1	14.0
Queue Length 50th (m)	3.7	27.7	0.0	0.1	104.9	1.5	123.9
Queue Length 95th (m)	10.6	48.0	10.3	0.8	177.4	4.6	208.8
Internal Link Dist (m)	53.1	355.9			273.6		78.6
Turn Bay Length (m)			20.0	15.0		40.0	
Base Capacity (vph)	235	219	291	259	1317	320	1369
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.58	0.15	0.01	0.74	0.09	0.78

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	4	1	115	5	42	2	861	61	28	1003	5
Future Volume (vph)	13	4	1	115	5	42	2	861	61	28	1003	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.5			6.5	6.5	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			0.99	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.96			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1831			1780	1560	1825	1723		1825	1794	
Flt Permitted		0.76			0.72	1.00	0.18	1.00		0.22	1.00	
Satd. Flow (perm)		1433			1345	1560	339	1723		419	1794	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	14	4	1	121	5	44	2	906	64	29	1056	5
RTOR Reduction (vph)	0	1	0	0	0	38	0	2	0	0	0	0
Lane Group Flow (vph)	0	18	0	0	126	6	2	968	0	29	1061	0
Confl. Peds. (#/hr)	1		2	2		1	2					2
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	0%	11%	2%	0%	7%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		15.7			15.7	15.7	91.1	91.1		91.1	91.1	
Effective Green, g (s)		15.7			15.7	15.7	91.1	91.1		91.1	91.1	
Actuated g/C Ratio		0.13			0.13	0.13	0.76	0.76		0.76	0.76	
Clearance Time (s)		6.5			6.5	6.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		188			177	205	258	1315		319	1369	
v/s Ratio Prot								0.56			c0.59	
v/s Ratio Perm		0.01			c0.09	0.00	0.01			0.07		
v/c Ratio		0.10			0.71	0.03	0.01	0.74		0.09	0.77	
Uniform Delay, d1		45.6			49.6	45.2	3.4	7.6		3.6	8.2	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			12.7	0.1	0.1	3.7		0.6	4.3	
Delay (s)		45.8			62.3	45.2	3.4	11.3		4.1	12.5	
Level of Service		D			E	D	A	B		A	B	
Approach Delay (s)		45.8			57.9			11.3			12.3	
Approach LOS		D			E			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	119.3	Sum of lost time (s)	12.5
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

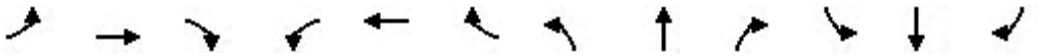
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	81	0	1	150	1	1
Future Volume (vph)	81	0	1	150	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.932	
Flt Protected					0.976	
Satd. Flow (prot)	1902	0	0	1884	1748	0
Flt Permitted					0.976	
Satd. Flow (perm)	1902	0	0	1884	1748	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	379.9			142.3	69.0	
Travel Time (s)	28.5			10.7	5.2	
Confl. Peds. (#/hr)		1	1			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	2%	0%	0%
Adj. Flow (vph)	88	0	1	163	1	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	88	0	0	164	2	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	19.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	81	0	1	150	1	1
Future Volume (Veh/h)	81	0	1	150	1	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	88	0	1	163	1	1
Pedestrians				1	1	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	380					
pX, platoon unblocked						
vC, conflicting volume			89		254	90
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			89		254	90
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1518		738	972

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	88	164	2
Volume Left	0	1	1
Volume Right	0	0	1
cSH	1700	1518	839
Volume to Capacity	0.05	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.1
Control Delay (s)	0.0	0.1	9.3
Lane LOS		A	A
Approach Delay (s)	0.0	0.1	9.3
Approach LOS			A

Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		19.0%	ICU Level of Service
Analysis Period (min)		15	

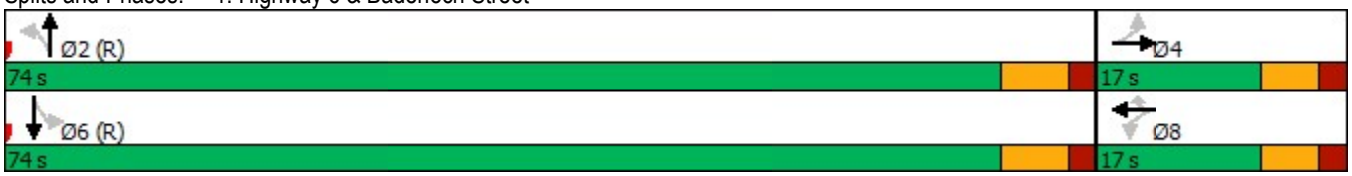


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	6	2	84	3	47	0	853	55	20	828	2
Future Volume (vph)	29	6	2	84	3	47	0	853	55	20	828	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		20.0	15.0		0.0	40.0		0.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.98	0.98					1.00	
Frt		0.993				0.850		0.991				
Flt Protected		0.962			0.954					0.950		
Satd. Flow (prot)	0	1660	0	0	1764	1555	1921	1709	0	1426	1615	0
Flt Permitted		0.711			0.705					0.225		
Satd. Flow (perm)	0	1224	0	0	1284	1518	1921	1709	0	338	1615	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				49		10				
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		77.1			379.9			297.6			102.6	
Travel Time (s)		5.8			28.5			22.3			7.7	
Confl. Peds. (#/hr)	1		4	4		1	1					1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	3%	17%	100%	4%	0%	5%	0%	12%	2%	28%	19%	0%
Adj. Flow (vph)	30	6	2	88	3	49	0	889	57	21	863	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	38	0	0	91	49	0	946	0	21	865	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	17.0	17.0		17.0	17.0	17.0	57.5	57.5		57.5	57.5	
Total Split (s)	17.0	17.0		17.0	17.0	17.0	74.0	74.0		74.0	74.0	
Total Split (%)	18.7%	18.7%		18.7%	18.7%	18.7%	81.3%	81.3%		81.3%	81.3%	
Maximum Green (s)	11.0	11.0		11.0	11.0	11.0	67.5	67.5		67.5	67.5	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5		4.5	4.5	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.5	6.5		6.5	6.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)		11.0			11.0	11.0		67.5		67.5	67.5	
Actuated g/C Ratio		0.12			0.12	0.12		0.74		0.74	0.74	
v/c Ratio		0.26			0.59	0.22		0.74		0.08	0.72	
Control Delay		39.7			54.5	13.6		11.3		4.2	11.0	
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	
Total Delay		39.7			54.5	13.6		11.3		4.2	11.0	
LOS		D			D	B		B		A	B	
Approach Delay		39.7			40.2			11.3			10.8	
Approach LOS		D			D			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 91			
Actuated Cycle Length: 91			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 13.6		Intersection LOS: B	
Intersection Capacity Utilization 82.0%		ICU Level of Service D	
Analysis Period (min) 15			

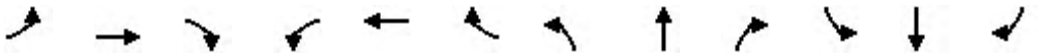
Splits and Phases: 1: Highway 6 & Badenoch Street



Lane Group	EBT	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	38	91	49	946	21	865
v/c Ratio	0.26	0.59	0.22	0.74	0.08	0.72
Control Delay	39.7	54.5	13.6	11.3	4.2	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.7	54.5	13.6	11.3	4.2	11.0
Queue Length 50th (m)	5.8	15.3	0.0	77.3	0.8	69.1
Queue Length 95th (m)	15.2	#34.3	9.8	124.8	2.8	111.8
Internal Link Dist (m)	53.1	355.9		273.6		78.6
Turn Bay Length (m)			20.0		40.0	
Base Capacity (vph)	149	155	226	1270	250	1197
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.59	0.22	0.74	0.08	0.72

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	6	2	84	3	47	0	853	55	20	828	2
Future Volume (vph)	29	6	2	84	3	47	0	853	55	20	828	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0	6.0		6.5		6.5	6.5	
Lane Util. Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.98		1.00		1.00	1.00	
Flpb, ped/bikes		1.00			0.98	1.00		1.00		1.00	1.00	
Frt		0.99			1.00	0.85		0.99		1.00	1.00	
Flt Protected		0.96			0.95	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		1655			1737	1518		1709		1426	1614	
Flt Permitted		0.71			0.71	1.00		1.00		0.23	1.00	
Satd. Flow (perm)		1223			1285	1518		1709		338	1614	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	30	6	2	88	3	49	0	889	57	21	862	2
RTOR Reduction (vph)	0	2	0	0	0	43	0	3	0	0	0	0
Lane Group Flow (vph)	0	36	0	0	91	6	0	943	0	21	865	0
Confl. Peds. (#/hr)	1		4	4		1	1					1
Heavy Vehicles (%)	3%	17%	100%	4%	0%	5%	0%	12%	2%	28%	19%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		11.0			11.0	11.0		67.5		67.5	67.5	
Effective Green, g (s)		11.0			11.0	11.0		67.5		67.5	67.5	
Actuated g/C Ratio		0.12			0.12	0.12		0.74		0.74	0.74	
Clearance Time (s)		6.0			6.0	6.0		6.5		6.5	6.5	
Lane Grp Cap (vph)		147			155	183		1267		250	1197	
v/s Ratio Prot								c0.55			0.54	
v/s Ratio Perm		0.03			c0.07	0.00				0.06		
v/c Ratio		0.25			0.59	0.03		0.74		0.08	0.72	
Uniform Delay, d1		36.2			37.9	35.3		6.8		3.2	6.5	
Progression Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2		4.0			15.3	0.3		4.0		0.7	3.8	
Delay (s)		40.2			53.1	35.6		10.8		3.9	10.3	
Level of Service		D			D	D		B		A	B	
Approach Delay (s)		40.2			47.0			10.8			10.2	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	82.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	72	6	2	123	14	2
Future Volume (vph)	72	6	2	123	14	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.989				0.985	
Flt Protected				0.999	0.957	
Satd. Flow (prot)	1727	0	0	1844	1811	0
Flt Permitted				0.999	0.957	
Satd. Flow (perm)	1727	0	0	1844	1811	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	379.9			142.3	69.0	
Travel Time (s)	28.5			10.7	5.2	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	10%	10%	10%	4%	0%	0%
Adj. Flow (vph)	83	7	2	141	16	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	90	0	0	143	18	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 18.1%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	72	6	2	123	14	2
Future Volume (Veh/h)	72	6	2	123	14	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	83	7	2	141	16	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	380					
pX, platoon unblocked						
vC, conflicting volume			90		232	86
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			90		232	86
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1456		760	978

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	90	143	18
Volume Left	0	2	16
Volume Right	7	0	2
cSH	1700	1456	779
Volume to Capacity	0.05	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.5
Control Delay (s)	0.0	0.1	9.7
Lane LOS		A	A
Approach Delay (s)	0.0	0.1	9.7
Approach LOS			A

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	18.1%	ICU Level of Service	A
Analysis Period (min)	15		

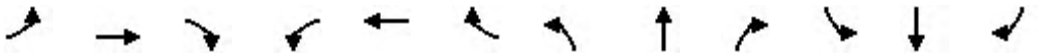
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	2	0	0	15	6	0
Future Volume (vph)	2	0	0	15	6	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected	0.950					
Satd. Flow (prot)	1825	0	0	1921	1921	0
Flt Permitted	0.950					
Satd. Flow (perm)	1825	0	0	1921	1921	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	145.0			95.3	69.0	
Travel Time (s)	10.9			7.1	5.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	2	0	0	15	6	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2	0	0	15	6	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	0	0	15	6	0
Future Volume (Veh/h)	2	0	0	15	6	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	0	0	15	6	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	21	6	6			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	21	6	6			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	1001	1083	1628			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	2	15	6
Volume Left	2	0	0
Volume Right	0	0	0
cSH	1001	1628	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	8.6	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.6	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

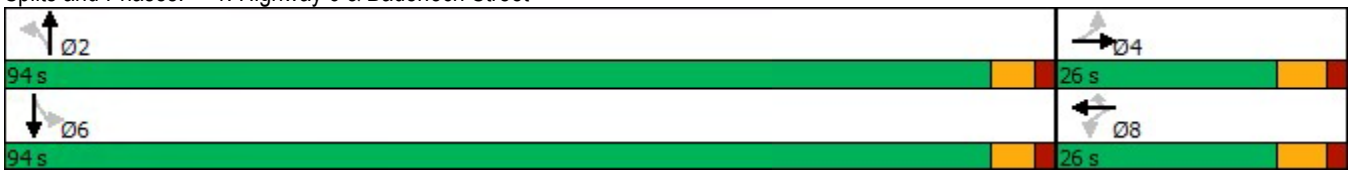


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	4	1	119	5	46	2	861	68	35	1003	5
Future Volume (vph)	13	4	1	119	5	46	2	861	68	35	1003	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		20.0	15.0		0.0	40.0		0.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.99	0.97					1.00	
Frt		0.993				0.850		0.989			0.999	
Flt Protected		0.964			0.954		0.950			0.950		
Satd. Flow (prot)	0	1836	0	0	1798	1601	1825	1722	0	1825	1794	0
Flt Permitted		0.755			0.721		0.176			0.214		
Satd. Flow (perm)	0	1433	0	0	1345	1560	338	1722	0	411	1794	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				48		9			1	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		77.1			379.9			297.6			102.6	
Travel Time (s)		5.8			28.5			22.3			7.7	
Confl. Peds. (#/hr)	1		2	2		1	2					2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	0%	11%	2%	0%	7%	0%
Adj. Flow (vph)	14	4	1	125	5	48	2	906	72	37	1056	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	19	0	0	130	48	2	978	0	37	1061	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	25.0	25.0		25.0	25.0	
Minimum Split (s)	17.5	17.5		17.5	17.5	17.5	57.5	57.5		57.5	57.5	
Total Split (s)	26.0	26.0		26.0	26.0	26.0	94.0	94.0		94.0	94.0	
Total Split (%)	21.7%	21.7%		21.7%	21.7%	21.7%	78.3%	78.3%		78.3%	78.3%	
Maximum Green (s)	19.5	19.5		19.5	19.5	19.5	88.0	88.0		88.0	88.0	
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.5			6.5	6.5	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max		Max	Max	
Walk Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)		15.9			15.9	15.9	91.0	91.0		91.0	91.0	
Actuated g/C Ratio		0.13			0.13	0.13	0.76	0.76		0.76	0.76	
v/c Ratio		0.10			0.73	0.19	0.01	0.74		0.12	0.78	
Control Delay		43.0			72.0	14.1	4.5	12.9		5.5	14.2	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		43.0			72.0	14.1	4.5	12.9		5.5	14.2	
LOS		D			E	B	A	B		A	B	
Approach Delay		43.0			56.4			12.9			13.9	
Approach LOS		D			E			B			B	

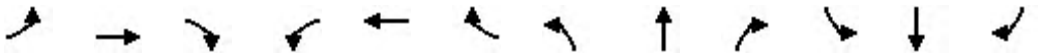
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 119.4			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 17.0		Intersection LOS: B	
Intersection Capacity Utilization 82.0%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Highway 6 & Badenoch Street



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	19	130	48	2	978	37	1061
v/c Ratio	0.10	0.73	0.19	0.01	0.74	0.12	0.78
Control Delay	43.0	72.0	14.1	4.5	12.9	5.5	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.0	72.0	14.1	4.5	12.9	5.5	14.2
Queue Length 50th (m)	3.7	28.7	0.0	0.1	108.8	2.0	126.2
Queue Length 95th (m)	10.6	49.6	10.5	0.8	181.0	5.7	208.8
Internal Link Dist (m)	53.1	355.9			273.6		78.6
Turn Bay Length (m)			20.0	15.0		40.0	
Base Capacity (vph)	234	219	294	257	1314	313	1367
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.59	0.16	0.01	0.74	0.12	0.78

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	4	1	119	5	46	2	861	68	35	1003	5
Future Volume (vph)	13	4	1	119	5	46	2	861	68	35	1003	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.5			6.5	6.5	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			0.99	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.96			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1831			1780	1560	1825	1722		1825	1794	
Flt Permitted		0.75			0.72	1.00	0.18	1.00		0.21	1.00	
Satd. Flow (perm)		1433			1344	1560	338	1722		410	1794	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	14	4	1	125	5	48	2	906	72	37	1056	5
RTOR Reduction (vph)	0	1	0	0	0	42	0	2	0	0	0	0
Lane Group Flow (vph)	0	18	0	0	130	6	2	976	0	37	1061	0
Confl. Peds. (#/hr)	1		2	2		1	2					2
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	0%	11%	2%	0%	7%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		15.9			15.9	15.9	91.0	91.0		91.0	91.0	
Effective Green, g (s)		15.9			15.9	15.9	91.0	91.0		91.0	91.0	
Actuated g/C Ratio		0.13			0.13	0.13	0.76	0.76		0.76	0.76	
Clearance Time (s)		6.5			6.5	6.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		190			178	207	257	1312		312	1367	
v/s Ratio Prot								0.57			c0.59	
v/s Ratio Perm		0.01			c0.10	0.00	0.01			0.09		
v/c Ratio		0.10			0.73	0.03	0.01	0.74		0.12	0.78	
Uniform Delay, d1		45.4			49.7	45.0	3.4	7.8		3.7	8.3	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			14.3	0.1	0.1	3.9		0.8	4.4	
Delay (s)		45.7			64.0	45.1	3.5	11.7		4.5	12.6	
Level of Service		D			E	D	A	B		A	B	
Approach Delay (s)		45.7			58.9			11.6			12.4	
Approach LOS		D			E			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	119.4	Sum of lost time (s)	12.5
Intersection Capacity Utilization	82.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	81	14	3	150	9	2
Future Volume (vph)	81	14	3	150	9	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.980				0.977	
Flt Protected				0.999	0.960	
Satd. Flow (prot)	1867	0	0	1882	1802	0
Flt Permitted				0.999	0.960	
Satd. Flow (perm)	1867	0	0	1882	1802	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	379.9			142.3	69.0	
Travel Time (s)	28.5			10.7	5.2	
Confl. Peds. (#/hr)		1	1			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	2%	0%	0%
Adj. Flow (vph)	88	15	3	163	10	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	103	0	0	166	12	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.6%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	81	14	3	150	9	2
Future Volume (Veh/h)	81	14	3	150	9	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	88	15	3	163	10	2
Pedestrians				1	1	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	380					
pX, platoon unblocked						
vC, conflicting volume			104		266	98
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			104		266	98
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1499		726	962

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	103	166	12
Volume Left	0	3	10
Volume Right	15	0	2
cSH	1700	1499	757
Volume to Capacity	0.06	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.4
Control Delay (s)	0.0	0.1	9.8
Lane LOS		A	A
Approach Delay (s)	0.0	0.1	9.8
Approach LOS			A

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	20.6%	ICU Level of Service	A
Analysis Period (min)	15		

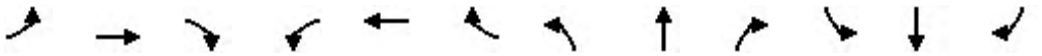
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	0	0	10	16	1
Future Volume (vph)	1	0	0	10	16	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.992	
Flt Protected	0.950					
Satd. Flow (prot)	1825	0	0	1921	1906	0
Flt Permitted	0.950					
Satd. Flow (perm)	1825	0	0	1921	1906	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	145.0			95.3	69.0	
Travel Time (s)	10.9			7.1	5.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	0	0	10	16	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1	0	0	10	17	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	0	0	10	16	1
Future Volume (Veh/h)	1	0	0	10	16	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1	0	0	10	16	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	26	16	17			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	26	16	17			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	994	1068	1613			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	1	10	17
Volume Left	1	0	0
Volume Right	0	0	1
cSH	994	1613	1700
Volume to Capacity	0.00	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	8.6	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.6	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

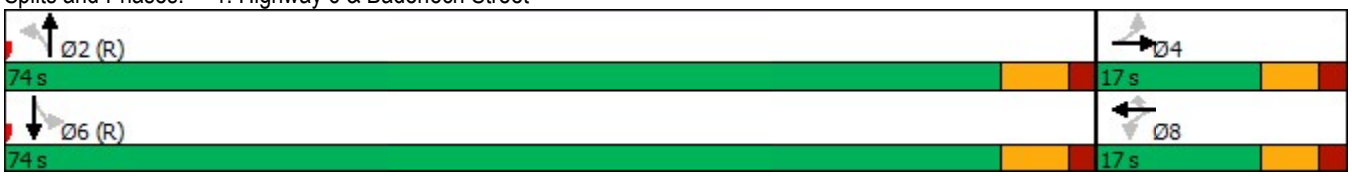


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	6	2	85	3	45	0	942	58	20	914	2
Future Volume (vph)	32	6	2	85	3	45	0	942	58	20	914	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		20.0	15.0		0.0	40.0		0.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.98	0.98					1.00	
Frt		0.993				0.850		0.991				
Flt Protected		0.961			0.954					0.950		
Satd. Flow (prot)	0	1667	0	0	1764	1555	1921	1709	0	1426	1615	0
Flt Permitted		0.706			0.703					0.179		
Satd. Flow (perm)	0	1221	0	0	1281	1518	1921	1709	0	269	1615	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				47		9				
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		77.1			379.9			297.6			102.6	
Travel Time (s)		5.8			28.5			22.3			7.7	
Confl. Peds. (#/hr)	1		4	4		1	1					1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	3%	17%	100%	4%	0%	5%	0%	12%	2%	28%	19%	0%
Adj. Flow (vph)	33	6	2	89	3	47	0	981	60	21	952	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	41	0	0	92	47	0	1041	0	21	954	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	17.0	17.0		17.0	17.0	17.0	57.5	57.5		57.5	57.5	
Total Split (s)	17.0	17.0		17.0	17.0	17.0	74.0	74.0		74.0	74.0	
Total Split (%)	18.7%	18.7%		18.7%	18.7%	18.7%	81.3%	81.3%		81.3%	81.3%	
Maximum Green (s)	11.0	11.0		11.0	11.0	11.0	67.5	67.5		67.5	67.5	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5		4.5	4.5	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.5	6.5		6.5	6.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)		11.0			11.0	11.0		67.5		67.5	67.5	
Actuated g/C Ratio		0.12			0.12	0.12		0.74		0.74	0.74	
v/c Ratio		0.28			0.60	0.21		0.82		0.11	0.80	
Control Delay		40.3			55.3	13.8		14.8		4.7	13.9	
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	
Total Delay		40.3			55.3	13.8		14.8		4.7	13.9	
LOS		D			E	B		B		A	B	
Approach Delay		40.3			41.3			14.8			13.7	
Approach LOS		D			D			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 91			
Actuated Cycle Length: 91			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 16.5		Intersection LOS: B	
Intersection Capacity Utilization 86.8%		ICU Level of Service E	
Analysis Period (min) 15			

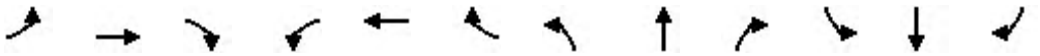
Splits and Phases: 1: Highway 6 & Badenoch Street



Lane Group	EBT	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	41	92	47	1041	21	954
v/c Ratio	0.28	0.60	0.21	0.82	0.11	0.80
Control Delay	40.3	55.3	13.8	14.8	4.7	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.3	55.3	13.8	14.8	4.7	13.9
Queue Length 50th (m)	6.3	15.5	0.0	97.7	0.8	86.5
Queue Length 95th (m)	15.9	#34.8	9.6	164.6	2.9	146.6
Internal Link Dist (m)	53.1	355.9		273.6		78.6
Turn Bay Length (m)			20.0		40.0	
Base Capacity (vph)	149	154	224	1269	199	1197
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.60	0.21	0.82	0.11	0.80

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	6	2	85	3	45	0	942	58	20	914	2
Future Volume (vph)	32	6	2	85	3	45	0	942	58	20	914	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0	6.0		6.5		6.5	6.5	
Lane Util. Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.98		1.00		1.00	1.00	
Flpb, ped/bikes		1.00			0.98	1.00		1.00		1.00	1.00	
Frt		0.99			1.00	0.85		0.99		1.00	1.00	
Flt Protected		0.96			0.95	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		1663			1738	1518		1709		1426	1614	
Flt Permitted		0.71			0.70	1.00		1.00		0.18	1.00	
Satd. Flow (perm)		1222			1280	1518		1709		269	1614	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	33	6	2	89	3	47	0	981	60	21	952	2
RTOR Reduction (vph)	0	2	0	0	0	41	0	2	0	0	0	0
Lane Group Flow (vph)	0	39	0	0	92	6	0	1039	0	21	954	0
Confl. Peds. (#/hr)	1		4	4		1	1					1
Heavy Vehicles (%)	3%	17%	100%	4%	0%	5%	0%	12%	2%	28%	19%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		11.0			11.0	11.0		67.5		67.5	67.5	
Effective Green, g (s)		11.0			11.0	11.0		67.5		67.5	67.5	
Actuated g/C Ratio		0.12			0.12	0.12		0.74		0.74	0.74	
Clearance Time (s)		6.0			6.0	6.0		6.5		6.5	6.5	
Lane Grp Cap (vph)		147			154	183		1267		199	1197	
v/s Ratio Prot								c0.61			0.59	
v/s Ratio Perm		0.03			c0.07	0.00				0.08		
v/c Ratio		0.27			0.60	0.03		0.82		0.11	0.80	
Uniform Delay, d1		36.3			37.9	35.3		7.7		3.3	7.4	
Progression Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2		4.4			15.9	0.3		6.0		1.1	5.6	
Delay (s)		40.7			53.8	35.6		13.8		4.4	13.0	
Level of Service		D			D	D		B		A	B	
Approach Delay (s)		40.7			47.7			13.8			12.8	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

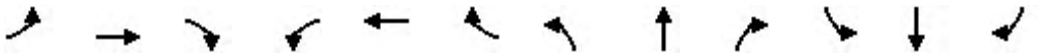
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	79	1	1	136	0	0
Future Volume (vph)	79	1	1	136	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.999					
Flt Protected						
Satd. Flow (prot)	1745	0	0	1847	1921	0
Flt Permitted						
Satd. Flow (perm)	1745	0	0	1847	1921	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	379.9			142.3	69.0	
Travel Time (s)	28.5			10.7	5.2	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	10%	10%	10%	4%	0%	0%
Adj. Flow (vph)	91	1	1	156	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	92	0	0	157	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	11.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	79	1	1	136	0	0
Future Volume (Veh/h)	79	1	1	136	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	91	1	1	156	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	380					
pX, platoon unblocked						
vC, conflicting volume			92		250	92
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			92		250	92
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1454		743	971

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	92	157	0
Volume Left	0	1	0
Volume Right	1	0	0
cSH	1700	1454	1700
Volume to Capacity	0.05	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.1	0.0
Lane LOS		A	A
Approach Delay (s)	0.0	0.1	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	11.3%	ICU Level of Service	A
Analysis Period (min)	15		

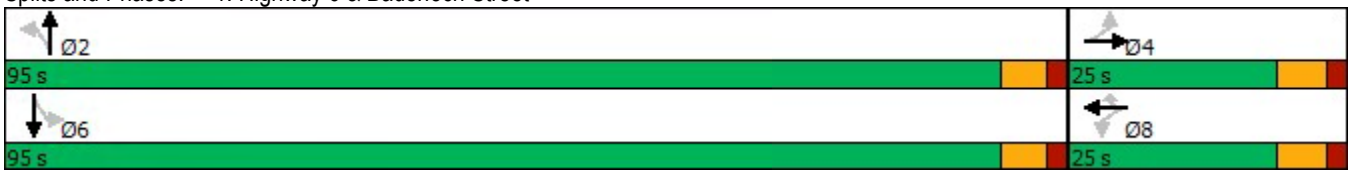


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	4	1	127	5	47	2	951	67	31	1108	5
Future Volume (vph)	14	4	1	127	5	47	2	951	67	31	1108	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		20.0	15.0		0.0	40.0		0.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.99	0.97					1.00	
Frt		0.993				0.850		0.990			0.999	
Flt Protected		0.964			0.954		0.950			0.950		
Satd. Flow (prot)	0	1836	0	0	1798	1601	1825	1723	0	1825	1794	0
Flt Permitted		0.744			0.719		0.124			0.170		
Satd. Flow (perm)	0	1413	0	0	1341	1560	238	1723	0	327	1794	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				45		8				
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		77.1			379.9			297.6			102.6	
Travel Time (s)		5.8			28.5			22.3			7.7	
Confl. Peds. (#/hr)	1		2	2		1	2					2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	0%	11%	2%	0%	7%	0%
Adj. Flow (vph)	15	4	1	134	5	49	2	1001	71	33	1166	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	139	49	2	1072	0	33	1171	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	25.0	25.0		25.0	25.0	
Minimum Split (s)	17.5	17.5		17.5	17.5	17.5	57.5	57.5		57.5	57.5	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	95.0	95.0		95.0	95.0	
Total Split (%)	20.8%	20.8%		20.8%	20.8%	20.8%	79.2%	79.2%		79.2%	79.2%	
Maximum Green (s)	18.5	18.5		18.5	18.5	18.5	89.0	89.0		89.0	89.0	
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.5			6.5	6.5	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max		Max	Max	
Walk Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)		16.1			16.1	16.1	91.3	91.3		91.3	91.3	
Actuated g/C Ratio		0.13			0.13	0.13	0.76	0.76		0.76	0.76	
v/c Ratio		0.11			0.77	0.20	0.01	0.82		0.13	0.86	
Control Delay		43.8			77.0	16.4	4.5	16.3		5.8	18.9	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		43.8			77.0	16.4	4.5	16.3		5.8	18.9	
LOS		D			E	B	A	B		A	B	
Approach Delay		43.8			61.2			16.3			18.5	
Approach LOS		D			E			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 119.9			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 21.0		Intersection LOS: C	
Intersection Capacity Utilization 86.7%		ICU Level of Service E	
Analysis Period (min) 15			

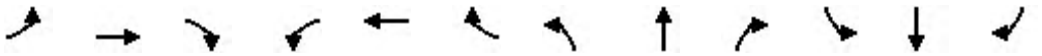
Splits and Phases: 1: Highway 6 & Badenoch Street



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	20	139	49	2	1072	33	1171
v/c Ratio	0.11	0.77	0.20	0.01	0.82	0.13	0.86
Control Delay	43.8	77.0	16.4	4.5	16.3	5.8	18.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.8	77.0	16.4	4.5	16.3	5.8	18.9
Queue Length 50th (m)	3.9	31.3	0.8	0.1	145.1	1.9	174.2
Queue Length 95th (m)	11.1	#57.7	11.7	0.8	225.8	5.3	#273.1
Internal Link Dist (m)	53.1	355.9			273.6		78.6
Turn Bay Length (m)			20.0	15.0		40.0	
Base Capacity (vph)	218	206	278	181	1313	248	1365
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.67	0.18	0.01	0.82	0.13	0.86

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	4	1	127	5	47	2	951	67	31	1108	5
Future Volume (vph)	14	4	1	127	5	47	2	951	67	31	1108	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.5			6.5	6.5	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			0.99	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.96			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1831			1780	1560	1825	1723		1825	1795	
Flt Permitted		0.74			0.72	1.00	0.12	1.00		0.17	1.00	
Satd. Flow (perm)		1414			1342	1560	238	1723		327	1795	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	15	4	1	134	5	49	2	1001	71	33	1166	5
RTOR Reduction (vph)	0	1	0	0	0	39	0	2	0	0	0	0
Lane Group Flow (vph)	0	19	0	0	139	10	2	1070	0	33	1171	0
Confl. Peds. (#/hr)	1		2	2		1	2					2
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	0%	11%	2%	0%	7%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		16.1			16.1	16.1	91.3	91.3		91.3	91.3	
Effective Green, g (s)		16.1			16.1	16.1	91.3	91.3		91.3	91.3	
Actuated g/C Ratio		0.13			0.13	0.13	0.76	0.76		0.76	0.76	
Clearance Time (s)		6.5			6.5	6.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		189			180	209	181	1312		249	1366	
v/s Ratio Prot								0.62			c0.65	
v/s Ratio Perm		0.01			c0.10	0.01	0.01			0.10		
v/c Ratio		0.10			0.77	0.05	0.01	0.82		0.13	0.86	
Uniform Delay, d1		45.6			50.1	45.2	3.4	9.0		3.8	9.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			18.3	0.1	0.1	5.7		1.1	7.1	
Delay (s)		45.8			68.5	45.3	3.6	14.7		4.9	16.9	
Level of Service		D			E	D	A	B		A	B	
Approach Delay (s)		45.8			62.4			14.7			16.6	
Approach LOS		D			E			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	119.9	Sum of lost time (s)	12.5
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

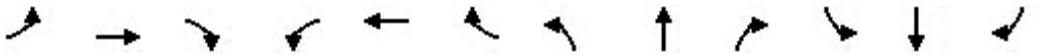
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	90	0	1	166	1	1
Future Volume (vph)	90	0	1	166	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.932	
Flt Protected					0.976	
Satd. Flow (prot)	1902	0	0	1884	1748	0
Flt Permitted					0.976	
Satd. Flow (perm)	1902	0	0	1884	1748	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	379.9			142.3	69.0	
Travel Time (s)	28.5			10.7	5.2	
Confl. Peds. (#/hr)		1	1			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	2%	0%	0%
Adj. Flow (vph)	98	0	1	180	1	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	98	0	0	181	2	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	19.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	90	0	1	166	1	1
Future Volume (Veh/h)	90	0	1	166	1	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	0	1	180	1	1
Pedestrians				1	1	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	380					
pX, platoon unblocked						
vC, conflicting volume			99		281	100
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			99		281	100
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1505		712	959

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	98	181	2
Volume Left	0	1	1
Volume Right	0	0	1
cSH	1700	1505	818
Volume to Capacity	0.06	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.1
Control Delay (s)	0.0	0.0	9.4
Lane LOS		A	A
Approach Delay (s)	0.0	0.0	9.4
Approach LOS			A

Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		19.9%	ICU Level of Service
Analysis Period (min)		15	

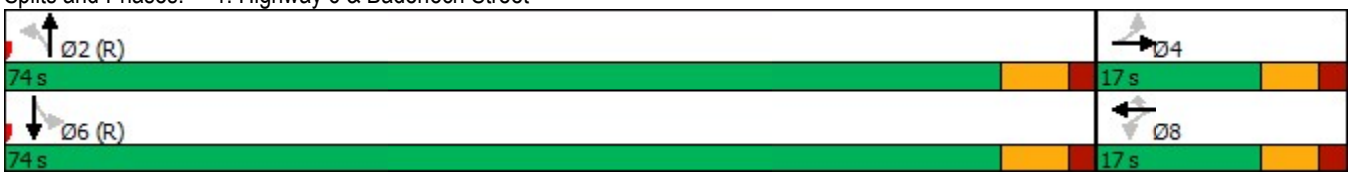


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	6	2	92	3	52	0	942	60	22	914	2
Future Volume (vph)	32	6	2	92	3	52	0	942	60	22	914	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		20.0	15.0		0.0	40.0		0.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.98	0.98					1.00	
Frt		0.993				0.850		0.991				
Flt Protected		0.961			0.954					0.950		
Satd. Flow (prot)	0	1667	0	0	1764	1555	1921	1709	0	1426	1615	0
Flt Permitted		0.702			0.702					0.178		
Satd. Flow (perm)	0	1214	0	0	1279	1518	1921	1709	0	267	1615	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				54		10				
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		77.1			379.9			297.6			102.6	
Travel Time (s)		5.8			28.5			22.3			7.7	
Confl. Peds. (#/hr)	1		4	4		1	1					1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	3%	17%	100%	4%	0%	5%	0%	12%	2%	28%	19%	0%
Adj. Flow (vph)	33	6	2	96	3	54	0	981	63	23	952	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	41	0	0	99	54	0	1044	0	23	954	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	17.0	17.0		17.0	17.0	17.0	57.5	57.5		57.5	57.5	
Total Split (s)	17.0	17.0		17.0	17.0	17.0	74.0	74.0		74.0	74.0	
Total Split (%)	18.7%	18.7%		18.7%	18.7%	18.7%	81.3%	81.3%		81.3%	81.3%	
Maximum Green (s)	11.0	11.0		11.0	11.0	11.0	67.5	67.5		67.5	67.5	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5		4.5	4.5	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.5	6.5		6.5	6.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)		11.0			11.0	11.0		67.5		67.5	67.5	
Actuated g/C Ratio		0.12			0.12	0.12		0.74		0.74	0.74	
v/c Ratio		0.28			0.64	0.23		0.82		0.12	0.80	
Control Delay		40.4			58.7	13.4		14.9		4.9	13.9	
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	
Total Delay		40.4			58.7	13.4		14.9		4.9	13.9	
LOS		D			E	B		B		A	B	
Approach Delay		40.4			42.7			14.9			13.7	
Approach LOS		D			D			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 91			
Actuated Cycle Length: 91			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 16.8		Intersection LOS: B	
Intersection Capacity Utilization 87.0%		ICU Level of Service E	
Analysis Period (min) 15			

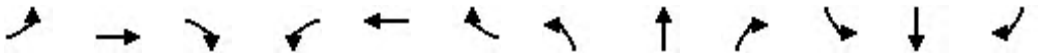
Splits and Phases: 1: Highway 6 & Badenoch Street



Lane Group	EBT	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	41	99	54	1044	23	954
v/c Ratio	0.28	0.64	0.23	0.82	0.12	0.80
Control Delay	40.4	58.7	13.4	14.9	4.9	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.4	58.7	13.4	14.9	4.9	13.9
Queue Length 50th (m)	6.3	16.8	0.0	97.9	0.9	86.5
Queue Length 95th (m)	15.9	#38.5	10.3	165.6	3.3	146.6
Internal Link Dist (m)	53.1	355.9		273.6		78.6
Turn Bay Length (m)			20.0		40.0	
Base Capacity (vph)	148	154	230	1270	198	1197
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.64	0.23	0.82	0.12	0.80

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	6	2	92	3	52	0	942	60	22	914	2
Future Volume (vph)	32	6	2	92	3	52	0	942	60	22	914	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0	6.0		6.5		6.5	6.5	
Lane Util. Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.98		1.00		1.00	1.00	
Flpb, ped/bikes		1.00			0.98	1.00		1.00		1.00	1.00	
Frt		0.99			1.00	0.85		0.99		1.00	1.00	
Flt Protected		0.96			0.95	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		1663			1737	1518		1709		1426	1614	
Flt Permitted		0.70			0.70	1.00		1.00		0.18	1.00	
Satd. Flow (perm)		1214			1279	1518		1709		267	1614	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	33	6	2	96	3	54	0	981	62	23	952	2
RTOR Reduction (vph)	0	2	0	0	0	47	0	3	0	0	0	0
Lane Group Flow (vph)	0	39	0	0	99	7	0	1041	0	23	954	0
Confl. Peds. (#/hr)	1		4	4		1	1					1
Heavy Vehicles (%)	3%	17%	100%	4%	0%	5%	0%	12%	2%	28%	19%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		11.0			11.0	11.0		67.5		67.5	67.5	
Effective Green, g (s)		11.0			11.0	11.0		67.5		67.5	67.5	
Actuated g/C Ratio		0.12			0.12	0.12		0.74		0.74	0.74	
Clearance Time (s)		6.0			6.0	6.0		6.5		6.5	6.5	
Lane Grp Cap (vph)		146			154	183		1267		198	1197	
v/s Ratio Prot								c0.61			0.59	
v/s Ratio Perm		0.03			c0.08	0.00				0.09		
v/c Ratio		0.27			0.64	0.04		0.82		0.12	0.80	
Uniform Delay, d1		36.3			38.1	35.3		7.8		3.3	7.4	
Progression Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2		4.5			18.8	0.4		6.1		1.2	5.6	
Delay (s)		40.8			57.0	35.7		13.9		4.5	13.0	
Level of Service		D			E	D		B		A	B	
Approach Delay (s)		40.8			49.4			13.9			12.8	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	87.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	79	6	2	136	14	2
Future Volume (vph)	79	6	2	136	14	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.990				0.985	
Flt Protected				0.999	0.957	
Satd. Flow (prot)	1729	0	0	1844	1811	0
Flt Permitted				0.999	0.957	
Satd. Flow (perm)	1729	0	0	1844	1811	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	379.9			142.3	69.0	
Travel Time (s)	28.5			10.7	5.2	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	10%	10%	10%	4%	0%	0%
Adj. Flow (vph)	91	7	2	156	16	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	98	0	0	158	18	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 18.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	79	6	2	136	14	2
Future Volume (Veh/h)	79	6	2	136	14	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	91	7	2	156	16	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	380					
pX, platoon unblocked						
vC, conflicting volume			98		254	94
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			98		254	94
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1446		737	968

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	98	158	18
Volume Left	0	2	16
Volume Right	7	0	2
cSH	1700	1446	758
Volume to Capacity	0.06	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.6
Control Delay (s)	0.0	0.1	9.9
Lane LOS		A	A
Approach Delay (s)	0.0	0.1	9.9
Approach LOS			A

Intersection Summary			
Average Delay		0.7	
Intersection Capacity Utilization		18.8%	ICU Level of Service
Analysis Period (min)		15	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	2	0	0	15	6	0
Future Volume (vph)	2	0	0	15	6	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected	0.950					
Satd. Flow (prot)	1825	0	0	1921	1921	0
Flt Permitted	0.950					
Satd. Flow (perm)	1825	0	0	1921	1921	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	145.0			95.3	69.0	
Travel Time (s)	10.9			7.1	5.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	2	0	0	15	6	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2	0	0	15	6	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	0	0	15	6	0
Future Volume (Veh/h)	2	0	0	15	6	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	0	0	15	6	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	21	6	6			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	21	6	6			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	1001	1083	1628			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	2	15	6
Volume Left	2	0	0
Volume Right	0	0	0
cSH	1001	1628	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	8.6	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.6	0.0	0.0
Approach LOS	A		

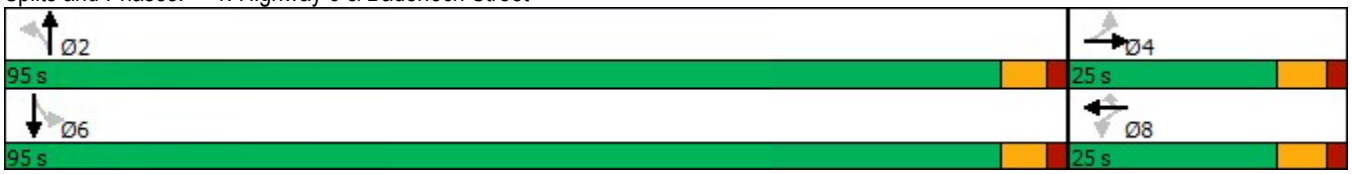
Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	4	1	131	5	51	2	951	74	38	1108	5
Future Volume (vph)	14	4	1	131	5	51	2	951	74	38	1108	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		20.0	15.0		0.0	40.0		0.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.99	0.97					1.00	
Frt		0.993				0.850		0.989			0.999	
Flt Protected		0.964			0.954		0.950			0.950		
Satd. Flow (prot)	0	1836	0	0	1798	1601	1825	1722	0	1825	1794	0
Flt Permitted		0.744			0.719		0.122			0.165		
Satd. Flow (perm)	0	1413	0	0	1341	1560	234	1722	0	317	1794	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				49		9				
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		77.1			379.9			297.6			102.6	
Travel Time (s)		5.8			28.5			22.3			7.7	
Confl. Peds. (#/hr)	1		2	2		1	2					2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	0%	11%	2%	0%	7%	0%
Adj. Flow (vph)	15	4	1	138	5	54	2	1001	78	40	1166	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	143	54	2	1079	0	40	1171	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	25.0	25.0		25.0	25.0	
Minimum Split (s)	17.5	17.5		17.5	17.5	17.5	57.5	57.5		57.5	57.5	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	95.0	95.0		95.0	95.0	
Total Split (%)	20.8%	20.8%		20.8%	20.8%	20.8%	79.2%	79.2%		79.2%	79.2%	
Maximum Green (s)	18.5	18.5		18.5	18.5	18.5	89.0	89.0		89.0	89.0	
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.5			6.5	6.5	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max		Max	Max	
Walk Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)		16.4			16.4	16.4	91.1	91.1		91.1	91.1	
Actuated g/C Ratio		0.14			0.14	0.14	0.76	0.76		0.76	0.76	
v/c Ratio		0.10			0.78	0.21	0.01	0.82		0.17	0.86	
Control Delay		43.7			77.8	16.3	4.5	16.8		6.4	19.1	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		43.7			77.8	16.3	4.5	16.8		6.4	19.1	
LOS		D			E	B	A	B		A	B	
Approach Delay		43.7			60.9			16.8			18.7	
Approach LOS		D			E			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 21.4		Intersection LOS: C	
Intersection Capacity Utilization 87.1%		ICU Level of Service E	
Analysis Period (min) 15			

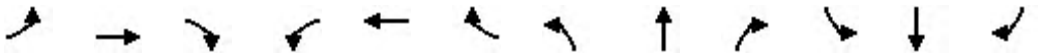
Splits and Phases: 1: Highway 6 & Badenoch Street



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	20	143	54	2	1079	40	1171
v/c Ratio	0.10	0.78	0.21	0.01	0.82	0.17	0.86
Control Delay	43.7	77.8	16.3	4.5	16.8	6.4	19.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.7	77.8	16.3	4.5	16.8	6.4	19.1
Queue Length 50th (m)	3.9	32.3	1.0	0.1	150.6	2.4	177.6
Queue Length 95th (m)	11.1	#60.1	12.4	0.8	230.8	6.4	#273.1
Internal Link Dist (m)	53.1	355.9			273.6		78.6
Turn Bay Length (m)			20.0	15.0		40.0	
Base Capacity (vph)	218	206	281	177	1309	240	1362
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.69	0.19	0.01	0.82	0.17	0.86

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	4	1	131	5	51	2	951	74	38	1108	5
Future Volume (vph)	14	4	1	131	5	51	2	951	74	38	1108	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.5			6.5	6.5	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			0.99	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.96			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1831			1780	1560	1825	1722		1825	1795	
Flt Permitted		0.74			0.72	1.00	0.12	1.00		0.17	1.00	
Satd. Flow (perm)		1414			1341	1560	234	1722		317	1795	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	15	4	1	138	5	54	2	1001	78	40	1166	5
RTOR Reduction (vph)	0	1	0	0	0	42	0	2	0	0	0	0
Lane Group Flow (vph)	0	19	0	0	143	12	2	1077	0	40	1171	0
Confl. Peds. (#/hr)	1		2	2		1	2					2
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	0%	11%	2%	0%	7%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		16.4			16.4	16.4	91.1	91.1		91.1	91.1	
Effective Green, g (s)		16.4			16.4	16.4	91.1	91.1		91.1	91.1	
Actuated g/C Ratio		0.14			0.14	0.14	0.76	0.76		0.76	0.76	
Clearance Time (s)		6.5			6.5	6.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		193			183	213	177	1307		240	1362	
v/s Ratio Prot								0.63			c0.65	
v/s Ratio Perm		0.01			c0.11	0.01	0.01			0.13		
v/c Ratio		0.10			0.78	0.05	0.01	0.82		0.17	0.86	
Uniform Delay, d1		45.3			50.1	45.1	3.5	9.3		4.0	10.0	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			19.2	0.1	0.1	6.0		1.5	7.3	
Delay (s)		45.6			69.3	45.2	3.6	15.3		5.5	17.3	
Level of Service		D			E	D	A	B		A	B	
Approach Delay (s)		45.6			62.7			15.3			16.9	
Approach LOS		D			E			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	90	14	3	166	9	2
Future Volume (vph)	90	14	3	166	9	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.982				0.977	
Flt Protected				0.999	0.960	
Satd. Flow (prot)	1870	0	0	1882	1802	0
Flt Permitted				0.999	0.960	
Satd. Flow (perm)	1870	0	0	1882	1802	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	379.9			142.3	69.0	
Travel Time (s)	28.5			10.7	5.2	
Confl. Peds. (#/hr)		1	1			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	2%	0%	0%
Adj. Flow (vph)	98	15	3	180	10	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	113	0	0	183	12	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 21.5%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	90	14	3	166	9	2
Future Volume (Veh/h)	90	14	3	166	9	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	15	3	180	10	2
Pedestrians				1	1	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	380					
pX, platoon unblocked						
vC, conflicting volume			114		292	108
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			114		292	108
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1486		701	950

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	113	183	12
Volume Left	0	3	10
Volume Right	15	0	2
cSH	1700	1486	733
Volume to Capacity	0.07	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.4
Control Delay (s)	0.0	0.1	10.0
Lane LOS		A	A
Approach Delay (s)	0.0	0.1	10.0
Approach LOS			A

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	21.5%	ICU Level of Service	A
Analysis Period (min)	15		

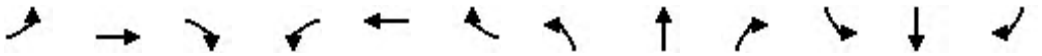
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	0	0	10	16	1
Future Volume (vph)	1	0	0	10	16	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.992	
Flt Protected	0.950					
Satd. Flow (prot)	1825	0	0	1921	1906	0
Flt Permitted	0.950					
Satd. Flow (perm)	1825	0	0	1921	1906	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	145.0			95.3	69.0	
Travel Time (s)	10.9			7.1	5.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	0	0	10	16	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1	0	0	10	17	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	0	0	10	16	1
Future Volume (Veh/h)	1	0	0	10	16	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1	0	0	10	16	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	26	16	17			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	26	16	17			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	994	1068	1613			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	1	10	17
Volume Left	1	0	0
Volume Right	0	0	1
cSH	994	1613	1700
Volume to Capacity	0.00	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	8.6	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.6	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

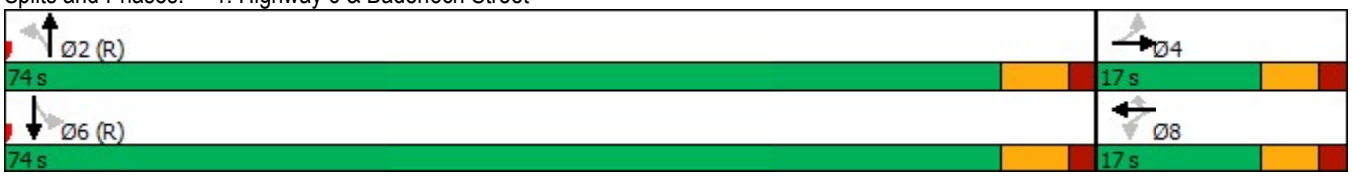


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	7	2	94	3	49	0	1040	64	22	1009	2
Future Volume (vph)	36	7	2	94	3	49	0	1040	64	22	1009	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		20.0	15.0		0.0	40.0		0.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.98	0.98					1.00	
Frt		0.994				0.850		0.991				
Flt Protected		0.961			0.954					0.950		
Satd. Flow (prot)	0	1678	0	0	1764	1555	1921	1709	0	1426	1615	0
Flt Permitted		0.699			0.698					0.126		
Satd. Flow (perm)	0	1217	0	0	1271	1518	1921	1709	0	189	1615	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				51		9				
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		77.1			379.9			297.6			102.6	
Travel Time (s)		5.8			28.5			22.3			7.7	
Confl. Peds. (#/hr)	1		4	4		1	1					1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	3%	17%	100%	4%	0%	5%	0%	12%	2%	28%	19%	0%
Adj. Flow (vph)	38	7	2	98	3	51	0	1083	67	23	1051	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	47	0	0	101	51	0	1150	0	23	1053	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	17.0	17.0		17.0	17.0	17.0	57.5	57.5		57.5	57.5	
Total Split (s)	17.0	17.0		17.0	17.0	17.0	74.0	74.0		74.0	74.0	
Total Split (%)	18.7%	18.7%		18.7%	18.7%	18.7%	81.3%	81.3%		81.3%	81.3%	
Maximum Green (s)	11.0	11.0		11.0	11.0	11.0	67.5	67.5		67.5	67.5	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5		4.5	4.5	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.5	6.5		6.5	6.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)		11.0			11.0	11.0		67.5		67.5	67.5	
Actuated g/C Ratio		0.12			0.12	0.12		0.74		0.74	0.74	
v/c Ratio		0.32			0.66	0.22		0.91		0.16	0.88	
Control Delay		41.7			60.2	13.6		21.7		6.5	19.7	
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	
Total Delay		41.7			60.2	13.6		21.7		6.5	19.7	
LOS		D			E	B		C		A	B	
Approach Delay		41.7			44.6			21.7			19.4	
Approach LOS		D			D			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 91			
Actuated Cycle Length: 91			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 22.5		Intersection LOS: C	
Intersection Capacity Utilization 92.4%		ICU Level of Service F	
Analysis Period (min) 15			

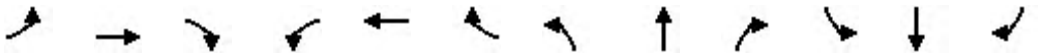
Splits and Phases: 1: Highway 6 & Badenoch Street



Lane Group	EBT	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	47	101	51	1150	23	1053
v/c Ratio	0.32	0.66	0.22	0.91	0.16	0.88
Control Delay	41.7	60.2	13.6	21.7	6.5	19.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.7	60.2	13.6	21.7	6.5	19.7
Queue Length 50th (m)	7.3	17.2	0.0	128.8	1.0	112.4
Queue Length 95th (m)	17.8	#39.8	10.1	#263.4	3.8	#239.3
Internal Link Dist (m)	53.1	355.9		273.6		78.6
Turn Bay Length (m)			20.0		40.0	
Base Capacity (vph)	148	153	228	1269	140	1197
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.66	0.22	0.91	0.16	0.88

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	7	2	94	3	49	0	1040	64	22	1009	2
Future Volume (vph)	36	7	2	94	3	49	0	1040	64	22	1009	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0	6.0		6.5		6.5	6.5	
Lane Util. Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.98		1.00		1.00	1.00	
Flpb, ped/bikes		1.00			0.98	1.00		1.00		1.00	1.00	
Frt		0.99			1.00	0.85		0.99		1.00	1.00	
Flt Protected		0.96			0.95	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		1674			1737	1518		1709		1426	1614	
Flt Permitted		0.70			0.70	1.00		1.00		0.13	1.00	
Satd. Flow (perm)		1218			1271	1518		1709		188	1614	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	38	7	2	98	3	51	0	1083	67	23	1051	2
RTOR Reduction (vph)	0	2	0	0	0	45	0	2	0	0	0	0
Lane Group Flow (vph)	0	45	0	0	101	6	0	1148	0	23	1053	0
Confl. Peds. (#/hr)	1		4	4		1	1					1
Heavy Vehicles (%)	3%	17%	100%	4%	0%	5%	0%	12%	2%	28%	19%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		11.0			11.0	11.0		67.5		67.5	67.5	
Effective Green, g (s)		11.0			11.0	11.0		67.5		67.5	67.5	
Actuated g/C Ratio		0.12			0.12	0.12		0.74		0.74	0.74	
Clearance Time (s)		6.0			6.0	6.0		6.5		6.5	6.5	
Lane Grp Cap (vph)		147			153	183		1267		139	1197	
v/s Ratio Prot								c0.67			0.65	
v/s Ratio Perm		0.04			c0.08	0.00				0.12		
v/c Ratio		0.31			0.66	0.03		0.91		0.17	0.88	
Uniform Delay, d1		36.5			38.2	35.3		9.2		3.5	8.7	
Progression Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2		5.4			20.2	0.3		10.9		2.6	9.4	
Delay (s)		41.9			58.4	35.7		20.1		6.0	18.1	
Level of Service		D			E	D		C		A	B	
Approach Delay (s)		41.9			50.8			20.1			17.8	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

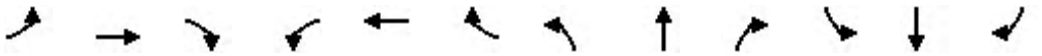
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	88	1	1	150	0	0
Future Volume (vph)	88	1	1	150	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.999					
Flt Protected						
Satd. Flow (prot)	1745	0	0	1847	1921	0
Flt Permitted						
Satd. Flow (perm)	1745	0	0	1847	1921	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	379.9			142.3	69.0	
Travel Time (s)	28.5			10.7	5.2	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	10%	10%	10%	4%	0%	0%
Adj. Flow (vph)	101	1	1	172	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	102	0	0	173	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	12.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	88	1	1	150	0	0
Future Volume (Veh/h)	88	1	1	150	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	101	1	1	172	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	380					
pX, platoon unblocked						
vC, conflicting volume			102		276	102
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			102		276	102
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1441		718	959

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	102	173	0
Volume Left	0	1	0
Volume Right	1	0	0
cSH	1700	1441	1700
Volume to Capacity	0.06	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS		A	A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	12.0%	ICU Level of Service	A
Analysis Period (min)	15		



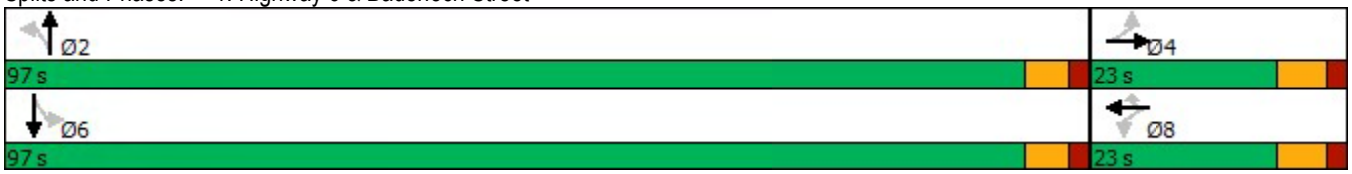
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	4	1	140	6	52	2	1050	74	34	1223	6
Future Volume (vph)	16	4	1	140	6	52	2	1050	74	34	1223	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		20.0	15.0		0.0	40.0		0.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.99	0.97					1.00	
Frt		0.994				0.850		0.990			0.999	
Flt Protected		0.963			0.954		0.950			0.950		
Satd. Flow (prot)	0	1836	0	0	1798	1601	1825	1723	0	1825	1794	0
Flt Permitted		0.677			0.718		0.064			0.120		
Satd. Flow (perm)	0	1287	0	0	1340	1560	123	1723	0	231	1794	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				45		9			1	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		77.1			379.9			297.6			102.6	
Travel Time (s)		5.8			28.5			22.3			7.7	
Confl. Peds. (#/hr)	1		2	2		1	2					2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	0%	11%	2%	0%	7%	0%
Adj. Flow (vph)	17	4	1	147	6	55	2	1105	78	36	1287	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	22	0	0	153	55	2	1183	0	36	1293	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	25.0	25.0		25.0	25.0	
Minimum Split (s)	17.5	17.5		17.5	17.5	17.5	57.5	57.5		57.5	57.5	
Total Split (s)	23.0	23.0		23.0	23.0	23.0	97.0	97.0		97.0	97.0	
Total Split (%)	19.2%	19.2%		19.2%	19.2%	19.2%	80.8%	80.8%		80.8%	80.8%	
Maximum Green (s)	16.5	16.5		16.5	16.5	16.5	91.0	91.0		91.0	91.0	
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.5			6.5	6.5	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max		Max	Max	
Walk Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)		15.8			15.8	15.8	91.7	91.7		91.7	91.7	
Actuated g/C Ratio		0.13			0.13	0.13	0.76	0.76		0.76	0.76	
v/c Ratio		0.13			0.87	0.23	0.02	0.90		0.20	0.94	
Control Delay		46.1			91.7	19.4	4.0	22.0		7.3	27.7	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		46.1			91.7	19.4	4.0	22.0		7.3	27.7	
LOS		D			F	B	A	C		A	C	
Approach Delay		46.1			72.6			22.0			27.1	
Approach LOS		D			E			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 28.5 Intersection LOS: C
Intersection Capacity Utilization 92.3% ICU Level of Service F
Analysis Period (min) 15

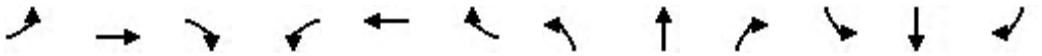
Splits and Phases: 1: Highway 6 & Badenoch Street



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	22	153	55	2	1183	36	1293
v/c Ratio	0.13	0.87	0.23	0.02	0.90	0.20	0.94
Control Delay	46.1	91.7	19.4	4.0	22.0	7.3	27.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.1	91.7	19.4	4.0	22.0	7.3	27.7
Queue Length 50th (m)	4.4	35.5	2.1	0.1	181.9	2.1	224.7
Queue Length 95th (m)	12.3	#71.5	14.0	0.8	#337.7	6.1	#380.3
Internal Link Dist (m)	53.1	355.9			273.6		78.6
Turn Bay Length (m)			20.0	15.0		40.0	
Base Capacity (vph)	177	184	253	94	1318	176	1370
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.83	0.22	0.02	0.90	0.20	0.94

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	4	1	140	6	52	2	1050	74	34	1223	6
Future Volume (vph)	16	4	1	140	6	52	2	1050	74	34	1223	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.5			6.5	6.5	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			0.99	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.96			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1830			1780	1560	1825	1723		1825	1794	
Flt Permitted		0.68			0.72	1.00	0.06	1.00		0.12	1.00	
Satd. Flow (perm)		1288			1340	1560	122	1723		231	1794	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	17	4	1	147	6	55	2	1105	78	36	1287	6
RTOR Reduction (vph)	0	1	0	0	0	39	0	2	0	0	0	0
Lane Group Flow (vph)	0	21	0	0	153	16	2	1181	0	36	1293	0
Confl. Peds. (#/hr)	1		2	2		1	2					2
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	0%	11%	2%	0%	7%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		15.8			15.8	15.8	91.7	91.7		91.7	91.7	
Effective Green, g (s)		15.8			15.8	15.8	91.7	91.7		91.7	91.7	
Actuated g/C Ratio		0.13			0.13	0.13	0.76	0.76		0.76	0.76	
Clearance Time (s)		6.5			6.5	6.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		169			176	205	93	1316		176	1370	
v/s Ratio Prot								0.69			c0.72	
v/s Ratio Perm		0.02			c0.11	0.01	0.02			0.16		
v/c Ratio		0.13			0.87	0.08	0.02	0.90		0.20	0.94	
Uniform Delay, d1		46.0			51.1	45.7	3.4	10.6		4.0	12.0	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			33.6	0.2	0.4	9.9		2.6	14.1	
Delay (s)		46.3			84.7	45.9	3.8	20.5		6.6	26.1	
Level of Service		D			F	D	A	C		A	C	
Approach Delay (s)		46.3			74.4			20.4			25.6	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

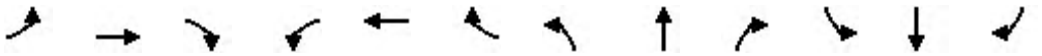
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	99	0	1	184	1	1
Future Volume (vph)	99	0	1	184	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.932	
Flt Protected					0.976	
Satd. Flow (prot)	1902	0	0	1884	1748	0
Flt Permitted					0.976	
Satd. Flow (perm)	1902	0	0	1884	1748	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	379.9			142.3	69.0	
Travel Time (s)	28.5			10.7	5.2	
Confl. Peds. (#/hr)		1	1			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	2%	0%	0%
Adj. Flow (vph)	108	0	1	200	1	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	108	0	0	201	2	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	99	0	1	184	1	1
Future Volume (Veh/h)	99	0	1	184	1	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	108	0	1	200	1	1
Pedestrians				1	1	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	380					
pX, platoon unblocked						
vC, conflicting volume			109		311	110
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			109		311	110
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1493		685	947

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	108	201	2
Volume Left	0	1	1
Volume Right	0	0	1
cSH	1700	1493	795
Volume to Capacity	0.06	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.1
Control Delay (s)	0.0	0.0	9.5
Lane LOS		A	A
Approach Delay (s)	0.0	0.0	9.5
Approach LOS			A

Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		20.8%	ICU Level of Service
Analysis Period (min)		15	

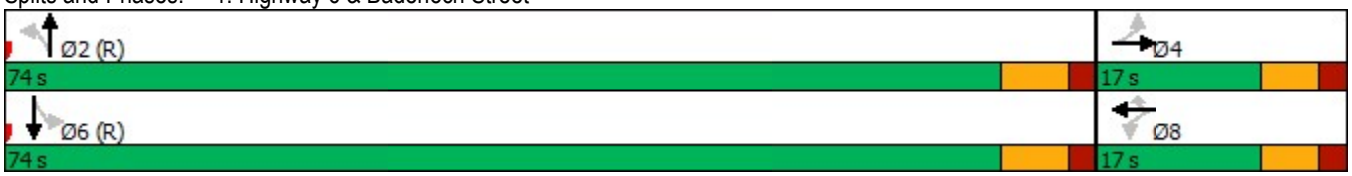


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	7	2	101	3	56	0	1040	66	24	1009	2
Future Volume (vph)	36	7	2	101	3	56	0	1040	66	24	1009	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		20.0	15.0		0.0	40.0		0.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.98	0.98					1.00	
Frt		0.994				0.850		0.991				
Flt Protected		0.961			0.954					0.950		
Satd. Flow (prot)	0	1678	0	0	1764	1555	1921	1709	0	1426	1615	0
Flt Permitted		0.695			0.697					0.125		
Satd. Flow (perm)	0	1210	0	0	1269	1518	1921	1709	0	188	1615	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				58		10				
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		77.1			379.9			297.6			102.6	
Travel Time (s)		5.8			28.5			22.3			7.7	
Confl. Peds. (#/hr)	1		4	4		1	1					1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	3%	17%	100%	4%	0%	5%	0%	12%	2%	28%	19%	0%
Adj. Flow (vph)	38	7	2	105	3	58	0	1083	69	25	1051	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	47	0	0	108	58	0	1152	0	25	1053	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	17.0	17.0		17.0	17.0	17.0	57.5	57.5		57.5	57.5	
Total Split (s)	17.0	17.0		17.0	17.0	17.0	74.0	74.0		74.0	74.0	
Total Split (%)	18.7%	18.7%		18.7%	18.7%	18.7%	81.3%	81.3%		81.3%	81.3%	
Maximum Green (s)	11.0	11.0		11.0	11.0	11.0	67.5	67.5		67.5	67.5	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5		4.5	4.5	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.5	6.5		6.5	6.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)		11.0			11.0	11.0		67.5		67.5	67.5	
Actuated g/C Ratio		0.12			0.12	0.12		0.74		0.74	0.74	
v/c Ratio		0.32			0.71	0.25		0.91		0.18	0.88	
Control Delay		41.8			64.4	13.2		21.8		7.0	19.7	
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	
Total Delay		41.8			64.4	13.2		21.8		7.0	19.7	
LOS		D			E	B		C		A	B	
Approach Delay		41.8			46.5			21.8			19.4	
Approach LOS		D			D			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 91			
Actuated Cycle Length: 91			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 22.8		Intersection LOS: C	
Intersection Capacity Utilization 92.5%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 1: Highway 6 & Badenoch Street



Lane Group	EBT	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	47	108	58	1152	25	1053
v/c Ratio	0.32	0.71	0.25	0.91	0.18	0.88
Control Delay	41.8	64.4	13.2	21.8	7.0	19.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.8	64.4	13.2	21.8	7.0	19.7
Queue Length 50th (m)	7.3	18.5	0.0	129.3	1.1	112.4
Queue Length 95th (m)	17.8	#43.1	10.6	#264.1	4.0	#239.3
Internal Link Dist (m)	53.1	355.9		273.6		78.6
Turn Bay Length (m)			20.0		40.0	
Base Capacity (vph)	148	153	234	1270	139	1197
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.71	0.25	0.91	0.18	0.88

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	7	2	101	3	56	0	1040	66	24	1009	2
Future Volume (vph)	36	7	2	101	3	56	0	1040	66	24	1009	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0	6.0		6.5		6.5	6.5	
Lane Util. Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.98		1.00		1.00	1.00	
Flpb, ped/bikes		1.00			0.98	1.00		1.00		1.00	1.00	
Frt		0.99			1.00	0.85		0.99		1.00	1.00	
Flt Protected		0.96			0.95	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		1674			1737	1518		1709		1426	1614	
Flt Permitted		0.70			0.70	1.00		1.00		0.12	1.00	
Satd. Flow (perm)		1210			1270	1518		1709		187	1614	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	38	7	2	105	3	58	0	1083	69	25	1051	2
RTOR Reduction (vph)	0	2	0	0	0	51	0	3	0	0	0	0
Lane Group Flow (vph)	0	45	0	0	108	7	0	1149	0	25	1053	0
Confl. Peds. (#/hr)	1		4	4		1	1					1
Heavy Vehicles (%)	3%	17%	100%	4%	0%	5%	0%	12%	2%	28%	19%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		11.0			11.0	11.0		67.5		67.5	67.5	
Effective Green, g (s)		11.0			11.0	11.0		67.5		67.5	67.5	
Actuated g/C Ratio		0.12			0.12	0.12		0.74		0.74	0.74	
Clearance Time (s)		6.0			6.0	6.0		6.5		6.5	6.5	
Lane Grp Cap (vph)		146			153	183		1267		138	1197	
v/s Ratio Prot								c0.67			0.65	
v/s Ratio Perm		0.04			c0.09	0.00				0.13		
v/c Ratio		0.31			0.71	0.04		0.91		0.18	0.88	
Uniform Delay, d1		36.5			38.4	35.3		9.3		3.5	8.7	
Progression Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2		5.4			23.9	0.4		11.0		2.9	9.4	
Delay (s)		42.0			62.4	35.7		20.3		6.4	18.1	
Level of Service		D			E	D		C		A	B	
Approach Delay (s)		42.0			53.1			20.3			17.8	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	21.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	92.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	88	6	2	150	14	2
Future Volume (vph)	88	6	2	150	14	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.991				0.985	
Flt Protected				0.999	0.957	
Satd. Flow (prot)	1731	0	0	1844	1811	0
Flt Permitted				0.999	0.957	
Satd. Flow (perm)	1731	0	0	1844	1811	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	379.9			142.3	69.0	
Travel Time (s)	28.5			10.7	5.2	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	10%	10%	10%	4%	0%	0%
Adj. Flow (vph)	101	7	2	172	16	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	108	0	0	174	18	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 19.5%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	88	6	2	150	14	2
Future Volume (Veh/h)	88	6	2	150	14	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	101	7	2	172	16	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	380					
pX, platoon unblocked						
vC, conflicting volume			108		280	104
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			108		280	104
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1434		713	956

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	108	174	18
Volume Left	0	2	16
Volume Right	7	0	2
cSH	1700	1434	733
Volume to Capacity	0.06	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.6
Control Delay (s)	0.0	0.1	10.0
Lane LOS		A	B
Approach Delay (s)	0.0	0.1	10.0
Approach LOS			B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	19.5%	ICU Level of Service	A
Analysis Period (min)	15		

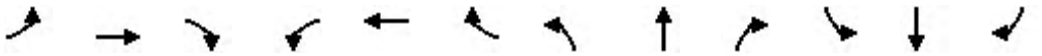
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	2	0	0	15	6	0
Future Volume (vph)	2	0	0	15	6	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected	0.950					
Satd. Flow (prot)	1825	0	0	1921	1921	0
Flt Permitted	0.950					
Satd. Flow (perm)	1825	0	0	1921	1921	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	145.0			95.3	69.0	
Travel Time (s)	10.9			7.1	5.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	2	0	0	15	6	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2	0	0	15	6	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	0	0	15	6	0
Future Volume (Veh/h)	2	0	0	15	6	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	0	0	15	6	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	21	6	6			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	21	6	6			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	1001	1083	1628			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	2	15	6
Volume Left	2	0	0
Volume Right	0	0	0
cSH	1001	1628	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	8.6	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.6	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

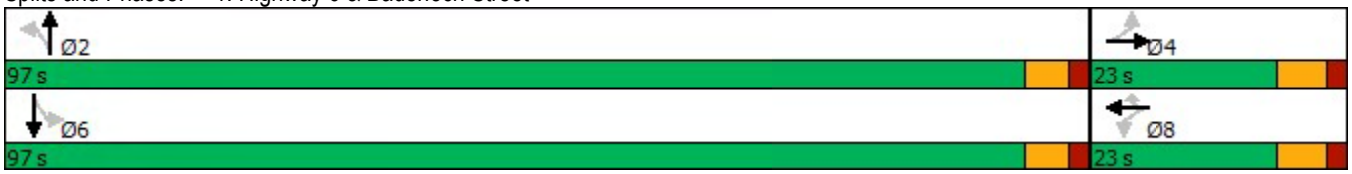


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	4	1	144	6	56	2	1050	81	41	1223	6
Future Volume (vph)	16	4	1	144	6	56	2	1050	81	41	1223	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		20.0	15.0		0.0	40.0		0.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.99	0.97					1.00	
Frt		0.994				0.850		0.989			0.999	
Flt Protected		0.963			0.954		0.950			0.950		
Satd. Flow (prot)	0	1836	0	0	1798	1601	1825	1722	0	1825	1794	0
Flt Permitted		0.664			0.718		0.063			0.116		
Satd. Flow (perm)	0	1263	0	0	1340	1560	121	1722	0	223	1794	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				47		10			1	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		77.1			379.9			297.6			102.6	
Travel Time (s)		5.8			28.5			22.3			7.7	
Confl. Peds. (#/hr)	1		2	2		1	2					2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	0%	11%	2%	0%	7%	0%
Adj. Flow (vph)	17	4	1	152	6	59	2	1105	85	43	1287	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	22	0	0	158	59	2	1190	0	43	1293	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	25.0	25.0		25.0	25.0	
Minimum Split (s)	17.5	17.5		17.5	17.5	17.5	57.5	57.5		57.5	57.5	
Total Split (s)	23.0	23.0		23.0	23.0	23.0	97.0	97.0		97.0	97.0	
Total Split (%)	19.2%	19.2%		19.2%	19.2%	19.2%	80.8%	80.8%		80.8%	80.8%	
Maximum Green (s)	16.5	16.5		16.5	16.5	16.5	91.0	91.0		91.0	91.0	
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.5			6.5	6.5	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max		Max	Max	
Walk Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)		15.9			15.9	15.9	91.6	91.6		91.6	91.6	
Actuated g/C Ratio		0.13			0.13	0.13	0.76	0.76		0.76	0.76	
v/c Ratio		0.13			0.89	0.24	0.02	0.90		0.25	0.95	
Control Delay		46.1			95.2	19.8	4.0	22.8		8.6	28.0	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		46.1			95.2	19.8	4.0	22.8		8.6	28.0	
LOS		D			F	B	A	C		A	C	
Approach Delay		46.1			74.7			22.7			27.3	
Approach LOS		D			E			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.95			
Intersection Signal Delay: 29.2		Intersection LOS: C	
Intersection Capacity Utilization 92.8%		ICU Level of Service F	
Analysis Period (min) 15			

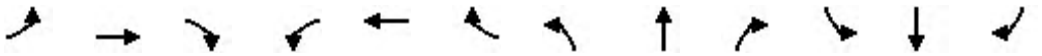
Splits and Phases: 1: Highway 6 & Badenoch Street



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	22	158	59	2	1190	43	1293
v/c Ratio	0.13	0.89	0.24	0.02	0.90	0.25	0.95
Control Delay	46.1	95.2	19.8	4.0	22.8	8.6	28.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.1	95.2	19.8	4.0	22.8	8.6	28.0
Queue Length 50th (m)	4.4	36.9	2.5	0.1	185.7	2.6	224.7
Queue Length 95th (m)	12.3	#74.4	14.7	0.8	#341.2	7.6	#380.3
Internal Link Dist (m)	53.1	355.9			273.6		78.6
Turn Bay Length (m)			20.0	15.0		40.0	
Base Capacity (vph)	174	184	255	92	1316	170	1368
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.86	0.23	0.02	0.90	0.25	0.95

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	4	1	144	6	56	2	1050	81	41	1223	6
Future Volume (vph)	16	4	1	144	6	56	2	1050	81	41	1223	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.5			6.5	6.5	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			0.99	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.96			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1831			1780	1560	1825	1722		1825	1794	
Flt Permitted		0.66			0.72	1.00	0.06	1.00		0.12	1.00	
Satd. Flow (perm)		1263			1340	1560	120	1722		223	1794	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	17	4	1	152	6	59	2	1105	85	43	1287	6
RTOR Reduction (vph)	0	1	0	0	0	41	0	2	0	0	0	0
Lane Group Flow (vph)	0	21	0	0	158	18	2	1188	0	43	1293	0
Confl. Peds. (#/hr)	1		2	2		1	2					2
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	0%	11%	2%	0%	7%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		15.9			15.9	15.9	91.6	91.6		91.6	91.6	
Effective Green, g (s)		15.9			15.9	15.9	91.6	91.6		91.6	91.6	
Actuated g/C Ratio		0.13			0.13	0.13	0.76	0.76		0.76	0.76	
Clearance Time (s)		6.5			6.5	6.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		167			177	206	91	1314		170	1369	
v/s Ratio Prot								0.69			c0.72	
v/s Ratio Perm		0.02			c0.12	0.01	0.02			0.19		
v/c Ratio		0.13			0.89	0.09	0.02	0.90		0.25	0.94	
Uniform Delay, d1		45.9			51.2	45.7	3.4	10.8		4.2	12.0	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			38.7	0.2	0.4	10.4		3.5	14.2	
Delay (s)		46.3			89.9	45.9	3.9	21.2		7.7	26.3	
Level of Service		D			F	D	A	C		A	C	
Approach Delay (s)		46.3			77.9			21.2			25.7	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	99	14	3	184	9	2
Future Volume (vph)	99	14	3	184	9	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.984				0.977	
Flt Protected				0.999	0.960	
Satd. Flow (prot)	1874	0	0	1882	1802	0
Flt Permitted				0.999	0.960	
Satd. Flow (perm)	1874	0	0	1882	1802	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	379.9			142.3	69.0	
Travel Time (s)	28.5			10.7	5.2	
Confl. Peds. (#/hr)		1	1			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	2%	0%	0%
Adj. Flow (vph)	108	15	3	200	10	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	123	0	0	203	12	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	22.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	99	14	3	184	9	2
Future Volume (Veh/h)	99	14	3	184	9	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	108	15	3	200	10	2
Pedestrians				1	1	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	380					
pX, platoon unblocked						
vC, conflicting volume			124		322	118
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			124		322	118
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1474		673	938

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	123	203	12
Volume Left	0	3	10
Volume Right	15	0	2
cSH	1700	1474	707
Volume to Capacity	0.07	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.4
Control Delay (s)	0.0	0.1	10.2
Lane LOS		A	B
Approach Delay (s)	0.0	0.1	10.2
Approach LOS			B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	22.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	0	0	10	16	1
Future Volume (vph)	1	0	0	10	16	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.992	
Flt Protected	0.950					
Satd. Flow (prot)	1825	0	0	1921	1906	0
Flt Permitted	0.950					
Satd. Flow (perm)	1825	0	0	1921	1906	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	145.0			95.3	69.0	
Travel Time (s)	10.9			7.1	5.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	0	0	10	16	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1	0	0	10	17	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	0	0	10	16	1
Future Volume (Veh/h)	1	0	0	10	16	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1	0	0	10	16	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	26	16	17			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	26	16	17			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	994	1068	1613			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	1	10	17
Volume Left	1	0	0
Volume Right	0	0	1
cSH	994	1613	1700
Volume to Capacity	0.00	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	8.6	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.6	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Highway 6 & Badenoch Street

Movement	EB	WB	WB	NB	SB	SB
Directions Served	LTR	LT	R	TR	L	TR
Maximum Queue (m)	30.6	56.5	22.5	249.2	36.8	110.5
Average Queue (m)	9.4	21.3	10.8	105.8	7.9	74.0
95th Queue (m)	21.5	43.7	24.5	213.1	24.5	125.9
Link Distance (m)	69.4	365.0		291.6		93.9
Upstream Blk Time (%)				0		6
Queuing Penalty (veh)				0		0
Storage Bay Dist (m)			20.0		40.0	
Storage Blk Time (%)		14	2	21	0	12
Queuing Penalty (veh)		7	2	0	0	3

Intersection: 1: Highway 6 & Badenoch Street

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	LTR	LT	R	L	TR	L	TR
Maximum Queue (m)	16.1	82.3	22.6	6.8	246.7	36.3	111.0
Average Queue (m)	4.9	36.4	12.9	0.4	124.1	10.9	92.4
95th Queue (m)	13.5	66.3	27.5	3.4	241.9	27.0	125.4
Link Distance (m)	69.4	365.0			291.6		93.9
Upstream Blk Time (%)					2		18
Queuing Penalty (veh)					0		0
Storage Bay Dist (m)			20.0	15.0		40.0	
Storage Blk Time (%)		36	2		20	0	18
Queuing Penalty (veh)		19	4		0	1	6

Intersection: 1: Highway 6 & Badenoch Street

Movement	EB	WB	WB	NB	SB	SB
Directions Served	LTR	LT	R	TR	L	TR
Maximum Queue (m)	37.2	51.7	22.5	241.1	31.4	110.4
Average Queue (m)	11.3	23.4	12.7	117.0	10.2	74.2
95th Queue (m)	26.8	45.7	25.8	231.0	27.5	122.2
Link Distance (m)	69.4	365.0		291.6		93.9
Upstream Blk Time (%)				2		6
Queuing Penalty (veh)				0		0
Storage Bay Dist (m)			20.0		40.0	
Storage Blk Time (%)		13	6	22	0	12
Queuing Penalty (veh)		7	6	0	1	3

Intersection: 1: Highway 6 & Badenoch Street

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	LTR	LT	R	L	TR	L	TR
Maximum Queue (m)	19.9	87.8	22.5	6.8	303.3	42.2	112.5
Average Queue (m)	5.0	36.6	12.9	0.3	141.1	17.0	96.0
95th Queue (m)	14.2	67.7	27.2	3.0	275.6	40.1	120.4
Link Distance (m)	69.4	365.0			291.6		93.9
Upstream Blk Time (%)					2		22
Queuing Penalty (veh)					0		0
Storage Bay Dist (m)			20.0	15.0		40.0	
Storage Blk Time (%)		37	3		20	6	19
Queuing Penalty (veh)		21	4		0	73	8

Appendix C

Transportation Tomorrow Survey 2016

AM Inbound

Mon Feb 13 2023 08:43:58 GMT-0500 (Eastern Standard Time) -

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of origin - pd_orig
Column: 2006 GTA zone of destination - gta06_dest

RowG:
ColG:(8307,8315)
TblG:

Filters:
Start time of trip - start_time In 600-900
and
Trip purpose of destination - purp_dest In H,

Trip 2016
Table:

.1	
Kitchener	20

AM Outbound

Mon Feb 13 2023 08:42:08 GMT-0500 (Eastern Standard Time) - Run Time: 2835ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of destination - pd_dest
Column: 2006 GTA zone of origin - gta06_orig

RowG:
ColG:(8307,8315)
TblG:

Filters:
Start time of trip - start_time In 600-900
and
Trip purpose of origin - purp_orig In H,

Trip 2016
Table:

.1	N	S	E		N Trips	S Trips	E Trips
PD 3 of Toronto	9	1			9	0	0
Scugog	113	1			113	0	0
Milton	44	1			44	0	0
Burlington	44	0.5	0.5		22	22	0
Kitchener	97	1			97	0	0
City of Guelph	175	0.5		0.5	87.5	0	87.5
Puslinch	175		1		0	175	0
Brantford	113	0.5	0.5		56.5	56.5	0
Sum	**770**				**429**	**253.5**	**87.5**
					56%	33%	11%

PM Inbound

Mon Feb 13 2023 08:43:44 GMT-0500 (Eastern Standard Time) - Run Time: 2605ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of origin - pd_orig
Column: 2006 GTA zone of destination - gta06_dest

RowG:
ColG:(8307,8315)
TblG:

Filters:
Start time of trip - start_time In 1600-1900
and
Trip purpose of destination - purp_dest In H,

Trip 2016
Table:

.1	N	S	E	W	N Trips	S Trips	E Trips	W Trips
PD 3 of Toronto	9	0.5	0.5		4.5	4.5	0	0
Milton	156	1			156	0	0	0
Burlington	44		1		0	44	0	0
Flamborough	45		0.5	0.5	0	22.5	0	22.5
Kitchener	78	1			78	0	0	0
City of Guelph	131	0.5		0.5	65.5	0	65.5	0
Puslinch	64		1		0	64	0	0
Sum	**527**				**304**	**135**	**65.5**	**22.5**
					58%	26%	12%	4%

PM Outbound

Mon Feb 13 2023 08:43:17 GMT-0500 (Eastern Standard Time) - Run Time: 2476ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of destination - pd_dest
Column: 2006 GTA zone of origin - gta06_orig

RowG:
ColG:(8307,8315)
TblG:

Filters:
Start time of trip - start_time In 1600-1900
and
Trip purpose of origin - purp_orig In H,

Trip 2016
Table:

.1		
Milton	89	
Puslinch	20	
		527

TOTAL - TTS

		N	S	E	W	
AM	Inbound					0%
	Outbound	56%	33%	11%	N/A	100%
PM	Inbound	58%	26%	12%	4%	100%
	Outbound					0%

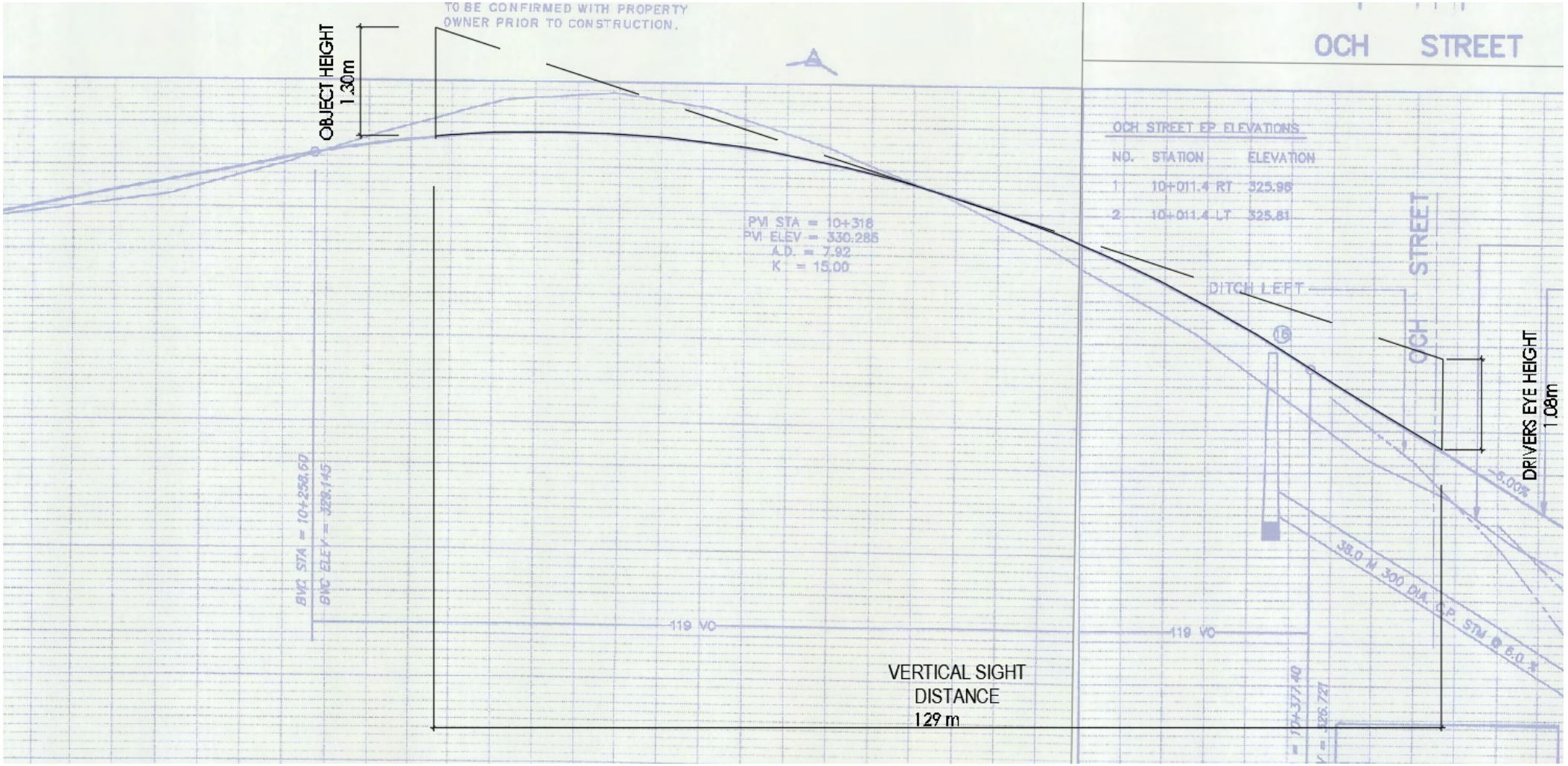
TOTAL - Adjusted

		N	S	E	W	
AM	Inbound	45%	45%	10%	0%	100%
	Outbound	45%	45%	10%	0%	100%
PM	Inbound	45%	45%	10%	0%	100%
	Outbound	45%	45%	10%	0%	100%

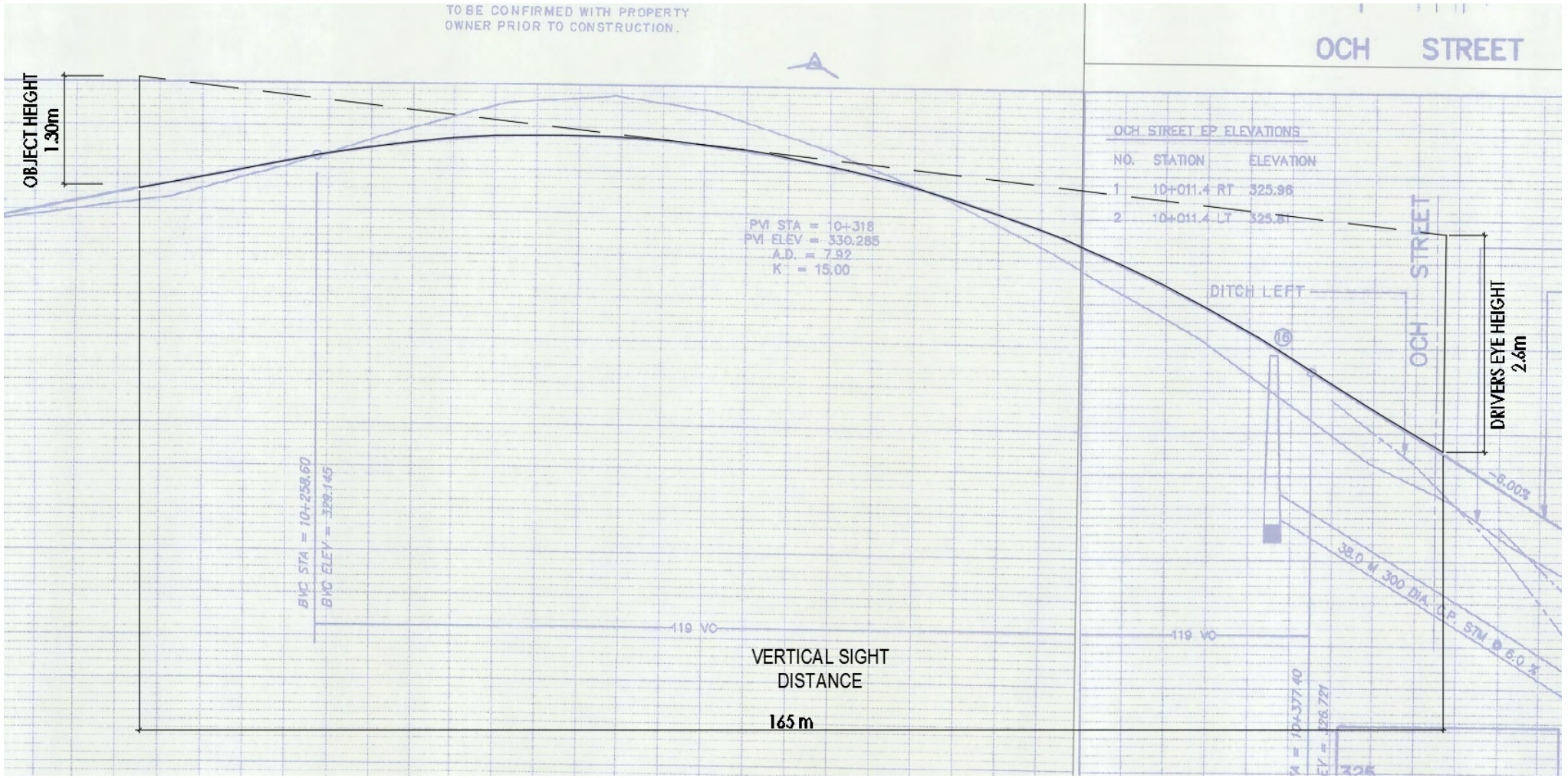
in	out
45%	45%
45%	45%
10%	10%
45%	45%
45%	45%
10%	10%

Appendix D

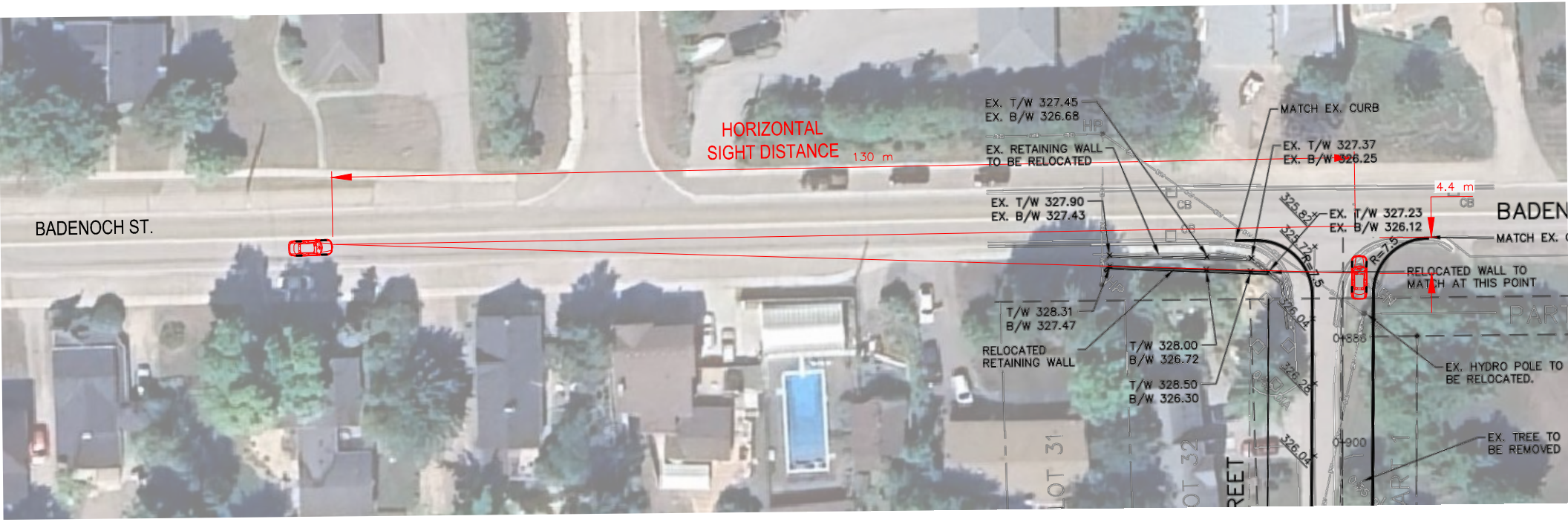
Sightline Assessment



Vertical Sightline – Passenger Vehicle



Vertical Sightline – Single Unit Truck


BADENOCH ST.
HORIZONTAL
SIGHT DISTANCE 130 m
EX. T/W 327.45
EX. B/W 326.68
EX. RETAINING WALL
TO BE RELOCATED
EX. T/W 327.90
EX. B/W 327.43
T/W 328.31
B/W 327.47
RELOCATED
RETAINING WALL
T/W 328.00
B/W 326.72
T/W 328.50
B/W 326.30
MATCH EX. CURB
EX. T/W 327.37
EX. B/W 326.25
4.4 m
EX. T/W 327.23
EX. B/W 326.12
MATCH EX.
RELOCATED WALL TO
MATCH AT THIS POINT
EX. HYDRO POLE TO
BE RELOCATED.
EX. TREE TO
BE REMOVED
CB
HP
R=7.5
325.82±
324.72±
326.04±
326.25±
326.04±
0+880
0+900
BADEN
PART
LOT 31
LOT 32
REET

Appendix E

Speed Study Data

Ontario Traffic, Inc.
17705 Leslie St., Unit 6
Newmarket, Ontario L3Y 3E3
Tel: (905) 898-7711 Fax: (905) 898-3664

Site Code: 1
Station ID: U248
Badenoch St just west of Ikonkar Place

Date Start: 21-Mar-24
Date End: 21-Mar-24

EB

Start Time	1 15	16 23	24 31	32 39	40 47	48 55	56 63	64 71	72 79	80 88	89 96	97 104	105 112	113 120	121 9999	Total
03/21/2																
4	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	3
00:15	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	3
00:30	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
00:45	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
	0	1	0	1	2	1	4	0	0	0	0	0	0	0	0	9
01:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
01:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2
	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	3
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
02:30	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
02:45	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	4
03:00	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
03:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
03:45	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	5
04:00	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
04:15	0	0	1	0	0	1	2	0	0	0	0	0	0	0	0	4
04:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45	0	0	0	0	1	0	3	1	0	0	0	0	0	0	0	5
	0	0	1	0	1	1	7	1	0	0	0	0	0	0	0	11
05:00	0	0	0	0	1	3	2	0	0	0	0	0	0	0	0	6
05:15	0	0	0	0	0	0	7	1	0	0	0	0	0	0	0	8
05:30	0	0	0	0	0	2	4	0	0	0	0	0	0	0	0	6
05:45	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	4
	0	0	0	0	1	5	15	3	0	0	0	0	0	0	0	24
06:00	0	0	0	0	0	3	4	1	0	0	0	0	0	0	0	8
06:15	0	0	0	0	0	4	4	2	0	0	0	0	0	0	0	10
06:30	0	0	0	0	0	2	7	1	0	0	0	0	0	0	0	10
06:45	0	0	0	1	1	3	6	0	0	0	0	0	0	0	0	11
	0	0	0	1	1	12	21	4	0	0	0	0	0	0	0	39
07:00	0	0	0	0	1	3	1	3	1	0	0	0	0	0	0	9
07:15	0	0	0	0	3	5	2	3	0	0	0	0	0	0	0	13
07:30	0	0	0	2	3	6	3	2	0	0	0	0	0	0	0	16
07:45	0	0	0	2	2	7	5	2	0	0	0	0	0	0	0	18
	0	0	0	4	9	21	11	10	1	0	0	0	0	0	0	56
08:00	0	0	0	0	1	4	3	1	0	0	0	0	0	0	0	9
08:15	0	0	0	1	3	3	4	1	0	0	0	0	0	0	0	12
08:30	0	0	1	2	3	9	3	0	0	0	0	0	0	0	0	18
08:45	0	0	0	0	2	7	4	0	0	0	0	0	0	0	0	13
	0	0	1	3	9	23	14	2	0	0	0	0	0	0	0	52
09:00	0	0	0	0	0	3	7	2	0	0	0	0	0	0	0	12
09:15	0	0	0	0	4	5	7	0	0	0	0	0	0	0	0	16
09:30	0	0	0	0	2	6	5	3	0	0	0	0	0	0	0	16
09:45	0	0	0	1	4	5	4	0	0	0	0	0	0	0	0	14
	0	0	0	1	10	19	23	5	0	0	0	0	0	0	0	58
10:00	0	0	0	0	1	5	3	3	0	0	0	0	0	0	0	12
10:15	0	0	0	0	2	7	0	1	0	0	0	0	0	0	0	10
10:30	1	0	1	1	0	6	4	1	1	0	0	0	0	0	0	15
10:45	0	0	0	2	0	6	4	0	0	0	0	0	0	0	0	12
	1	0	1	3	3	24	11	5	1	0	0	0	0	0	0	49
11:00	0	0	0	4	0	2	3	0	0	0	0	0	0	0	0	9
11:15	0	0	0	5	3	2	8	0	0	0	0	0	0	0	0	18
11:30	0	0	0	2	5	7	7	1	1	0	0	0	0	0	0	23
11:45	0	0	1	1	0	10	2	0	0	0	0	0	0	0	0	14
	0	0	1	12	8	21	20	1	1	0	0	0	0	0	0	64
Total	1	1	4	27	46	131	128	33	3	0	0	0	0	0	0	374

Ontario Traffic, Inc.
17705 Leslie St., Unit 6
Newmarket, Ontario L3Y 3E3
Tel: (905) 898-7711 Fax: (905) 898-3664

Site Code: 1
Station ID: U248
Badenoch St just west of Ikonkar Place

Date Start: 21-Mar-24
Date End: 21-Mar-24

EB

Start	1	16	24	32	40	48	56	64	72	80	89	97	105	113	121	
Time	15	23	31	39	47	55	63	71	79	88	96	104	112	120	9999	Total
12 PM	0	0	0	1	2	1	6	1	0	0	0	0	0	0	0	11
12:15	0	0	0	0	0	6	7	1	0	0	0	0	0	0	0	14
12:30	0	0	0	0	0	6	3	2	0	0	0	0	0	0	0	11
12:45	0	0	0	1	2	8	5	0	0	0	0	0	0	0	0	16
	0	0	0	2	4	21	21	4	0	0	0	0	0	0	0	52
13:00	0	0	1	2	3	7	5	1	0	0	0	0	0	0	0	19
13:15	0	1	1	0	2	8	6	1	1	0	0	0	0	0	0	20
13:30	0	0	0	4	2	7	3	1	0	0	0	0	0	0	0	17
13:45	0	0	0	0	1	9	4	0	0	0	0	0	0	0	0	14
	0	1	2	6	8	31	18	3	1	0	0	0	0	0	0	70
14:00	0	0	0	1	0	7	2	0	1	0	0	0	0	0	0	11
14:15	0	0	1	0	2	4	8	0	0	1	0	0	0	0	0	16
14:30	0	0	0	0	0	3	5	1	0	0	0	0	0	0	0	9
14:45	0	0	0	1	1	7	7	2	0	1	0	0	0	0	0	19
	0	0	1	2	3	21	22	3	1	2	0	0	0	0	0	55
15:00	0	0	1	5	3	2	4	1	0	0	0	0	0	0	0	16
15:15	0	1	2	2	3	9	6	1	0	0	0	0	0	0	0	24
15:30	0	0	1	1	2	6	4	3	1	0	0	0	0	0	0	18
15:45	0	0	1	1	2	8	5	0	0	0	0	0	0	0	0	17
	0	1	5	9	10	25	19	5	1	0	0	0	0	0	0	75
16:00	0	0	0	2	1	6	6	5	1	0	0	0	0	0	0	21
16:15	0	0	0	1	3	3	9	0	0	0	0	0	0	0	0	16
16:30	0	0	0	1	3	5	8	1	0	0	0	0	0	0	0	18
16:45	0	0	0	0	3	4	9	2	1	0	0	0	0	0	0	19
	0	0	0	4	10	18	32	8	2	0	0	0	0	0	0	74
17:00	0	0	2	5	7	6	5	2	0	0	0	0	0	0	0	27
17:15	0	0	0	2	6	7	8	4	1	0	0	0	0	0	0	28
17:30	0	0	0	4	3	10	3	1	0	0	0	0	0	0	0	21
17:45	0	1	0	1	1	5	3	1	1	0	0	1	0	0	0	14
	0	1	2	12	17	28	19	8	2	0	0	1	0	0	0	90
18:00	0	0	0	3	3	9	7	2	0	1	0	0	0	0	0	25
18:15	0	0	1	4	1	7	4	0	0	0	0	0	0	0	0	17
18:30	1	0	0	1	0	5	6	2	0	0	0	0	0	0	0	15
18:45	0	0	0	0	3	3	4	1	1	0	0	0	0	0	0	12
	1	0	1	8	7	24	21	5	1	1	0	0	0	0	0	69
19:00	0	0	0	2	2	3	8	1	0	0	0	0	0	0	0	16
19:15	0	0	1	2	2	2	2	1	0	0	0	0	0	0	0	10
19:30	0	0	0	1	2	6	6	3	1	0	0	0	0	0	0	19
19:45	0	0	0	0	3	7	4	1	0	0	0	0	0	0	0	15
	0	0	1	5	9	18	20	6	1	0	0	0	0	0	0	60
20:00	0	0	0	0	3	6	3	1	0	0	0	0	0	0	0	13
20:15	0	0	0	0	2	7	5	0	0	0	0	0	0	0	0	14
20:30	0	0	1	0	2	1	2	0	0	0	0	0	0	0	0	6
20:45	0	0	0	0	1	6	3	0	0	0	0	0	0	0	0	10
	0	0	1	0	8	20	13	1	0	0	0	0	0	0	0	43
21:00	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	3
21:15	0	0	0	0	1	3	1	1	0	0	0	0	0	0	0	6
21:30	0	0	0	0	0	8	5	1	0	0	0	0	0	0	0	14
21:45	0	0	0	0	0	3	4	0	0	0	0	0	0	0	0	7
	0	0	0	1	1	14	11	3	0	0	0	0	0	0	0	30
22:00	0	0	0	0	0	7	3	0	0	0	0	0	0	0	0	10
22:15	0	0	0	0	2	2	5	0	0	0	0	0	0	0	0	9
22:30	0	0	0	0	0	5	4	2	0	0	0	0	0	0	0	11
22:45	0	0	0	1	1	5	1	1	1	0	0	0	0	0	0	10
	0	0	0	1	3	19	13	3	1	0	0	0	0	0	0	40
23:00	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	3
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:30	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
23:45	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	3
	0	0	0	0	0	4	3	1	0	0	0	0	0	0	0	8
Total	1	3	13	50	80	243	212	50	10	3	0	1	0	0	0	666
Total	2	4	17	77	126	374	340	83	13	3	0	1	0	0	0	1040

Stats		
	15th Percentile :	42 KPH
	50th Percentile :	53 KPH
	85th Percentile :	61 KPH
	95th Percentile :	67 KPH
	Mean Speed(Average) :	53 KPH
	15 KPH Pace Speed :	48-62 KPH
	Number in Pace :	671
	Percent in Pace :	64.5%
	Number of Vehicles > 40 KPH :	924
	Percent of Vehicles > 40 KPH :	88.9%

Ontario Traffic, Inc.
17705 Leslie St., Unit 6
Newmarket, Ontario L3Y 3E3
Tel: (905) 898-7711 Fax: (905) 898-3664

Site Code: 1
Station ID: U248
Badenoch St just west of Ikonkar Place

Date Start: 21-Mar-24
Date End: 21-Mar-24

WB

Start Time	1 15	16 23	24 31	32 39	40 47	48 55	56 63	64 71	72 79	80 88	89 96	97 104	105 112	113 120	121 9999	Total
03/21/2																
4	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
00:15	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	2
00:30	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
00:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	1	0	0	1	0	2	0	0	0	0	0	0	0	0	4
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
01:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2
03:30	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
03:45	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2
	0	0	0	0	1	3	1	0	1	0	0	0	0	0	0	6
04:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
04:15	0	0	0	1	0	2	2	0	1	0	0	0	0	0	0	6
04:30	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	3
04:45	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	2
	0	0	1	2	0	3	5	0	1	0	0	0	0	0	0	12
05:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
05:15	0	0	0	0	1	3	1	1	1	0	0	0	0	0	0	7
05:30	0	0	1	0	0	1	3	1	0	0	0	0	0	0	0	6
05:45	0	0	0	1	0	6	2	1	1	0	0	0	0	0	0	11
	0	0	1	1	1	10	7	3	2	0	0	0	0	0	0	25
06:00	0	0	0	1	1	3	9	1	0	0	0	0	0	0	0	15
06:15	0	0	0	0	3	6	5	2	0	0	0	0	0	0	0	16
06:30	0	0	0	0	4	2	6	3	0	0	0	0	0	0	0	15
06:45	0	0	0	0	5	8	9	1	1	0	0	0	0	0	0	24
	0	0	0	1	13	19	29	7	1	0	0	0	0	0	0	70
07:00	0	0	0	1	0	9	7	2	0	0	0	0	0	0	0	19
07:15	0	1	0	2	3	16	10	2	1	0	0	0	0	0	0	35
07:30	0	0	0	4	7	6	5	4	1	0	0	0	0	0	0	27
07:45	0	2	1	4	7	15	3	0	1	0	0	0	0	0	0	33
	0	3	1	11	17	46	25	8	3	0	0	0	0	0	0	114
08:00	0	0	0	1	6	11	11	0	0	0	0	0	0	0	0	29
08:15	0	0	1	2	5	13	19	0	1	0	0	0	0	0	0	41
08:30	0	0	1	1	7	11	5	4	0	0	0	0	0	0	0	29
08:45	0	0	1	1	0	14	6	2	0	0	0	0	0	0	0	24
	0	0	3	5	18	49	41	6	1	0	0	0	0	0	0	123
09:00	0	0	2	0	5	10	5	1	0	0	0	0	0	0	0	23
09:15	0	0	0	2	6	16	4	2	0	0	0	0	0	0	0	30
09:30	0	0	0	1	10	7	6	1	0	0	0	0	0	0	0	25
09:45	0	0	1	2	6	10	1	3	0	0	0	0	0	0	0	23
	0	0	3	5	27	43	16	7	0	0	0	0	0	0	0	101
10:00	0	0	0	2	7	7	8	0	0	1	0	0	0	0	0	25
10:15	0	0	0	2	5	8	7	0	0	0	0	0	0	0	0	22
10:30	0	0	0	4	5	6	4	0	0	0	0	0	0	0	0	19
10:45	0	1	0	1	4	3	4	3	0	0	0	0	0	0	0	16
	0	1	0	9	21	24	23	3	0	1	0	0	0	0	0	82
11:00	0	0	4	3	5	8	1	1	0	0	0	0	0	0	0	22
11:15	0	0	2	6	3	8	6	3	0	0	0	0	0	0	0	28
11:30	0	0	1	1	4	10	7	0	0	0	0	0	0	0	0	23
11:45	0	0	0	1	6	10	3	0	1	0	0	0	0	0	0	21
	0	0	7	11	18	36	17	4	1	0	0	0	0	0	0	94
Total	0	5	16	45	117	234	168	38	10	1	0	0	0	0	0	634

Ontario Traffic, Inc.
17705 Leslie St., Unit 6
Newmarket, Ontario L3Y 3E3
Tel: (905) 898-7711 Fax: (905) 898-3664

Site Code: 1
Station ID: U248
Badenoch St just west of Ikonkar Place

Date Start: 21-Mar-24
Date End: 21-Mar-24

WB

Start Time	1 15	16 23	24 31	32 39	40 47	48 55	56 63	64 71	72 79	80 88	89 96	97 104	105 112	113 120	121 9999	Total
12 PM	0	0	0	0	0	7	9	0	0	0	0	0	0	0	0	16
12:15	0	0	0	0	7	11	5	0	1	0	0	0	0	0	0	24
12:30	0	0	0	1	2	6	1	1	0	0	0	0	0	0	0	11
12:45	0	0	0	1	6	4	2	1	0	0	0	0	0	0	0	14
	0	0	0	2	15	28	17	2	1	0	0	0	0	0	0	65
13:00	0	0	1	1	2	10	2	0	0	0	0	0	0	0	0	16
13:15	0	0	1	3	5	10	0	2	0	0	0	0	0	0	0	21
13:30	0	0	1	5	2	8	5	0	0	0	0	0	0	0	0	21
13:45	0	0	1	0	4	7	6	1	1	0	0	0	0	0	0	20
	0	0	4	9	13	35	13	3	1	0	0	0	0	0	0	78
14:00	0	0	0	0	2	7	3	0	0	0	0	0	0	0	0	12
14:15	0	0	0	0	4	14	5	0	0	0	0	0	0	0	0	23
14:30	0	0	0	2	5	17	4	2	0	0	0	0	0	0	0	30
14:45	0	0	0	2	6	5	5	1	0	0	0	0	0	0	0	19
	0	0	0	4	17	43	17	3	0	0	0	0	0	0	0	84
15:00	0	0	1	2	3	6	7	2	1	0	0	0	0	0	0	22
15:15	0	1	3	4	4	11	6	0	0	0	0	0	0	0	0	29
15:30	0	0	0	1	6	8	2	0	0	0	0	0	0	0	0	17
15:45	0	0	0	1	7	13	8	1	0	0	0	0	0	0	0	30
	0	1	4	8	20	38	23	3	1	0	0	0	0	0	0	98
16:00	0	0	1	2	15	6	7	3	1	0	0	0	0	0	0	35
16:15	0	0	2	0	12	13	13	6	1	0	0	0	0	0	0	47
16:30	0	0	0	0	14	8	6	2	1	0	0	0	0	0	0	31
16:45	0	0	0	1	9	22	7	3	0	0	0	0	0	0	0	42
	0	0	3	3	50	49	33	14	3	0	0	0	0	0	0	155
17:00	0	0	0	14	8	13	6	3	1	0	0	0	0	0	0	45
17:15	0	0	2	3	14	16	2	2	0	0	0	0	0	0	0	39
17:30	0	0	0	2	10	19	11	0	0	0	0	0	0	0	0	42
17:45	0	0	0	1	4	18	11	3	0	0	0	0	0	0	0	37
	0	0	2	20	36	66	30	8	1	0	0	0	0	0	0	163
18:00	0	0	0	0	12	12	6	3	1	0	0	0	0	0	0	34
18:15	0	0	2	5	7	10	3	0	0	0	0	0	0	0	0	27
18:30	0	0	0	1	10	10	1	1	0	0	0	0	0	0	0	23
18:45	0	0	0	1	3	5	4	3	0	0	0	0	0	0	0	16
	0	0	2	7	32	37	14	7	1	0	0	0	0	0	0	100
19:00	0	0	1	2	3	4	6	1	1	0	0	0	0	0	0	18
19:15	0	0	0	0	2	9	2	1	0	0	0	0	0	0	0	14
19:30	0	0	0	1	2	4	3	0	0	0	0	0	0	0	0	10
19:45	0	0	0	1	0	6	3	0	0	0	0	0	0	0	0	10
	0	0	1	4	7	23	14	2	1	0	0	0	0	0	0	52
20:00	0	0	0	0	3	5	5	0	0	0	0	0	0	0	0	13
20:15	0	0	0	0	3	6	4	1	1	0	0	0	0	0	0	15
20:30	0	0	0	0	0	4	1	1	0	0	0	0	0	0	0	6
20:45	0	0	0	1	0	5	2	0	0	0	0	0	0	0	0	8
	0	0	0	1	6	20	12	2	1	0	0	0	0	0	0	42
21:00	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	5
21:15	0	0	0	0	0	5	3	0	0	0	0	0	0	0	0	8
21:30	0	0	0	0	1	4	1	0	0	0	0	0	0	0	0	6
21:45	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	3
	0	0	0	2	2	11	6	1	0	0	0	0	0	0	0	22
22:00	0	0	1	1	1	3	0	0	0	0	0	0	0	0	0	6
22:15	0	0	0	0	1	5	2	1	1	0	0	0	0	0	0	10
22:30	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
22:45	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	3
	0	0	1	1	3	9	5	1	1	0	0	0	0	0	0	21
23:00	0	0	0	0	0	3	1	2	0	0	0	0	0	0	0	6
23:15	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:45	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
	0	0	0	0	0	6	1	2	0	0	0	0	0	0	0	9
Total	0	1	17	61	201	365	185	48	11	0	0	0	0	0	0	889
Total	0	6	33	106	318	599	353	86	21	1	0	0	0	0	0	1523

Stats	
15th Percentile :	41 KPH
50th Percentile :	50 KPH
85th Percentile :	60 KPH
95th Percentile :	65 KPH
Mean Speed(Average) :	51 KPH
15 KPH Pace Speed :	48-62 KPH
Number in Pace :	908
Percent in Pace :	59.6%
Number of Vehicles > 40 KPH :	1338
Percent of Vehicles > 40 KPH :	87.9%

Ontario Traffic, Inc.
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Newmarket, Ontario L3Y 3E3
Tel: (905) 898-7711 Fax: (905) 898-3664

Site Code: 1
Station ID: U248
Badenoch St just west of Ikonkar Place

Date Start: 21-Mar-24
Date End: 21-Mar-24

EB, WB

Start Time	1 15	16 23	24 31	32 39	40 47	48 55	56 63	64 71	72 79	80 88	89 96	97 104	105 112	113 120	121 9999	Total
03/21/2																
4	0	1	0	0	0	0	3	0	0	0	0	0	0	0	0	4
00:15	0	1	0	0	2	1	1	0	0	0	0	0	0	0	0	5
00:30	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
00:45	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
	0	2	0	1	3	1	6	0	0	0	0	0	0	0	0	13
01:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
01:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
01:45	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2
	0	0	0	0	0	3	1	1	0	0	0	0	0	0	0	5
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
02:30	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
02:45	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
	0	0	0	1	1	1	2	0	0	0	0	0	0	0	0	5
03:00	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
03:15	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2
03:30	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	4
03:45	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	3
	0	0	0	1	2	4	2	1	1	0	0	0	0	0	0	11
04:00	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
04:15	0	0	1	1	0	3	4	0	1	0	0	0	0	0	0	10
04:30	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	3
04:45	0	0	0	1	1	0	4	1	0	0	0	0	0	0	0	7
	0	0	2	2	1	4	12	1	1	0	0	0	0	0	0	23
05:00	0	0	0	0	1	3	3	0	0	0	0	0	0	0	0	7
05:15	0	0	0	0	1	3	8	2	1	0	0	0	0	0	0	15
05:30	0	0	1	0	0	3	7	1	0	0	0	0	0	0	0	12
05:45	0	0	0	1	0	6	4	3	1	0	0	0	0	0	0	15
	0	0	1	1	2	15	22	6	2	0	0	0	0	0	0	49
06:00	0	0	0	1	1	6	13	2	0	0	0	0	0	0	0	23
06:15	0	0	0	0	3	10	9	4	0	0	0	0	0	0	0	26
06:30	0	0	0	0	4	4	13	4	0	0	0	0	0	0	0	25
06:45	0	0	0	1	6	11	15	1	1	0	0	0	0	0	0	35
	0	0	0	2	14	31	50	11	1	0	0	0	0	0	0	109
07:00	0	0	0	1	1	12	8	5	1	0	0	0	0	0	0	28
07:15	0	1	0	2	6	21	12	5	1	0	0	0	0	0	0	48
07:30	0	0	0	6	10	12	8	6	1	0	0	0	0	0	0	43
07:45	0	2	1	6	9	22	8	2	1	0	0	0	0	0	0	51
	0	3	1	15	26	67	36	18	4	0	0	0	0	0	0	170
08:00	0	0	0	1	7	15	14	1	0	0	0	0	0	0	0	38
08:15	0	0	1	3	8	16	23	1	1	0	0	0	0	0	0	53
08:30	0	0	2	3	10	20	8	4	0	0	0	0	0	0	0	47
08:45	0	0	1	1	2	21	10	2	0	0	0	0	0	0	0	37
	0	0	4	8	27	72	55	8	1	0	0	0	0	0	0	175
09:00	0	0	2	0	5	13	12	3	0	0	0	0	0	0	0	35
09:15	0	0	0	2	10	21	11	2	0	0	0	0	0	0	0	46
09:30	0	0	0	1	12	13	11	4	0	0	0	0	0	0	0	41
09:45	0	0	1	3	10	15	5	3	0	0	0	0	0	0	0	37
	0	0	3	6	37	62	39	12	0	0	0	0	0	0	0	159
10:00	0	0	0	2	8	12	11	3	0	1	0	0	0	0	0	37
10:15	0	0	0	2	7	15	7	1	0	0	0	0	0	0	0	32
10:30	1	0	1	5	5	12	8	1	1	0	0	0	0	0	0	34
10:45	0	1	0	3	4	9	8	3	0	0	0	0	0	0	0	28
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11:45	0	0	1	2	6	20	5	0	1	0	0	0	0	0	0	35
	0	0	8	23	26	57	37	5	2	0	0	0	0	0	0	158
Total	1	6	20	72	163	365	296	71	13	1	0	0	0	0	0	1008

Ontario Traffic, Inc.
17705 Leslie St., Unit 6
Newmarket, Ontario L3Y 3E3
Tel: (905) 898-7711 Fax: (905) 898-3664

Site Code: 1
Station ID: U248
Badenoch St just west of Ikonkar Place

Date Start: 21-Mar-24
Date End: 21-Mar-24

EB, WB

Start Time	1 15	16 23	24 31	32 39	40 47	48 55	56 63	64 71	72 79	80 88	89 96	97 104	105 112	113 120	121 9999	Total
12 PM	0	0	0	1	2	8	15	1	0	0	0	0	0	0	0	27
12:15	0	0	0	0	7	17	12	1	1	0	0	0	0	0	0	38
12:30	0	0	0	1	2	12	4	3	0	0	0	0	0	0	0	22
12:45	0	0	0	2	8	12	7	1	0	0	0	0	0	0	0	30
	0	0	0	4	19	49	38	6	1	0	0	0	0	0	0	117
13:00	0	0	2	3	5	17	7	1	0	0	0	0	0	0	0	35
13:15	0	1	2	3	7	18	6	3	1	0	0	0	0	0	0	41
13:30	0	0	1	9	4	15	8	1	0	0	0	0	0	0	0	38
13:45	0	0	1	0	5	16	10	1	1	0	0	0	0	0	0	34
	0	1	6	15	21	66	31	6	2	0	0	0	0	0	0	148
14:00	0	0	0	1	2	14	5	0	1	0	0	0	0	0	0	23
14:15	0	0	1	0	6	18	13	0	0	1	0	0	0	0	0	39
14:30	0	0	0	2	5	20	9	3	0	0	0	0	0	0	0	39
14:45	0	0	0	3	7	12	12	3	0	1	0	0	0	0	0	38
	0	0	1	6	20	64	39	6	1	2	0	0	0	0	0	139
15:00	0	0	2	7	6	8	11	3	1	0	0	0	0	0	0	38
15:15	0	2	5	6	7	20	12	1	0	0	0	0	0	0	0	53
15:30	0	0	1	2	8	14	6	3	1	0	0	0	0	0	0	35
15:45	0	0	1	2	9	21	13	1	0	0	0	0	0	0	0	47
	0	2	9	17	30	63	42	8	2	0	0	0	0	0	0	173
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16:15	0	0	2	1	15	16	22	6	1	0	0	0	0	0	0	63
16:30	0	0	0	1	17	13	14	3	1	0	0	0	0	0	0	49
16:45	0	0	0	1	12	26	16	5	1	0	0	0	0	0	0	61
	0	0	3	7	60	67	65	22	5	0	0	0	0	0	0	229
17:00	0	0	2	19	15	19	11	5	1	0	0	0	0	0	0	72
17:15	0	0	2	5	20	23	10	6	1	0	0	0	0	0	0	67
17:30	0	0	0	6	13	29	14	1	0	0	0	0	0	0	0	63
17:45	0	1	0	2	5	23	14	4	1	0	0	1	0	0	0	51
	0	1	4	32	53	94	49	16	3	0	0	1	0	0	0	253
18:00	0	0	0	3	15	21	13	5	1	1	0	0	0	0	0	59
18:15	0	0	3	9	8	17	7	0	0	0	0	0	0	0	0	44
18:30	1	0	0	2	10	15	7	3	0	0	0	0	0	0	0	38
18:45	0	0	0	1	6	8	8	4	1	0	0	0	0	0	0	28
	1	0	3	15	39	61	35	12	2	1	0	0	0	0	0	169
19:00	0	0	1	4	5	7	14	2	1	0	0	0	0	0	0	34
19:15	0	0	1	2	4	11	4	2	0	0	0	0	0	0	0	24
19:30	0	0	0	2	4	10	9	3	1	0	0	0	0	0	0	29
19:45	0	0	0	1	3	13	7	1	0	0	0	0	0	0	0	25
	0	0	2	9	16	41	34	8	2	0	0	0	0	0	0	112
20:00	0	0	0	0	6	11	8	1	0	0	0	0	0	0	0	26
20:15	0	0	0	0	5	13	9	1	1	0	0	0	0	0	0	29
20:30	0	0	1	0	2	5	3	1	0	0	0	0	0	0	0	12
20:45	0	0	0	1	1	11	5	0	0	0	0	0	0	0	0	18
	0	0	1	1	14	40	25	3	1	0	0	0	0	0	0	85
21:00	0	0	0	2	1	1	2	2	0	0	0	0	0	0	0	8
21:15	0	0	0	0	1	8	4	1	0	0	0	0	0	0	0	14
21:30	0	0	0	0	1	12	6	1	0	0	0	0	0	0	0	20
21:45	0	0	0	1	0	4	5	0	0	0	0	0	0	0	0	10
	0	0	0	3	3	25	17	4	0	0	0	0	0	0	0	52
22:00	0	0	1	1	1	10	3	0	0	0	0	0	0	0	0	16
22:15	0	0	0	0	3	7	7	1	1	0	0	0	0	0	0	19
22:30	0	0	0	0	0	5	6	2	0	0	0	0	0	0	0	13
22:45	0	0	0	1	2	6	2	1	1	0	0	0	0	0	0	13
	0	0	1	2	6	28	18	4	2	0	0	0	0	0	0	61
23:00	0	0	0	0	0	4	2	3	0	0	0	0	0	0	0	9
23:15	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
23:30	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
23:45	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	4
	0	0	0	0	0	10	4	3	0	0	0	0	0	0	0	17
Total	1	4	30	111	281	608	397	98	21	3	0	1	0	0	0	1555
Total	2	10	50	183	444	973	693	169	34	4	0	1	0	0	0	2563

Stats	
15th Percentile :	41 KPH
50th Percentile :	51 KPH
85th Percentile :	60 KPH
95th Percentile :	66 KPH
Mean Speed(Average) :	52 KPH
15 KPH Pace Speed :	48-62 KPH
Number in Pace :	1579
Percent in Pace :	61.6%
Number of Vehicles > 40 KPH :	2262
Percent of Vehicles > 40 KPH :	88.3%

Appendix F

Response to Comments

Draft Plan and Zoning By-law Amendment Application (ZBA)

Second Submission Comments

Township of Puslinch

Weston File: 10779

February 2024

1. GM Blueplan Engineering Parth Lad Feb 09, 2024		
Comment	**Consultant**	**Response**
24. Sight Distance Figure Traffic Impact Study		
GMBP Comment (February 9, 2024) In Section 9 of the Traffic Impact Study (TIS), please include an additional figure that is similar to Figure 15 but enlarged to illustrate the extent of the sight distances described in Table 9.	GHD	A figure illustrating the full extent of the sightline assessment is provided in Appendix D.
25. Internal Road Geometry Figure Traffic Impact Study		
GMBP Comment (February 9, 2024) Section 10 of the TIS needs to be revised using the Township of Puslinch 20m wide urban road cross-section. Additionally, the TIS states that the proposed right-of-way is 18m wide. Please revise to 20m to be consistent with the engineering reports and drawings.	GHD	Report has been updated to reflect the proposed 20 metre right-of-way for Street A

6. Salvini Consulting Julia Salvini March 07, 2024		
Comment	**Consultant**	**Response**
I've reviewed the December 2023 TIS prepared by GHD for the proposed residential subdivision in Morriston and provide my comments below:		
• Base traffic data, the background growth assumptions, the traffic generation and distribution, and the future total traffic volumes are all acceptable. I am in agreement with the capacity analyses at the Badenoch/Ochs and Ochs/Back intersections.	GHD	Noted.
• The sightline assessment exiting Ochs Street to Badenoch Street was undertaken with the following parameters from the TAC Geometric Design Guide for Canadian Roads: - Driver's eye set back 4.4 metres from the edge of the traveled way - Driver's eye height of 1.08 metres for the passenger vehicle - Driver's eye height of 1.8 metres for the truck/snow plow - Object height of 1.3 metres representing the top of a car • A design speed of 60 kph was chosen for the assessment representing 10 kph beyond the posted speed limit of 50 kph. Given the tight assessment, Township staff would like to see a speed study on Badenoch Street at the crest of the hill to confirm that 60 kph is appropriate. The speed study should provide a speed assessment by direction.	GHD	A speed study was completed with the results of the study indicating that the 85th percentile speed in the eastbound direction travelling towards Ochs Street is 61 km/h and generally consistent with the assumed design speed based on the posted speed limit.
• The sightline assessment indicates that using these parameters, the available sightlines meet the TAC requirements for the passenger vehicle but there is about a 3 metre shortfall in the sightline for the truck (out of a requirement for 158.4 metres). The calculation of available sightlines is based both on the design drawings for reconstructed Badenoch Street and were confirmed in the field to be slightly higher than on the design drawings. Township staff have confirmed that the height of the driver's eye for the snow plow is 2.6 metres. The consultant should revise the drawing to confirm if the appropriate sight distance can be achieved with the additional height to the driver's eye.	GHD	Noted. The sightline assessment was updated using a 2.6 metre driver's eye height for the snow plow assessment.

• The parameters above represent daylight conditions where the top of an approaching vehicle can be seen. At night there are streetlights on Badenoch Street to illuminate oncoming vehicles and given the curve in the road, headlights from westbound traffic will be pointing upward and will be more easily seen from the east.	GHD	Noted.
• The study does not address the reconstruction of Ochs Street. Ochs Street is narrow and requires reconstruction to meet Township standards. It is also my understanding that it will be realigned slightly to the east.	GHD Crozier	Noted. Ochs Street is being reconstructed and realigned to meet Township standards.
• Crozier, the Civil Engineer for the project, has prepared a drawing illustrating how the retaining wall at the southwest corner of the Badenoch/Ochs intersection could be reconfigured to meet the sightline requirements at the intersection. This will be reviewed in more detail with GM BluePlan. This drawing illustrates a reconstructed Ochs Street. Township staff confirmed that the distance between the front of a snow plow and the driver's eye can fit in the 4.4 metre setback from the traveled way (see photo below). The design of the shifted retaining wall must consider the sight triangle for the snow plow and include the 4.4 metre setback to ensure proper sight distance for the snow plow driver.	GHD	Noted. The assessment was completed with design of the shifted retaining wall considering the daylighting triangle and to accommodate the sightline assessment for a snow plow design vehicle.
• A proposed cross-section is included in the study for new Streets A and B. The consultant suggests that the cross-section will accommodate a single lane of traffic in each direction plus parking on both sides of the road. This should be reviewed in more detail with GM BluePlan and Township staff. The paved portion of the road is proposed at 6.5 metres with a 1.25 metre shoulder on both sides. If there were cars parked on both sides of the road, there would not be 6 metres of clear width for a firetruck.	GHD	The proposed cross-section for Street A is based on the Township's design standards for a 20-metre right-of-way, however a sidewalk is provided only on the west side of the road due to the small number of units and limited sidewalk connectivity.
• MTO comments on the previous version of the TIS were provided to the consultant on August 2, 2023. MTO will have to provide further comments on this revised TIS. • We have shared these comments with staff from the County and they are in agreement with them.	GHD	Noted. The report has been updated to address all commens from the MTO.

7. Ministry of Transportation Allan Hodgins March 27, 2024		
Comment	**Consultant**	**Response**
Blocks and Land Use:		
It is premature to comment on any block configuration until a municipal road configuration is determined to be acceptable by MTO and supported by an approved Traffic Impact Study (TIS), MTO comments on the TIS detailed below. • The draft plans achieve MTO required 14.0m setback, however future submission should clearly show/label the setback along the Highway 6 frontage.	GHD	Noted.
MTO would be willing to review a sight line analysis as proposed by Township/County staff to review both locations to further support access, pending the following comments are addressed in a TIS resubmission:		
• MTO will require the MTO/TAC protocol analysis to be completed for all four legs of the intersection of Highway and Badenoch St. ○ Page 18, Section 7.1.1, only provides analysis for SBLT lane, analysis for the NB, WB, EB lanes shall be included in the resubmission.	GHD	The queuing analysis in Section 7.1.1 was completed for left-turn lanes only. Despite the subject site not generating any additional trips to the northbound left-turn movement, the section was revised to also include the NBL lane. The eastbound and westbound approaches do not have exclusive left-turn lanes resulting in no queuing analysis for the respective approaches.
• MTO will require the MTO/TAC protocol to be completed for the right turn lane analysis. ○ Page 19, Section 7.1.2, notes it is not possible, please see section below for information to perform right turn lane analysis.	GHD	Similar to the comment above, only the westbound approach has an exclusive right-turn lane and the queue assessment was only completed for that approach.
• The Synchro files show a PHF= 0.95-96 for future horizon years, MTO policy requires PHF= 0.88 (rural), or 0.92 (urban/suburban). ○ See section below regarding MTO PHF Policy to prepare the resubmission.	GHD	As confirmed through discussion with MTO staff, the existing PHF that is greater than 0.92 can continue to be used.

• In addition to the proposed intersection sightline analysis, MTO suggest alternative measure be reviewed and considered to support access from Ochs St (i.e. posted speed reduction, higher enforcement or photo-radar along this section.	GHD	Noted.

ghd.com

→ The Power of Commitment

ORIGNAL 12 FEBRUARY 2023

STAGE 2 ARCHAEOLOGICAL PROPERTY ASSESSMENT

11 Main Street, Part of Lot 31, Concession 8 (Geographic Township of Puslinch, County of Wellington), Town of Morriston (AMICK Corporate File #: 2022-996/MHSTCI File #: P038-1193-2022)

SUBMITTED TO:
Ontario Ministry of Citizenship and Multiculturalism
(MCM)

SUBMITTED BY:
AMICK Consultants Limited
Phone: (519) 432-4435
Email: mhenry@amick.ca/mcornies@amick.ca
www.amick.ca

LICENSEE:
Michael B. Henry CD BA FRAI FRSA (P058)

PIF NUMBER: P038-1193-2022

CORPORATE PROJECT NUMBER: 2022-996

12 FEBRUARY 2023

Table of Contents

Project Personnel

AMICK Consultants Limited Partners

Michael Henry (MCM Professional Archaeologist Licence #P058)
Marilyn Cornies (MCM Professional Archaeologist Licence #P038)

Project Licensee Archaeologist

Marilyn Cornies (MCM Professional Archaeologist Licence #P038)

Project Field Directors

Alex Cassidy-Neumiller (MCM Applied Research Archaeologist Licence #R1311)
Michael Moody (MCM Applied Research Archaeologist Licence #R1215)

Project Field Assistants

Aaron Burden Kaitlyn Brennan Shannon Rayner Ashley Poyntz
Cameron Davenport

Project Report Preparation & Graphics

Alysia Gillham (MTCS Applied Research Archaeologist Licence #R1340)

Project Photography

Alex Cassidy-Neumiller (MCM Applied Research Archaeologist Licence #R1311)
Michael Moody (MCM Applied Research Archaeologist Licence #R1215)

EXECUTIVE SUMMARY

This report describes the results of the 2022 Stage 2 Archaeological Property Assessment of 11 Main Street, Part of Lot 31, Concession 8 (Geographic Township of Puslinch, County of Wellington), Town of Morrison, conducted by AMICK Consultants Limited. This assessment was undertaken as a requirement under the Planning Act (RSO 1990b0) and was conducted under Professional Archaeologist License #P058 issued to Michael Henry by the Minister of Heritage, Sport, Tourism and Culture Industries (MHSTCI) for the Province of Ontario. All work was conducted in conformity with Ontario Ministry of Tourism and Culture (MTC) Standards and Guidelines for Consultant Archaeologists (MTC 2011) and the Ontario Heritage Act (RSO 1990a).

The entirety of the study area is approximately 23.63 hectares (ha) in area and includes within it mostly woodlot with an area of ploughable land. The study area is bounded on the northwest by residential area, on the northeast by farmland, on the southeast by woodlot and farmland, and on the southwest by residential area and Queen Street. AMICK Consultants Limited was engaged by the proponent to undertake a Stage 2 Archaeological Property Assessment of lands potentially affected by the proposed undertaking and was granted permission to carry out archaeological fieldwork. Following the criteria outlined by MCM (2011) for determining archaeological potential, portions of the study area were determined as having archaeological potential for Pre-contact and Post-contact archaeological resources. Consequently, this report is being prepared in advance of the planning process for this property.

The entirety of the study area was subject to property inspection and photographic documentation concurrently with the Stage 2 Property Assessment which consisted of high intensity test pit methodology at a five-metre interval between individual test pits and high intensity pedestrian survey at an interval of 5 metres between individual transects on 18, 20-23 October 2022. All records, documentation, field notes, photographs, and artifacts (as applicable) related to the conduct and findings of these investigations are held at the Lakelands District corporate offices of AMICK Consultants Limited until such time that they can be transferred to an agency or institution approved by the MCM on behalf of the government and citizens of Ontario.

As a result of the Stage 2 Property Assessment of the study area, no archaeological resources were encountered. Consequently, the following recommendations are made:

1. *No further archaeological assessment of the study area is warranted.*
2. *The Provincial interest in archaeological resources with respect to the proposed undertaking has been addressed.*
3. *The proposed undertaking is clear of any archaeological concern.*

1.0 PROJECT CONTEXT

1.1 DEVELOPMENT CONTEXT

This report describes the results of the 2022 Stage 2 Archaeological Property Assessment of 11 Main Street, Part of Lot 31, Concession 8 (Geographic Township of Puslinch, County of Wellington), Town of Morrison, conducted by AMICK Consultants Limited. This assessment was undertaken as a requirement under the Planning Act (RSO 1990b0) and was conducted under Professional Archaeologist License #P058 issued to Michael Henry by the Minister of Heritage, Sport, Tourism and Culture Industries (MHSTCI) for the Province of Ontario. All work was conducted in conformity with Ontario Ministry of Tourism and Culture (MTC) Standards and Guidelines for Consultant Archaeologists (MTC 2011) and the Ontario Heritage Act (RSO 1990a).

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The proposed development of the study area includes 16 residential lots with associated services and landscape modifications. A preliminary plan of the proposed development has been submitted together with this report to MCM for review and reproduced within this report as Map 4.

1.2 HISTORICAL CONTEXT

1.2.1 PRE-CONTACT LAND-USE OUTLINE

Table 1 illustrates the chronological development of cultures within southern Ontario prior to the arrival of European cultures to the area at the beginning of the 17th century. This general cultural outline is based on archaeological data and represents a synthesis and summary of research over a long period of time. It is necessarily generalizing and is not necessarily representative of the point of view of all researchers or stakeholders. It is offered here as a rough guideline and as a very broad outline to illustrate the relationships of broad cultural groups and time periods.

TABLE 1 PRE-CONTACT CULTURAL CHRONOLOGY FOR SOUTHERN ONTARIO

Years ago	Period	Southern Ontario
250	Terminal Woodland	Ontario and St. Lawrence Iroquois Cultures
1000 2000	Initial Woodland	Princess Point, Saugeen, Point Peninsula, and Meadowood Cultures
3000 4000 5000 6000	Archaic	Laurentian Culture
7000 8000 9000 10000 11000	Palaeo-Indian	Plano and Clovis Cultures
		(Wright 1972)

What follows is an outline of Aboriginal occupation in the area during the Pre-Contact Era from the earliest known period, about 9000 B.C. up to approximately 1650 AD.

1.2.1.1 PALEO-INDIAN PERIOD (APPROXIMATELY 9000-7500 B.C.)

North of Lake Ontario, evidence suggests that early occupation began around 9000 B.C. People probably began to move into this area as the glaciers retreated and glacial lake levels began to recede. The early occupation of the area probably occurred in conjunction with environmental conditions that would be comparable to modern Sub-Arctic conditions. Due to the great antiquity of these sites, and the relatively small populations likely involved, evidence of these early inhabitants is sparse and generally limited to tools produced from stone or to by-products of the manufacture of these implements.

1.2.1.2 ARCHAIC PERIOD (APPROXIMATELY 8000-1000 B.C.)

By about 8000 B.C. the gradual transition from a post glacial tundra-like environment to an essentially modern environment was largely complete. Prior to European clearance of the landscape for timber and cultivation, the area was characterized by forest. The Archaic Period is the longest and the most apparently stable of the cultural periods identified through archaeology. The Archaic Period is divided into the Early, Middle and Late Sub-Periods, each represented by specific styles in projectile point manufacture. Many more sites of this period are found throughout Ontario, than of the Palaeo-Indian Period. This is probably a reflection of two factors: the longer period of time reflected in these sites, and a greater

population density. The greater population was likely the result of a more diversified subsistence strategy carried out in an environment offering a greater variety of abundant resources (Smith 2002:58-59).

Current interpretations suggest that the Archaic Period populations followed a seasonal cycle of resource exploitation. Although similar in concept to the practices speculated for the big game hunters of the Palaeo-Indian Period, the Archaic populations utilized a much broader range of resources, particularly with respect to plants. It is suggested that in the spring and early summer, bands would gather at the mouths of rivers and at rapids to take advantage of fish spawning runs. Later in the summer and into the fall season, smaller groups would move to areas of wetlands to harvest nuts and wild rice. During the winter, they would break into yet smaller groups probably based on the nuclear family and perhaps some additional relatives to move into the interior for hunting. The result of such practices would be to create a distribution of sites across much of the landscape (Smith 2002: 59-60).

The material culture of this period is much more extensive than that of the Palaeo-Indians. Stylistic changes between Sub-Periods and cultural groups are apparent, although the overall quality in production of chipped lithic tools seems to decline. This period sees the introduction of ground stone technology in the form of celts (axes and adzes), manos and metates for grinding nuts and fibres, and decorative items like gorgets, pendants, birdstones, and bannerstones. Bone tools are also evident from this time period. Their presence may be a result of better preservation from these more recent sites rather than a lack of such items in earlier occupations. In addition, copper and exotic chert types appear during the period and are indicative of extensive trading (Smith 2002: 58-59).

1.2.1.3 WOODLAND PERIOD (APPROXIMATELY 1000 B.C.-1650 A.D.)

The primary difference in archaeological assemblages that differentiates the beginning of the Woodland Period from the Archaic Period is the introduction of ceramics to Ontario populations. This division is probably not a reflection of any substantive cultural changes, as the earliest sites of this period seem to be in all other respects a continuation of the Archaic mode of life with ceramics added as a novel technology. The seasonally based system of resource exploitation and associated population mobility persists for at least 1500 years into the Woodland Period (Smith 2002: 61-62).

The Early Woodland Sub-Period dates from about 1000-400 B.C. Many of the artifacts from this time are similar to the late Archaic and suggest a direct cultural continuity between these two temporal divisions. The introduction of pottery represents and entirely new technology that was probably acquired through contact with more southerly populations from which it likely originates (Smith 2002:62).

The Middle Woodland Sub-Period dates from about 400 B.C.-800 A.D. Within the region including the study area, a complex emerged at this time termed “Point Peninsula.” Point Peninsula pottery reflects a greater sophistication in pottery manufacture compared with the earlier industry. The paste and temper of the new pottery is finer and new decorative techniques such as dentate and pseudo-scallop stamping appear. There is a noted

Hopewellian influence in southern Ontario populations at this time. Hopewell influences from south of the Great Lakes include a widespread trade in exotic materials and the presence of distinct Hopewell style artifacts such as platform pipes, copper or silver panpipe covers and shark's teeth. The populations of the Middle Woodland participated in a trade network that extended well beyond the Great Lakes Region.

The Late Woodland Sub-Period dates from about 500-1650 A.D. The Late Woodland includes four separate phases: Princess Point, Early Ontario Iroquoian, Middle Ontario Iroquoian and Late Ontario Iroquoian.

The Princess Point phase dates to approximately 500-1000 A.D. Pottery of this phase is distinguished from earlier technology in that it is produced by the paddle method instead of coil and the decoration is characterized by the cord wrapped stick technique. Ceramic smoking pipes appear at this time in noticeable quantities. Princess Point sites cluster along major stream valleys and wetland areas. Maize cultivation is introduced by these people to Ontario. These people were not fully committed to horticulture and seemed to be experimenting with maize production. They generally adhere to the seasonal pattern of occupation practiced by earlier occupations, perhaps staying at certain locales repeatedly and for a larger portion of each year (Smith 2002: 65-66).

The Early Ontario Iroquoian stage dates to approximately 950-1050 A.D. This stage marks the beginning of a cultural development that led to the historically documented Ontario Iroquoian groups that were first contacted by Europeans during the early 1600s (Petun, Neutral, and Huron). At this stage formal semi-sedentary villages emerge. The Early stage of this cultural development is divided into two cultural groups in southern Ontario. The areas occupied by each being roughly divided by the Niagara Escarpment. To the west were located the Glen Meyer populations, and to the east were situated the Pickering people (Smith 2002: 67).

The Middle Ontario Iroquoian stage dates to approximately 1300-1400 A.D. This stage is divided into two sub-stages. The first is the Uren sub-stage lasting from approximately 1300-1350 A.D. The second of the two sub-stages is known as the Middleport sub-stage lasting from roughly 1350-1400 A.D. Villages tend to be larger throughout this stage than formerly (Smith 2002: 67).

The Late Ontario Iroquoian stage dates to approximately 1400-1650 A.D. During this time the cultural divisions identified by early European explorers are under development and the geographic distribution of these groups within southern Ontario begins to be defined.

1.2.2 Post-Contact Land Use Outline

In 1837 by Act of Parliament the new District of Wellington was formed and a court house and jail in the town of Guelph were authorized. The District was named after England's Duke of Wellington and initially included the counties of Wellington, Waterloo, Grey and parts of Dufferin (Wikipedia 2017).

By January 1854, Wellington County became an individual entity. At the time, it included the Townships and Towns of Amaranth, Arthur, Eramosa, Erin, Guelph, Guelph (Town), Garafraxa, Maryborough, Nichol, Peel, Pilkington, and Puslinch. Other municipalities were added between 1857 and 1881. Guelph separated in 1879 and was incorporated as a City; it lost representation on the County Council. Orangeville and Garafraxa East were annexed by Dufferin County (Wikipedia 2017).

The township was named after Puslinch House in Devon, England, where Elizabeth Yonge, the wife of Lieutenant Governor of Upper Canada Sir John Colborne, was born. The name was given by Lady Seaton after her birthplace in Devon, England. Sir John would later be the Lieutenant-Governor of Ontario from 1828 to 1836. A historical plaque indicates that the township was surveyed in 1828-1832 by David Gibson and was originally known as the Church Lands. Many people arrived in the 1830's via Stone Road from Dundas to Galt toward Killean in Puslinch. A settler, Edward Ellis who arrived in 1839, donated land for the construction of the Wesleyan Methodist Church, also known as Ellis Chapel, in 1861. Records from 1846 indicate a population in the township of 1500, most of whom were "Highland Scotch" (Wikipedia 2017).

Map 2 is a facsimile segment from Leslie's Historical County Map of Wellington County (Leslie 1861). Map 2 illustrates the location of the study area and environs as of 1861. The study area is shown to belong to D. McEdwards. This demonstrates that the original property of which the study area is a part was settled by the time that the atlas data was compiled. Accordingly, it has been determined that there is potential for archaeological deposits related to early Post-Contact settlement within the study area. In addition, a settlement road is depicted as adjacent to the study area to the southwest. This road is the current Queen Street.

Map 3 is a facsimile segment of the Township of Puslinch map reproduced from The Illustrated Historical Atlas of Waterloo and Wellington Counties (Walker & Miles 1877). Map 3 illustrates the location of the study area and environs as of 1877. The study area is shown to belong to D. McEdwards; one mill and a church are shown to be along the southwest border of the study area. This demonstrates that the original property of which the study area is a part was settled by the time that the atlas data was compiled. Accordingly, it has been determined that there is potential for archaeological deposits related to early Post-Contact settlement within the study area. In addition, a settlement road is depicted as adjacent to the study area to the southwest. This road is the current Queen Street.

A plan of the study area is included within this report as Map 4. Current conditions encountered during the Stage 2 Property Assessment are illustrated in Maps 5 & 6.

1.2.3 SUMMARY OF HISTORICAL CONTEXT

The brief overview of readily available documentary evidence indicates that the study area is situated within an area that was close to historic transportation routes and in an area well populated during the nineteenth century and therefore has potential for sites relating to early Post-Contact settlement in the region. Background research indicates the property has potential for archaeological resources of Native origins based on proximity to a natural

source of potable water in the past. Bronte Creek runs near the southwestern border of the study area.

1.3 ARCHAEOLOGICAL CONTEXT

The study area is located near 11 Main Street and is bounded on the northwest by residential area, on the northeast by farmland, on the southeast by woodlot and farmland, and on the southwest by residential area and Queen Street.

The study area appears to retain much of its natural topography and vegetation with an area of ploughable lands located near the northwest border. Woodlot and meadow are located in the rest of the study area Bronte Creek runs near the southwestern border of the study area and associated low-lying wet areas.

1.3.1 PHYSIOGRAPHIC REGION

The western half of the study area is situated within the Horseshoe Moraines physiographic region. The surface is composed of two chief landform components (a) the irregular stony knobs and ridges which are composed mostly of till with some sand and gravel deposits (kames) and (b) the more or less pitted sand and gravel terraces and swampy valley floors. Huron clay is the most representative soil type. The average depth is 18-20 inches and it is generally susceptible to erosion. The general elevation is from 800 to 1700 feet a.s.l. (Chapman and Putnam 1984: 127-129).

The eastern half of the study area is situated within the Flamborough Plain physiographic region. The Flamborough Plain is an isolated tract of shallow drift on the Niagara cuesta northwest of Hamilton. A few drumlins are found scattered over this limestone plain, and swamps are plentiful. The town of Dundas taps water from Spencer Creek to the north, which is a drain for the plain. Soil is either wet or stony and shallow in this region, and thus, most of the area is still in woods or pasture (Chapman and Putnam 1984: 129-130).

1.3.2 SURFACE WATER

Bronte Creek is located within the study area near the southwestern border and is associated with a pond situated approximately 302 metres from the western corner of the study area.

1.3.3 REGISTERED ARCHAEOLOGICAL SITES

The Archaeological Site Database administered by the MHSTCI indicates that there are eight (8) previously documented sites within 1 kilometre of the study area. However, it must be noted that this assumes the accuracy of information compiled from numerous researchers using different methodologies over many years. AMICK Consultants Limited assumes no responsibility for the accuracy of site descriptions, interpretations such as cultural affiliation, or location information derived from the Archaeological Sites Database administered by MHSTCI. In addition, it must also be noted that a lack of formerly documented sites does not

indicate that there are no sites present as the documentation of any archaeological site is contingent upon prior research having been conducted within the study area.

1.3.3.1 Pre-contact Registered Sites

A summary of registered and/or known archaeological sites within a 1-kilometre radius of the study area was gathered from the Archaeological Sites Database, administered by MHSTCI. As a result, it was determined that six (6) archaeological sites relating directly to Pre-Contact habitation/activity had been formally registered within the immediate vicinity of the study area. However, the lack of formally documented archaeological sites does not mean that Pre-Contact people did not use the area; it more likely reflects a lack of systematic archaeological research in the immediate vicinity. Even in cases where one or more assessments may have been conducted in close proximity to a proposed landscape alteration, an extensive area of physical archaeological assessment coverage is required throughout the region to produce a representative sample of all potentially available archaeological data in order to provide any meaningful evidence to construct a pattern of land use and settlement in the past. All previously registered Pre-Contact sites are briefly described below in Table 2:

Table 2 Pre-Contact Sites within 1km

Borden #	Site Name	Time Period	Affinity	Site Type
AiHc-448	RID 2	Pre-Contact	Aboriginal	Unknown
AiHc-447	RID 1	Pre-Contact	Aboriginal	Unknown
AiHa-57	6P1	Pre-Contact	--	Unknown
AiHa-44	Canin	Late Woodland	Aboriginal	Campsite
AiHa-4	McPhee	Late Woodland	Aboriginal	Campsite, Burial, Village
AiHa-16	Ivan Elliot	Late Woodland	Aboriginal	Village

None of the above noted archaeological sites are situated within 300 metres of the study area. Therefore, they have no impact on determinations of archaeological potential for further archaeological resources related to Pre-Contact activity and occupation with respect to the archaeological assessment of the proposed undertaking.

1.3.3.2 Post-contact Registered Sites

A summary of registered and/or known archaeological sites within a 1-kilometre radius of the study area was gathered from the Archaeological Sites Database, administered by MHSTCI. As a result, it was determined that two (2) archaeological sites relating directly to Post-Contact habitation/activity had been formally registered within the immediate vicinity of the study area. All previously registered Post-Contact sites are briefly described below in Table 3:

Table 3 Post-Contact Sites within 1km

Borden #	Site Name	Time Period	Affinity	Site Type
AiHa-56	The Mast Site	Post-Contact	--	Homestead

AiHa-53	--	Post-Contact	Euro-Canadian	Homestead, Midden

None of the above noted archaeological sites are situated within 300 metres of the study area. Therefore, they have no impact on determinations of archaeological potential for further archaeological resources related to Post-Contact activity and occupation with respect to the archaeological assessment of the proposed undertaking.

1.3.4 Previous Archaeological Assessments

On the basis of information supplied by MCM, no archaeological assessments have been conducted within 50 metres of the study area. AMICK Consultants Limited assumes no responsibility for the accuracy of previous assessments, interpretations such as cultural affiliation, or location information derived from the Archaeological Sites Database administered by MCM. In addition, it must also be noted that the lack of formerly documented previous assessments does not indicate that no assessments have been conducted.

1.3.4.1 Previous Regional Archaeological Potential Modelling

The study area is situated in area for which there is no archaeological master plan.

1.3.5 Historic Plaques

There are no relevant plaques associated with the study area, which would suggest an activity or occupation within, or near, the study area that may indicate potential for associated archaeological resources of significant CHVI.

1.3.6 Summary of Archaeological Context

The study area appears to retain much of its natural topography and vegetation with an area of ploughable lands located near the northwest border. Woodlot and meadow are located in the rest of the study area Bronte Creek runs near the southwestern border of the study area and associated low-lying wet areas.

Background research also indicates that the western half of the study area is situated within the Horseshoe Moraines physiographic region, which is characterized by irregular stony knobs, ridges, pitted sand and gravel terraces, as well as swampy valley floors. The eastern half of the study area is situated within the Flamborough Plain physiographic region, which is characterized by drumlins scattered over limestone plain with plentiful swamps.

A total of eight (8) previously registered archaeological sites have been documented within 1km of the study area. Of these, 6 are Pre-Contact and 2 are Post-Contact. None of these sites are located within 300m of the study area and, therefore, do not demonstrate archaeological potential for further archaeological resources of Pre-Contact/Post-Contact activity and occupation with respect to the archaeological assessment of the current study area.

The study area is situated in an area for which there is no archaeological master plan. There are also no relevant plaques associated with the study area.

The study area has potential for archaeological resources of Native origins based on proximity to a source of potable water. Background research also suggests potential for archaeological resources of Post-Contact origins based on proximity to a historic roadway, and proximity to areas of documented historic settlement.

2.0 FIELD WORK METHODS AND WEATHER CONDITIONS

2.1 INTRODUCTION

A property inspection was carried out in compliance with Standards and Guidelines for Consultant Archaeologists (MTC 2011) to document the existing conditions of the study area to facilitate the Stage 2 Property Assessment. All areas of the study area were visually inspected and select features were photographed as a representative sample of each area defined within Maps 5 and 6. Observations made of conditions within the study area at the time of the inspection were used to inform the requirement for Stage 2 Property Assessment for portions of the study area as well as to aid in the determination of appropriate Stage 2 Property Assessment strategies. The locations from which photographs were taken and the directions toward which the camera was aimed for each photograph are illustrated in Maps 5 & 6 of this report.

The Stage 2 Assessment of the study area was carried out on 18, 20-23 October 2022 and consisted of high intensity test pit methodology at a five-metre interval between individual test pits and by high intensity pedestrian survey at an interval of 5 metres between individual transects which was conducted in compliance with the Standards and Guidelines for Consultant Archaeologists, section 2.1.1: Pedestrian Survey and 2.1.2: Test Pit Survey (MTC 2011). Weather conditions were appropriate for the necessary fieldwork required to complete the Stage 2 Property Assessment and to create the documentation appropriate to this study.

2.2 PEDESTRIAN SURVEY

Approximately 5.02 ha of the study area was subjected to pedestrian survey at 5m transect intervals. All actively or recently cultivated agricultural land within the study area was recently ploughed deep enough to provide total topsoil exposure but not deeper than previous ploughing and was weathered by a heavy rainfall. In addition, approximately 85% of the ploughed field surface was exposed and visible per Section 2.1.1, Standards 1-6 (MTC 2011). All work was photo-documented.

Through the course of the pedestrian survey, no archaeological resources were encountered.

2.3 TEST PIT SURVEY

Approximately 9.16 ha of the study area was wooded and was subjected to test pit survey at 5m intervals per Section 2.1.2, Standard 1 (MTC 2011).

All test pits were excavated within 1m of all built structures, were at least 30cm in diameter and were excavated into the first 5cm of subsoil to examine stratigraphy, cultural features and evidence of fill. All soils were screen through mesh no greater than 6mm and all test pits were backfilled. All work was photo documented.

During the 5m test pit survey, no archaeological resources were encountered.

3.0 RECORD OF FINDS

3.1 INTRODUCTION

As a result of the Stage 2 Assessment of the study area, no archaeological resources of any description were encountered.

The documentation produced during the field investigation conducted in support of this report includes: one sketch map, one page of photo log, one page of field notes, and 87 digital photographs.

4.0 ANALYSIS AND CONCLUSIONS

4.1 STAGE 2 ANALYSIS AND CONCLUSIONS

No archaeological sites or resources were found during the Stage 2 survey of the study area.

In accordance with the definitions contained within the Standards and Guidelines for Consultant Archaeologists (MTC 2011), it has been concluded that no archaeological sites or resources were found during the Stage 2 survey of the study area.

5.0 RECOMMENDATIONS

5.1 STAGE 2 RECOMMENDATIONS

As a result of the Stage 2 Property Assessment of the study area, no archaeological resources were encountered. Consequently, the following recommendations are made:

4. *No further archaeological assessment of the study area is warranted.*
5. *The Provincial interest in archaeological resources with respect to the proposed undertaking has been addressed.*
6. *The proposed undertaking is clear of any archaeological concern.*

6.0 ADVICE ON COMPLIANCE WITH LEGISLATION

While not part of the archaeological record, this report must include the following standard advisory statements for the benefit of the proponent and the approval authority in the land use planning and development process:

a. *This report is submitted to the Minister of Tourism and Culture as a condition of licensing in accordance with Part VI of the Ontario Heritage Act, R.S.O. 1990, c. 0.18. The report is reviewed to ensure that it complies with the standards and guidelines issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism and Culture, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.*

b. *It is an offence under Sections 48 and 69 of the Ontario Heritage Act for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeological Reports referred to in Section 65.1 of the Ontario Heritage Act.*

c. *Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed archaeologist to carry out archaeological fieldwork, in compliance with sec. 48 (1) of the Ontario Heritage Act.*

d. *The Cemeteries Act, R.S.O. 1990, c. C.4 and the Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33 (when proclaimed in force) require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ontario Ministry of Consumer Services.*

e. *Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48 (1) of the Ontario Heritage Act and may not be altered, or have artifacts removed from them, except by a person holding an archaeological licence.*

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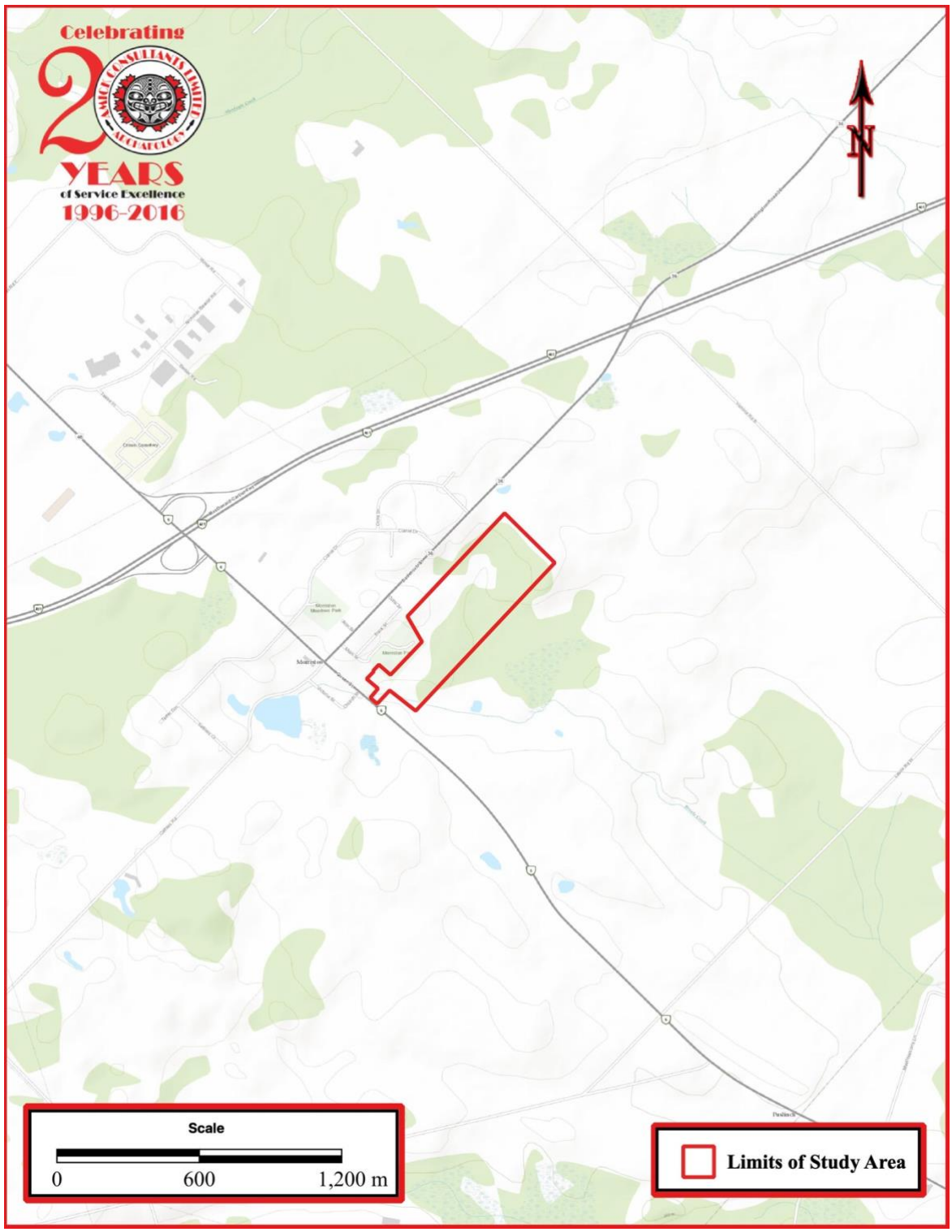
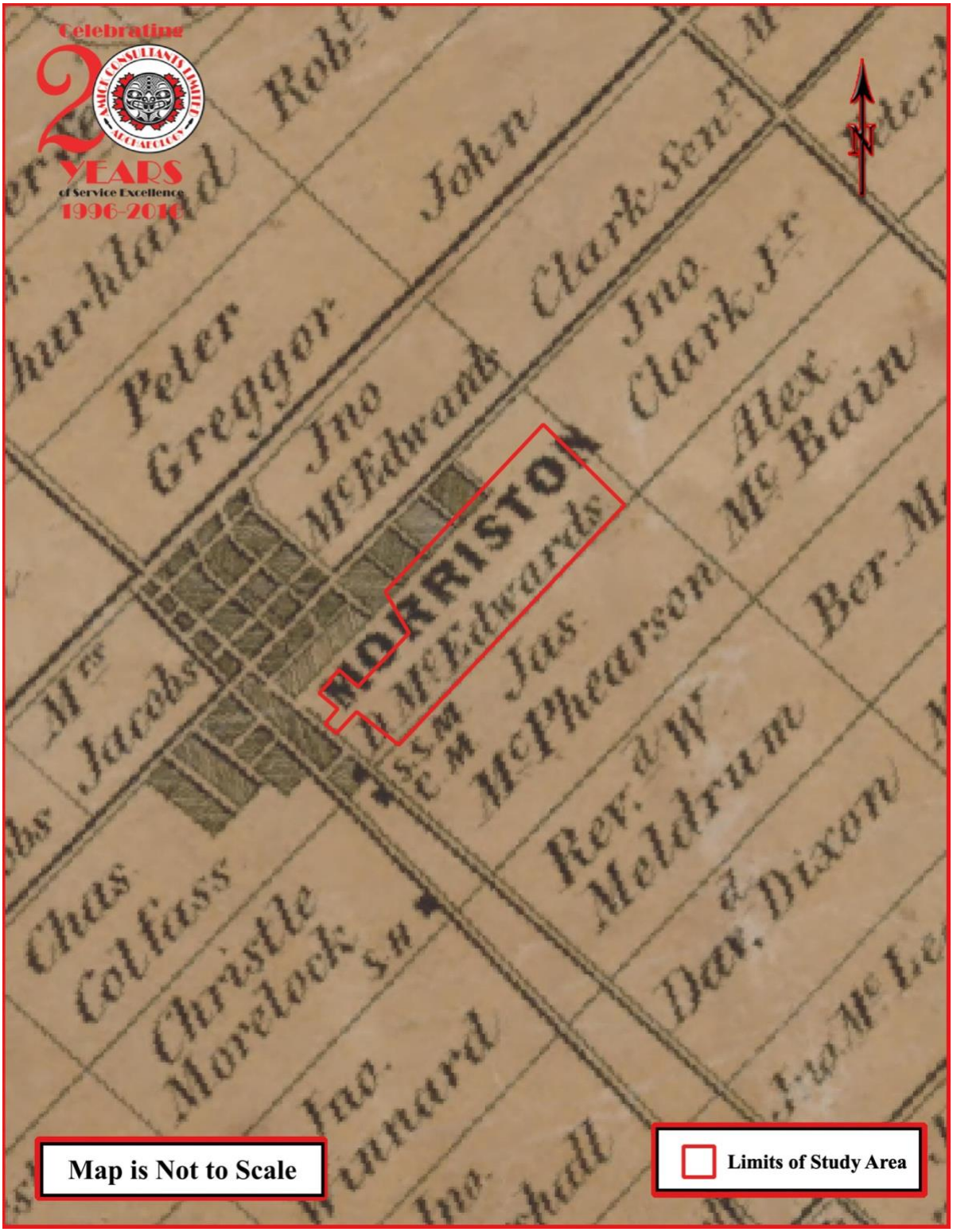
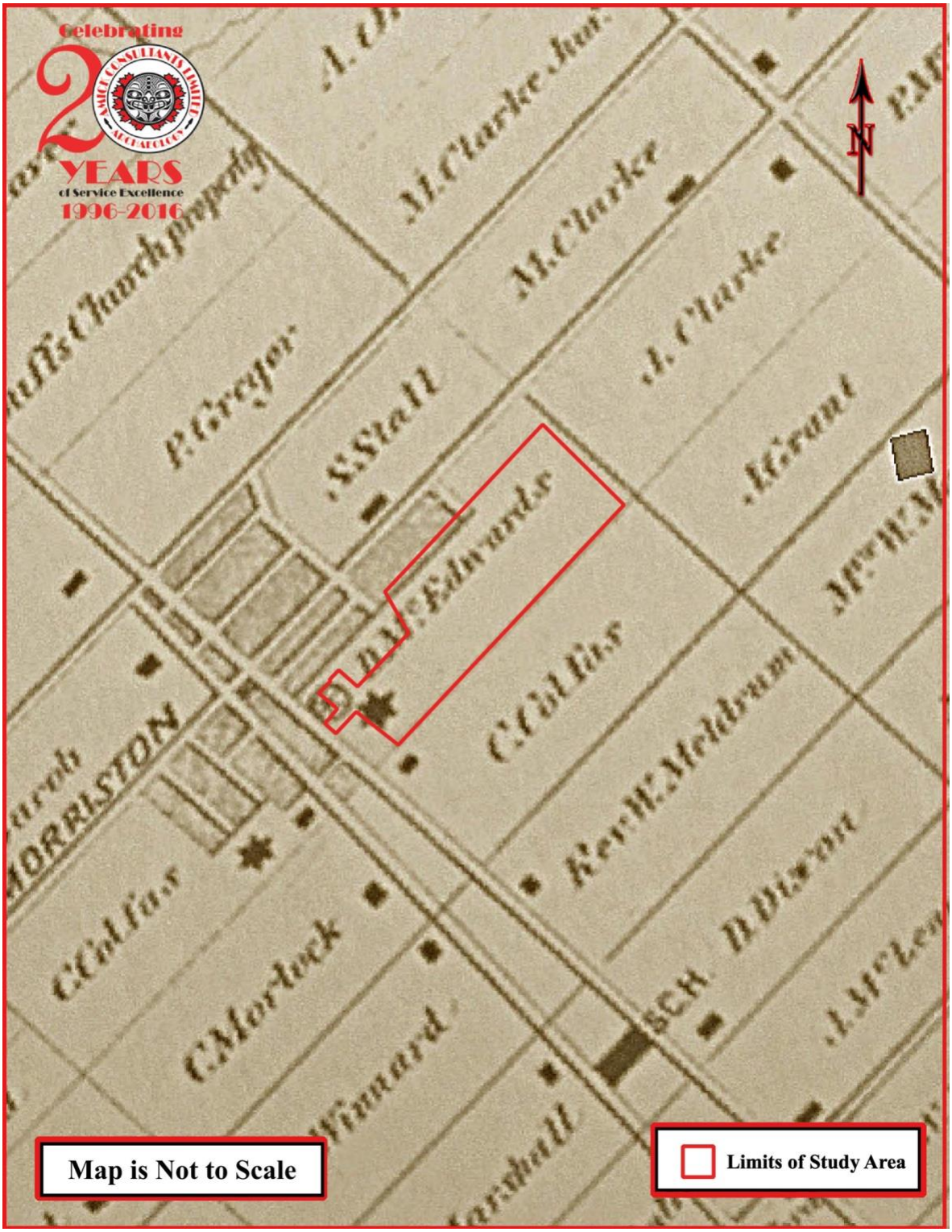
MAPS



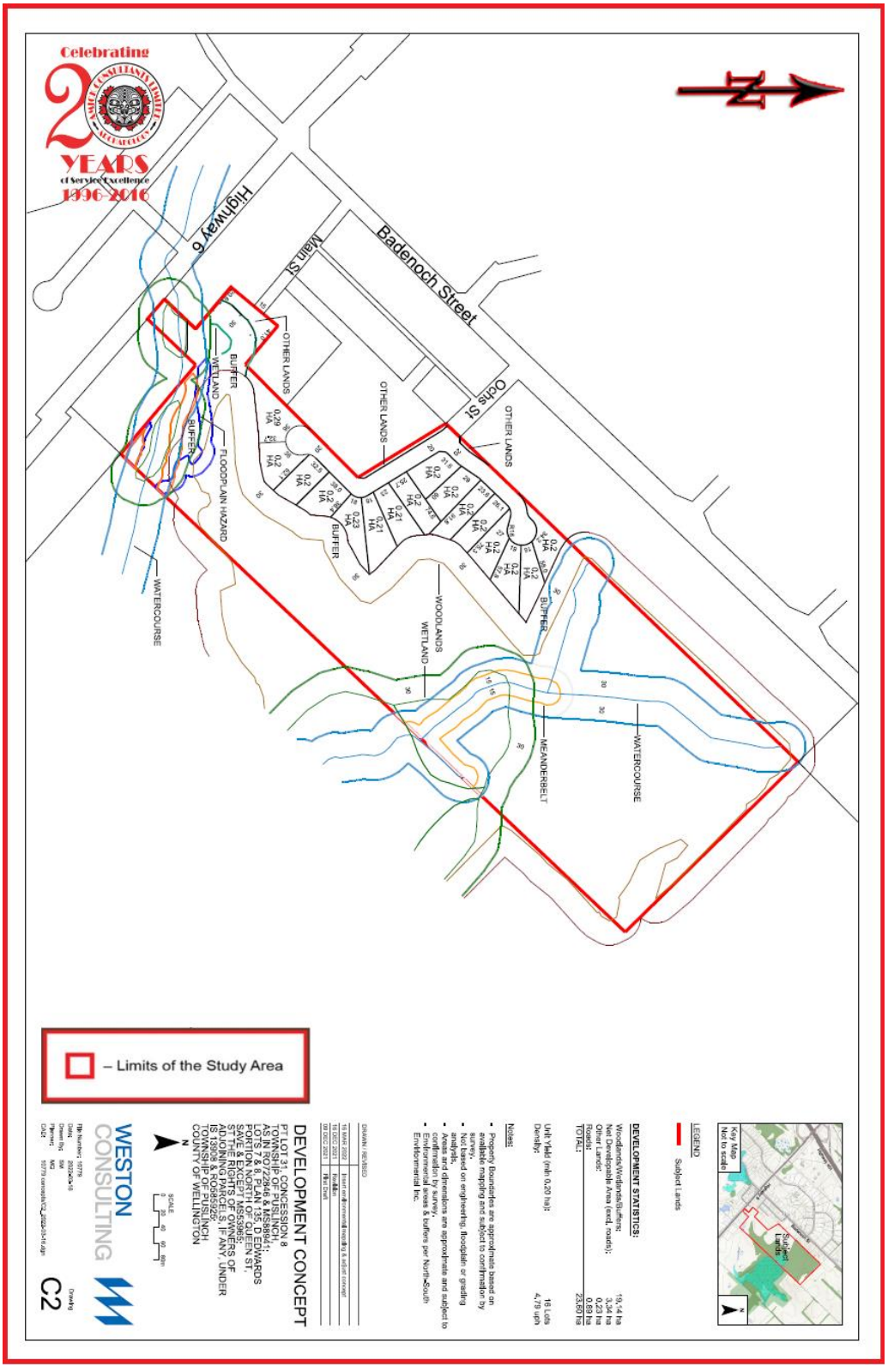
MAP 1 LOCATION OF THE STUDY AREA (ESRI 2019)



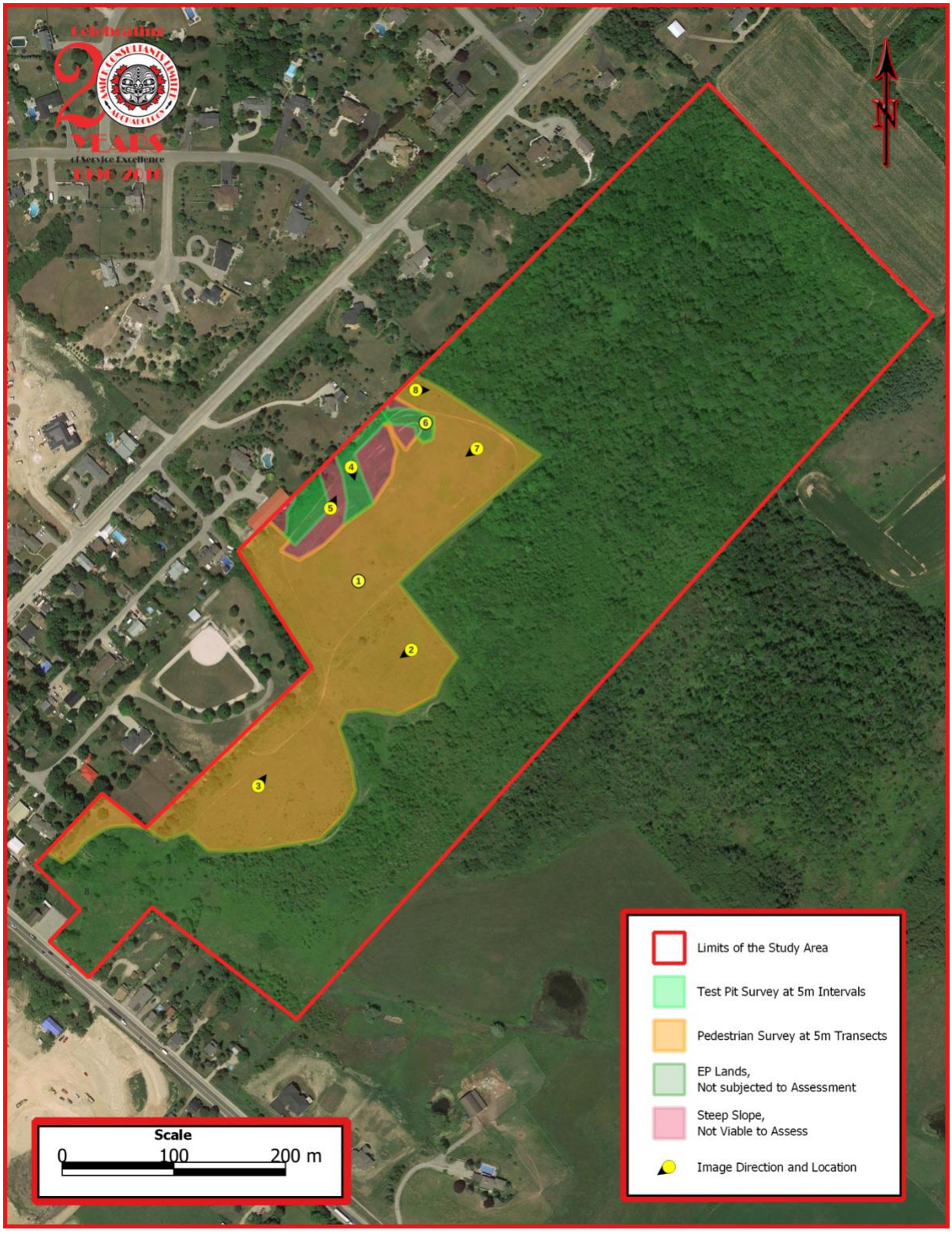
MAP 2 FACSIMILE SEGMENT OF GUY LESLIE'S MAP OF THE COUNTY OF PEEL (LESLIE 1861)



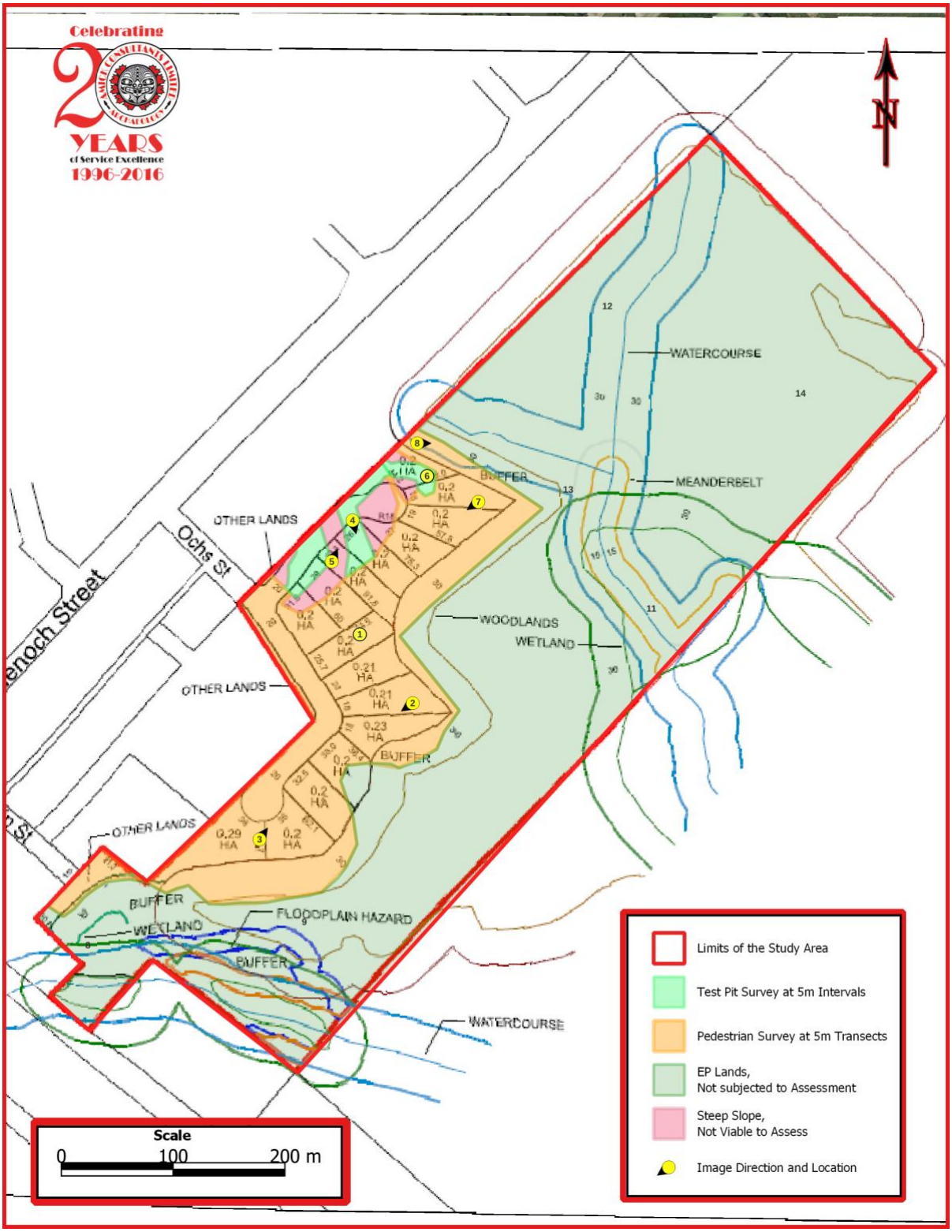
MAP 3 FACSIMILE SEGMENT OF THE HISTORIC ATLAS MAP OF THE TOWNSHIP OF PUSLINCH (WALKER & MILES 1877)



MAP 4 CONCEPT PLAN (WESTON CONSULTING. 2022)



MAP 5 AERIAL PHOTO OF THE STUDY AREA (GOOGLE EARTH 2016)



MAP 6 DETAILED PLAN OF THE STUDY AREA AFTER (WESTON CONSULTING. 2022)

IMAGES

IMAGE 1 VIEW OF PEDESTRIAN SURVEY SOIL CONDITIONS

IMAGE 2 OVERVIEW OF PEDESTRIAN SURVEY AREA

IMAGE 3 VIEW OF CREW WORKING

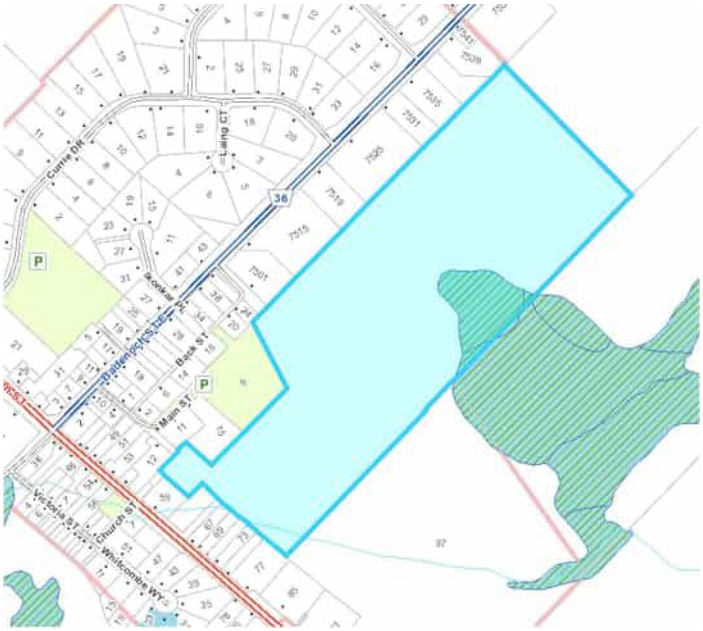
IMAGE 4 OVERVIEW OF TEST PIT SURVEY CONDITIONS

IMAGE 5 OVERVIEW OF STUDY AREA

IMAGE 6 VIEW OF COMPLETED TEST PIT

	
IMAGE 7 OVERVIEW OF STUDY AREA	**IMAGE 8 OVERVIEW OF STUDY AREA**

Phase One Environmental Site Assessment -rev, Vacant Lot Northside Hwy 6, ~~Morriston~~



Project Location:
Vacant Lot South of Highway 401,
Morriston, ON

Prepared For:
Mr. Faisal Hamadi

NIAGARA SOILS SOLUTIONS LTD.

Prepared By:
Niagara Soils Solutions Ltd.
3300 Merrittville Highway, Unit 5
Thorold, ON
L2V 4Y6

Date: August 14, 2024
NSSL File No.: NS2212-01

EXECUTIVE SUMMARY

Niagara Soils Solutions Ltd. [NSSL] was retained by Mr. Faisal Hamadi to conduct a Phase One Environmental Site Assessment [ESA] of the vacant lot located on the northside of Highway 6, Morriston, Ontario [herein referred to as the "Phase One Property" or the "Site"]. The Phase One Property is currently owned by "The Hammersley Corporation" with the report being requested for due diligence purposes relating to proposed site development.

The Phase One ESA was completed in general accordance with Ontario Regulation 153/04, as amended [O. Reg. 153/04], and has been supervised by a Qualified Person [QP_{ESA}] to support the filing of a Record of Site Condition [RSC] if required.

The legal description of the Site includes PT Lot 31, Concession 8, Township of Puslinch, as in RO722846 & MS88941; Lots 7 & 8, Plan 135, Donald McEdwards Portion, North of Queen Street, Save and Except MS53965; s/t the rights of owners of adjoining parcels, if any, under IS13908 & ROS585925; Township of Puslinch. The Property Identification Number [PIN]s is 71194-0038 [LT]. The size of the entire land parcel is approximately 24.8 hectares, however only 4.5 hectares will be developed for residential purposes at this time. The developable area of the property is the focus of this Phase One ESA investigation. The property is currently vacant agricultural land with no structures on-site and is predominately comprised of open field and wooded lot. The vacant lot is situated at the east side of Brock Road South and southside of Badenoch Street. Initial land use was noted as partially agricultural with the remaining area remaining as vacant since 1954. Agricultural land use ceased pre-1966 following the development of the northern residential suburb. No infrastructure has ever been documented on the study site. The Ministry of Natural Resources identified a regulated wetland at the eastern boundary of the site. One [1] tributary/source of the Bronte Creek is noted at the southwestern boundary on the property.

The Phase One ESA investigation revealed one off-site PCA, that did not result in on-site Areas of Potential Environmental Concern [APEC] to the Phase One property.

- **PCA-1: #34. Metal Fabrication** The site reconnaissance and review of aerial photographs dated 2000, 2010, and 2020 identified a welding shop named "Abermor Manufacturing" at 12 Main Street. The mixed-use property, residential and commercial, is located northwest of the study site. The welding activities taking place within the workshop are not anticipated to result in creating an onsite APEC to the site's soil and/or groundwater given the distance from the building location, approximately 30 metres to the property boundary, and inferred groundwater flow direction south-southeast.

CONCLUSION

The Phase One ESA did not identify any areas of potential environmental concern at the Study Site. Therefore, as of August 14th, 2024, no additional environmental work is considered necessary and the conversion of existing site use to residential land use is justified.

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FIGURES

APPENDICES

1.0 INTRODUCTION

1.1 Phase One Property Information

Niagara Soils Solutions Ltd. [NSSL] was retained by Mr. Faisal Hamadi to conduct a Phase One Environmental Site Assessment [ESA] of the vacant lot located on the northside of Highway 6, Morriston, Ontario [herein referred to as the "Phase One Property" or the "Site"]. The Phase One Property is currently owned by "The Hammersley Corporation" with the report being requested for due diligence purposes relating to proposed site development. The Site location is shown on Figure 1.

The legal description of the Site includes PT Lot 31, Concession 8, Township of Puslinch, as in RO722846 & MS88941; Lots 7 & 8, Plan 135, Donald McEdwards Portion, North of Queen Street, Save and Except MS53965; s/t the rights of owners of adjoining parcels, if any, under IS13908 & ROS585925; Township of Puslinch. The Property Identification Numbers [PIN]s is 71194-0038 [LT]. The Phase One Property is currently owned by "The Hammersley Corporation". A copy of the Parcel Register is included in Appendix A. Authorization to proceed with the Phase One ESA was received from Mr. Faisal Hamadi. The contact information for Ms. Hamadi is faisalhamadi5@gmail.com, 905-483-7399.

The size of the entire land parcel is approximately 24.8 hectares, however only 4.5 hectares will be developed for residential purposes at this time. The developable area of the property is the primary focus of this Phase One ESA investigation. The property is currently vacant agricultural land with no structures on-site and is predominately comprised of open field and wooded lot. The vacant lot is situated at the east side of Brock Road South and southside of Badenoch Street. Initial land use was noted as partially agricultural with the remaining area remaining as vacant since 1954. Agricultural land use ceased pre-1966 following the development of the northern residential suburb. No infrastructure has ever been documented on the study site. The Ministry of Natural Resources identified a regulated wetland at the eastern boundary of the site. One [1] tributary/source of the Bronte Creek is noted at the southwestern boundary on the property. The site layout is illustrated on Figure 2.

2.0 SCOPE OF INVESTIGATION

The Phase One ESA was completed in general accordance with Ontario Regulation 153/04 [as amended]. The purpose of the Phase One ESA was to identify evidence of actual or potential contamination on the Site based on an evaluation of information collected through records review, site visit and interview. The report was prepared under the supervision of a Qualified Person [QP_{ESA}] and may be used in filing of a Record of Site Condition [RSC] with the Ministry of the Environment, Conservation and Parks [MECP] if required. The scope of work for the Phase One ESA included the following:

- Review of available environmental reports that are pertinent to the Site and surrounding lands.
- Review of municipal directory records related to the Site and surrounding lands [where available].
- Review of Chain-of-Title information.
- Review of physical setting information including aerial photographs, fire insurance plans [FIPs], topographic maps and geologic information related to the Site and surrounding lands.
- Review of EcoLog ERIS database report for the Site and surrounding lands.
- Review of environmental source information including published and online records form the Ministry of the Environment, Conservation and Parks [MECP], Ministry of Natural Resources and Forestry [MNRF], Wellington Interactive Map [WIM], and the County of Wellington for information related to the Site and the surrounding lands.
- Site reconnaissance to observe the Site and surrounding lands.
- Interview with key persons knowledgeable about the current and historical operations of the Site.
- Preparation of a photographic log.
- Preparation of a summary report of findings and recommendations.
- Assessment of information and preparation of a Conceptual Site Model [CSM] to illustrate the Site location and limits, the surrounding lands, Potentially Contaminating Activities [PCAs] and Areas of Potential Environmental Concern [APECs] on the Phase One Property.

3.0 RECORDS REVIEW

3.1 General

3.1.1 Phase One Study Area Determination

The Phase One Study Area includes properties located wholly or partially, within 250 m of the nearest point on a boundary of the Phase One ESA property. There were no other properties located beyond 250 m of the Phase One ESA property that were considered relevant to the Phase One ESA assessment at this time. The Study Area is illustrated on Figure 1.

3.1.2 First Developed Use Determination

O. Reg. 153/04 22. [1] defines first developed land use as the earlier of a: the first use of a Phase One Property in or after 1875 that resulted in the development of a building or structure on the property, and b: the first potentially contaminating use or activity on the Phase One Property".

The results of the Phase One ESA historical records and aerial photograph review indicated that the site was partially developed for agricultural land use within the western and northern portion of the site adjacent to Brock Road South and Badenoch Street. The remaining eastern area of the site was noted as vacant/undeveloped as a wooded lot in 1954. The agricultural activity land use ceased pre-1966 during the construction of the northwest adjacent suburb development. Portions of the property appear to be utilized for recreational purposes as dirt trails traverse throughout the property.

3.1.3 Fire Insurance Plans

NSSL contacted ERIS to complete a search of available Fire Insurance Plans [FIPs] for information pertaining to the Phase One ESA property and surrounding area. No FIPs were available for review within the study site or study area.

3.1.4 Chain of Title

A current parcel register [land title document] for the Vacant Lot South of Highway 401 was obtained from Teranet Express for the study site. The document identified the Property Identifier Number as 71194-0038 [LT]. The document covered the period of land ownership from 1959 to the present day. Landownership was confirmed as belonging to "The Hammersley Corporation". A copy of all parcel registers is included in Appendix A.

3.1.5 Environmental Reports

No previous environmental reports were provided for NSSL to review regarding the study site.

3.2 Environmental Source Information

3.2.1 Environmental Risk information Services

ERIS was contracted to conduct a search of available government and private records for information pertaining to the Phase One ESA property and surrounding study area. A copy of the full report is provided in Appendix C. No environmentally significant information was provided regarding the study site or the study area.

3.2.2 Insurance Reports

No insurance reports were available for review.

3.2.3 Other Environmental Sources

NSSL reviewed additional environmental resources for information pertaining to the Phase One Property and Study Area. The table below provides details of the findings with any associated supporting documents located in Appendix B.

Source	Study Site Details
Environmental Incidents, Orders, Offences, Spills and Discharges	No records
Environmental Registry of Ontario	No records
Federal Contaminated Sites and Solid Waste Landfills Inventory	No records
Hazardous Waste Information Network	No records.
Inventory of Coal Gasification Plants	No records
Inventory of Industrial Sites Producing or Using Coal Tar in Ontario	No records
Ministry of Natural Resources [MNR]	Two [2] areas of natural significance were noted within the limits of the study site. Both areas are identified as a wetland, one [1] at the central-eastern boundary, and the other at the southernmost boundary of the site. The southern area is also identified as a tributary/source to the Bronte Creek, however, only the eastern wetland was classified as a regulated wetland. The property is illustrated as predominately “Woodland Area” at the central to eastern portion of the site. The topographic contours of the site identify the site as generally sloping southeast at a 6.25% decline.
National Pollutant Release Inventory	No records

Source	Study Site Details
PCB Waste Storage Inventory	No records
Record of Site Condition [RSC]/ Brownfields Environmental Registry	No records
Reports submitted to the MECP [Freedom of Information]	At the time of report issuance, no records returned. Any documents received will be provided to the client.
TSSA Retail Fuel Storage Tank Info	A request was submitted to the Technical Safety and Standards Authority [TSSA] for information concerning fueling systems [USTs, ASTs]. Email correspondence from TSSA dated March 7th, 2022, indicated "we confirm that there are no records in our database of any fuel storage tanks at the subject address".
Waste Disposal Site Inventory	No records
Waste Management Records	No records

3.3 Physical Setting Sources

3.3.1 Aerial Photographs

Aerial photographs were reviewed for information pertaining to the Study Site and Study Area. The photographs were available through Brock University Special Collections Library, Niagara Air Photo Index, EcoLog ERIS – Historical Aerials, and Google Earth. The earliest available aerial image for review was from 1954. The following aerials were selected to review based on scale and quality. Images are provided in Appendix D.

Date	Study Site	Study Area
1954	The aerial photograph depicts the study site as vacant/undeveloped with no structures on the property. The north and western portion of the site appears to be utilized for agricultural land use. The eastern area of the site is a wooded lot. One [1] tributary of the Bronte Creek is noted on-site at the southwestern boundary of the site.	The adjacent properties are noted to be vacant/residential land. The township of Morriston is noted northwest of the study area and contains a mix of residential and commercial infrastructures. The majority of the study area appears to be entirely undeveloped. The initial construction of Highway 401 is noted to the northwest, outside of the study area.
1966	The agricultural land use appears to have ceased. No significant changes were noted.	The north adjacent property appears to have been reworked for potential community activities. Further north the development of the residential suburb is noted. Residential development along the major roadways within the study area and Morriston is also noted. Highway 401 appears to have been completed north of the study area.
1972		No other significant changes were noted to the study area within the 1972 aerial photograph.
1989		The north adjacent community park has been completed and initial residential development north of the study site and study area is noted.
2000		Few commercial and residential developments are noted within the township of Morriston [northern portion of the study area]

Date	Study Site	Study Area
2010	No significant changes were noted.	The northwestern adjacent vacant lots have been developed into residential land use.
2020		No other significant changes were noted to the study area within the 2020 aerial photograph.

3.3.2 Topography, Hydrology, Geology

A review of the Ministry of Northern Development Mines "Quaternary Geology, Cambridge Area, Map M2508", "Provincial Digital Elevation Model 2007", and "Ontario Geological Survey 2010" indicates that the Wentworth Till [Ontario – Erie Lobe], with sand silt to silt matrix, highly calcareous, clast content moderate to low. The northwestern area is considered within the "Hummocky topography" and the southeast boundary of the site is considered an ice-contact gravel: kames and eskers, and one [1] rock quarry as illustrated in M2508. The surrounding area may also include glaciofluvial outwash deposits, with gravel and sand, which include proglacial river and deltaic deposits. A review of a nearby Water Well [ID 6714637] located within the western portion of the site completed in 2003 reports clay over the top of limestone bedrock at 16.5 m bgs, and limestone noted to a maximum depth of 25 m bgs at borehole termination. The study site was found to be within the Galt Moraine with slight drumlin features facing northwest to southeast. Bedrock Geology maps indicate the bedrock as the Guelph Formation that is consisted of interbedded sandstone, shale, dolostone and/or siltstone.

A review of the Geotechnical Report, prepared by AMEC, for the Proposed "New Salt/Sand Storage Structure at Morriston Patrol Yard, Morriston, Ontario, at BH4 of the report [500 m northwest of the subject site undertaken in 2009] found dense sand and gravel fill, with some silt at 0 – 1.4 m bgs. Till of sand, silty sand, and silt was found from 1.4 to 11.1 m bgs. The soil properties consisted of trace to some clay and gravel, some cobbles, compact to very dense, and damp to moist. The till composition became increasingly siltier and more clayey with depth and decreasing denseness. The maximum depth was estimated to be 94.5 m with no boreholes reaching bedrock at termination.

Regional groundwater flow is expected to be southeast towards Lake Ontario. The Phase One Property is not located within 30 m of a body of water and is found within the Bronte Creek Watershed. The source and tributaries of the Bronte Creek are noted on-site within the southwestern boundary of the property. Surface water runoff was noted as running off into the Bronte Creek. Ponded surface water was also encountered across the study site being infiltrated on-site into the groundwater, attributed to the commencement of spring melt.

3.3.3 Fill Materials

Based on a review of aerial photographs, and observations made during the site analysis, NSSL did not identify potential fill material across the study site.

3.3.4 Water Bodies & Areas of Natural Significance

The Phase One ESA research revealed two [2] areas of natural significance noted within the limits of the study site. Both areas are identified as a wetland, one [1] at the central-eastern boundary, and the other at the southernmost boundary of the site. The southern area is also identified as a tributary/source to the Bronte Creek, however, only the eastern wetland was classified as a regulated wetland. The property is illustrated as predominately "Woodland Area" at the central to eastern portion of the site. The topographic contours of the site identify the site as generally sloping southeast at a 6.25% decline. NSSL did not identify additional significant features including provincially significant wetlands, natural heritage features or Areas of Natural Significance onsite or within the Study Area.

NSSL reviewed the "Mapping of Natural Heritage Systems in the County of Wellington" report by "The Grand River Conservation Authority [GRCA]" requested by "The County of Wellington", September 2018. The comprehensive report addressed the Puslinch Township [study area] regarding an overview of natural heritage, physical characteristics, aquatic and wetland ecology, and terrestrial ecology. The framework for developing project governance, scope, and phases was reviewed in detail. Figures were compiled regarding all geologic and environmental significance in preparation for future developments within the specific county. Maps highlighting the previously mentioned comments were drafted per specific sector.

Key findings included consideration for not impeding ground and surface water functions within the Galt Moraine areas. Additionally, policies should be maintained/enhanced for Moraine protection areas within Wellington County, to support surrounding agricultural activities.

3.3.5 Well Records

The MECP provides the public with access to their well record inventory. The study site and area are serviced by the municipal drinking water system, however well records [if available] were accessed and reviewed for information pertaining to the area's hydrogeological and geological characteristics. One-hundred and fifty-eight [158] well records were found within the study area [250 m radius]. A record can contain descriptive information pertaining to soil stratigraphy and aquifer groundwater levels. An example summary from one of the wells is presented below. Select well records are provided in Appendix E.

Well ID	Location	Description
6714637	Depicted as on-site, within the western boundary property line	0 – 16.5 m Clay 16.5 – 25 m Limestone

3.4 Site Operating Records

No historic site operating records were provided to NSSL.

3.5 Other

No additional information regarding the Phase One property was identified at the time of report issuance.

4.0 INTERVIEW/QUESTIONNAIRE

A site questionnaire was provided to Mr. Faisal Hamadi for additional information pertaining to the study site. At the time of report issuance this document was not returned to NSSL for review.

5.0 SITE RECONNAISSANCE

5.1 General Requirements

A site reconnaissance was completed on Friday March 1st, 2022, by Mrs. Jodie Glasier, H.BA., M.MM., EP., Vice President of NSSL. The weather was sunny, with the temperature approximately 0°C. The site reconnaissance and photo log are included in Appendix F. The Phase One ESA property is not considered to be an enhanced investigation property.

The site reconnaissance and analysis of the property indicated the property was within a moraine with potential drumlin features noted. The land cover of the site was predominately a wooded lot with select open grass areas and only one [1] main access point. The site sloped steeply in a southeast direction with other points of steep topography being identified across the land. One [1] watercourse was noted within the southwest area of the study site. No other environmentally significant features were noted at the time of analysis.

5.2 Specific Observations at Phase One Property

The following table summarizes the general observations made at the Phase One property based upon NSSL's site reconnaissance.

Item	Specific Observation
General Site Description	The vacant lot site was located east of Brock Road South and south of Badenoch Street in the Town of Morriston, Ontario. At the time of the investigation, the property was vacant/undeveloped and was predominately snow-covered field grass and wooded lot. As per the Ministry of Natural Resources one [1] area of regulated wetlands was identified within the eastern boundary of the property.
General Description of Structures	No structures were identified within the limits of the study site.
Above and Below Ground Tanks	N/A
Utilities and Water Sources	The site has yet to be serviced with hydro, natural gas, municipal water, and municipal sanitary sewer.
Exit and Entry Points	One [1] small laneway is noted north of Brock Road South. Another potential access is noted at the end of Main Street but has not been developed at this time.
Existing and Former Heating/cooling Systems	
Catch basins, drains, pits, pumps or sumps	Catch basins were identified to the north and west of the study site, along Badenoch Street and Brock Road South. No catch basins were identified on the study site.
Staining and corrosion	Not found within the limits of the study site.
Wells	Three [3] potable groundwater MECP water wells were identified on-site during records review; none were located during site reconnaissance.
Sewage Work	N/A

Item	Specific Observation
Surface Cover	Snow, over field grass vegetation and wooded land cover. Areas of open grassland and sparse dirt tracks were noted.
Areas of Stained Soil, Vegetation, Pavement, and Stressed Vegetation	No areas of stained soil, surface water, ground cover nor vegetation were noted across the property.
Current or Former Railway Lines or Spurs	No evidence of current or former rail spurs was observed at the study site during the site reconnaissance.
Debris & Fill Material	No debris or fill material was noted.
Details of Unidentified Substances	N/A
Designated Substances & Hazardous Materials	Not found within the limits of the study site.
Surrounding Properties within the Phase One Study Area	The study area is a mix of residential, community, agricultural, vacant/undeveloped wooded lots, and commercial properties. Adjacent properties were documented as residential to the south, east and west with commercial land use identified within the southwest corner of the property. Community (baseball diamond) and residential to the northwest, and agricultural and vacant/undeveloped wooded lot to the northeast and southeast.

6.0 REVIEW AND EVALUATION OF INFORMATION

6.1 Potentially Contaminating Activities

O. Reg. 153/04 Table 2 of Schedule D – List of Potentially Contaminating Activities [PCAs] are provided in Appendix G for reference purposes. The Phase One ESA investigation revealed one off-site PCA, that did not result in on-site Areas of Potential Environmental Concern [APEC] to the Phase One property. Figure 3 highlights the PCA location.

- **PCA-1: #34. Metal Fabrication** The site reconnaissance and review of aerial photographs dated 2000, 2010, and 2020 identified a welding shop named "Abermor Manufacturing" at 12 Main Street. The mixed-use property, residential and commercial, is located northwest of the study site. The welding activities taking place within the workshop are not anticipated to result in creating an onsite APEC to the site's soil and/or groundwater given the distance from the building location, approximately 30 metres to the property boundary, and inferred groundwater flow direction south-southeast.

A Phase One Conceptual Site Model [CSM] was prepared in accordance with Schedule D, Part V of O. Reg. 153/04 [as amended]. The CSM includes Figures 1 -4 and is provided in Appendix H.

7.0 CONCLUSIONS

The Phase One ESA did not identify any areas of potential environmental concern at the Study Site. Therefore, as of August 14th, 2024, no additional environmental work is considered necessary and the conversion of existing site use to residential land use is justified.

7.2 Limitations and Use of the Report

Achieving the objectives that are stated in this report has required Niagara Soils Solutions Ltd. to derive conclusions based upon the best and most recent information currently available to Niagara Soils Solutions Ltd. No investigative method can completely eliminate the possibility of obtaining partially imprecise information. Niagara Soils Solutions Ltd. has expressed professional judgement in gathering and analysing the information obtained and in the formulation of its conclusions.

Information in this report was obtained from sources deemed to be reliable, however, no representation or warranty is made as to the accuracy of this information. To the best of Niagara Soils Solutions Ltd.'s knowledge, the information gathered from outside sources contained in this report on which Niagara Soils Solutions Ltd. has formulated its opinions and conclusions, are both true and correct. Niagara Soils Solutions Ltd. assumes no responsibility for any misrepresentation of facts gathered from outside sources.

This report was prepared to assess and document evidence of potential environmental contamination, and not to judge the acceptability of the risks associated with such environmental contamination. Much of the information gathered for this report is only accurate at the time of collection and a change in the Site conditions may alter the interpretation of Niagara Soils Solutions Ltd.'s findings. Furthermore, the reader should note that the Site reconnaissance described in this report was an environmental assessment of the Site, not regulatory compliance or an environmental audit of the Site.

Niagara Soils Solutions Ltd. prepared this Report for Mr. Faisal Hamadi. The material in it reflects Niagara Soils Solutions Ltd.'s best judgement in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Niagara Soils Solutions Ltd. accepts no responsibility for damages, if any suffered by any third party as a result of decisions made or actions based on this report.

Yours very truly,

Niagara Soils Solutions Ltd.

Jodie Glasier, HB.A., M.MM, EP
President

Philip Adene, P. Geo, QP_{ESA}
Professional Geoscientist

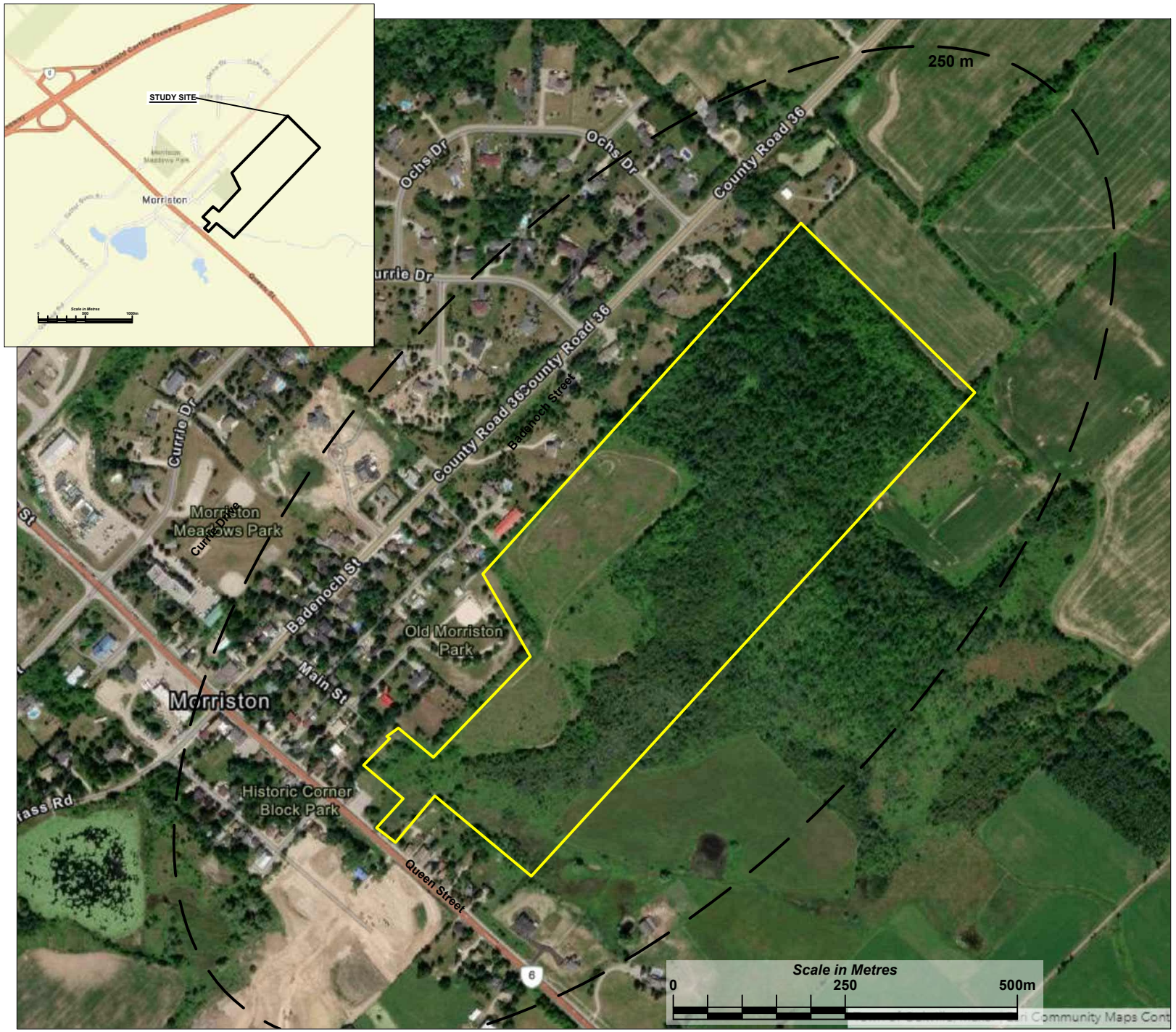
8.0 REFERENCES

The following resources were utilized as references:

- EcoLog ERIS
- Environmental Registry of Ontario
- Federal Contaminated Sites Inventory
- Interactive Map – Wellington Navigator, wellington.ca/en/
- Inventory of Coal Gasification Plant Waste Sites in Ontario, Volume II; MOE, 1987
- Ministry of Environment, Conservation & Parks Inventory of Industrial Sites Producing or Using Coal Tar and Related Tars in Ontario
- Ministry of the Environment Freedom of Information and Protection of Privacy Search
- Ministry of the Environment Hazardous Waste Information Network
- Ministry of Natural Resources [ANSIs]
- Ministry of Northern Development and Mines. Bedrock Geology of Ontario
- National Pollutant Release Inventory [NPRI] database
- Conservation Halton Watersheds [CHW], conservationhalton.ca/conservation-halton-watersheds
- Ontario Base Mapping
- Ontario Inventory of PCB Storage Site October 1991, Ministry of the Environment, January 1992.
- Ontario Oil, Gas, and Salt Resources Library
- Technical Safety and Standards Authority [TSSA] Fuel Storage Information
- Waste Disposal Site Inventory, Ministry of the Environment, 1991.

FIGURES

1. SITE LOCATION
2. SITE LAYOUT
3. POTENTIALLY CONTAMINATING ACTIVITIES



REFERENCE: BASE MAP PROVIDED BY NIAGARA NAVIGATOR, https://maps-beta.niagararegion.ca/Navigator/
NOTE: FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.

LEGEND

- Phase One ESA Property Boundary
- 250 m Study Area

NIAGARA SOILS SOLUTIONS LTD

CLIENT:
Mr. Faisal Hamadi

PROJECT:
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT-REV
Vacant Lot South of Highway 401, Morriston, Ontario

TITLE:
SITE LOCATION PLAN

DRAWN BY: CN

CHECKED BY: PA

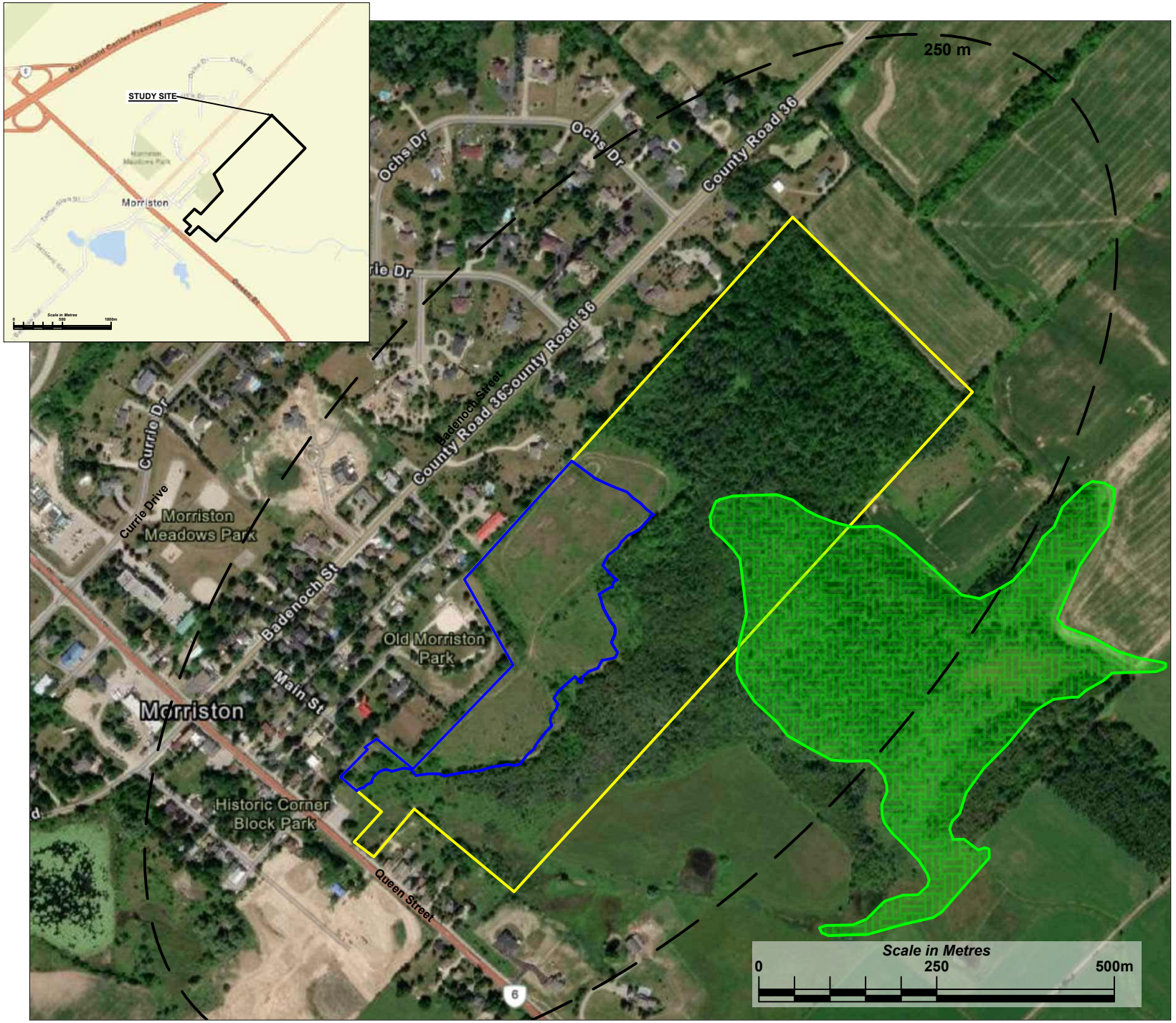
DATE: 08/14/2024

PROJECT NO: NS2212-01

SCALE: AS SHOWN

NO:

Figure 1



LEGEND

- Phase One ESA Property Boundary
- Ministry of Natural Resources Regulated Wetland Area
- Proposed Residential Development Area

NIAGARA SOILS SOLUTIONS LTD

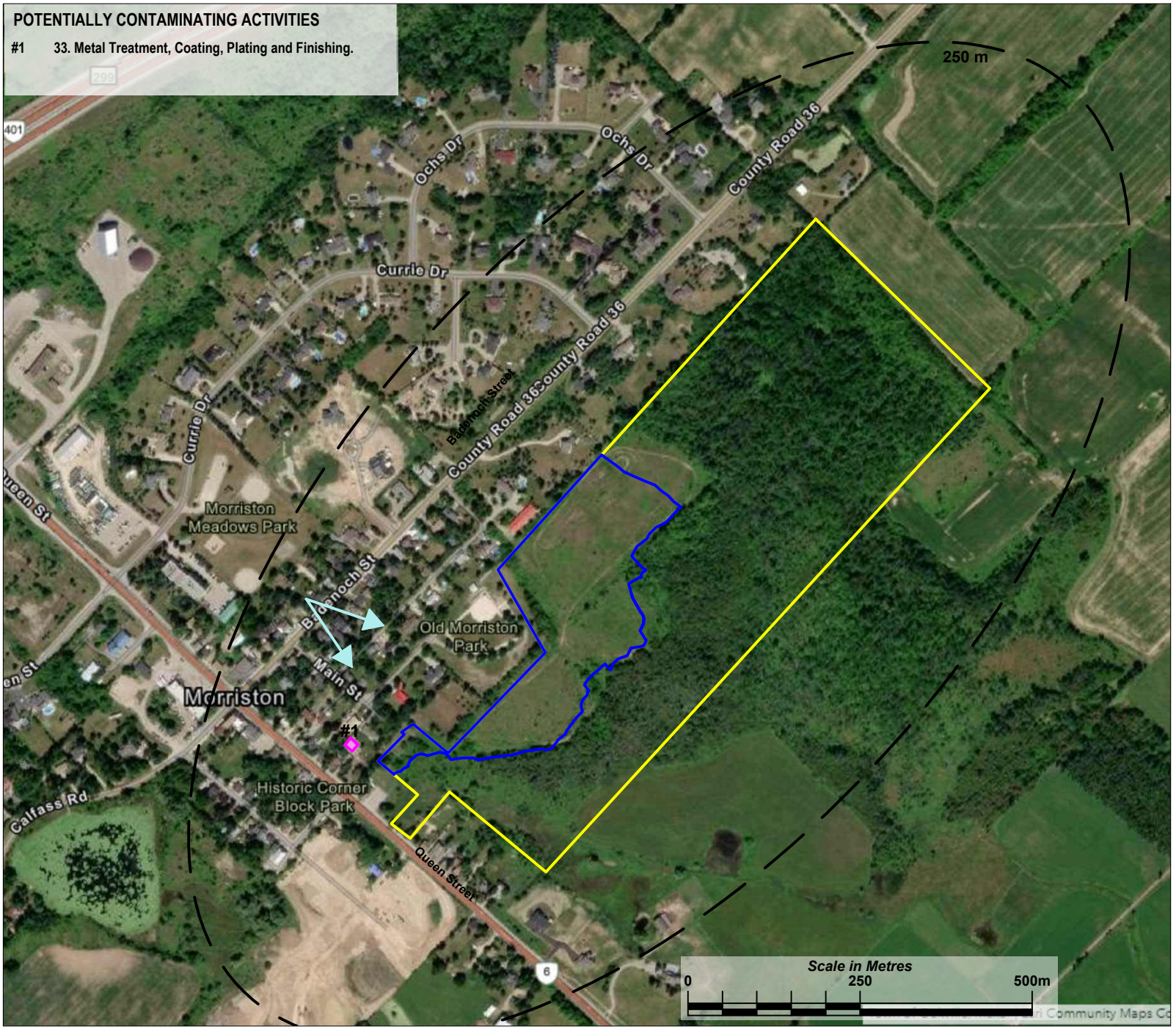
CLIENT:
Mr. Faisal Hamadi

PROJECT:
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT-REV
Vacant Lot South of Highway 401, Morriston, Ontario

TITLE:
SITE LAYOUT & FEATURES

DRAWN BY:	CN
CHECKED BY:	PA
DATE:	08/14/2024
PROJECT NO:	NS2212-01
SCALE:	AS SHOWN
NO:	Figure 2

REFERENCE: BASE MAP PROVIDED BY NIAGARA NAVIGATOR, https://maps-beta.niagararegion.ca/Navigator/
NOTE: FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.



REFERENCE: BASE MAP PROVIDED BY NIAGARA NAVIGATOR, https://maps-beta.niagararegion.ca/Navigator/
NOTE: FOR ILLUSTRATION PURPOSES ONLY, ALL LOCATIONS APPROXIMATE.

LEGEND

- Phase One ESA Property Boundary NSSL
- 250 m Study Area
- PCA Areas
- Proposed Residential Development Area
- Inferred Groundwater Flow Direction

NIAGARA SOILS SOLUTIONS LTD.

CLIENT:
Mr. Faisal Hamadi

PROJECT:
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT-REV
Vacant Lot South of Highway 401, Morriston, Ontario

TITLE:
POTENTIALLY CONTAMINATING ACTIVITIES

DRAWN BY: CN

CHECKED BY: PA

DATE: 08/14/2024

PROJECT NO: NS2212-01

SCALE: AS SHOWN

NO:

Figure 3

APPENDIX A

PARCEL REGISTER/ CHAIN OF TITLE

* CERTIFIED IN ACCORDANCE WITH THE LAND TITLES ACT * SUBJECT TO RESERVATIONS IN CROWN GRANT *

PROPERTY DESCRIPTION: PT LOT 31, CONCESSION 8 , TOWNSHIP OF PUSLINCH, AS IN RO722846 & MS88941 ; LOTS 7 & 8, PLAN 135 , DONALD MCEDWARDS PORTION, NORTH OF QUEEN ST, SAVE AND EXCEPT MS53965 ; S/T THE RIGHTS OF OWNERS OF ADJOINING PARCELS, IF ANY, UNDER IS13908 & ROS585925 ; TOWNSHIP OF PUSLINCH

PROPERTY REMARKS:

ESTATE/QUALIFIER:
FEE SIMPLE
LT CONVERSION QUALIFIED

RECENTLY:
FIRST CONVERSION FROM BOOK

PIN CREATION DATE:
1998/11/09

OWNERS' NAMES
THE HAMMERSLEY CORPORATION

CAPACITY SHARE

REG. NUM.	DATE	INSTRUMENT TYPE	AMOUNT	PARTIES FROM	PARTIES TO	CERT/ CHKD
EFFECTIVE 2000/07/29 THE NOTATION OF THE "BLOCK IMPLEMENTATION DATE" OF 1998/11/09 ON THIS PIN						
WAS REPLACED WITH THE "PIN CREATION DATE" OF 1998/11/09						
*** PRINTOUT INCLUDES ALL DOCUMENT TYPES AND DELETED INSTRUMENTS SINCE 1998/11/06 ***						
***SUBJECT, ON FIRST REGISTRATION UNDER THE LAND TITLES ACT, TO:*						
*** SUBSECTION 44(1) OF THE LAND TITLES ACT, EXCEPT PARAGRAPH 11, PARAGRAPH 14, PROVINCIAL SUCCESSION DUTIES **						
*** AND ESCHEATS OR FORFEITURE TO THE CROWN.*						
*** THE RIGHTS OF ANY PERSON WHO WOULD, BUT FOR THE LAND TITLES ACT, BE ENTITLED TO THE LAND OR ANY PART OF*						
*** IT THROUGH LENGTH OF ADVERSE POSSESSION, PRESCRIPTION, MISDESCRIPTION OR BOUNDARIES SETTLED BY*						
*** CONVENTION.*						
*** ANY LEASE TO WHICH THE SUBSECTION 70(2) OF THE REGISTRY ACT APPLIES.*						
***DATE OF CONVERSION TO LAND TITLES: 1998/11/09 ***						
MS7674	1959/05/25	NOTICE *REMARKS: OIL & GAS GRANT*				C
MS88941	1969/10/08	TRANSFER		**** COMPLETELY DELETED ****	HAMMERSLEY, GORDON JOHN HAMMERSLEY, JEFFREY ROSS	
ROS245414	1981/08/21	BYLAW DEEM PLNP				C
ROS397832	1985/05/09	ORDER *REMARKS: ORDER IN COUNCIL*				C
RO722846	1994/10/26	TRANSFER		**** COMPLETELY DELETED ****	HAMMERSLEY, JEFFREY ROSS HAMMERSLEY, BONNIE MARILYN	

REG. NUM.	DATE	INSTRUMENT TYPE	AMOUNT	PARTIES FROM	PARTIES TO	CERT/ CHKD
WC132678	2006/03/29	TRANSFER	$2	HAMMERSLEY, BONNIE MARILYN HAMMERSLEY, JEFFREY ROSS	THE HAMMERSLEY CORPORATION	C

NOTE: ADJOINING PROPERTIES SHOULD BE INVESTIGATED TO ASCERTAIN DESCRIPTIVE INCONSISTENCIES, IF ANY, WITH DESCRIPTION REPRESENTED FOR THIS PROPERTY.
NOTE: ENSURE THAT YOUR PRINTOUT STATES THE TOTAL NUMBER OF PAGES AND THAT YOU HAVE PICKED THEM ALL UP.

APPENDIX B

MINISTRY OF NATURAL RESOURCES
MAPPING

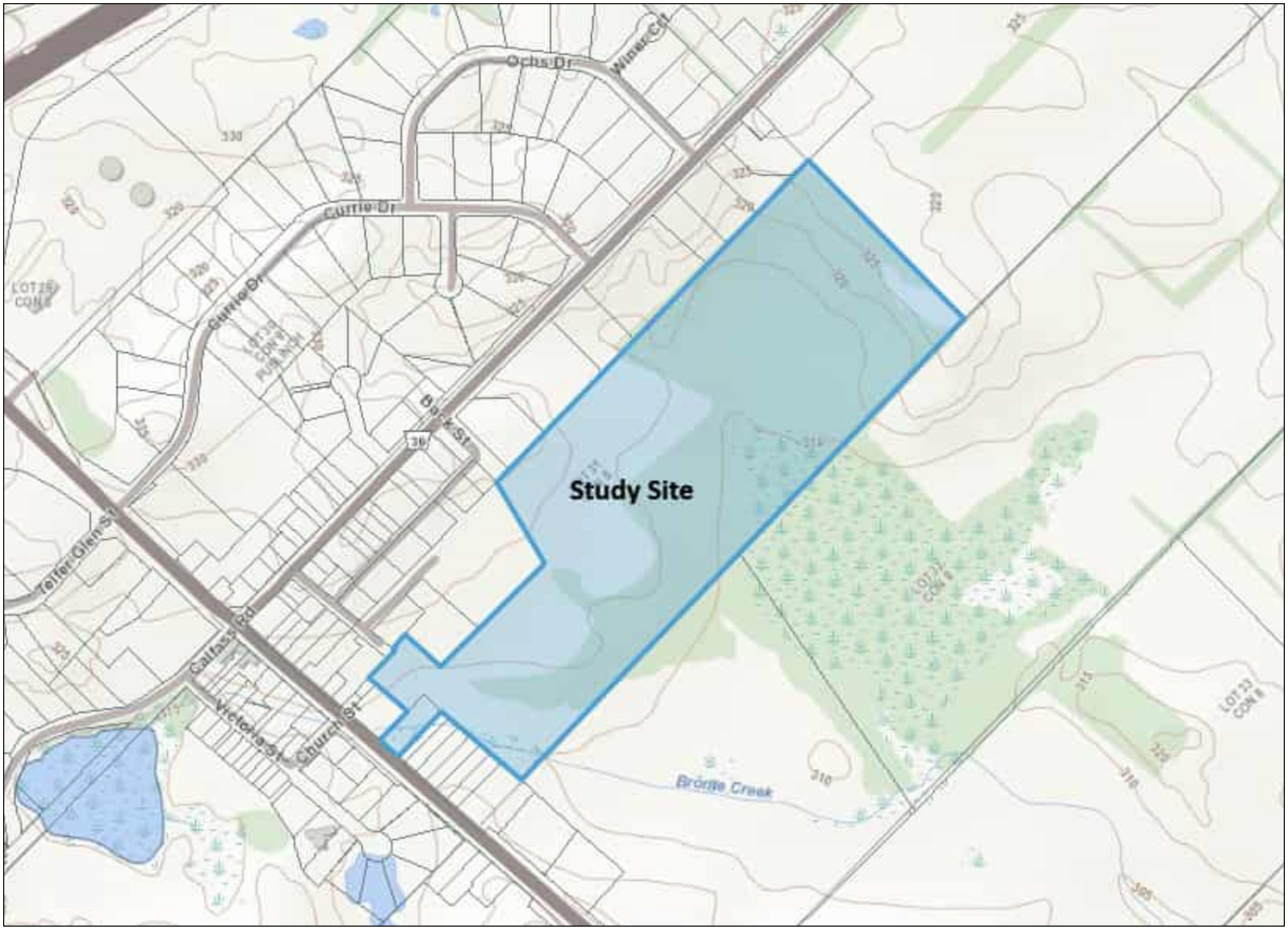
Ontario

MINISTRY OF NATURAL RESOURCES AND FORESTRY

Make a Topographic Map

Phase One ESA - 11 Main Street, Morriston, ON

Notes:
NS2212-01



Legend

- Building as Symbol
- Building to Scale
- Airport
- Heliport \ Hospital Heliport
- Seaplane Base
- Ferry Route
- Trail Head \ Trail
- Railway \ Train Station
- Railway with Bridge
- Railway with Tunnel
- Road (Major — Minor)
- Winter Road
- Road with Bridge
- Road with Tunnel
- Primary, Kings or 400 Series Highway
- Secondary Highway
- Tertiary Highway
- District, County, Regional or Municipal Road
- Toll Highway
- One Way Road
- Road with Permanent Blocked Passage
- Road with Address Ranges
- Hydro Line, Communication Line or Unknown Transmission Line
- Natural Gas Pipeline, Water Pipeline or Unknown Pipeline
- Spot Height
- Index Contour
- Contour
- Wooded Area
- Wetland
- Waterbody
- Waterbody Elevation
- Watercourse
- Falls
- Rapids
- Rapids \ Falls
- Rapids
- Rocks
- Lock Gate
- Dam \ Hydro Wall
- Dam \ Hydro Wall
- Provincial \ State Boundary
- International Boundary
- Upper Tier \ District Municipal Boundary
- Lower Tier \ Single Tier Municipal Boundary
- Lot Line
- Indian Reserve
- Provincial Park
- National Park
- Conservation Reserve
- Military Lands

0 0.4 km

Projection: Web Mercator

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APPENDIX C

ECOLOG ERIS REPORT

DATABASE REPORT

Project Property:	*Phase One ESA - 11 Main Street, Morriston, ON* *11 Main Street* *Morriston ON N0B 2C0*
Project No:	
Report Type:	*Quote - Custom-Build Your Own Report*
Order No:	*22021100164*
Requested by:	*Niagara Soils Solutions Ltd.*
Date Completed:	*February 22, 2022*

Environmental Risk Information Services
A division of Glacier Media Inc.
1.866.517.5204 | info@erisinfo.com | erisinfo.com

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Executive Summary

Property Information:

Project Property: *Phase One ESA - 11 Main Street, Morriston, ON*
11 Main Street Morriston ON N0B 2C0

Project No:

Order Information:

Order No: *22021100164*
Date Requested: *February 11, 2022*
Requested by: *Niagara Soils Solutions Ltd.*
Report Type: *Quote - Custom-Build Your Own Report*

Historical/Products:

Executive Summary: Report Summary

Database	Name	Searched	Project Property	Boundary to 0.25km	Total
AAGR	*Abandoned Aggregate Inventory*	Y	0	0	0
AGR	*Aggregate Inventory*	Y	0	0	0
AMIS	*Abandoned Mine Information System*	Y	0	0	0
ANDR	*Anderson's Waste Disposal Sites*	Y	0	0	0
AST	*Aboveground Storage Tanks*	Y	0	0	0
AUWR	*Automobile Wrecking & Supplies*	Y	0	0	0
BORE	*Borehole*	Y	0	0	0
CA	*Certificates of Approval*	Y	0	0	0
CDRY	*Dry Cleaning Facilities*	Y	0	0	0
CFOT	*Commercial Fuel Oil Tanks*	Y	0	0	0
CHEM	*Chemical Manufacturers and Distributors*	Y	0	0	0
CHM	*Chemical Register*	Y	0	0	0
CNG	*Compressed Natural Gas Stations*	Y	0	0	0
COAL	*Inventory of Coal Gasification Plants and Coal Tar Sites*	Y	0	0	0
CONV	*Compliance and Convictions*	Y	0	0	0
CPU	*Certificates of Property Use*	Y	0	0	0
DRL	*Drill Hole Database*	Y	0	0	0
DTNK	*Delisted Fuel Tanks*	Y	0	0	0
EASR	*Environmental Activity and Sector Registry*	Y	0	0	0
EBR	*Environmental Registry*	Y	0	1	1
ECA	*Environmental Compliance Approval*	Y	0	3	3
EEM	*Environmental Effects Monitoring*	Y	0	0	0
EHS	*ERIS Historical Searches*	Y	0	2	2
EIIS	*Environmental Issues Inventory System*	Y	0	0	0
EMHE	*Emergency Management Historical Event*	Y	0	0	0
EPAR	*Environmental Penalty Annual Report*	Y	0	0	0
EXP	*List of Expired Fuels Safety Facilities*	Y	0	0	0
FCON	*Federal Convictions*	Y	0	0	0
FCS	*Contaminated Sites on Federal Land*	Y	0	0	0
FOFT	*Fisheries & Oceans Fuel Tanks*	Y	0	0	0
FRST	*Federal Identification Registry for Storage Tank Systems (FIRSTS)*	Y	0	0	0
FST	*Fuel Storage Tank*	Y	0	0	0
FSTH	*Fuel Storage Tank - Historic*	Y	0	0	0
GEN	*Ontario Regulation 347 Waste Generators Summary*	Y	0	0	0
GHG	*Greenhouse Gas Emissions from Large Facilities*	Y	0	0	0
HINC	*TSSA Historic Incidents*	Y	0	0	0

Database	Name	Searched	Project Property	Boundary to 0.25km	Total
IAFT	Indian & Northern Affairs Fuel Tanks	Y	0	0	0
INC	Fuel Oil Spills and Leaks	Y	0	0	0
LIMO	Landfill Inventory Management Ontario	Y	0	0	0
MINE	Canadian Mine Locations	Y	0	0	0
MNR	Mineral Occurrences	Y	0	0	0
NATE	National Analysis of Trends in Emergencies System (NATES)	Y	0	0	0
NCPL	Non-Compliance Reports	Y	0	0	0
NDFT	National Defense & Canadian Forces Fuel Tanks	Y	0	0	0
NDSP	National Defense & Canadian Forces Spills	Y	0	0	0
NDWD	National Defence & Canadian Forces Waste Disposal Sites	Y	0	0	0
NEBI	National Energy Board Pipeline Incidents	Y	0	0	0
NEBP	National Energy Board Wells	Y	0	0	0
NEES	National Environmental Emergencies System (NEES)	Y	0	0	0
NPCB	National PCB Inventory	Y	0	0	0
NPRI	National Pollutant Release Inventory	Y	0	0	0
OGWE	Oil and Gas Wells	Y	0	0	0
OOGW	Ontario Oil and Gas Wells	Y	0	0	0
OPCB	Inventory of PCB Storage Sites	Y	0	0	0
ORD	Orders	Y	0	0	0
PAP	Canadian Pulp and Paper	Y	0	0	0
PCFT	Parks Canada Fuel Storage Tanks	Y	0	0	0
PES	Pesticide Register	Y	0	0	0
PINC	Pipeline Incidents	Y	0	1	1
PRT	Private and Retail Fuel Storage Tanks	Y	0	0	0
PTTW	Permit to Take Water	Y	0	0	0
REC	Ontario Regulation 347 Waste Receivers Summary	Y	0	0	0
RSC	Record of Site Condition	Y	0	1	1
RST	Retail Fuel Storage Tanks	Y	0	0	0
SCT	Scott's Manufacturing Directory	Y	0	0	0
SPL	Ontario Spills	Y	0	3	3
SRDS	Wastewater Discharger Registration Database	Y	0	0	0
TANK	Anderson's Storage Tanks	Y	0	0	0
TCFT	Transport Canada Fuel Storage Tanks	Y	0	0	0
VAR	Variances for Abandonment of Underground Storage Tanks	Y	0	0	0
WDS	Waste Disposal Sites - MOE CA Inventory	Y	0	0	0
WDSH	Waste Disposal Sites - MOE 1991 Historical Approval Inventory	Y	0	0	0
WWIS	Water Well Information System	Y	2	93	95
	Total:		2	104	106

Executive Summary: Site Report Summary - Project Property

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev diff (m)	Page Number
1	WWIS		lot 31 con 8 ON ***Well ID:*** 6707089	W/0.0	13.19	30
2	WWIS		lot 31 con 8 ON ***Well ID:*** 6714637	WSW/0.0	8.12	33

Executive Summary: Site Report Summary - Surrounding Properties

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
3	WWIS		7501 WELL RD. #36 lot 31 con 8 MORRISTON ON ***Well ID:*** 7112768	W/5.4	14.45	36
4	WWIS		lot 31 con 8 ON ***Well ID:*** 6710046	SW/18.5	0.92	44
5	WWIS		lot 32 con 8 ON ***Well ID:*** 6707677	SSW/27.5	0.00	47
6	WWIS		lot 31 con 8 ON ***Well ID:*** 6714525	NE/33.0	15.05	52
7	WWIS		lot 31 con 8 ON ***Well ID:*** 6713406	NE/34.1	15.05	56
8	WWIS		lot 31 con 8 ON ***Well ID:*** 6712999	NE/36.4	15.05	59
8	WWIS		lot 31 con 8 ON ***Well ID:*** 6709990	NE/36.4	15.05	63
9	WWIS		lot 31 con 8 ON ***Well ID:*** 6713220	NE/37.4	15.05	67
10	WWIS		lot 31 con 8 ON ***Well ID:*** 6709771	WSW/37.8	8.00	71
11	WWIS		lot 31 con 8 ON ***Well ID:*** 6708111	SW/40.0	2.11	75
12	WWIS		22 BACK ST lot 31 con 8 MORRISTON ON ***Well ID:*** 7138233	W/46.0	14.94	78
13	WWIS		lot 31 con 7 ON	WSW/46.0	1.11	85

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
			Well ID: 6702536			
14	WWIS		lot 31 con 8 ON ***Well ID:*** 7204352	WSW/47.3	7.82	88
15	WWIS		69 QUEEN STREET lot 31 con 8 MORRISTON ON ***Well ID:*** 6715615	SW/49.0	3.73	93
16	WWIS		lot 31 con 8 ON ***Well ID:*** 6710612	WSW/49.7	8.00	94
17	WWIS		66 QUEEN ST lot 31 con 7 MORRISTON ON ***Well ID:*** 7314679	SW/50.7	2.00	99
18	WWIS		lot 31 con 8 ON ***Well ID:*** 6712182	NNE/57.9	15.03	101
19	WWIS		71 QUEEN ST. lot 31 con 8 MORRISTON ON ***Well ID:*** 7114630	SW/58.4	4.00	106
20	EBR	DRS Developments Ltd.	66 Queen Street Puslinch County of Wellington N0B 2C0 TOWNSHIP OF PUSLINCH ON	SW/58.7	3.39	113
20	ECA	DRS Developments Ltd.	66 Queen St Puslinch ON N0B 2J0	SW/58.7	3.39	113
21	WWIS		7501 BADENOCH ST.COUNTY RD.#36 lot 31 con 8 MORRISTON ON ***Well ID:*** 6714759	W/58.8	13.64	114
22	WWIS		75 QUEEN ST lot 31 con 8 MORRISTON ON ***Well ID:*** 7274863	SW/64.1	4.03	120
23	EHS		71 Queen Street Morriston ON N0B 2C0	SW/64.4	4.00	123
24	WWIS		lot 31 con 8 ON ***Well ID:*** 7199020	N/70.6	16.63	123

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
25	WWIS		85 QUEEN ST MORRISTON lot 32 con 8 Wellington ON ***Well ID:*** 7285591	SSW/74.8	3.32	129
26	WWIS		lot 31 con 8 ON ***Well ID:*** 6711803	N/80.1	16.63	136
27	WWIS		66 HWY 6 MORRISTON ON ***Well ID:*** 7133961	SW/87.2	4.00	139
28	WWIS		66 QUEEN ST lot 31 con 7 MORRISTON ON ***Well ID:*** 7314681	SW/87.9	4.00	150
29	WWIS		lot 31 con 8 ON ***Well ID:*** 6702666	WSW/90.0	9.00	153
30	WWIS		6 BACK ST. lot 31 con 8 MORRISTON ON ***Well ID:*** 7114627	WSW/92.9	12.36	155
31	WWIS		lot 31 con 8 ON ***Well ID:*** 6702669	WSW/100.1	13.64	162
32	WWIS		lot 31 con 8 ON ***Well ID:*** 6702670	WSW/100.8	13.64	165
33	WWIS		lot 31 con 7 ON ***Well ID:*** 6705423	SW/107.4	4.00	168
34	SPL	s.21	54 Queen St Morriston Puslinch ON NA	WSW/108.3	6.25	171
35	WWIS		lot 31 con 8 ON ***Well ID:*** 6703544	W/109.3	19.08	172
36	WWIS		lot 31 con 8 ON ***Well ID:*** 6711879	WSW/110.8	15.00	175
37	WWIS		lot 31 con 7 ON ***Well ID:*** 6707594	SW/113.2	5.00	178

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
38	WWIS		lot 31 con 8 ON ***Well ID:*** 6707595	W/115.2	19.04	182
39	WWIS		lot 31 con 8 ON ***Well ID:*** 6712163	W/115.3	18.77	185
40	WWIS		lot 31 con 7 ON ***Well ID:*** 6703313	WSW/123.3	9.03	188
41	WWIS		66 QUEEN ST lot 31 con 7 MORRISTON ON ***Well ID:*** 7314680	SW/125.1	5.00	192
42	WWIS		lot 32 con 8 ON ***Well ID:*** 6714294	W/125.2	18.91	194
43	WWIS		lot 31 con 7 ON ***Well ID:*** 6702540	WSW/125.9	4.51	195
44	WWIS		91 HWY 6 ON ***Well ID:*** 7254633	SSW/126.8	1.31	200
45	WWIS		lot 31 con 7 ON ***Well ID:*** 6708055	WSW/126.9	4.51	206
46	WWIS		lot 30 con 8 ON ***Well ID:*** 6702663	NW/129.8	16.08	209
47	WWIS		lot 31 con 8 ON ***Well ID:*** 6702674	WSW/134.8	11.41	212
48	WWIS		lot 30 con 8 ON ***Well ID:*** 6710353	NNW/135.3	19.00	215
49	WWIS		BACK ST. lot 31 con 8 MORRISTON ON ***Well ID:*** 7114629	W/138.1	14.25	219
50	WWIS		lot 32 con 7 ON ***Well ID:*** 6702546	SSW/138.3	8.36	226

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
51	WWIS		lot 31 con 7 ON **Well ID:** 6709858	WSW/139.1	4.44	229
52	WWIS		lot 31 con 8 ON **Well ID:** 6702667	WSW/147.6	11.15	232
53	WWIS		lot 31 con 8 ON **Well ID:** 6706778	WSW/148.2	12.31	235
54	WWIS		lot 30 con 8 ON **Well ID:** 6710440	NNW/150.1	19.78	240
55	WWIS		lot 31 con 8 ON **Well ID:** 6711667	WSW/150.5	17.37	244
56	WWIS		lot 30 con 8 ON **Well ID:** 6710473	W/151.7	13.48	247
57	WWIS		lot 31 con 8 ON **Well ID:** 6708922	W/154.6	17.44	251
58	WWIS		lot 30 con 8 ON **Well ID:** 6710441	N/156.5	19.56	255
59	WWIS		lot 31 con 8 ON **Well ID:** 6702665	WSW/157.7	13.34	259
60	WWIS		lot 31 con 8 ON **Well ID:** 6702671	WSW/159.4	15.00	263
61	PINC	C5 CORP	41 BADENOCH ST E,,MORRISTON,ON, N0B 2C0,CA ON	W/161.4	18.70	265
61	SPL	Union Gas Limited	41 Badenoch Street Guelph ON	W/161.4	18.70	266
62	WWIS		lot 32 con 7 ON **Well ID:** 6702545	SSW/162.4	9.44	266

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
63	WWIS		lot 31 con 8 ON ***Well ID:*** 6702672	WSW/166.0	15.00	269
64	ECA	1719303 Ontario Inc	31 Wellington Road 36 (Badenock Road) Puslinch ON N1H 6H9	W/166.9	20.02	272
64	ECA	1719303 Ontario Inc	31 Wellington Road 36 (Badenock Road) Puslinch ON N1H 6H9	W/166.9	20.02	272
65	WWIS		lot 31 con 8 ON ***Well ID:*** 6702673	W/167.6	18.64	273
66	WWIS		lot 31 con 8 ON ***Well ID:*** 6706256	W/168.0	18.64	276
67	WWIS		lot 30 con 8 ON ***Well ID:*** 6703857	NNE/169.3	14.53	279
68	WWIS		84 QUEEN ST. ` MORRISTON ON ***Well ID:*** 7319287	SSW/169.4	10.39	283
69	WWIS		lot 31 con 8 ON ***Well ID:*** 6708057	WSW/172.1	15.00	286
70	WWIS		12 BADENOCH ST lot 31 con 8 MORRISTON ON ***Well ID:*** 7311547	W/173.1	16.70	290
71	WWIS		24 BADENOCK ST lot 31 con 8 MORRISTON ON ***Well ID:*** 7166392	W/178.2	18.39	292
72	WWIS		lot 31 con 8 ON ***Well ID:*** 6702668	W/182.8	18.44	294
73	WWIS		5 VICTORIA ST lot 31 con 7 MORRISTON ON ***Well ID:*** 7190634	WSW/185.9	3.00	298
74	WWIS		lot 31 con 7 ON ***Well ID:*** 6709991	WSW/186.4	4.39	304

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
75	WWIS		lot 31 con 7 ON ***Well ID:*** 6702539	WSW/189.0	9.47	309
76	WWIS		lot 30 con 8 ON ***Well ID:*** 6711984	N/189.1	21.00	312
77	WWIS		lot 30 con 8 ON ***Well ID:*** 6704136	W/193.8	14.76	314
78	WWIS		lot 30 con 8 ON ***Well ID:*** 6707588	W/194.3	20.00	318
79	WWIS		27 BAPENOCH ST lot 30 con 8 MORRISTON ON ***Well ID:*** 6715529	W/195.1	20.11	321
80	WWIS		17 BADENOCH ST lot 30 con 8 MORRISTON ON ***Well ID:*** 7342709	W/197.1	18.61	329
81	SPL	TRANSPORT TRUCK	HIGHWAY 6 & CALFASS ROAD MOTOR VEHICLE (OPERATING FLUID) PUSLINCH TOWNSHIP ON	WSW/199.4	9.47	330
82	WWIS		lot 30 con 8 ON ***Well ID:*** 6702662	W/201.1	14.76	331
83	WWIS		lot 30 con 8 ON ***Well ID:*** 6711290	N/202.2	19.61	334
84	WWIS		lot 30 con 8 ON ***Well ID:*** 6709100	W/202.3	18.61	337
85	WWIS		5 VICTORIA ST lot 31 con 7 MORRISTON ON ***Well ID:*** 7190638	WSW/203.7	4.52	340
86	WWIS		lot 30 con 8 ON ***Well ID:*** 6709927	NNW/203.8	19.55	342
87	EHS		27 Badenoch St Morriston ON N0B 2C0	W/204.3	19.72	345

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
88	WWIS		lot 32 con 8 ON ***Well ID:*** 6704652	S/205.0	0.39	345
89	WWIS		lot 31 con 7 ON ***Well ID:*** 6703703	WSW/205.1	3.78	349
90	WWIS		BADENOCH STREET MORRISTON ON ***Well ID:*** 7154838	W/209.0	16.01	353
91	WWIS		ON ***Well ID:*** 6712612	N/212.1	21.00	356
92	WWIS		lot 30 con 8 ON ***Well ID:*** 6702661	WSW/212.8	9.95	360
93	WWIS		Ikonkar Place con 8 MORRISTON ON ***Well ID:*** 7353621	WNW/216.8	13.02	363
94	WWIS		11 BADENOCH ST lot 30 con 8 MORRISTON ON ***Well ID:*** 7320421	W/217.1	16.73	369
95	WWIS		lot 30 con 8 ON ***Well ID:*** 6711486	WNW/222.8	14.18	376
96	WWIS		lot 31 con 7 ON ***Well ID:*** 6702541	WSW/231.0	2.97	381
97	WWIS		27 lot 30 con 8 MORRISTON ON ***Well ID:*** 7119802	W/232.5	19.73	384
98	WWIS		11 KONKER PLACE lot 30 con 8 MORRISTON ON ***Well ID:*** 7299228	WNW/233.4	14.30	390
99	WWIS		lot 31 con 7 ON ***Well ID:*** 6702537	WSW/234.5	4.59	397
100	WWIS		lot 32 con 8 ON ***Well ID:*** 6713456	WNW/241.9	14.16	400

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
101	WWIS		lot 31 con 7 ON ***Well ID:*** 6714286	WSW/245.4	2.50	403
102	RSC	Makhan Singh Jassal	No Municipal Address PUSLINCH ON	W/249.5	16.00	407

Executive Summary: Summary By Data Source

EBR - Environmental Registry

A search of the EBR database, dated 1994 - Jan 31, 2022 has found that there are 1 EBR site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
DRS Developments Ltd.	66 Queen Street Puslinch County of Wellington N0B 2C0 TOWNSHIP OF PUSLINCH ON	58.7	20

ECA - Environmental Compliance Approval

A search of the ECA database, dated Oct 2011- Jan 31, 2021 has found that there are 3 ECA site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
DRS Developments Ltd.	66 Queen St Puslinch ON N0B 2J0	58.7	20
1719303 Ontario Inc	31 Wellington Road 36 (Badenock Road) Puslinch ON N1H 6H9	166.9	64
1719303 Ontario Inc	31 Wellington Road 36 (Badenock Road) Puslinch ON N1H 6H9	166.9	64

EHS - ERIS Historical Searches

A search of the EHS database, dated 1999-Nov 30, 2021 has found that there are 2 EHS site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
	71 Queen Street Morriston ON N0B 2C0	64.4	23
	27 Badenoch St Morriston ON N0B 2C0	204.3	87

Site	Address	Distance (m)	Map Key

PINC - Pipeline Incidents

A search of the PINC database, dated May 31, 2021 has found that there are 1 PINC site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
C5 CORP	41 BADENOCH ST E,,MORRISTON,ON,N0B 2C0,CA ON	161.4	61

RSC - Record of Site Condition

A search of the RSC database, dated 1997-Sept 2001, Oct 2004-Jan 2022 has found that there are 1 RSC site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
Makhan Singh Jassal	No Municipal Address PUSLINCH ON	249.5	102

SPL - Ontario Spills

A search of the SPL database, dated 1988-Sep 2020 has found that there are 3 SPL site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
s.21	54 Queen St Morriston Puslinch ON NA	108.3	34
Union Gas Limited	41 Badenoch Street Guelph ON	161.4	61
TRANSPORT TRUCK	HIGHWAY 6 & CALFASS ROAD MOTOR VEHICLE (OPERATING FLUID) PUSLINCH TOWNSHIP ON	199.4	81

WWIS - Water Well Information System

A search of the WWIS database, dated Sep 30, 2021 has found that there are 95 WWIS site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
	lot 31 con 8 ON ***Well ID:*** 6707089	0.0	1
	lot 31 con 8 ON ***Well ID:*** 6714637	0.0	2
	7501 WELL RD. #36 lot 31 con 8 MORRISTON ON ***Well ID:*** 7112768	5.4	3
	lot 31 con 8 ON ***Well ID:*** 6710046	18.5	4
	lot 32 con 8 ON ***Well ID:*** 6707677	27.5	5
	lot 31 con 8 ON ***Well ID:*** 6714525	33.0	6
	lot 31 con 8 ON ***Well ID:*** 6713406	34.1	7
	lot 31 con 8 ON ***Well ID:*** 6712999	36.4	8
	lot 31 con 8 ON ***Well ID:*** 6709990	36.4	8
	lot 31 con 8 ON ***Well ID:*** 6713220	37.4	9
	lot 31 con 8 ON ***Well ID:*** 6709771	37.8	10

Site	Address	Distance (m)	Map Key
	lot 31 con 8 ON ***Well ID:*** 6708111	40.0	11
	22 BACK ST lot 31 con 8 MORRISTON ON ***Well ID:*** 7138233	46.0	12
	lot 31 con 7 ON ***Well ID:*** 6702536	46.0	13
	lot 31 con 8 ON ***Well ID:*** 7204352	47.3	14
	69 QUEEN STREET lot 31 con 8 MORRISTON ON ***Well ID:*** 6715615	49.0	15
	lot 31 con 8 ON ***Well ID:*** 6710612	49.7	16
	66 QUEEN ST lot 31 con 7 MORRISTON ON ***Well ID:*** 7314679	50.7	17
	lot 31 con 8 ON ***Well ID:*** 6712182	57.9	18
	71 QUEEN ST. lot 31 con 8 MORRISTON ON ***Well ID:*** 7114630	58.4	19
	7501 BADENOCH ST.COUNTY RD.#36 lot 31 con 8 MORRISTON ON ***Well ID:*** 6714759	58.8	21
	75 QUEEN ST lot 31 con 8 MORRISTON ON ***Well ID:*** 7274863	64.1	22
	lot 31 con 8 ON	70.6	24

Site	Address	Distance (m)	Map Key
	Well ID: 7199020		
	85 QUEEN ST MORRISTON lot 32 con 8 Wellington ON ***Well ID:*** 7285591	74.8	25
	lot 31 con 8 ON ***Well ID:*** 6711803	80.1	26
	66 HWY 6 MORRISTON ON ***Well ID:*** 7133961	87.2	27
	66 QUEEN ST lot 31 con 7 MORRISTON ON ***Well ID:*** 7314681	87.9	28
	lot 31 con 8 ON ***Well ID:*** 6702666	90.0	29
	6 BACK ST. lot 31 con 8 MORRISTON ON ***Well ID:*** 7114627	92.9	30
	lot 31 con 8 ON ***Well ID:*** 6702669	100.1	31
	lot 31 con 8 ON ***Well ID:*** 6702670	100.8	32
	lot 31 con 7 ON ***Well ID:*** 6705423	107.4	33
	lot 31 con 8 ON ***Well ID:*** 6703544	109.3	35
	lot 31 con 8 ON ***Well ID:*** 6711879	110.8	36

Site	Address	Distance (m)	Map Key
	lot 31 con 7 ON ***Well ID:*** 6707594	113.2	37
	lot 31 con 8 ON ***Well ID:*** 6707595	115.2	38
	lot 31 con 8 ON ***Well ID:*** 6712163	115.3	39
	lot 31 con 7 ON ***Well ID:*** 6703313	123.3	40
	66 QUEEN ST lot 31 con 7 MORRISTON ON ***Well ID:*** 7314680	125.1	41
	lot 32 con 8 ON ***Well ID:*** 6714294	125.2	42
	lot 31 con 7 ON ***Well ID:*** 6702540	125.9	43
	91 HWY 6 ON ***Well ID:*** 7254633	126.8	44
	lot 31 con 7 ON ***Well ID:*** 6708055	126.9	45
	lot 30 con 8 ON ***Well ID:*** 6702663	129.8	46
	lot 31 con 8 ON ***Well ID:*** 6702674	134.8	47
	lot 30 con 8 ON	135.3	48

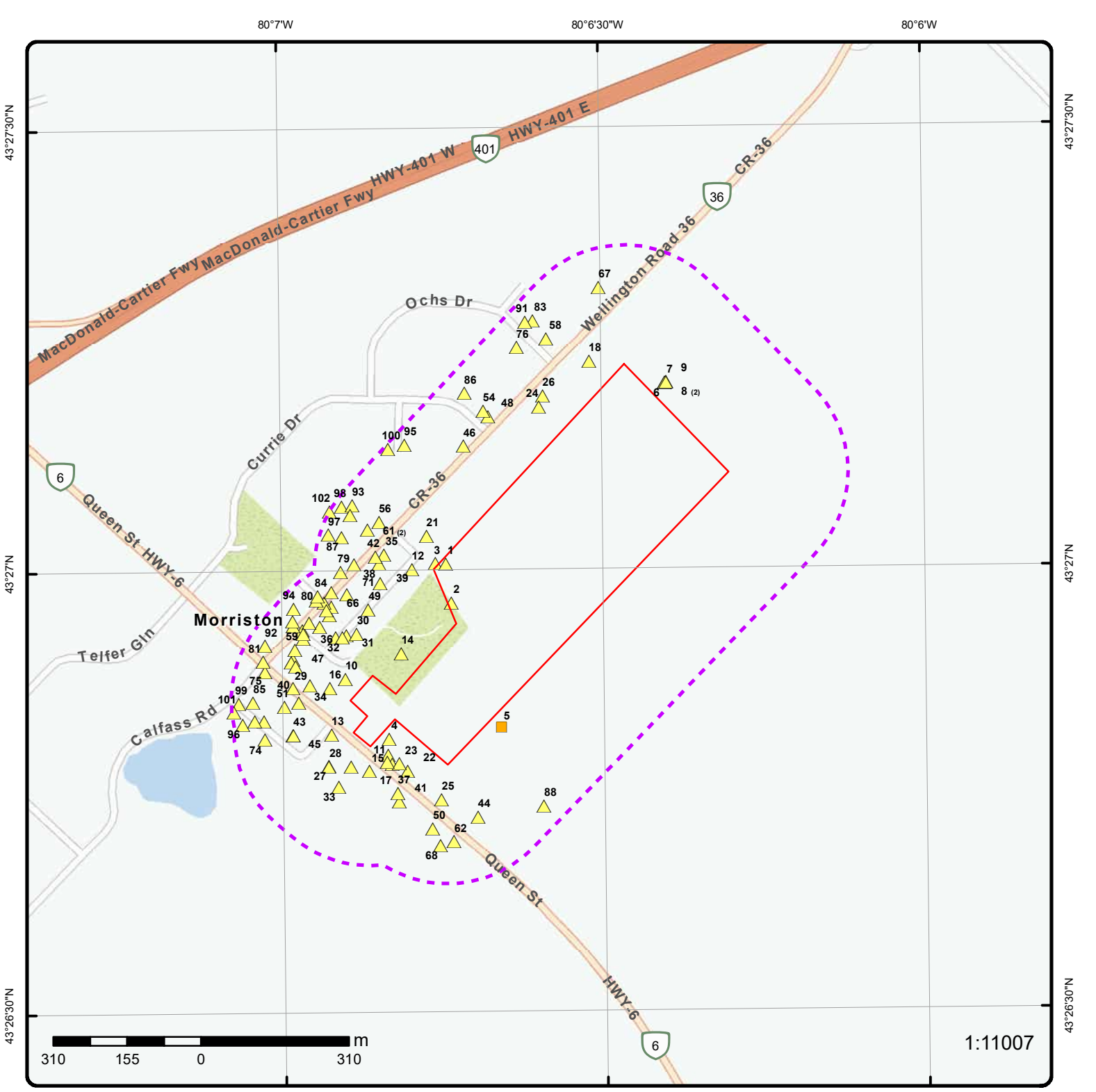
Site	Address	Distance (m)	Map Key
	Well ID: 6710353		
	BACK ST. lot 31 con 8 MORRISTON ON ***Well ID:*** 7114629	138.1	49
	lot 32 con 7 ON ***Well ID:*** 6702546	138.3	50
	lot 31 con 7 ON ***Well ID:*** 6709858	139.1	51
	lot 31 con 8 ON ***Well ID:*** 6702667	147.6	52
	lot 31 con 8 ON ***Well ID:*** 6706778	148.2	53
	lot 30 con 8 ON ***Well ID:*** 6710440	150.1	54
	lot 31 con 8 ON ***Well ID:*** 6711667	150.5	55
	lot 30 con 8 ON ***Well ID:*** 6710473	151.7	56
	lot 31 con 8 ON ***Well ID:*** 6708922	154.6	57
	lot 30 con 8 ON ***Well ID:*** 6710441	156.5	58
	lot 31 con 8 ON ***Well ID:*** 6702665	157.7	59

Site	Address	Distance (m)	Map Key
	lot 31 con 8 ON ***Well ID:*** 6702671	159.4	60
	lot 32 con 7 ON ***Well ID:*** 6702545	162.4	62
	lot 31 con 8 ON ***Well ID:*** 6702672	166.0	63
	lot 31 con 8 ON ***Well ID:*** 6702673	167.6	65
	lot 31 con 8 ON ***Well ID:*** 6706256	168.0	66
	lot 30 con 8 ON ***Well ID:*** 6703857	169.3	67
	84 QUEEN ST. ` MORRISTON ON ***Well ID:*** 7319287	169.4	68
	lot 31 con 8 ON ***Well ID:*** 6708057	172.1	69
	12 BADENOCH ST lot 31 con 8 MORRISTON ON ***Well ID:*** 7311547	173.1	70
	24 BADENOCK ST lot 31 con 8 MORRISTON ON ***Well ID:*** 7166392	178.2	71
	lot 31 con 8 ON ***Well ID:*** 6702668	182.8	72
	5 VICTORIA ST lot 31 con 7 MORRISTON ON	185.9	73

Site	Address	Distance (m)	Map Key
	Well ID: 7190634		
	lot 31 con 7 ON ***Well ID:*** 6709991	186.4	74
	lot 31 con 7 ON ***Well ID:*** 6702539	189.0	75
	lot 30 con 8 ON ***Well ID:*** 6711984	189.1	76
	lot 30 con 8 ON ***Well ID:*** 6704136	193.8	77
	lot 30 con 8 ON ***Well ID:*** 6707588	194.3	78
	27 BAPENOCH ST lot 30 con 8 MORRISTON ON ***Well ID:*** 6715529	195.1	79
	17 BADENOCH ST lot 30 con 8 MORRISTON ON ***Well ID:*** 7342709	197.1	80
	lot 30 con 8 ON ***Well ID:*** 6702662	201.1	82
	lot 30 con 8 ON ***Well ID:*** 6711290	202.2	83
	lot 30 con 8 ON ***Well ID:*** 6709100	202.3	84
	5 VICTORIA ST lot 31 con 7 MORRISTON ON ***Well ID:*** 7190638	203.7	85

Site	Address	Distance (m)	Map Key
	lot 30 con 8 ON ***Well ID:*** 6709927	203.8	86
	lot 32 con 8 ON ***Well ID:*** 6704652	205.0	88
	lot 31 con 7 ON ***Well ID:*** 6703703	205.1	89
	BADENOCH STREET MORRISTON ON ***Well ID:*** 7154838	209.0	90
	ON ***Well ID:*** 6712612	212.1	91
	lot 30 con 8 ON ***Well ID:*** 6702661	212.8	92
	Ikonkar Place con 8 MORRISTON ON ***Well ID:*** 7353621	216.8	93
	11 BADENOCH ST lot 30 con 8 MORRISTON ON ***Well ID:*** 7320421	217.1	94
	lot 30 con 8 ON ***Well ID:*** 6711486	222.8	95
	lot 31 con 7 ON ***Well ID:*** 6702541	231.0	96
	27 lot 30 con 8 MORRISTON ON ***Well ID:*** 7119802	232.5	97
	11 KONKER PLACE lot 30 con 8 MORRISTON ON	233.4	98

Site	Address	Distance (m)	Map Key
	Well ID: 7299228		
	lot 31 con 7 ON ***Well ID:*** 6702537	234.5	99
	lot 32 con 8 ON ***Well ID:*** 6713456	241.9	100
	lot 31 con 7 ON ***Well ID:*** 6714286	245.4	101



Map: 0.25 Kilometer Radius

Order Number: 22021100164

Address: 11 Main Street, Morriston, ON

- Project Property
- Buffer Outline
- Eris Sites with Higher Elevation
- Eris Sites with Same Elevation
- Eris Sites with Lower Elevation
- Eris Sites with Unknown Elevation
- Freeways; Highways
- Traffic Circle; Ramp
- Major Arterial; Minor Arterial
- Local Road
- Service Road; Traffic Circle; Ramp
- Rail
- Beach
- Airport
- Industrial Area
- Military Base
- Aircraft Roads
- Native Reservation
- Hospital
- Shopping & Sports Area
- University/College
- Cemetery; Golf Course
- Parkt (National)
- Park (City/County)

Source: © 2021 ESRI StreetMap Premium.

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80°6'W

43°27'N

43°27'N

Aerial

Year: 2018

Order Number: 22021100164

Address: 11 Main Street, Morriston, ON

Source: ESRI World Imagery

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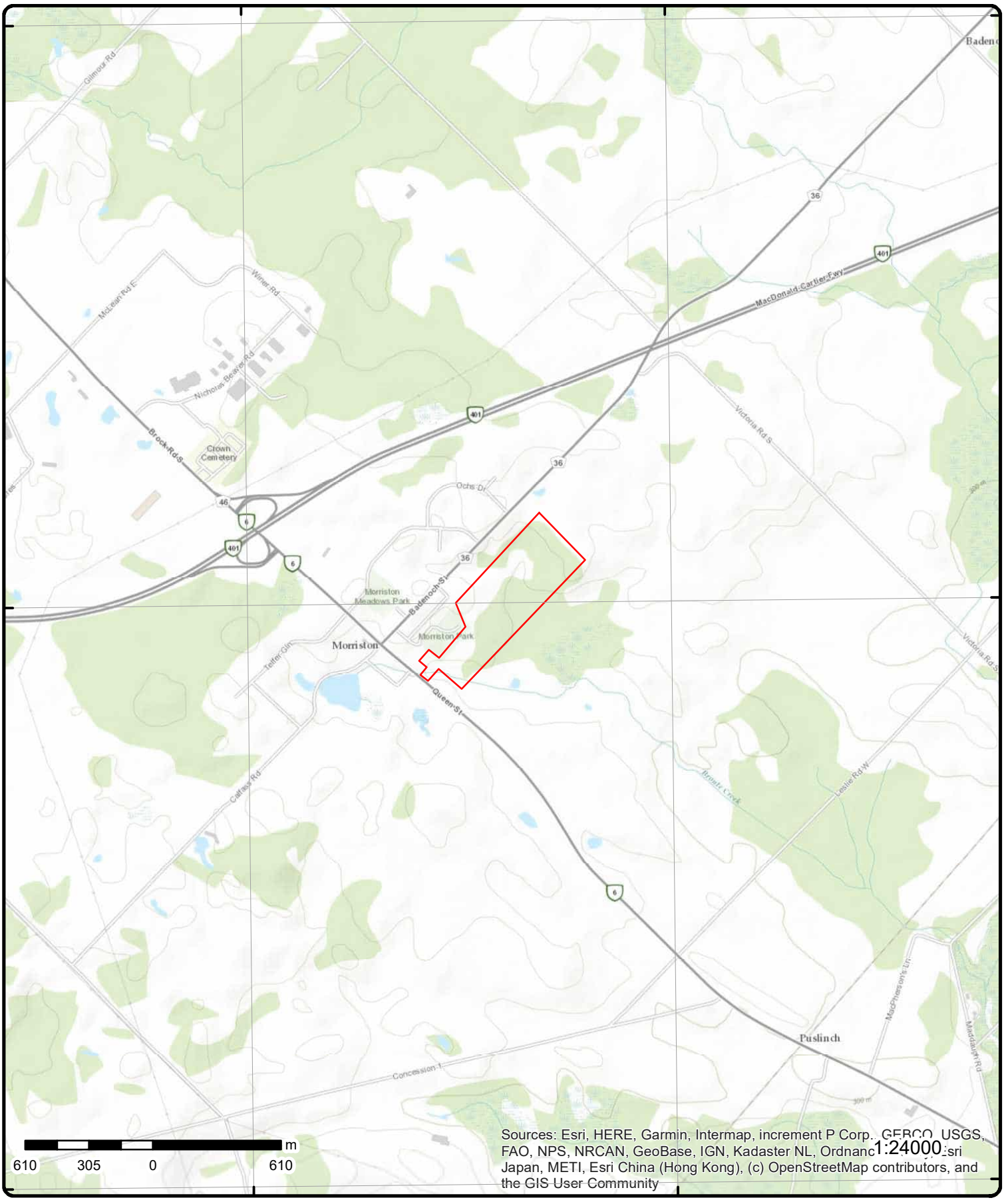

Topographic Map

Address: 11 Main Street, ON

Source: ESRI World Topographic Map

Order Number: 22021100164

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Detail Report

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	1 of 1	W/0.0	324.0 / 13.19	lot 31 con 8 ON	WWIS

Well ID:	6707089	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Commerical	**Date Received:**	10/12/1979
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	2336
Casing Material:		**Form Version:**	1
Audit No:		**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6707089.pdf

Additional Detail(s) (Map)

Well Completed Date:	1979/09/24
Year Completed:	1979
Depth (m):	27.1272
Latitude:	43.4501075367452
Longitude:	-80.1124289883701
Path:	670\6707089.pdf

Bore Hole Information

Bore Hole ID:	10471155	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571814.30
Code OB Desc:		**North83:**	4811183.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	4
Date Completed:	24-Sep-1979 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	p4
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932634052
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	28
Mat2 Desc:	SAND
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	15.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932634053
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	28
Mat2 Desc:	SAND
Mat3:	12
Mat3 Desc:	STONES
Formation Top Depth:	15.0
Formation End Depth:	25.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932634055
Layer:	4
Color:	6
General Color:	BROWN
Mat1:	12
Most Common Material:	STONES
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	73.0
Formation End Depth:	89.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932634054
Layer:	3
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	28
Mat2 Desc:	SAND

Mat3:	11
Mat3 Desc:	GRAVEL
Formation Top Depth:	25.0
Formation End Depth:	73.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966707089
Method Construction Code:	1
Method Construction:	Cable Tool
Other Method Construction:	

Pipe Information

Pipe ID:	11019725
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930766679
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	75.0
Casing Diameter:	5.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	930766680
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	
Depth To:	89.0
Casing Diameter:	5.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996707089
Pump Set At:	
Static Level:	35.0
Final Level After Pumping:	65.0
Recommended Pump Depth:	80.0
Pumping Rate:	10.0
Flowing Rate:	
Recommended Pump Rate:	10.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	2
Pumping Duration HR:	1
Pumping Duration MIN:	0

Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 934345858
Test Type: Recovery
Test Duration: 15
Test Level: 35.0
Test Level UOM: ft

Water Details

Water ID: 933960182
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 87.0
Water Found Depth UOM: ft

---

2 | ***1 of 1*** | ***WSW/0.0*** | ***319.0 / 8.12*** | ***lot 31 con 8 ON*** | ***WWIS***

Well ID:	6714637	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	10/22/2003
Sec. Water Use:		***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	2663
Casing Material:		***Form Version:***	1
Audit No:	257967	***Owner:***	
Tag:		***Street Name:***	
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	031
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6714637.pdf

Additional Detail(s) (Map)

Well Completed Date: 2003/09/30
Year Completed: 2003
Depth (m): 24.9936
Latitude: 43.449377147255
Longitude: -80.1122950685742
Path: 671\6714637.pdf

Bore Hole Information

Bore Hole ID:	10548188	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571826.00

Code OB Desc:		***North83:***	4811102.00
Open Hole:		***Org CS:***	N83a
Cluster Kind:		***UTMRC:***	5
Date Completed:	30-Sep-2003 00:00:00	***UTMRC Desc:***	margin of error : 100 m - 300 m
Remarks:		***Location Method:***	wcgps
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932940299
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	85
Mat2 Desc:	SOFT
Mat3:	
Mat3 Desc:	
Formation Top Depth:	54.0
Formation End Depth:	82.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932940298
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	28
Mat2 Desc:	SAND
Mat3:	12
Mat3 Desc:	STONES
Formation Top Depth:	0.0
Formation End Depth:	54.0
Formation End Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	933244787
Layer:	1
Plug From:	0.0
Plug To:	20.0
Plug Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966714637
Method Construction Code:	4
Method Construction:	Rotary (Air)
Other Method Construction:	

Pipe Information

Pipe ID:	11096758
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930779393
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	930779394
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	
Depth To:	
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996714637
Pump Set At:	
Static Level:	21.0
Final Level After Pumping:	21.0
Recommended Pump Depth:	60.0
Pumping Rate:	25.0
Flowing Rate:	
Recommended Pump Rate:	25.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	934875757
Test Type:	Draw Down
Test Duration:	45
Test Level:	21.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934614747
Test Type:	Draw Down
Test Duration:	30
Test Level:	21.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	935136816
Test Type:	Draw Down
Test Duration:	60
Test Level:	21.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934350188
Test Type:	Draw Down
Test Duration:	15
Test Level:	21.0
Test Level UOM:	ft

Water Details

Water ID:	934042120
Layer:	2
Kind Code:	1
Kind:	FRESH
Water Found Depth:	82.0
Water Found Depth UOM:	ft

Water Details

Water ID:	934042119
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	65.0
Water Found Depth UOM:	ft

---

3 | ***1 of 1*** | ***W/5.4*** | ***325.3 / 14.45*** | ***7501 WELL RD. #36 lot 31 con 8 MORRISTON ON*** | ***WWIS***

Well ID:	7112768	***Data Entry Status:***	
Construction Date:		***Data Src:***	
Primary Water Use:	Commerical	***Date Received:***	10/9/2008
Sec. Water Use:		***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	7385
Casing Material:		***Form Version:***	7
Audit No:	Z80652	***Owner:***	
Tag:	A066876	***Street Name:***	7501 WELL RD. #36
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	031
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	

Clear/Cloudy:

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/711\7112768.pdf

Additional Detail(s) (Map)

Well Completed Date: 2008/09/24
Year Completed: 2008
Depth (m): 30.48
Latitude: 43.4501185829355
Longitude: -80.1126920777635
Path: 711\7112768.pdf

Bore Hole Information

Bore Hole ID: 1001832953
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 24-Sep-2008 00:00:00
Remarks:
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 17
East83: 571793.00
North83: 4811184.00
Org CS: UTM83
UTMRC: 3
UTMRC Desc: margin of error : 10 - 30 m
Location Method: wwr

Overburden and Bedrock Materials Interval

Formation ID: 1001929215
Layer: 1
Color: 6
General Color: BROWN
Mat1: 05
Most Common Material: CLAY
Mat2: 12
Mat2 Desc: STONES
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 15.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1001929219
Layer: 5
Color: 6
General Color: BROWN
Mat1: 26
Most Common Material: ROCK
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 85.0

Formation End Depth: 100.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1001929217
Layer: 3
Color: 2
General Color: GREY
Mat1: 05
Most Common Material: CLAY
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 38.0
Formation End Depth: 75.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1001929218
Layer: 4
Color: 2
General Color: GREY
Mat1: 28
Most Common Material: SAND
Mat2: 11
Mat2 Desc: GRAVEL
Mat3:
Mat3 Desc:
Formation Top Depth: 75.0
Formation End Depth: 85.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1001929216
Layer: 2
Color: 6
General Color: BROWN
Mat1: 11
Most Common Material: GRAVEL
Mat2: 28
Mat2 Desc: SAND
Mat3:
Mat3 Desc:
Formation Top Depth: 15.0
Formation End Depth: 38.0
Formation End Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1001929222
Layer: 1
Plug From: 0.0
Plug To: 20.0
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID:	1001929254
Method Construction Code:	4
Method Construction:	Rotary (Air)
Other Method Construction:	

Pipe Information

Pipe ID:	1001929213
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	1001929224
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	-2.0
Depth To:	86.0
Casing Diameter:	6.125
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	1001929225
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	86.0
Depth To:	100.0
Casing Diameter:	6.125
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Screen

Screen ID:	1001929226
Layer:	
Slot:	
Screen Top Depth:	
Screen End Depth:	
Screen Material:	
Screen Depth UOM:	ft
Screen Diameter UOM:	inch
Screen Diameter:	

Results of Well Yield Testing

Pump Test ID:	1001929214
Pump Set At:	80.0
Static Level:	41.0
Final Level After Pumping:	60.0
Recommended Pump Depth:	80.0
Pumping Rate:	10.0
Flowing Rate:	

Recommended Pump Rate: 10.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 0
Pumping Duration HR: 1
Pumping Duration MIN: 0
Flowing:

Draw Down & Recovery

Pump Test Detail ID: 1001929233
Test Type: Draw Down
Test Duration: 4
Test Level: 59.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929234
Test Type: Recovery
Test Duration: 4
Test Level: 48.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929237
Test Type: Draw Down
Test Duration: 10
Test Level: 60.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929243
Test Type: Draw Down
Test Duration: 25
Test Level: 60.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929244
Test Type: Recovery
Test Duration: 25
Test Level: 41.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929251
Test Type: Draw Down
Test Duration: 60
Test Level: 60.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929228
Test Type: Recovery
Test Duration: 1
Test Level: 56.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929239
Test Type: Draw Down
Test Duration: 15
Test Level: 60.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929249
Test Type: Draw Down
Test Duration: 50
Test Level: 60.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929227
Test Type: Draw Down
Test Duration: 1
Test Level: 49.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929229
Test Type: Draw Down
Test Duration: 2
Test Level: 53.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929235
Test Type: Draw Down
Test Duration: 5
Test Level: 60.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929240
Test Type: Recovery
Test Duration: 15
Test Level: 41.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929238
Test Type: Recovery
Test Duration: 10
Test Level: 43.0

Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929252
Test Type: Recovery
Test Duration: 60
Test Level: 41.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929232
Test Type: Recovery
Test Duration: 3
Test Level: 50.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929241
Test Type: Draw Down
Test Duration: 20
Test Level: 60.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929245
Test Type: Draw Down
Test Duration: 30
Test Level: 60.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929246
Test Type: Recovery
Test Duration: 30
Test Level: 41.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929248
Test Type: Recovery
Test Duration: 40
Test Level: 41.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929230
Test Type: Recovery
Test Duration: 2
Test Level: 52.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929236
Test Type: Recovery
Test Duration: 5
Test Level: 46.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929242
Test Type: Recovery
Test Duration: 20
Test Level: 41.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929250
Test Type: Recovery
Test Duration: 50
Test Level: 41.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929231
Test Type: Draw Down
Test Duration: 3
Test Level: 57.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001929247
Test Type: Draw Down
Test Duration: 40
Test Level: 60.0
Test Level UOM: ft

Water Details

Water ID: 1001929223
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 100.0
Water Found Depth UOM: ft

Hole Diameter

Hole ID: 1001929220
Diameter: 8.75
Depth From: 0.0
Depth To: 20.0
Hole Depth UOM: ft
Hole Diameter UOM: inch

Hole Diameter

Hole ID: 1001929221

Diameter:	6.125
Depth From:	20.0
Depth To:	100.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

4 **1 of 1** **SW/18.5** **311.8 / 0.92** **lot 31 con 8 ON** **WWIS**

Well ID:	6710046	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	11/27/1989
Sec. Water Use:		**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	4207
Casing Material:		**Form Version:**	1
Audit No:	42523	**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6710046.pdf

Additional Detail(s) (Map)

Well Completed Date:	1989/09/18
Year Completed:	1989
Depth (m):	28.6512
Latitude:	43.4468236662996
Longitude:	-80.1139390216867
Path:	671\6710046.pdf

Bore Hole Information

Bore Hole ID:	10473893	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571696.00
Code OB Desc:		**North83:**	4810817.00
Open Hole:		**Org CS:**	N83
Cluster Kind:		**UTMRC:**	3
Date Completed:	18-Sep-1989 00:00:00	**UTMRC Desc:**	margin of error : 10 - 30 m
Remarks:		**Location Method:**	
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932646160
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	18.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932646161
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	06
Mat3 Desc:	SILT
Formation Top Depth:	18.0
Formation End Depth:	60.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932646162
Layer:	3
Color:	2
General Color:	GREY
Mat1:	06
Most Common Material:	SILT
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	60.0
Formation End Depth:	85.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932646164
Layer:	5
Color:	2
General Color:	GREY
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	93.0
Formation End Depth:	94.0

Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932646163
Layer: 4
Color: 2
General Color: GREY
Mat1: 11
Most Common Material: GRAVEL
Mat2: 06
Mat2 Desc: SILT
Mat3:
Mat3 Desc:
Formation Top Depth: 85.0
Formation End Depth: 93.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966710046
Method Construction Code: 4
Method Construction: Rotary (Air)
Other Method Construction:

Pipe Information

Pipe ID: 11022463
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930771592
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To:
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930771591
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 93.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996710046

Pump Set At:	
Static Level:	15.0
Final Level After Pumping:	90.0
Recommended Pump Depth:	30.0
Pumping Rate:	100.0
Flowing Rate:	
Recommended Pump Rate:	20.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	934618897
Test Type:	Recovery
Test Duration:	30
Test Level:	15.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	935131153
Test Type:	Recovery
Test Duration:	60
Test Level:	15.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934871173
Test Type:	Recovery
Test Duration:	45
Test Level:	15.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934344828
Test Type:	Recovery
Test Duration:	15
Test Level:	15.0
Test Level UOM:	ft

Water Details

Water ID:	933963583
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	94.0
Water Found Depth UOM:	ft

5	***1 of 1***	***SSW/27.5***	***310.9 / 0.00***	***lot 32 con 8 ON***	***WWIS***

Well ID: 6707677 ***Data Entry Status:***

Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	7/6/1982
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	2336
Casing Material:		**Form Version:**	1
Audit No:		**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	032
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6707677.pdf

Additional Detail(s) (Map)

Well Completed Date:	1982/06/29
Year Completed:	1982
Depth (m):	46.6344
Latitude:	43.4470171483577
Longitude:	-80.1110245189036
Path:	670\6707677.pdf

Bore Hole Information

Bore Hole ID:	10471712	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571931.60
Code OB Desc:		**North83:**	4810841.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	4
Date Completed:	29-Jun-1982 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	p4
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932636558
Layer:	5
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	28
Mat2 Desc:	SAND
Mat3:	11
Mat3 Desc:	GRAVEL
Formation Top Depth:	60.0

Formation End Depth: 75.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932636559
Layer: 6
Color: 6
General Color: BROWN
Mat1: 05
Most Common Material: CLAY
Mat2: 11
Mat2 Desc: GRAVEL
Mat3: 73
Mat3 Desc: HARD
Formation Top Depth: 75.0
Formation End Depth: 89.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932636562
Layer: 9
Color: 6
General Color: BROWN
Mat1: 12
Most Common Material: STONES
Mat2: 78
Mat2 Desc: MEDIUM-GRAINED
Mat3:
Mat3 Desc:
Formation Top Depth: 145.0
Formation End Depth: 153.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932636554
Layer: 1
Color:
General Color:
Mat1: 02
Most Common Material: TOPSOIL
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 1.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932636556
Layer: 3
Color: 6
General Color: BROWN
Mat1: 05

Most Common Material:	CLAY
Mat2:	28
Mat2 Desc:	SAND
Mat3:	11
Mat3 Desc:	GRAVEL
Formation Top Depth:	15.0
Formation End Depth:	40.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932636560
Layer:	7
Color:	6
General Color:	BROWN
Mat1:	12
Most Common Material:	STONES
Mat2:	78
Mat2 Desc:	MEDIUM-GRAINED
Mat3:	
Mat3 Desc:	
Formation Top Depth:	89.0
Formation End Depth:	110.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932636557
Layer:	4
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	28
Mat2 Desc:	SAND
Mat3:	
Mat3 Desc:	
Formation Top Depth:	40.0
Formation End Depth:	60.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932636555
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	1.0
Formation End Depth:	15.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932636561
Layer:	8
Color:	6
General Color:	BROWN
Mat1:	12
Most Common Material:	STONES
Mat2:	65
Mat2 Desc:	DARK-COLOURED
Mat3:	
Mat3 Desc:	
Formation Top Depth:	110.0
Formation End Depth:	145.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966707677
Method Construction Code:	1
Method Construction:	Cable Tool
Other Method Construction:	

Pipe Information

Pipe ID:	11020282
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930767641
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	
Depth To:	153.0
Casing Diameter:	5.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	930767640
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	91.0
Casing Diameter:	5.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996707677
Pump Set At:	
Static Level:	30.0
Final Level After Pumping:	95.0
Recommended Pump Depth:	115.0
Pumping Rate:	10.0

Flowing Rate:
Recommended Pump Rate: 10.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 2
Pumping Duration HR: 1
Pumping Duration MIN: 0
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 934346998
Test Type: Recovery
Test Duration: 15
Test Level: 30.0
Test Level UOM: ft

Water Details

Water ID: 933960889
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 150.0
Water Found Depth UOM: ft

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6 | ***1 of 1*** | ***NE/33.0*** | ***325.9 / 15.05*** | ***lot 31 con 8 ON*** | ***WWIS***

Well ID: 6714525
Construction Date:
Primary Water Use: Domestic
Sec. Water Use:
Final Well Status: Water Supply
Water Type:
Casing Material:
Audit No: 222591
Tag:
Construction Method:
Elevation (m):
Elevation Reliability:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Flowing (Y/N):
Flow Rate:
Clear/Cloudy:

Data Entry Status:
Data Src: 1
Date Received: 7/16/2003
Selected Flag: TRUE
Abandonment Rec:
Contractor: 4207
Form Version: 1
Owner:
Street Name:
County: WELLINGTON
Municipality: PUSLINCH TOWNSHIP
Site Info:
Lot: 031
Concession: 08
Concession Name: CON
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6714525.pdf

Additional Detail(s) (Map)

Well Completed Date: 2003/04/07
Year Completed: 2003
Depth (m): 27.7368
Latitude: 43.4534846808223
Longitude: -80.1067150617307
Path: 671\6714525.pdf

Bore Hole Information

Bore Hole ID:	10548076	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	572272.60
Code OB Desc:		***North83:***	4811563.00
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	9
Date Completed:	07-Apr-2003 00:00:00	***UTMRC Desc:***	unknown UTM
Remarks:		***Location Method:***	lot
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932939947
Layer:	3
Color:	2
General Color:	GREY
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	85
Mat2 Desc:	SOFT
Mat3:	74
Mat3 Desc:	LAYERED
Formation Top Depth:	73.0
Formation End Depth:	76.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932939948
Layer:	4
Color:	2
General Color:	GREY
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	73
Mat2 Desc:	HARD
Mat3:	
Mat3 Desc:	
Formation Top Depth:	76.0
Formation End Depth:	91.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932939946
Layer:	2
Color:	2
General Color:	GREY
Mat1:	11
Most Common Material:	GRAVEL

Mat2:	05
Mat2 Desc:	CLAY
Mat3:	
Mat3 Desc:	
Formation Top Depth:	58.0
Formation End Depth:	73.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932939945
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	58.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966714525
Method Construction Code:	4
Method Construction:	Rotary (Air)
Other Method Construction:	

Pipe Information

Pipe ID:	11096646
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930779248
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	
Depth To:	
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	930779247
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	
Casing Diameter:	6.0
Casing Diameter UOM:	inch

Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996714525
Pump Set At:
Static Level: 39.0
Final Level After Pumping: 55.0
Recommended Pump Depth: 70.0
Pumping Rate: 30.0
Flowing Rate:
Recommended Pump Rate: 15.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 1
Pumping Duration HR: 2
Pumping Duration MIN: 0
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 934350112
Test Type: Recovery
Test Duration: 15
Test Level: 39.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934614671
Test Type: Recovery
Test Duration: 30
Test Level: 39.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934875682
Test Type: Recovery
Test Duration: 45
Test Level: 39.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 935136741
Test Type: Recovery
Test Duration: 60
Test Level: 39.0
Test Level UOM: ft

Water Details

Water ID: 934042012
Layer: 2
Kind Code: 1
Kind: FRESH
Water Found Depth: 89.0
Water Found Depth UOM: ft

Water Details

Water ID:	934042011
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	80.0
Water Found Depth UOM:	ft

7	1 of 1	NE/34.1	325.9 / 15.05	lot 31 con 8 ON	WWIS

Well ID:	6713406	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	8/10/2000
Sec. Water Use:		***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	2336
Casing Material:		***Form Version:***	1
Audit No:	199961	***Owner:***	
Tag:		***Street Name:***	
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	031
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6713406.pdf

Additional Detail(s) (Map)

Well Completed Date:	2000/07/18
Year Completed:	2000
Depth (m):	25.6032
Latitude:	43.4534936358258
Longitude:	-80.1067087499707
Path:	671\6713406.pdf

Bore Hole Information

Bore Hole ID:	10477239	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	572273.10
Code OB Desc:		***North83:***	4811564.00
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	9
Date Completed:	18-Jul-2000 00:00:00	***UTMRC Desc:***	unknown UTM
Remarks:		***Location Method:***	lot
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932662024
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	30.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932662025
Layer:	2
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	30.0
Formation End Depth:	75.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932662026
Layer:	3
Color:	6
General Color:	BROWN
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	10
Mat2 Desc:	COARSE SAND
Mat3:	
Mat3 Desc:	
Formation Top Depth:	75.0
Formation End Depth:	84.0
Formation End Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	933211384
Layer:	1
Plug From:	0.0
Plug To:	25.0
Plug Depth UOM:	ft

Method of Construction & Well

Use

Method Construction ID:	966713406
Method Construction Code:	4
Method Construction:	Rotary (Air)
Other Method Construction:	

Pipe Information

Pipe ID:	11025809
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930777585
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996713406
Pump Set At:	
Static Level:	34.0
Final Level After Pumping:	38.0
Recommended Pump Depth:	60.0
Pumping Rate:	12.0
Flowing Rate:	
Recommended Pump Rate:	10.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	934355538
Test Type:	Draw Down
Test Duration:	15
Test Level:	38.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934872368
Test Type:	Draw Down
Test Duration:	45
Test Level:	38.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934620106
Test Type:	Draw Down
Test Duration:	30
Test Level:	38.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	935133423
Test Type:	Draw Down
Test Duration:	60
Test Level:	38.0
Test Level UOM:	ft

Water Details

Water ID:	933968154
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	84.0
Water Found Depth UOM:	ft

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8 | ***1 of 2*** | ***NE/36.4*** | ***325.9 / 15.05*** | ***lot 31 con 8 ON*** | ***WWIS***

Well ID:	6712999	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	7/6/1999
Sec. Water Use:		***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	2336
Casing Material:		***Form Version:***	1
Audit No:	196642	***Owner:***	
Tag:		***Street Name:***	
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	031
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6712999.pdf

Additional Detail(s) (Map)

Well Completed Date:	1999/06/15
Year Completed:	1999
Depth (m):	30.48
Latitude:	43.4535024266928
Longitude:	-80.1066814288172
Path:	671\6712999.pdf

Bore Hole Information

Bore Hole ID:	10476832	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	572275.30
Code OB Desc:		**North83:**	4811565.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	9
Date Completed:	15-Jun-1999 00:00:00	**UTMRC Desc:**	unknown UTM
Remarks:		**Location Method:**	lot
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932660026
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	10.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932660027
Layer:	2
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	10.0
Formation End Depth:	50.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932660029
Layer:	4
Color:	6
General Color:	BROWN
Mat1:	26
Most Common Material:	ROCK
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	

Formation Top Depth:	88.0
Formation End Depth:	100.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932660028
Layer:	3
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	28
Mat2 Desc:	SAND
Mat3:	11
Mat3 Desc:	GRAVEL
Formation Top Depth:	50.0
Formation End Depth:	88.0
Formation End Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	933211117
Layer:	1
Plug From:	0.0
Plug To:	25.0
Plug Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966712999
Method Construction Code:	4
Method Construction:	Rotary (Air)
Other Method Construction:	

Pipe Information

Pipe ID:	11025402
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930776899
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	
Depth To:	100.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	930776898
Layer:	1

Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	88.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996712999
Pump Set At:	
Static Level:	30.0
Final Level After Pumping:	31.0
Recommended Pump Depth:	50.0
Pumping Rate:	20.0
Flowing Rate:	
Recommended Pump Rate:	15.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	934618521
Test Type:	
Test Duration:	30
Test Level:	31.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	935131840
Test Type:	
Test Duration:	60
Test Level:	31.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934870787
Test Type:	
Test Duration:	45
Test Level:	31.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934354497
Test Type:	
Test Duration:	15
Test Level:	31.0
Test Level UOM:	ft

Water Details

Water ID:	933967591
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	100.0
Water Found Depth UOM:	ft

8 **2 of 2** **NE/36.4** **325.9 / 15.05** **lot 31 con 8 ON** **WWIS**

Well ID:	6709990	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	10/25/1989
Sec. Water Use:		**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	4005
Casing Material:		**Form Version:**	1
Audit No:	55663	**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6709990.pdf

Additional Detail(s) (Map)

Well Completed Date:	1989/10/19
Year Completed:	1989
Depth (m):	27.7368
Latitude:	43.4535024266928
Longitude:	-80.1066814288172
Path:	670\6709990.pdf

Bore Hole Information

Bore Hole ID:	10473838	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	572275.30
Code OB Desc:		**North83:**	4811565.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	9
Date Completed:	19-Oct-1989 00:00:00	**UTMRC Desc:**	unknown UTM
Remarks:		**Location Method:**	lot
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID: 932645939
Layer: 5
Color: 2
General Color: GREY
Mat1: 05
Most Common Material: CLAY
Mat2: 11
Mat2 Desc: GRAVEL
Mat3: 77
Mat3 Desc: LOOSE
Formation Top Depth: 43.0
Formation End Depth: 55.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932645940
Layer: 6
Color: 6
General Color: BROWN
Mat1: 05
Most Common Material: CLAY
Mat2: 81
Mat2 Desc: SANDY
Mat3: 77
Mat3 Desc: LOOSE
Formation Top Depth: 55.0
Formation End Depth: 70.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932645936
Layer: 2
Color: 6
General Color: BROWN
Mat1: 28
Most Common Material: SAND
Mat2: 11
Mat2 Desc: GRAVEL
Mat3: 77
Mat3 Desc: LOOSE
Formation Top Depth: 6.0
Formation End Depth: 24.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932645942
Layer: 8
Color: 2
General Color: GREY
Mat1: 15
Most Common Material: LIMESTONE
Mat2: 73
Mat2 Desc: HARD
Mat3:
Mat3 Desc:
Formation Top Depth: 87.0

Formation End Depth: 91.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932645937
Layer: 3
Color: 6
General Color: BROWN
Mat1: 11
Most Common Material: GRAVEL
Mat2: 77
Mat2 Desc: LOOSE
Mat3:
Mat3 Desc:
Formation Top Depth: 24.0
Formation End Depth: 38.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932645941
Layer: 7
Color: 2
General Color: GREY
Mat1: 11
Most Common Material: GRAVEL
Mat2: 79
Mat2 Desc: PACKED
Mat3:
Mat3 Desc:
Formation Top Depth: 70.0
Formation End Depth: 87.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932645935
Layer: 1
Color:
General Color:
Mat1: 28
Most Common Material: SAND
Mat2: 77
Mat2 Desc: LOOSE
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 6.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932645938
Layer: 4
Color: 2
General Color: GREY
Mat1: 11

Most Common Material:	GRAVEL
Mat2:	77
Mat2 Desc:	LOOSE
Mat3:	
Mat3 Desc:	
Formation Top Depth:	38.0
Formation End Depth:	43.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966709990
Method Construction Code:	1
Method Construction:	Cable Tool
Other Method Construction:	

Pipe Information

Pipe ID:	11022408
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930771493
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	87.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	930771494
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	
Depth To:	91.0
Casing Diameter:	
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996709990
Pump Set At:	
Static Level:	10.0
Final Level After Pumping:	30.0
Recommended Pump Depth:	85.0
Pumping Rate:	20.0
Flowing Rate:	
Recommended Pump Rate:	10.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	2
Water State After Test:	CLOUDY

Pumping Test Method:	2
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	935131117
Test Type:	Recovery
Test Duration:	60
Test Level:	10.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934344367
Test Type:	Recovery
Test Duration:	15
Test Level:	10.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934618864
Test Type:	Recovery
Test Duration:	30
Test Level:	10.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934871145
Test Type:	Recovery
Test Duration:	45
Test Level:	10.0
Test Level UOM:	ft

Water Details

Water ID:	933963512
Layer:	1
Kind Code:	5
Kind:	Not stated
Water Found Depth:	90.0
Water Found Depth UOM:	ft

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9 ***1 of 1*** ***NE/37.4*** ***325.9 / 15.05*** ***lot 31 con 8 ON*** ***WWIS***

Well ID:	6713220	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	1/7/2000
Sec. Water Use:		***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	2336
Casing Material:		***Form Version:***	1
Audit No:	199903	***Owner:***	
Tag:		***Street Name:***	
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	

Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6713220.pdf

Additional Detail(s) (Map)

Well Completed Date:	1999/12/02
Year Completed:	1999
Depth (m):	24.384
Latitude:	43.4535113816943
Longitude:	-80.1066751170504
Path:	671\6713220.pdf

Bore Hole Information

Bore Hole ID:	10477053	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	572275.80
Code OB Desc:		**North83:**	4811566.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	9
Date Completed:	02-Dec-1999 00:00:00	**UTMRC Desc:**	unknown UTM
Remarks:		**Location Method:**	lot
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932661155
Layer:	2
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	30.0
Formation End Depth:	38.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932661157
Layer:	4
Color:	6
General Color:	BROWN

Mat1: 26
Most Common Material: ROCK
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 62.0
Formation End Depth: 80.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932661156
Layer: 3
Color: 6
General Color: BROWN
Mat1: 28
Most Common Material: SAND
Mat2: 11
Mat2 Desc: GRAVEL
Mat3:
Mat3 Desc:
Formation Top Depth: 38.0
Formation End Depth: 62.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932661154
Layer: 1
Color: 6
General Color: BROWN
Mat1: 05
Most Common Material: CLAY
Mat2: 12
Mat2 Desc: STONES
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 30.0
Formation End Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 933211275
Layer: 1
Plug From: 0.0
Plug To: 25.0
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966713220
Method Construction Code: 4
Method Construction: Rotary (Air)
Other Method Construction:

Pipe Information

Pipe ID: 11025623
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930777268
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 80.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930777267
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 64.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996713220
Pump Set At:
Static Level: 37.0
Final Level After Pumping: 38.0
Recommended Pump Depth: 60.0
Pumping Rate: 20.0
Flowing Rate:
Recommended Pump Rate: 20.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 1
Pumping Duration HR: 1
Pumping Duration MIN:
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 934353992
Test Type: Draw Down
Test Duration: 15
Test Level: 38.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 935132859
Test Type: Draw Down
Test Duration: 60

Test Level: 38.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934619542
Test Type: Draw Down
Test Duration: 30
Test Level: 38.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934871805
Test Type: Draw Down
Test Duration: 45
Test Level: 38.0
Test Level UOM: ft

Water Details

Water ID: 933967882
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 80.0
Water Found Depth UOM: ft

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10 | **1 of 1** | **WSW/37.8** | **318.9 / 8.00** | **lot 31 con 8 ON** | **WWIS**

Well ID:	6709771	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	6/20/1989
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	4005
Casing Material:		**Form Version:**	1
Audit No:	55526	**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6709771.pdf

Additional Detail(s) (Map)

Well Completed Date: 1989/06/08
Year Completed: 1989
Depth (m): 27.432
Latitude: 43.4479578549572
Longitude: -80.1150557630907
Path: 670\6709771.pdf

Bore Hole Information

Bore Hole ID:	10473619	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571604.30
Code OB Desc:		***North83:***	4810942.00
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	3
Date Completed:	08-Jun-1989 00:00:00	***UTMRC Desc:***	margin of error : 10 - 30 m
Remarks:		***Location Method:***	gps
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932644973
Layer:	5
Color:	2
General Color:	GREY
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	73
Mat2 Desc:	HARD
Mat3:	
Mat3 Desc:	
Formation Top Depth:	79.0
Formation End Depth:	90.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932644969
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	77
Mat3 Desc:	LOOSE
Formation Top Depth:	0.0
Formation End Depth:	14.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932644970
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY

Mat2: 81
Mat2 Desc: SANDY
Mat3: 77
Mat3 Desc: LOOSE
Formation Top Depth: 14.0
Formation End Depth: 31.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932644971
Layer: 3
Color: 6
General Color: BROWN
Mat1: 05
Most Common Material: CLAY
Mat2: 77
Mat2 Desc: LOOSE
Mat3:
Mat3 Desc:
Formation Top Depth: 31.0
Formation End Depth: 54.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932644972
Layer: 4
Color: 2
General Color: GREY
Mat1: 28
Most Common Material: SAND
Mat2: 11
Mat2 Desc: GRAVEL
Mat3: 77
Mat3 Desc: LOOSE
Formation Top Depth: 54.0
Formation End Depth: 79.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966709771
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 11022189
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930771091
Layer: 2
Material: 4

Open Hole or Material:	OPEN HOLE
Depth From:	
Depth To:	90.0
Casing Diameter:	
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	930771090
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	79.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996709771
Pump Set At:	
Static Level:	24.0
Final Level After Pumping:	34.0
Recommended Pump Depth:	87.0
Pumping Rate:	24.0
Flowing Rate:	
Recommended Pump Rate:	10.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	2
Water State After Test:	CLOUDY
Pumping Test Method:	2
Pumping Duration HR:	1
Pumping Duration MIN:	
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	935130538
Test Type:	Draw Down
Test Duration:	60
Test Level:	24.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934343773
Test Type:	Draw Down
Test Duration:	15
Test Level:	24.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934870597
Test Type:	Draw Down
Test Duration:	45
Test Level:	24.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934618309
Test Type:	Draw Down
Test Duration:	30
Test Level:	24.0
Test Level UOM:	ft

Water Details

Water ID:	933963242
Layer:	1
Kind Code:	5
Kind:	Not stated
Water Found Depth:	81.0
Water Found Depth UOM:	ft

Water Details

Water ID:	933963243
Layer:	2
Kind Code:	5
Kind:	Not stated
Water Found Depth:	87.0
Water Found Depth UOM:	ft

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11 ***1 of 1*** ***SW/40.0*** ***313.0 / 2.11*** ***lot 31 con 8 ON*** ***WWIS***

Well ID:	6708111	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	1/25/1985
Sec. Water Use:	0	***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	4208
Casing Material:		***Form Version:***	1
Audit No:		***Owner:***	
Tag:		***Street Name:***	
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	031
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6708111.pdf

Additional Detail(s) (Map)

Well Completed Date:	1984/06/18
Year Completed:	1984
Depth (m):	23.7744
Latitude:	43.4465177166712
Longitude:	-80.1139644971427
Path:	670\6708111.pdf

Bore Hole Information

Bore Hole ID:	10472027	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571694.30
Code OB Desc:		***North83:***	4810783.00
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	4
Date Completed:	18-Jun-1984 00:00:00	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	p4
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932637951
Layer:	3
Color:	2
General Color:	GREY
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	70.0
Formation End Depth:	78.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932637949
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	81
Mat2 Desc:	SANDY
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	25.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932637950
Layer:	2
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL

Mat3:	81
Mat3 Desc:	SANDY
Formation Top Depth:	25.0
Formation End Depth:	70.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966708111
Method Construction Code:	4
Method Construction:	Rotary (Air)
Other Method Construction:	

Pipe Information

Pipe ID:	11020597
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930768204
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	70.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996708111
Pump Set At:	
Static Level:	2.0
Final Level After Pumping:	6.0
Recommended Pump Depth:	20.0
Pumping Rate:	40.0
Flowing Rate:	
Recommended Pump Rate:	20.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	934867845
Test Type:	Recovery
Test Duration:	45
Test Level:	2.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID: 935134896
Test Type: Recovery
Test Duration: 60
Test Level: 2.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934614929
Test Type: Recovery
Test Duration: 30
Test Level: 2.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934348041
Test Type: Recovery
Test Duration: 15
Test Level: 2.0
Test Level UOM: ft

Water Details

Water ID: 933961276
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 77.0
Water Found Depth UOM: ft

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12 | ***1 of 1*** | ***W/46.0*** | ***325.8 / 14.94*** | ***22 BACK ST lot 31 con 8 MORRISTON ON*** | ***WWIS***

Well ID: 7138233
Construction Date:
Primary Water Use: Domestic
Sec. Water Use:
Final Well Status: Water Supply
Water Type:
Casing Material:
Audit No: Z107712
Tag: A079610
Construction Method:
Elevation (m):
Elevation Reliability:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Flowing (Y/N):
Flow Rate:
Clear/Cloudy:

Data Entry Status:
Data Src:
Date Received: 1/21/2010
Selected Flag: TRUE
Abandonment Rec:
Contractor: 7385
Form Version: 7
Owner:
Street Name: 22 BACK ST
County: WELLINGTON
Municipality: PUSLINCH TOWNSHIP
Site Info:
Lot: 031
Concession: 08
Concession Name: CON
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/713\7138233.pdf

Additional Detail(s) (Map)

Well Completed Date: 2009/12/10
Year Completed: 2009

Depth (m): 35.9664
Latitude: 43.4500153364885
Longitude: -80.1133115460862
Path: 713\7138233.pdf

Bore Hole Information

Bore Hole ID: 1002924681
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 10-Dec-2009 00:00:00
Remarks:
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 17
East83: 571743.00
North83: 4811172.00
Org CS: UTM83
UTMRC: 4
UTMRC Desc: margin of error : 30 m - 100 m
Location Method: wwr

Overburden and Bedrock Materials Interval

Formation ID: 1003049022
Layer: 2
Color: 6
General Color: BROWN
Mat1: 28
Most Common Material: SAND
Mat2: 11
Mat2 Desc: GRAVEL
Mat3:
Mat3 Desc:
Formation Top Depth: 12.0
Formation End Depth: 40.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1003049025
Layer: 5
Color: 6
General Color: BROWN
Mat1: 26
Most Common Material: ROCK
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 97.0
Formation End Depth: 118.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1003049024
Layer: 4

Color:	2
General Color:	GREY
Mat1:	28
Most Common Material:	SAND
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	80.0
Formation End Depth:	97.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1003049021
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	12.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1003049023
Layer:	3
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	40.0
Formation End Depth:	80.0
Formation End Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1003049028
Layer:	1
Plug From:	0.0
Plug To:	20.0
Plug Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	1003049060
Method Construction Code:	B
Method Construction:	Other Method
Other Method Construction:	AIR ROTARY

Pipe Information

Pipe ID:	1003049019
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	1003049031
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	98.0
Depth To:	118.0
Casing Diameter:	6.125
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	1003049030
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	-2.0
Depth To:	98.0
Casing Diameter:	6.125
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Screen

Screen ID:	1003049032
Layer:	
Slot:	
Screen Top Depth:	
Screen End Depth:	
Screen Material:	
Screen Depth UOM:	ft
Screen Diameter UOM:	inch
Screen Diameter:	

Results of Well Yield Testing

Pump Test ID:	1003049020
Pump Set At:	70.0
Static Level:	54.0
Final Level After Pumping:	56.0
Recommended Pump Depth:	70.0
Pumping Rate:	12.0
Flowing Rate:	
Recommended Pump Rate:	12.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	0
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	

Draw Down & Recovery

Pump Test Detail ID: 1003049036
Test Type: Recovery
Test Duration: 2
Test Level: 54.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049038
Test Type: Recovery
Test Duration: 3
Test Level: 54.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049034
Test Type: Recovery
Test Duration: 1
Test Level: 54.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049037
Test Type: Draw Down
Test Duration: 3
Test Level: 56.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049043
Test Type: Draw Down
Test Duration: 10
Test Level: 56.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049044
Test Type: Recovery
Test Duration: 10
Test Level: 54.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049049
Test Type: Draw Down
Test Duration: 25
Test Level: 56.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049056
Test Type: Recovery
Test Duration: 50
Test Level: 54.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049046
Test Type: Recovery
Test Duration: 15
Test Level: 54.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049041
Test Type: Draw Down
Test Duration: 5
Test Level: 56.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049052
Test Type: Recovery
Test Duration: 30
Test Level: 54.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049054
Test Type: Recovery
Test Duration: 40
Test Level: 54.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049039
Test Type: Draw Down
Test Duration: 4
Test Level: 56.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049040
Test Type: Recovery
Test Duration: 4
Test Level: 54.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049047
Test Type: Draw Down
Test Duration: 20
Test Level: 56.0

Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049051
Test Type: Draw Down
Test Duration: 30
Test Level: 56.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049058
Test Type: Recovery
Test Duration: 60
Test Level: 54.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049033
Test Type: Draw Down
Test Duration: 1
Test Level: 56.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049050
Test Type: Recovery
Test Duration: 25
Test Level: 54.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049055
Test Type: Draw Down
Test Duration: 50
Test Level: 56.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049035
Test Type: Draw Down
Test Duration: 2
Test Level: 56.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049042
Test Type: Recovery
Test Duration: 5
Test Level: 54.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049053
Test Type: Draw Down
Test Duration: 40
Test Level: 56.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049045
Test Type: Draw Down
Test Duration: 15
Test Level: 56.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049048
Test Type: Recovery
Test Duration: 20
Test Level: 54.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1003049057
Test Type: Draw Down
Test Duration: 60
Test Level: 56.0
Test Level UOM: ft

Water Details

Water ID: 1003049029
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 118.0
Water Found Depth UOM: ft

Hole Diameter

Hole ID: 1003049026
Diameter: 8.75
Depth From: 0.0
Depth To: 20.0
Hole Depth UOM: ft
Hole Diameter UOM: inch

Hole Diameter

Hole ID: 1003049027
Diameter: 6.125
Depth From: 20.0
Depth To: 118.0
Hole Depth UOM: ft
Hole Diameter UOM: inch

13	*1 of 1*	*WSW/46.0*	*312.0 / 1.11*	*lot 31 con 7 ON*	*WWIS*

Well ID:	6702536	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	8/1/1961
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	4208
Casing Material:		**Form Version:**	1
Audit No:		**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	07
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6702536.pdf

Additional Detail(s) (Map)

Well Completed Date:	1961/06/16
Year Completed:	1961
Depth (m):	12.4968
Latitude:	43.4469072407689
Longitude:	-80.1154294781059
Path:	670\6702536.pdf

Bore Hole Information

Bore Hole ID:	10466679	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571575.30
Code OB Desc:		**North83:**	4810825.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	5
Date Completed:	16-Jun-1961 00:00:00	**UTMRC Desc:**	margin of error : 100 m - 300 m
Remarks:		**Location Method:**	p5
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932614243
Layer:	1
Color:	
General Color:	
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	05
Mat2 Desc:	CLAY
Mat3:	

Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 35.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614244
Layer: 2
Color:
General Color:
Mat1: 11
Most Common Material: GRAVEL
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 35.0
Formation End Depth: 41.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966702536
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 11015249
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930758956
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 41.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996702536
Pump Set At:
Static Level: 10.0
Final Level After Pumping: 20.0
Recommended Pump Depth: 25.0
Pumping Rate: 10.0
Flowing Rate:
Recommended Pump Rate: 5.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1

Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Water Details

Water ID:	933954874
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	39.0
Water Found Depth UOM:	ft

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14 | ***1 of 1*** | ***WSW/47.3*** | ***318.7 / 7.82*** | ***lot 31 con 8 ON*** | ***WWIS***

Well ID:	7204352	**Data Entry Status:**	
Construction Date:		**Data Src:**	
Primary Water Use:	Domestic	**Date Received:**	7/9/2013
Sec. Water Use:		**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	7154
Casing Material:		**Form Version:**	7
Audit No:	Z169250	**Owner:**	
Tag:	A133128	**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/720\7204352.pdf

Additional Detail(s) (Map)

Well Completed Date:	2013/06/15
Year Completed:	2013
Depth (m):	32.6136
Latitude:	43.4484328633805
Longitude:	-80.1136065590667
Path:	720\7204352.pdf

Bore Hole Information

Bore Hole ID:	1004400231	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571721.00
Code OB Desc:		**North83:**	4810996.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	15-Jun-2013 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr
Elevrc Desc:			

Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Overburden and Bedrock Materials Interval

Formation ID: 1004814053
Layer: 1
Color: 6
General Color: BROWN
Mat1: 05
Most Common Material: CLAY
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 18.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1004814054
Layer: 2
Color: 2
General Color: GREY
Mat1: 05
Most Common Material: CLAY
Mat2: 12
Mat2 Desc: STONES
Mat3:
Mat3 Desc:
Formation Top Depth: 18.0
Formation End Depth: 79.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1004814055
Layer: 3
Color: 2
General Color: GREY
Mat1: 15
Most Common Material: LIMESTONE
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 79.0
Formation End Depth: 107.0
Formation End Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1004814078
Layer: 1

Plug From: 0.0
Plug To: 82.0
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 1004814077
Method Construction Code: 2
Method Construction: Rotary (Convent.)
Other Method Construction:

Pipe Information

Pipe ID: 1004814051
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1004814061
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From: 82.0
Depth To: 107.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 1004814060
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From: 0.0
Depth To: 82.0
Casing Diameter: 6.25
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Screen

Screen ID: 1004814062
Layer:
Slot:
Screen Top Depth:
Screen End Depth:
Screen Material:
Screen Depth UOM: ft
Screen Diameter UOM: inch
Screen Diameter:

Results of Well Yield Testing

Pump Test ID: 1004814052
Pump Set At: 60.0
Static Level: 25.0
Final Level After Pumping: 52.0

Recommended Pump Depth:	60.0
Pumping Rate:	15.0
Flowing Rate:	
Recommended Pump Rate:	15.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	0
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	

Draw Down & Recovery

Pump Test Detail ID:	1004814071
Test Type:	Draw Down
Test Duration:	25
Test Level:	47.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1004814063
Test Type:	Draw Down
Test Duration:	1
Test Level:	27.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1004814067
Test Type:	Draw Down
Test Duration:	5
Test Level:	34.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1004814069
Test Type:	Draw Down
Test Duration:	15
Test Level:	43.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1004814066
Test Type:	Draw Down
Test Duration:	4
Test Level:	33.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1004814070
Test Type:	Draw Down
Test Duration:	20
Test Level:	47.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID: 1004814072
Test Type: Draw Down
Test Duration: 30
Test Level: 49.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004814064
Test Type: Draw Down
Test Duration: 2
Test Level: 29.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004814068
Test Type: Draw Down
Test Duration: 10
Test Level: 39.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004814074
Test Type: Draw Down
Test Duration: 50
Test Level: 52.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004814065
Test Type: Draw Down
Test Duration: 3
Test Level: 31.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004814073
Test Type: Draw Down
Test Duration: 40
Test Level: 50.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004814075
Test Type: Draw Down
Test Duration: 60
Test Level: 52.0
Test Level UOM: ft

Water Details

Water ID: 1004814058

Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	101.0
Water Found Depth UOM:	ft

Water Details

Water ID:	1004814059
Layer:	2
Kind Code:	1
Kind:	FRESH
Water Found Depth:	104.0
Water Found Depth UOM:	ft

Hole Diameter

Hole ID:	1004814056
Diameter:	8.75
Depth From:	0.0
Depth To:	82.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

Hole Diameter

Hole ID:	1004814057
Diameter:	6.0
Depth From:	82.0
Depth To:	107.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

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15 | ***1 of 1*** | ***SW/49.0*** | ***314.6 / 3.73*** | ***69 QUEEN STREET lot 31 con 8 MORRISTON ON*** | ***WWIS***

Well ID:	6715615	**Data Entry Status:**	
Construction Date:		**Data Src:**	
Primary Water Use:		**Date Received:**	1/18/2006
Sec. Water Use:		**Selected Flag:**	TRUE
Final Well Status:	Abandoned-Other	**Abandonment Rec:**	Yes
Water Type:		**Contractor:**	2663
Casing Material:		**Form Version:**	3
Audit No:	Z41559	**Owner:**	
Tag:		**Street Name:**	69 QUEEN STREET
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6715615.pdf

Additional Detail(s) (Map)

Well Completed Date: 2005/12/15

Year Completed:	2005
Depth (m):	
Latitude:	43.446373883992
Longitude:	-80.1139950210533
Path:	671\6715615.pdf

Bore Hole Information

Bore Hole ID:	11558136	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571692.00
Code OB Desc:		**North83:**	4810767.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	3
Date Completed:	15-Dec-2005 00:00:00	**UTMRC Desc:**	margin of error : 10 - 30 m
Remarks:		**Location Method:**	wwr
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Annular Space/Abandonment Sealing Record

Plug ID:	933289452
Layer:	1
Plug From:	0.0
Plug To:	14.0
Plug Depth UOM:	m

Method of Construction & Well Use

Method Construction ID:	966715615
Method Construction Code:	
Method Construction:	
Other Method Construction:	

Pipe Information

Pipe ID:	11567743
Casing No:	1
Comment:	
Alt Name:	

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16 | ***1 of 1*** | ***WSW/49.7*** | ***318.9 / 8.00*** | ***lot 31 con 8 ON*** | ***WWIS***

Well ID:	6710612	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	5/22/1991
Sec. Water Use:		**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	4005
Casing Material:		**Form Version:**	1
Audit No:	76456	**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP

Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6710612.pdf

Additional Detail(s) (Map)

Well Completed Date:	1991/05/02
Year Completed:	1991
Depth (m):	23.4696
Latitude:	43.4477808771785
Longitude:	-80.1154575301166
Path:	671\6710612.pdf

Bore Hole Information

Bore Hole ID:	10474457	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571572.00
Code OB Desc:		**North83:**	4810922.00
Open Hole:		**Org CS:**	N83
Cluster Kind:		**UTMRC:**	3
Date Completed:	02-May-1991 00:00:00	**UTMRC Desc:**	margin of error : 10 - 30 m
Remarks:		**Location Method:**	
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932648714
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	85
Mat3 Desc:	SOFT
Formation Top Depth:	0.0
Formation End Depth:	8.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932648718
Layer:	5
Color:	2

General Color:	GREY
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	28
Mat2 Desc:	SAND
Mat3:	79
Mat3 Desc:	PACKED
Formation Top Depth:	45.0
Formation End Depth:	65.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932648720
Layer:	7
Color:	2
General Color:	GREY
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	72.0
Formation End Depth:	77.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932648719
Layer:	6
Color:	2
General Color:	GREY
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	28
Mat2 Desc:	SAND
Mat3:	
Mat3 Desc:	
Formation Top Depth:	65.0
Formation End Depth:	72.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932648716
Layer:	3
Color:	6
General Color:	BROWN
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	28
Mat2 Desc:	SAND
Mat3:	
Mat3 Desc:	
Formation Top Depth:	19.0
Formation End Depth:	27.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932648717
Layer:	4
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	27.0
Formation End Depth:	45.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932648715
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	28
Mat2 Desc:	SAND
Mat3:	77
Mat3 Desc:	LOOSE
Formation Top Depth:	8.0
Formation End Depth:	19.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966710612
Method Construction Code:	1
Method Construction:	Cable Tool
Other Method Construction:	

Pipe Information

Pipe ID:	11023027
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930772622
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	
Depth To:	77.0
Casing Diameter:	
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID: 930772621
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 72.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996710612
Pump Set At:
Static Level: 2.0
Final Level After Pumping: 18.0
Recommended Pump Depth:
Pumping Rate: 48.0
Flowing Rate:
Recommended Pump Rate:
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 2
Water State After Test: CLOUDY
Pumping Test Method: 2
Pumping Duration HR: 2
Pumping Duration MIN: 0
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 934346572
Test Type: Draw Down
Test Duration: 15
Test Level: 18.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 935133249
Test Type: Draw Down
Test Duration: 60
Test Level: 18.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934620536
Test Type: Draw Down
Test Duration: 30
Test Level: 18.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934872810
Test Type: Draw Down
Test Duration: 45
Test Level: 18.0
Test Level UOM: ft

Water Details

Water ID:	933964282
Layer:	1
Kind Code:	5
Kind:	Not stated
Water Found Depth:	73.0
Water Found Depth UOM:	ft

17 | ***1 of 1*** | ***SW/50.7*** | ***312.9 / 2.00*** | ***66 QUEEN ST lot 31 con 7 MORRISTON ON*** | ***WWIS***

Well ID:	7314679	***Data Entry Status:***	
Construction Date:		***Data Src:***	
Primary Water Use:	Monitoring	***Date Received:***	7/16/2018
Sec. Water Use:		***Selected Flag:***	TRUE
Final Well Status:	Abandoned-Other	***Abandonment Rec:***	Yes
Water Type:		***Contractor:***	7221
Casing Material:		***Form Version:***	7
Audit No:	Z293135	***Owner:***	
Tag:	A090746	***Street Name:***	66 QUEEN ST
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	031
Well Depth:		***Concession:***	07
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map):

Additional Detail(s) (Map)

Well Completed Date:	2018/07/04
Year Completed:	2018
Depth (m):	
Latitude:	43.446224369552
Longitude:	-80.114454464432
Path:	

Bore Hole Information

Bore Hole ID:	1007164550	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571655.00
Code OB Desc:		***North83:***	4810750.00
Open Hole:		***Org CS:***	UTM83
Cluster Kind:		***UTMRC:***	4
Date Completed:	04-Jul-2018 00:00:00	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	wwr
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1007394302
Layer:	
Color:	
General Color:	
Mat1:	
Most Common Material:	
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	
Formation End Depth:	
Formation End Depth UOM:	m

Annular Space/Abandonment Sealing Record

Plug ID:	1007394310
Layer:	1
Plug From:	0.0
Plug To:	3.0
Plug Depth UOM:	m

Annular Space/Abandonment Sealing Record

Plug ID:	1007394309
Layer:	1
Plug From:	0.0
Plug To:	3.0
Plug Depth UOM:	m

Method of Construction & Well Use

Method Construction ID:	1007394308
Method Construction Code:	
Method Construction:	
Other Method Construction:	

Pipe Information

Pipe ID:	1007394301
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	1007394305
Layer:	1
Material:	5
Open Hole or Material:	PLASTIC
Depth From:	1.0
Depth To:	
Casing Diameter:	5.099999904632568
Casing Diameter UOM:	cm
Casing Depth UOM:	m

Construction Record - Screen

Screen ID:	1007394306
Layer:	
Slot:	
Screen Top Depth:	
Screen End Depth:	
Screen Material:	
Screen Depth UOM:	m
Screen Diameter UOM:	cm
Screen Diameter:	

Water Details

Water ID:	1007394304
Layer:	
Kind Code:	
Kind:	
Water Found Depth:	
Water Found Depth UOM:	m

Hole Diameter

Hole ID:	1007394303
Diameter:	
Depth From:	
Depth To:	
Hole Depth UOM:	m
Hole Diameter UOM:	cm

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18 ***1 of 1*** ***NNE/57.9*** ***325.9 / 15.03*** ***lot 31 con 8 ON*** ***WWIS***

Well ID:	6712182	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	2/11/1997
Sec. Water Use:	0	***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	6865
Casing Material:		***Form Version:***	1
Audit No:	176912	***Owner:***	
Tag:		***Street Name:***	
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	031
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6712182.pdf

Additional Detail(s) (Map)

Well Completed Date:	1997/01/07
Year Completed:	1997
Depth (m):	51.816
Latitude:	43.4539050953534

Longitude: -80.1086654562889
Path: 671\6712182.pdf

Bore Hole Information

Bore Hole ID: 10476015
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 07-Jan-1997 00:00:00
Remarks:
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 17
East83: 572114.30
North83: 4811608.00
Org CS:
UTMRC: 3
UTMRC Desc: margin of error : 10 - 30 m
Location Method: gps

Overburden and Bedrock Materials Interval

Formation ID: 932655978
Layer: 1
Color:
General Color:
Mat1: 02
Most Common Material: TOPSOIL
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 2.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932655983
Layer: 6
Color: 6
General Color: BROWN
Mat1: 15
Most Common Material: LIMESTONE
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 88.0
Formation End Depth: 154.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932655979
Layer: 2
Color: 6
General Color: BROWN

Mat1: 11
Most Common Material: GRAVEL
Mat2: 28
Mat2 Desc: SAND
Mat3:
Mat3 Desc:
Formation Top Depth: 2.0
Formation End Depth: 16.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932655982
Layer: 5
Color: 2
General Color: GREY
Mat1: 11
Most Common Material: GRAVEL
Mat2: 28
Mat2 Desc: SAND
Mat3: 06
Mat3 Desc: SILT
Formation Top Depth: 61.0
Formation End Depth: 88.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932655981
Layer: 4
Color: 2
General Color: GREY
Mat1: 11
Most Common Material: GRAVEL
Mat2: 05
Mat2 Desc: CLAY
Mat3:
Mat3 Desc:
Formation Top Depth: 43.0
Formation End Depth: 61.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932655980
Layer: 3
Color: 6
General Color: BROWN
Mat1: 05
Most Common Material: CLAY
Mat2: 11
Mat2 Desc: GRAVEL
Mat3:
Mat3 Desc:
Formation Top Depth: 16.0
Formation End Depth: 43.0
Formation End Depth UOM: ft

Overburden and Bedrock

Materials Interval

Formation ID:	932655984
Layer:	7
Color:	2
General Color:	GREY
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	154.0
Formation End Depth:	170.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966712182
Method Construction Code:	2
Method Construction:	Rotary (Convent.)
Other Method Construction:	

Pipe Information

Pipe ID:	11024585
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930775438
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	
Depth To:	170.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	930775437
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	92.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996712182
Pump Set At:	
Static Level:	42.0
Final Level After Pumping:	90.0
Recommended Pump Depth:	90.0

Pumping Rate:	12.0
Flowing Rate:	
Recommended Pump Rate:	10.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	934342262
Test Type:	Draw Down
Test Duration:	15
Test Level:	81.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934868014
Test Type:	Draw Down
Test Duration:	45
Test Level:	89.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	935137807
Test Type:	Draw Down
Test Duration:	60
Test Level:	90.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934616173
Test Type:	Draw Down
Test Duration:	30
Test Level:	87.0
Test Level UOM:	ft

Water Details

Water ID:	933966379
Layer:	2
Kind Code:	1
Kind:	FRESH
Water Found Depth:	170.0
Water Found Depth UOM:	ft

Water Details

Water ID:	933966378
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	110.0
Water Found Depth UOM:	ft

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
19	1 of 1	SW/58.4	314.9 / 4.00	71 QUEEN ST. lot 31 con 8 MORRISTON ON	WWIS

Well ID:	7114630	**Data Entry Status:**	
Construction Date:		**Data Src:**	
Primary Water Use:	Domestic	**Date Received:**	11/10/2008
Sec. Water Use:		**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	7385
Casing Material:		**Form Version:**	7
Audit No:	Z90630	**Owner:**	
Tag:	A066878	**Street Name:**	71 QUEEN ST.
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/711\7114630.pdf

Additional Detail(s) (Map)

Well Completed Date:	2008/10/20
Year Completed:	2008
Depth (m):	23.7744
Latitude:	43.4463459165166
Longitude:	-80.1138718449688
Path:	711\7114630.pdf

Bore Hole Information

Bore Hole ID:	1001864611	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571702.00
Code OB Desc:		**North83:**	4810764.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	3
Date Completed:	20-Oct-2008 00:00:00	**UTMRC Desc:**	margin of error : 10 - 30 m
Remarks:		**Location Method:**	wwr
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1001873878
Layer:	4
Color:	6
General Color:	BROWN
Mat1:	26

Most Common Material:	ROCK
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	76.0
Formation End Depth:	78.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1001873875
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	10.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1001873876
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	28
Mat2 Desc:	SAND
Mat3:	
Mat3 Desc:	
Formation Top Depth:	10.0
Formation End Depth:	30.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1001873877
Layer:	3
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	30.0
Formation End Depth:	76.0
Formation End Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID: 1001873881
Layer: 1
Plug From: 0.0
Plug To: 20.0
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 1001873913
Method Construction Code: B
Method Construction: Other Method
Other Method Construction: AIR ROTARY

Pipe Information

Pipe ID: 1001873873
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1001873884
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From: 76.0
Depth To: 78.0
Casing Diameter: 6.125
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 1001873883
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From: -2.0
Depth To: 76.0
Casing Diameter: 6.125
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Screen

Screen ID: 1001873885
Layer:
Slot:
Screen Top Depth:
Screen End Depth:
Screen Material:
Screen Depth UOM: ft
Screen Diameter UOM: inch
Screen Diameter:

Results of Well Yield Testing

Pump Test ID: 1001873874

Pump Set At:	40.0
Static Level:	6.0
Final Level After Pumping:	6.5
Recommended Pump Depth:	40.0
Pumping Rate:	12.0
Flowing Rate:	
Recommended Pump Rate:	12.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	0
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	1001873892
Test Type:	Draw Down
Test Duration:	4
Test Level:	6.5
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1001873897
Test Type:	Recovery
Test Duration:	10
Test Level:	6.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1001873900
Test Type:	Draw Down
Test Duration:	20
Test Level:	6.5
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1001873906
Test Type:	Draw Down
Test Duration:	40
Test Level:	6.5
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1001873907
Test Type:	Recovery
Test Duration:	40
Test Level:	6.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1001873910
Test Type:	Draw Down
Test Duration:	60

Test Level: 6.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873896
Test Type: Draw Down
Test Duration: 10
Test Level: 6.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873903
Test Type: Recovery
Test Duration: 25
Test Level: 6.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873889
Test Type: Recovery
Test Duration: 2
Test Level: 6.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873891
Test Type: Recovery
Test Duration: 3
Test Level: 6.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873894
Test Type: Draw Down
Test Duration: 5
Test Level: 6.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873888
Test Type: Draw Down
Test Duration: 2
Test Level: 6.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873886
Test Type: Draw Down
Test Duration: 1
Test Level: 6.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873890
Test Type: Draw Down
Test Duration: 3
Test Level: 6.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873899
Test Type: Recovery
Test Duration: 15
Test Level: 6.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873905
Test Type: Recovery
Test Duration: 30
Test Level: 6.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873908
Test Type: Draw Down
Test Duration: 50
Test Level: 6.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873909
Test Type: Recovery
Test Duration: 50
Test Level: 6.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873893
Test Type: Recovery
Test Duration: 4
Test Level: 6.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873901
Test Type: Recovery
Test Duration: 20
Test Level: 6.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873887
Test Type: Recovery

Test Duration: 1
Test Level: 6.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873895
Test Type: Recovery
Test Duration: 5
Test Level: 6.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873898
Test Type: Draw Down
Test Duration: 15
Test Level: 6.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873902
Test Type: Draw Down
Test Duration: 25
Test Level: 6.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873904
Test Type: Draw Down
Test Duration: 30
Test Level: 6.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873911
Test Type: Recovery
Test Duration: 60
Test Level: 6.0
Test Level UOM: ft

Water Details

Water ID: 1001873882
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 78.0
Water Found Depth UOM: ft

Hole Diameter

Hole ID: 1001873880
Diameter: 6.125
Depth From: 20.0
Depth To: 78.0
Hole Depth UOM: ft

Hole Diameter UOM: inch

Hole Diameter

Hole ID: 1001873879
Diameter: 8.75
Depth From: 0.0
Depth To: 20.0
Hole Depth UOM: ft
Hole Diameter UOM: inch

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20 ***1 of 2*** ***SW/58.7*** ***314.2 / 3.39*** ***DRS Developments Ltd.***
66 Queen Street Puslinch County of Wellington
N0B 2C0 TOWNSHIP OF PUSLINCH
ON ***EBR***

EBR Registry No: 013-2416
Ministry Ref No: 3466-AUVKKQ
Notice Type: Instrument Decision
Notice Stage:
Notice Date: July 23, 2018
Proposal Date: February 15, 2018
Year: 2018
Instrument Type: Environmental Compliance Approval (project type: sewage) - EPA Part II.1-sewage
Off Instrument Name:
Posted By:
Company Name: DRS Developments Ltd.(EPA Part II.1-sewage) - Environmental Compliance Approval (project type: sewage)
Site Address:
Location Other:
Proponent Name: DRS Developments Ltd.
Proponent Address: 7468 Gore Road
Puslinch Ontario
Canada N0B 2J0
Comment Period:
URL: http://www.ebr.gov.on.ca/ERS-WEB-External/displaynoticecontent.do?noticeId=MTM0NjI4&statusId=MjA2NDQy&language=en

Decision Posted:
Exception Posted:
Section:
Act 1:
Act 2:
Site Location Map:

Site Location Details:

66 Queen Street

Puslinch County of Wellington N0B 2C0
TOWNSHIP OF PUSLINCH

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20 ***2 of 2*** ***SW/58.7*** ***314.2 / 3.39*** ***DRS Developments Ltd.***
66 Queen St
Puslinch ON N0B 2J0 ***ECA***

Approval No: 6950-AXZSGV
Approval Date: 2018-06-26
Status: Approved
Record Type: ECA
Link Source: IDS
SWP Area Name:
Approval Type: ECA-MUNICIPAL AND PRIVATE SEWAGE WORKS
Project Type: MUNICIPAL AND PRIVATE SEWAGE WORKS
Business Name: DRS Developments Ltd.
Address: 66 Queen St
Full Address:
Full PDF Link: https://www.accessenvironment.ene.gov.on.ca/instruments/3466-AUVKKQ-14.pdf
PDF Site Location:

MOE District:
City:
Longitude:
Latitude:
Geometry X:
Geometry Y:

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
21	1 of 1	W/58.8	324.5 / 13.64	7501 BADENOCH ST.COUNTY RD.#36 lot 31 con 8 MORRISTON ON	WWIS

Well ID:	6714759	**Data Entry Status:**	
Construction Date:		**Data Src:**	
Primary Water Use:	Domestic	**Date Received:**	12/8/2003
Sec. Water Use:		**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	2336
Casing Material:		**Form Version:**	3
Audit No:	Z01886	**Owner:**	
Tag:	A001796	**Street Name:**	7501 BADENOCH ST.COUNTY RD.#36
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6714759.pdf

Additional Detail(s) (Map)

Well Completed Date:	2003/11/17
Year Completed:	2003
Depth (m):	30.5
Latitude:	43.4506425959969
Longitude:	-80.112919243533
Path:	671\6714759.pdf

Bore Hole Information

Bore Hole ID:	11108125	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571774.00
Code OB Desc:		**North83:**	4811242.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	5
Date Completed:	17-Nov-2003 00:00:00	**UTMRC Desc:**	margin of error : 100 m - 300 m
Remarks:		**Location Method:**	wwr
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932965284
Layer:	2
Color:	6
General Color:	BROWN

Mat1: 28
Most Common Material: SAND
Mat2: 11
Mat2 Desc: GRAVEL
Mat3:
Mat3 Desc:
Formation Top Depth: 6.099999904632568
Formation End Depth: 15.0
Formation End Depth UOM: m

Overburden and Bedrock Materials Interval

Formation ID: 932965283
Layer: 1
Color: 6
General Color: BROWN
Mat1: 05
Most Common Material: CLAY
Mat2: 12
Mat2 Desc: STONES
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 6.099999904632568
Formation End Depth UOM: m

Overburden and Bedrock Materials Interval

Formation ID: 932965285
Layer: 3
Color: 2
General Color: GREY
Mat1: 05
Most Common Material: CLAY
Mat2: 11
Mat2 Desc: GRAVEL
Mat3:
Mat3 Desc:
Formation Top Depth: 15.0
Formation End Depth: 27.0
Formation End Depth UOM: m

Overburden and Bedrock Materials Interval

Formation ID: 932965286
Layer: 4
Color: 6
General Color: BROWN
Mat1: 26
Most Common Material: ROCK
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 27.0
Formation End Depth: 30.5
Formation End Depth UOM: m

Annular Space/Abandonment

Sealing Record

Plug ID:	933251983
Layer:	1
Plug From:	0.0
Plug To:	6.099999904632568
Plug Depth UOM:	m

Method of Construction & Well Use

Method Construction ID:	966714759
Method Construction Code:	4
Method Construction:	Rotary (Air)
Other Method Construction:	

Pipe Information

Pipe ID:	11116074
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930841472
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	46.0
Depth To:	27.0
Casing Diameter:	16.0
Casing Diameter UOM:	cm
Casing Depth UOM:	m

Construction Record - Casing

Casing ID:	930841473
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	27.0
Depth To:	30.5
Casing Diameter:	
Casing Diameter UOM:	cm
Casing Depth UOM:	m

Results of Well Yield Testing

Pump Test ID:	11119497
Pump Set At:	25.0
Static Level:	17.0
Final Level After Pumping:	18.0
Recommended Pump Depth:	25.0
Pumping Rate:	61.0
Flowing Rate:	
Recommended Pump Rate:	61.0
Levels UOM:	m
Rate UOM:	LPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1

Pumping Duration HR: 1
Pumping Duration MIN: 0
Flowing:

Draw Down & Recovery

Pump Test Detail ID: 11168094
Test Type: Draw Down
Test Duration: 3
Test Level: 18.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11168102
Test Type: Draw Down
Test Duration: 40
Test Level: 18.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11168105
Test Type: Recovery
Test Duration: 1
Test Level: 18.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11168098
Test Type: Draw Down
Test Duration: 15
Test Level: 18.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11168092
Test Type: Draw Down
Test Duration: 1
Test Level: 18.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11168104
Test Type: Draw Down
Test Duration: 60
Test Level: 18.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11168095
Test Type: Draw Down
Test Duration: 4
Test Level: 18.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11168106
Test Type: Recovery
Test Duration: 2
Test Level: 17.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11168099
Test Type: Draw Down
Test Duration: 20
Test Level: 18.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11168101
Test Type: Draw Down
Test Duration: 30
Test Level: 18.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11168103
Test Type: Draw Down
Test Duration: 50
Test Level: 18.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11168096
Test Type: Draw Down
Test Duration: 5
Test Level: 18.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11168097
Test Type: Draw Down
Test Duration: 10
Test Level: 18.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11168107
Test Type: Recovery
Test Duration: 3
Test Level: 17.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11168108

Test Type: Recovery
Test Duration: 4
Test Level: 17.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11168110
Test Type: Recovery
Test Duration: 10
Test Level: 17.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11168091
Test Type: Draw Down
Test Duration: 0
Test Level: 17.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11168093
Test Type: Draw Down
Test Duration: 2
Test Level: 18.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11168100
Test Type: Draw Down
Test Duration: 25
Test Level: 18.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11168109
Test Type: Recovery
Test Duration: 5
Test Level: 17.0
Test Level UOM: m

Water Details

Water ID: 934049343
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 3.0999999046325684
Water Found Depth UOM: m

Hole Diameter

Hole ID: 11116073
Diameter: 16.0
Depth From: 6.0
Depth To: 30.5

Hole Depth UOM: m
Hole Diameter UOM: cm

Hole Diameter

Hole ID: 11116072
Diameter: 22.0
Depth From: 0.0
Depth To: 6.0
Hole Depth UOM: m
Hole Diameter UOM: cm

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22 | **1 of 1** | **SW/64.1** | **314.9 / 4.03** | **75 QUEEN ST lot 31 con 8 MORRISTON ON** | **WWIS**

Well ID: 7274863
Construction Date:
Primary Water Use: Not Used
Sec. Water Use:
Final Well Status: Abandoned-Other
Water Type:
Casing Material:
Audit No: Z230803
Tag:
Construction Method:
Elevation (m):
Elevation Reliability:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Flowing (Y/N):
Flow Rate:
Clear/Cloudy:

Data Entry Status:
Data Src:
Date Received: 11/16/2016
Selected Flag: TRUE
Abandonment Rec: Yes
Contractor: 7578
Form Version: 7
Owner:
Street Name: 75 QUEEN ST
County: WELLINGTON
Municipality: PUSLINCH TOWNSHIP
Site Info:
Lot: 031
Concession: 08
Concession Name: CON
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/727\7274863.pdf

Additional Detail(s) (Map)

Well Completed Date: 2016/11/07
Year Completed: 2016
Depth (m):
Latitude: 43.4462167093592
Longitude: -80.1134659038319
Path: 727\7274863.pdf

Bore Hole Information

Bore Hole ID: 1006290689
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 07-Nov-2016 00:00:00
Remarks:
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:

Elevation:
Elevrc:
Zone: 17
East83: 571735.00
North83: 4810750.00
Org CS: dmi83
UTMRC: 4
UTMRC Desc: margin of error : 30 m - 100 m
Location Method: wwr

Source Revision Comment:
Supplier Comment:

Overburden and Bedrock Materials Interval

Formation ID: 1006412619
Layer:
Color:
General Color:
Mat1:
Most Common Material:
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth:
Formation End Depth:
Formation End Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1006412628
Layer: 3
Plug From: 11.0
Plug To: 0.0
Plug Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1006412626
Layer: 1
Plug From: 13.5
Plug To: 12.0
Plug Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1006412629
Layer: 1
Plug From: 13.5
Plug To: 12.0
Plug Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1006412630
Layer: 2
Plug From: 12.0
Plug To: 11.0
Plug Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1006412631
Layer: 3

Plug From: 11.0
Plug To: 0.0
Plug Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1006412627
Layer: 2
Plug From: 12.0
Plug To: 11.0
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 1006412625
Method Construction Code: B
Method Construction: Other Method
Other Method Construction: DUG WELL

Pipe Information

Pipe ID: 1006412618
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1006412622
Layer: 1
Material: 7
Open Hole or Material: OTHER
Depth From: 13.5
Depth To: 0.0
Casing Diameter: 48.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Screen

Screen ID: 1006412623
Layer:
Slot:
Screen Top Depth:
Screen End Depth:
Screen Material:
Screen Depth UOM: ft
Screen Diameter UOM: inch
Screen Diameter:

Water Details

Water ID: 1006412621
Layer:
Kind Code:
Kind:
Water Found Depth:
Water Found Depth UOM: ft

Hole Diameter

Hole ID:	1006412620
Diameter:	
Depth From:	
Depth To:	
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

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23 | ***1 of 1*** | ***SW/64.4*** | ***314.9 / 4.00*** | ***71 Queen Street Morriston ON N0B 2C0*** | ***EHS***

Order No:	20190304147	***Nearest Intersection:***	
Status:	C	***Municipality:***	
Report Type:	Standard Report	***Client Prov/State:***	ON
Report Date:	11-MAR-19	***Search Radius (km):***	.25
Date Received:	04-MAR-19	***X:***	-80.113683
Previous Site Name:	Mark Wigood	***Y:***	43.446352
Lot/Building Size:	60 feet frontage by 290 feet depth		
Additional Info Ordered:	Title Searches; City Directory; Aerial Photos		

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24 | ***1 of 1*** | ***N/70.6*** | ***327.5 / 16.63*** | ***lot 31 con 8 ON*** | ***WWIS***

Well ID:	7199020	***Data Entry Status:***	
Construction Date:		***Data Src:***	
Primary Water Use:	Domestic	***Date Received:***	3/20/2013
Sec. Water Use:		***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	7154
Casing Material:		***Form Version:***	7
Audit No:	Z152235	***Owner:***	
Tag:	A125482	***Street Name:***	
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	031
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/719\7199020.pdf

Additional Detail(s) (Map)

Well Completed Date:	2013/03/06
Year Completed:	2013
Depth (m):	42.9768
Latitude:	43.4530599202053
Longitude:	-80.109979356639
Path:	719\7199020.pdf

Bore Hole Information

Bore Hole ID:	1004266070	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17

Code OB:		***East83:***	572009.00
Code OB Desc:		***North83:***	4811513.00
Open Hole:		***Org CS:***	UTM83
Cluster Kind:		***UTMRC:***	4
Date Completed:	06-Mar-2013 00:00:00	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	wwr
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1004922709
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	28
Mat2 Desc:	SAND
Mat3:	12
Mat3 Desc:	STONES
Formation Top Depth:	0.0
Formation End Depth:	9.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1004922713
Layer:	5
Color:	2
General Color:	GREY
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	89.0
Formation End Depth:	141.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1004922710
Layer:	2
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	06
Mat3 Desc:	SILT
Formation Top Depth:	9.0
Formation End Depth:	23.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID: 1004922712
Layer: 4
Color: 2
General Color: GREY
Mat1: 05
Most Common Material: CLAY
Mat2: 12
Mat2 Desc: STONES
Mat3:
Mat3 Desc:
Formation Top Depth: 67.0
Formation End Depth: 89.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1004922711
Layer: 3
Color: 2
General Color: GREY
Mat1: 28
Most Common Material: SAND
Mat2: 12
Mat2 Desc: STONES
Mat3:
Mat3 Desc:
Formation Top Depth: 23.0
Formation End Depth: 67.0
Formation End Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1004922737
Layer: 1
Plug From: 0.0
Plug To:
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 1004922736
Method Construction Code: 2
Method Construction: Rotary (Convent.)
Other Method Construction:

Pipe Information

Pipe ID: 1004922707
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID:	1004922718
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	94.0
Depth To:	141.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	1004922717
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	0.0
Depth To:	94.0
Casing Diameter:	6.25
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Screen

Screen ID:	1004922719
Layer:	1
Slot:	
Screen Top Depth:	
Screen End Depth:	
Screen Material:	
Screen Depth UOM:	ft
Screen Diameter UOM:	inch
Screen Diameter:	

Results of Well Yield Testing

Pump Test ID:	1004922708
Pump Set At:	80.0
Static Level:	52.0
Final Level After Pumping:	70.0
Recommended Pump Depth:	80.0
Pumping Rate:	12.0
Flowing Rate:	
Recommended Pump Rate:	12.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	0
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	1004922730
Test Type:	Draw Down
Test Duration:	10
Test Level:	68.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID: 1004922721
Test Type: Recovery
Test Duration: 1
Test Level: 64.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004922725
Test Type: Recovery
Test Duration: 3
Test Level: 60.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004922724
Test Type: Draw Down
Test Duration: 3
Test Level: 60.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004922733
Test Type: Draw Down
Test Duration: 60
Test Level: 70.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004922723
Test Type: Recovery
Test Duration: 2
Test Level: 62.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004922726
Test Type: Draw Down
Test Duration: 4
Test Level: 62.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004922728
Test Type: Draw Down
Test Duration: 5
Test Level: 64.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004922729
Test Type: Recovery
Test Duration: 5

Test Level: 56.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004922731
Test Type: Recovery
Test Duration: 10
Test Level: 52.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004922732
Test Type: Draw Down
Test Duration: 15
Test Level: 70.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004922734
Test Type: Recovery
Test Duration: 60
Test Level: 52.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004922720
Test Type: Draw Down
Test Duration: 1
Test Level: 56.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004922722
Test Type: Draw Down
Test Duration: 2
Test Level: 58.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004922727
Test Type: Recovery
Test Duration: 4
Test Level: 58.0
Test Level UOM: ft

Water Details

Water ID: 1004922716
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 137.0
Water Found Depth UOM: ft

Hole Diameter

Hole ID:	1004922714
Diameter:	8.75
Depth From:	0.0
Depth To:	94.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

Hole Diameter

Hole ID:	1004922715
Diameter:	6.0
Depth From:	94.0
Depth To:	141.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

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25 ***1 of 1*** ***SSW/74.8*** ***314.2 / 3.32*** ***85 QUEEN ST MORRISTON lot 32 con 8 Wellington ON*** ***WWIS***

Well ID:	7285591	***Data Entry Status:***	
Construction Date:		***Data Src:***	
Primary Water Use:	Domestic	***Date Received:***	4/24/2017
Sec. Water Use:		***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	2123
Casing Material:		***Form Version:***	7
Audit No:	Z233697	***Owner:***	
Tag:	A204504	***Street Name:***	85 QUEEN ST MORRISTON
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	032
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/728\7285591.pdf

Additional Detail(s) (Map)

Well Completed Date:	2016/12/20
Year Completed:	2016
Depth (m):	26.2128
Latitude:	43.4456607022347
Longitude:	-80.112596585529
Path:	728\7285591.pdf

Bore Hole Information

Bore Hole ID:	1006384163	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571806.00
Code OB Desc:		***North83:***	4810689.00
Open Hole:		***Org CS:***	UTM83
Cluster Kind:		***UTMRC:***	4

Date Completed: 20-Dec-2016 00:00:00
Remarks:
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:
UTMRC Desc: margin of error : 30 m - 100 m
Location Method: wwr

Overburden and Bedrock Materials Interval

Formation ID: 1006695946
Layer: 4
Color: 2
General Color: GREY
Mat1: 15
Most Common Material: LIMESTONE
Mat2:
Mat2 Desc:
Mat3: 26
Mat3 Desc: ROCK
Formation Top Depth: 83.0
Formation End Depth: 86.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1006695944
Layer: 2
Color: 6
General Color: BROWN
Mat1: 28
Most Common Material: SAND
Mat2: 11
Mat2 Desc: GRAVEL
Mat3: 05
Mat3 Desc: CLAY
Formation Top Depth: 14.0
Formation End Depth: 39.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1006695945
Layer: 3
Color: 7
General Color: RED
Mat1: 28
Most Common Material: SAND
Mat2: 05
Mat2 Desc: CLAY
Mat3: 74
Mat3 Desc: LAYERED
Formation Top Depth: 39.0
Formation End Depth: 83.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1006695943
Layer: 1
Color: 6
General Color: BROWN
Mat1: 05
Most Common Material: CLAY
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 14.0
Formation End Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1006695981
Layer: 1
Plug From: 0.0
Plug To: 20.0
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 1006695980
Method Construction Code: 5
Method Construction: Air Percussion
Other Method Construction:

Pipe Information

Pipe ID: 1006695941
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1006695950
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From: 0.0
Depth To: 83.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Screen

Screen ID: 1006695951
Layer:
Slot:
Screen Top Depth:
Screen End Depth:
Screen Material:
Screen Depth UOM: ft
Screen Diameter UOM: inch
Screen Diameter:

Results of Well Yield Testing

Pump Test ID:	1006695942
Pump Set At:	70.0
Static Level:	16.0
Final Level After Pumping:	63.0
Recommended Pump Depth:	70.0
Pumping Rate:	10.0
Flowing Rate:	
Recommended Pump Rate:	10.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	0
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	

Draw Down & Recovery

Pump Test Detail ID:	1006695971
Test Type:	Draw Down
Test Duration:	30
Test Level:	52.29999923706055
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1006695957
Test Type:	Draw Down
Test Duration:	3
Test Level:	35.099998474121094
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1006695958
Test Type:	Recovery
Test Duration:	3
Test Level:	37.400001525878906
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1006695961
Test Type:	Draw Down
Test Duration:	5
Test Level:	44.29999923706055
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1006695970
Test Type:	Recovery
Test Duration:	25
Test Level:	20.100000381469727
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID: 1006695974
Test Type: Recovery
Test Duration: 40
Test Level: 18.399999618530273
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006695976
Test Type: Recovery
Test Duration: 50
Test Level: 18.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006695977
Test Type: Draw Down
Test Duration: 60
Test Level: 52.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006695953
Test Type: Draw Down
Test Duration: 1
Test Level: 23.600000381469727
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006695959
Test Type: Draw Down
Test Duration: 4
Test Level: 39.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006695964
Test Type: Recovery
Test Duration: 10
Test Level: 27.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006695966
Test Type: Recovery
Test Duration: 15
Test Level: 25.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006695967
Test Type: Draw Down

Test Duration: 20
Test Level: 52.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006695972
Test Type: Recovery
Test Duration: 30
Test Level: 18.600000381469727
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006695960
Test Type: Recovery
Test Duration: 4
Test Level: 34.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006695968
Test Type: Recovery
Test Duration: 20
Test Level: 23.399999618530273
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006695975
Test Type: Draw Down
Test Duration: 50
Test Level: 52.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006695954
Test Type: Recovery
Test Duration: 1
Test Level: 46.20000076293945
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006695952
Test Type: Recovery
Test Duration: 0
Test Level: 52.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006695962
Test Type: Recovery
Test Duration: 5
Test Level: 29.200000762939453
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006695955
Test Type: Draw Down
Test Duration: 2
Test Level: 28.399999618530273
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006695965
Test Type: Draw Down
Test Duration: 15
Test Level: 51.599998474121094
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006695956
Test Type: Recovery
Test Duration: 2
Test Level: 40.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006695963
Test Type: Draw Down
Test Duration: 10
Test Level: 50.400001525878906
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006695969
Test Type: Draw Down
Test Duration: 25
Test Level: 52.099998474121094
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006695973
Test Type: Draw Down
Test Duration: 40
Test Level: 52.400001525878906
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006695978
Test Type: Recovery
Test Duration: 60
Test Level: 18.0
Test Level UOM: ft

Water Details

Water ID: 1006695949

Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	84.0
Water Found Depth UOM:	ft

Hole Diameter

Hole ID:	1006695947
Diameter:	10.0
Depth From:	0.0
Depth To:	20.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

Hole Diameter

Hole ID:	1006695948
Diameter:	6.0
Depth From:	20.0
Depth To:	86.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

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26 ***1 of 1*** ***N/80.1*** ***327.5 / 16.63*** ***lot 31 con 8 ON*** ***WWIS***

Well ID:	6711803	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	9/20/1995
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	2336
Casing Material:		**Form Version:**	1
Audit No:	163103	**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6711803.pdf

Additional Detail(s) (Map)

Well Completed Date:	1995/08/17
Year Completed:	1995
Depth (m):	48.768
Latitude:	43.4532661973219
Longitude:	-80.1098737447056
Path:	671\6711803.pdf

Bore Hole Information

Bore Hole ID:	10475636	**Elevation:**	

DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	572017.30
Code OB Desc:		**North83:**	4811536.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	3
Date Completed:	17-Aug-1995 00:00:00	**UTMRC Desc:**	margin of error : 10 - 30 m
Remarks:		**Location Method:**	gps
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932654203
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	25.0
Formation End Depth:	50.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932654204
Layer:	3
Color:	6
General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	50.0
Formation End Depth:	95.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932654205
Layer:	4
Color:	6
General Color:	BROWN
Mat1:	26
Most Common Material:	ROCK
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	95.0

Formation End Depth: 160.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932654202
Layer: 1
Color: 6
General Color: BROWN
Mat1: 05
Most Common Material: CLAY
Mat2: 12
Mat2 Desc: STONES
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 25.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966711803
Method Construction Code: 4
Method Construction: Rotary (Air)
Other Method Construction:

Pipe Information

Pipe ID: 11024206
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930774770
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 160.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930774769
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 97.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID:	996711803
Pump Set At:	
Static Level:	60.0
Final Level After Pumping:	81.0
Recommended Pump Depth:	110.0
Pumping Rate:	20.0
Flowing Rate:	
Recommended Pump Rate:	15.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	934867332
Test Type:	Recovery
Test Duration:	45
Test Level:	79.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934341154
Test Type:	Recovery
Test Duration:	15
Test Level:	72.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934615074
Test Type:	Recovery
Test Duration:	30
Test Level:	78.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	935136674
Test Type:	Recovery
Test Duration:	60
Test Level:	81.0
Test Level UOM:	ft

Water Details

Water ID:	933965877
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	158.0
Water Found Depth UOM:	ft

27	***1 of 1***	***SW/87.2***	***314.9 / 4.00***	***66 HWY 6 MORRISTON ON***	***WWIS***

Well ID:	7133961	**Data Entry Status:**	
Construction Date:		**Data Src:**	
Primary Water Use:	Monitoring	**Date Received:**	11/13/2009
Sec. Water Use:		**Selected Flag:**	TRUE
Final Well Status:	Test Hole	**Abandonment Rec:**	
Water Type:		**Contractor:**	7238
Casing Material:		**Form Version:**	5
Audit No:	M04676	**Owner:**	
Tag:	A090746	**Street Name:**	66 HWY 6
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	
Well Depth:		**Concession:**	
Overburden/Bedrock:		**Concession Name:**	
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/713\7133961.pdf

Additional Detail(s) (Map)

Well Completed Date: 2009/09/10
Year Completed: 2009
Depth (m):
Latitude: 43.4456332187098
Longitude: -80.1136968747149
Path: 713\7133961.pdf

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/713\7133961.pdf

Additional Detail(s) (Map)

Well Completed Date: 2009/09/10
Year Completed: 2009
Depth (m):
Latitude: 43.446224369552
Longitude: -80.114454464432
Path: 713\7133961.pdf

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/713\7133961.pdf

Additional Detail(s) (Map)

Well Completed Date: 2009/09/10
Year Completed: 2009
Depth (m):
Latitude: 43.4463135289396
Longitude: -80.1155036297757
Path: 713\7133961.pdf

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/713\7133961.pdf

Additional Detail(s) (Map)

Well Completed Date: 2009/09/10
Year Completed: 2009
Depth (m):
Latitude: 43.4452355207093

Longitude: -80.1158282926147
Path: 713\7133961.pdf

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/713\7133961.pdf

Additional Detail(s) (Map)

Well Completed Date: 2009/09/10
Year Completed: 2009
Depth (m): 3
Latitude: 43.446224369552
Longitude: -80.114454464432
Path: 713\7133961.pdf

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/713\7133961.pdf

Additional Detail(s) (Map)

Well Completed Date: 2009/09/10
Year Completed: 2009
Depth (m):
Latitude: 43.4457045696712
Longitude: -80.1147710050409
Path: 713\7133961.pdf

Bore Hole Information

Bore Hole ID: 1003260905
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind: This is a record from cluster log sheet
Date Completed: 10-Sep-2009 00:00:00
Remarks:
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 17
East83: 571655.00
North83: 4810750.00
Org CS: UTM83
UTMRC: 3
UTMRC Desc: margin of error : 10 - 30 m
Location Method: wwr

Annular Space/Abandonment Sealing Record

Plug ID: 1003260909
Layer:
Plug From:
Plug To:
Plug Depth UOM:

Method of Construction & Well Use

Method Construction ID: 1003260908
Method Construction Code:
Method Construction:
Other Method Construction: AUGER

Pipe Information

Pipe ID: 1003260910
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1003260912
Layer:
Material: 5
Open Hole or Material: PLASTIC
Depth From:
Depth To: 1.5
Casing Diameter:
Casing Diameter UOM:
Casing Depth UOM: m

Construction Record - Screen

Screen ID: 1003260911
Layer:
Slot:
Screen Top Depth: 1.5
Screen End Depth: 3.0
Screen Material:
Screen Depth UOM: m
Screen Diameter UOM:
Screen Diameter:

Results of Well Yield Testing

Pump Test ID: 1003260913
Pump Set At:
Static Level:
Final Level After Pumping:
Recommended Pump Depth:
Pumping Rate:
Flowing Rate:
Recommended Pump Rate:
Levels UOM:
Rate UOM:
Water State After Test Code:
Water State After Test:
Pumping Test Method:
Pumping Duration HR:
Pumping Duration MIN:
Flowing:

Hole Diameter

Hole ID: 1003260907
Diameter: 21.0
Depth From:
Depth To: 3.0
Hole Depth UOM: m
Hole Diameter UOM: cm

Bore Hole Information

Bore Hole ID: 1003260923 ***Elevation:***
DP2BR: ***Elevrc:***

Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571630.00
Code OB Desc:		***North83:***	4810692.00
Open Hole:		***Org CS:***	UTM83
Cluster Kind:	This is a record from cluster log sheet	***UTMRC:***	3
Date Completed:	10-Sep-2009 00:00:00	***UTMRC Desc:***	margin of error : 10 - 30 m
Remarks:		***Location Method:***	wwr
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Annular Space/Abandonment Sealing Record

Plug ID:	1003260927
Layer:	
Plug From:	
Plug To:	
Plug Depth UOM:	

Method of Construction & Well Use

Method Construction ID:	1003260926
Method Construction Code:	
Method Construction:	
Other Method Construction:	AUGER

Pipe Information

Pipe ID:	1003260928
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	1003260930
Layer:	
Material:	5
Open Hole or Material:	PLASTIC
Depth From:	
Depth To:	1.5
Casing Diameter:	
Casing Diameter UOM:	
Casing Depth UOM:	m

Construction Record - Screen

Screen ID:	1003260929
Layer:	
Slot:	
Screen Top Depth:	1.5
Screen End Depth:	3.0
Screen Material:	
Screen Depth UOM:	m
Screen Diameter UOM:	
Screen Diameter:	

Results of Well Yield Testing

Pump Test ID:	1003260931
Pump Set At:	
Static Level:	
Final Level After Pumping:	
Recommended Pump Depth:	
Pumping Rate:	
Flowing Rate:	
Recommended Pump Rate:	
Levels UOM:	
Rate UOM:	
Water State After Test Code:	
Water State After Test:	
Pumping Test Method:	
Pumping Duration HR:	
Pumping Duration MIN:	
Flowing:	

Hole Diameter

Hole ID:	1003260925
Diameter:	21.0
Depth From:	
Depth To:	3.0
Hole Depth UOM:	m
Hole Diameter UOM:	cm

Bore Hole Information

Bore Hole ID:	1002819937	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571655.00
Code OB Desc:		***North83:***	4810750.00
Open Hole:		***Org CS:***	UTM83
Cluster Kind:		***UTMRC:***	4
Date Completed:	10-Sep-2009 00:00:00	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	wwr
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1003260951
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	1.5
Formation End Depth UOM:	m

Overburden and Bedrock Materials Interval

Formation ID:	1003260952
Layer:	2
Color:	2
General Color:	GREY
Mat1:	06
Most Common Material:	SILT
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	1.5
Formation End Depth:	3.0
Formation End Depth UOM:	m

Annular Space/Abandonment Sealing Record

Plug ID:	1003260954
Layer:	1
Plug From:	0.0
Plug To:	1.0499999523162842
Plug Depth UOM:	m

Annular Space/Abandonment Sealing Record

Plug ID:	1003260955
Layer:	2
Plug From:	1.0499999523162842
Plug To:	3.0
Plug Depth UOM:	m

Method of Construction & Well Use

Method Construction ID:	1003260959
Method Construction Code:	E
Method Construction:	Auger
Other Method Construction:	

Pipe Information

Pipe ID:	1003260950
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	1003260956
Layer:	1
Material:	5
Open Hole or Material:	PLASTIC
Depth From:	0.0
Depth To:	3.0
Casing Diameter:	5.0
Casing Diameter UOM:	cm

Casing Depth UOM: m

Construction Record - Screen

Screen ID: 1003260957
Layer: 1
Slot: 10
Screen Top Depth:
Screen End Depth:
Screen Material: 5
Screen Depth UOM: m
Screen Diameter UOM: cm
Screen Diameter: 6.400000095367432

Hole Diameter

Hole ID: 1003260953
Diameter: 21.0
Depth From: 0.0
Depth To: 3.0
Hole Depth UOM: m
Hole Diameter UOM: cm

Bore Hole Information

Bore Hole ID: 1003260932
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind: This is a record from cluster log sheet
Date Completed: 10-Sep-2009 00:00:00
Remarks:
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:
Elevation:
Elevrc:
Zone: 17
East83: 571545.00
North83: 4810639.00
Org CS: UTM83
UTMRC: 3
UTMRC Desc: margin of error : 10 - 30 m
Location Method: wwr

Annular Space/Abandonment Sealing Record

Plug ID: 1003260936
Layer:
Plug From:
Plug To:
Plug Depth UOM:

Method of Construction & Well Use

Method Construction ID: 1003260935
Method Construction Code:
Method Construction:
Other Method Construction: AUGER

Pipe Information

Pipe ID: 1003260937

Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1003260939
Layer:
Material: 5
Open Hole or Material: PLASTIC
Depth From:
Depth To: 3.0
Casing Diameter:
Casing Diameter UOM:
Casing Depth UOM: m

Construction Record - Screen

Screen ID: 1003260938
Layer:
Slot:
Screen Top Depth: 3.0
Screen End Depth: 4.5
Screen Material:
Screen Depth UOM: m
Screen Diameter UOM:
Screen Diameter:

Results of Well Yield Testing

Pump Test ID: 1003260940
Pump Set At:
Static Level:
Final Level After Pumping:
Recommended Pump Depth:
Pumping Rate:
Flowing Rate:
Recommended Pump Rate:
Levels UOM:
Rate UOM:
Water State After Test Code:
Water State After Test:
Pumping Test Method:
Pumping Duration HR:
Pumping Duration MIN:
Flowing:

Hole Diameter

Hole ID: 1003260934
Diameter: 21.0
Depth From:
Depth To: 4.5
Hole Depth UOM: m
Hole Diameter UOM: cm

Bore Hole Information

Bore Hole ID: 1003260914 ***Elevation:***
DP2BR: ***Elevrc:***
Spatial Status: ***Zone:*** 17
Code OB: ***East83:*** 571717.00

Code OB Desc:		***North83:***	4810685.00
Open Hole:		***Org CS:***	UTM83
Cluster Kind:	This is a record from cluster log sheet	***UTMRC:***	3
Date Completed:	10-Sep-2009 00:00:00	***UTMRC Desc:***	margin of error : 10 - 30 m
Remarks:		***Location Method:***	wwr
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Annular Space/Abandonment Sealing Record

Plug ID:	1003260918
Layer:	
Plug From:	
Plug To:	
Plug Depth UOM:	

Method of Construction & Well Use

Method Construction ID:	1003260917
Method Construction Code:	
Method Construction:	
Other Method Construction:	AUGER

Pipe Information

Pipe ID:	1003260919
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	1003260921
Layer:	
Material:	5
Open Hole or Material:	PLASTIC
Depth From:	
Depth To:	3.0
Casing Diameter:	
Casing Diameter UOM:	
Casing Depth UOM:	m

Construction Record - Screen

Screen ID:	1003260920
Layer:	
Slot:	
Screen Top Depth:	3.0
Screen End Depth:	4.5
Screen Material:	
Screen Depth UOM:	m
Screen Diameter UOM:	
Screen Diameter:	

Results of Well Yield Testing

Pump Test ID: 1003260922
Pump Set At:
Static Level:
Final Level After Pumping:
Recommended Pump Depth:
Pumping Rate:
Flowing Rate:
Recommended Pump Rate:
Levels UOM:
Rate UOM:
Water State After Test Code:
Water State After Test:
Pumping Test Method:
Pumping Duration HR:
Pumping Duration MIN:
Flowing:

Hole Diameter

Hole ID: 1003260916
Diameter: 21.0
Depth From:
Depth To: 4.5
Hole Depth UOM: m
Hole Diameter UOM: cm

Bore Hole Information

Bore Hole ID: 1003260941
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind: This is a record from cluster log sheet
Date Completed: 10-Sep-2009 00:00:00
Remarks:
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 17
East83: 571570.00
North83: 4810759.00
Org CS: UTM83
UTMRC: 3
UTMRC Desc: margin of error : 10 - 30 m
Location Method: wwr

Annular Space/Abandonment Sealing Record

Plug ID: 1003260945
Layer:
Plug From:
Plug To:
Plug Depth UOM:

Method of Construction & Well Use

Method Construction ID: 1003260944
Method Construction Code:
Method Construction:
Other Method Construction: AUGER

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Pipe Information

Pipe ID: 1003260946
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1003260948
Layer:
Material: 5
Open Hole or Material: PLASTIC
Depth From:
Depth To: 2.0999999046325684
Casing Diameter:
Casing Diameter UOM:
Casing Depth UOM: m

Construction Record - Screen

Screen ID: 1003260947
Layer:
Slot:
Screen Top Depth: 2.0999999046325684
Screen End Depth: 3.75
Screen Material:
Screen Depth UOM: m
Screen Diameter UOM:
Screen Diameter:

Results of Well Yield Testing

Pump Test ID: 1003260949
Pump Set At:
Static Level:
Final Level After Pumping:
Recommended Pump Depth:
Pumping Rate:
Flowing Rate:
Recommended Pump Rate:
Levels UOM:
Rate UOM:
Water State After Test Code:
Water State After Test:
Pumping Test Method:
Pumping Duration HR:
Pumping Duration MIN:
Flowing:

Hole Diameter

Hole ID: 1003260943
Diameter: 21.0
Depth From:
Depth To: 3.75
Hole Depth UOM: m
Hole Diameter UOM: cm

28	*1 of 1*	*SW/87.9*	*314.9 / 4.00*	***66 QUEEN ST lot 31 con 7 MORRISTON ON***	***WWIS***

Well ID:	7314681	**Data Entry Status:**	
Construction Date:		**Data Src:**	
Primary Water Use:	Monitoring	**Date Received:**	7/16/2018
Sec. Water Use:		**Selected Flag:**	TRUE
Final Well Status:	Abandoned-Other	**Abandonment Rec:**	Yes
Water Type:		**Contractor:**	7221
Casing Material:		**Form Version:**	7
Audit No:	Z272690	**Owner:**	
Tag:	A090746	**Street Name:**	66 QUEEN ST
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	07
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map):

Additional Detail(s) (Map)

Well Completed Date:	2018/07/04
Year Completed:	2018
Depth (m):	
Latitude:	43.4463045256291
Longitude:	-80.1155037609671
Path:	

Bore Hole Information

Bore Hole ID:	1007164595	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571570.00
Code OB Desc:		**North83:**	4810758.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	04-Jul-2018 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1007394321
Layer:	
Color:	
General Color:	
Mat1:	
Most Common Material:	
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	

Formation Top Depth:
Formation End Depth:
Formation End Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1007394328
Layer: 1
Plug From: 0.0
Plug To: 3.75
Plug Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1007394329
Layer: 1
Plug From: 0.0
Plug To: 3.75
Plug Depth UOM: m

Method of Construction & Well Use

Method Construction ID: 1007394327
Method Construction Code:
Method Construction:
Other Method Construction:

Pipe Information

Pipe ID: 1007394320
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1007394324
Layer: 1
Material: 5
Open Hole or Material: PLASTIC
Depth From: 2.0999999046325684
Depth To:
Casing Diameter: 5.099999904632568
Casing Diameter UOM: cm
Casing Depth UOM: m

Construction Record - Screen

Screen ID: 1007394325
Layer:
Slot:
Screen Top Depth:
Screen End Depth:
Screen Material:
Screen Depth UOM: m
Screen Diameter UOM: cm
Screen Diameter:

Water Details

Water ID:	1007394323
Layer:	
Kind Code:	
Kind:	
Water Found Depth:	
Water Found Depth UOM:	m

Hole Diameter

Hole ID:	1007394322
Diameter:	
Depth From:	
Depth To:	
Hole Depth UOM:	m
Hole Diameter UOM:	cm

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29 | ***1 of 1*** | ***WSW/90.0*** | ***319.9 / 9.00*** | ***lot 31 con 8 ON*** | ***WWIS***

Well ID:	6702666	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	9/25/1951
Sec. Water Use:	0	***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	2411
Casing Material:		***Form Version:***	1
Audit No:		***Owner:***	
Tag:		***Street Name:***	
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	031
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6702666.pdf

Additional Detail(s) (Map)

Well Completed Date:	1951/08/19
Year Completed:	1951
Depth (m):	27.432
Latitude:	43.4478388821153
Longitude:	-80.1159720440636
Path:	670\6702666.pdf

Bore Hole Information

Bore Hole ID:	10466809	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571530.30
Code OB Desc:		***North83:***	4810928.00
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	9

Date Completed: 19-Aug-1951 00:00:00
Remarks:
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:
UTMRC Desc: unknown UTM
Location Method: p9

Overburden and Bedrock Materials Interval

Formation ID: 932614799
Layer: 3
Color:
General Color:
Mat1: 11
Most Common Material: GRAVEL
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 80.0
Formation End Depth: 90.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614798
Layer: 2
Color:
General Color:
Mat1: 07
Most Common Material: QUICKSAND
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 20.0
Formation End Depth: 80.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614797
Layer: 1
Color:
General Color:
Mat1: 05
Most Common Material: CLAY
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 20.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966702666
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 11015379
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930759204
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 90.0
Casing Diameter: 4.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996702666
Pump Set At:
Static Level: 25.0
Final Level After Pumping:
Recommended Pump Depth:
Pumping Rate:
Flowing Rate:
Recommended Pump Rate:
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code:
Water State After Test:
Pumping Test Method:
Pumping Duration HR:
Pumping Duration MIN:
Flowing: No

Water Details

Water ID: 933955012
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 90.0
Water Found Depth UOM: ft

30	1 of 1	WSW/92.9	323.2 / 12.36	6 BACK ST. lot 31 con 8 MORRISTON ON	WWIS

Well ID: 7114627
Construction Date:
Primary Water Use: Domestic
Sec. Water Use:
Final Well Status: Water Supply
Water Type:
Data Entry Status:
Data Src:
Date Received: 11/10/2008
Selected Flag: TRUE
Abandonment Rec:
Contractor: 7385

Casing Material:		**Form Version:**	7
Audit No:	Z90632	**Owner:**	
Tag:	A066880	**Street Name:**	6 BACK ST.
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/711\7114627.pdf

Additional Detail(s) (Map)

Well Completed Date:	2008/10/22
Year Completed:	2008
Depth (m):	24.384
Latitude:	43.4488018986962
Longitude:	-80.1147505502707
Path:	711\7114627.pdf

Bore Hole Information

Bore Hole ID:	1001864602	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571628.00
Code OB Desc:		**North83:**	4811036.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	3
Date Completed:	22-Oct-2008 00:00:00	**UTMRC Desc:**	margin of error : 10 - 30 m
Remarks:		**Location Method:**	wwr
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1001873783
Layer:	4
Color:	6
General Color:	BROWN
Mat1:	26
Most Common Material:	ROCK
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	70.0
Formation End Depth:	80.0
Formation End Depth UOM:	ft

Overburden and Bedrock

Materials Interval

Formation ID:	1001873782
Layer:	3
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	28
Mat2 Desc:	SAND
Mat3:	11
Mat3 Desc:	GRAVEL
Formation Top Depth:	60.0
Formation End Depth:	70.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1001873781
Layer:	2
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	25.0
Formation End Depth:	60.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1001873780
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	25.0
Formation End Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1001873785
Layer:	1
Plug From:	0.0
Plug To:	20.0
Plug Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID: 1001873817
Method Construction Code: B
Method Construction: Other Method
Other Method Construction: AIR ROTARY

Pipe Information

Pipe ID: 1001873778
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1001873788
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From: 71.0
Depth To: 80.0
Casing Diameter: 6.125
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 1001873787
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From: -2.0
Depth To: 71.0
Casing Diameter: 6.125
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Screen

Screen ID: 1001873789
Layer:
Slot:
Screen Top Depth:
Screen End Depth:
Screen Material:
Screen Depth UOM: ft
Screen Diameter UOM: inch
Screen Diameter:

Results of Well Yield Testing

Pump Test ID: 1001873779
Pump Set At: 55.0
Static Level: 34.0
Final Level After Pumping: 38.0
Recommended Pump Depth: 55.0
Pumping Rate: 12.0
Flowing Rate:
Recommended Pump Rate: 10.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR

Pumping Test Method: 0
Pumping Duration HR: 1
Pumping Duration MIN: 0
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 1001873809
Test Type: Recovery
Test Duration: 30
Test Level: 34.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873793
Test Type: Recovery
Test Duration: 2
Test Level: 34.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873799
Test Type: Recovery
Test Duration: 5
Test Level: 34.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873806
Test Type: Draw Down
Test Duration: 25
Test Level: 38.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873790
Test Type: Draw Down
Test Duration: 1
Test Level: 35.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873802
Test Type: Draw Down
Test Duration: 15
Test Level: 38.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873807
Test Type: Recovery
Test Duration: 25
Test Level: 34.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873814
Test Type: Draw Down
Test Duration: 60
Test Level: 38.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873801
Test Type: Recovery
Test Duration: 10
Test Level: 34.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873804
Test Type: Draw Down
Test Duration: 20
Test Level: 38.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873813
Test Type: Recovery
Test Duration: 50
Test Level: 34.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873791
Test Type: Recovery
Test Duration: 1
Test Level: 35.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873798
Test Type: Draw Down
Test Duration: 5
Test Level: 37.599998474121094
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873808
Test Type: Draw Down
Test Duration: 30
Test Level: 38.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873810
Test Type: Draw Down
Test Duration: 40
Test Level: 38.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873796
Test Type: Draw Down
Test Duration: 4
Test Level: 37.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873803
Test Type: Recovery
Test Duration: 15
Test Level: 34.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873794
Test Type: Draw Down
Test Duration: 3
Test Level: 36.599998474121094
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873795
Test Type: Recovery
Test Duration: 3
Test Level: 34.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873800
Test Type: Draw Down
Test Duration: 10
Test Level: 38.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873805
Test Type: Recovery
Test Duration: 20
Test Level: 34.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873812
Test Type: Draw Down
Test Duration: 50
Test Level: 38.0

Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873792
Test Type: Draw Down
Test Duration: 2
Test Level: 36.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873797
Test Type: Recovery
Test Duration: 4
Test Level: 34.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873811
Test Type: Recovery
Test Duration: 40
Test Level: 34.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873815
Test Type: Recovery
Test Duration: 60
Test Level: 34.0
Test Level UOM: ft

Water Details

Water ID: 1001873786
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 80.0
Water Found Depth UOM: ft

Hole Diameter

Hole ID: 1001873784
Diameter:
Depth From:
Depth To:
Hole Depth UOM: ft
Hole Diameter UOM: inch

31	1 of 1	WSW/100.1	324.5 / 13.64	lot 31 con 8 ON	WWIS

Well ID: 6702669
Construction Date:
Primary Water Use: Domestic
Sec. Water Use: 0
Final Well Status: Water Supply
Data Entry Status:
Data Src: 1
Date Received: 4/25/1952
Selected Flag: TRUE
Abandonment Rec:

Water Type:		**Contractor:**	2411
Casing Material:		**Form Version:**	1
Audit No:		**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6702669.pdf

Additional Detail(s) (Map)

Well Completed Date:	1951/12/06
Year Completed:	1951
Depth (m):	36.576
Latitude:	43.4487769645373
Longitude:	-80.115019102632
Path:	670\6702669.pdf

Bore Hole Information

Bore Hole ID:	10466812	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571606.30
Code OB Desc:		**North83:**	4811033.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	9
Date Completed:	06-Dec-1951 00:00:00	**UTMRC Desc:**	unknown UTM
Remarks:		**Location Method:**	p9
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932614811
Layer:	3
Color:	
General Color:	
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	80.0
Formation End Depth:	120.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932614810
Layer:	2
Color:	
General Color:	
Mat1:	13
Most Common Material:	BOULDERS
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	60.0
Formation End Depth:	80.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932614809
Layer:	1
Color:	
General Color:	
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	60.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966702669
Method Construction Code:	1
Method Construction:	Cable Tool
Other Method Construction:	

Pipe Information

Pipe ID:	11015382
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930759208
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	
Depth To:	120.0
Casing Diameter:	4.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID: 930759207
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 80.0
Casing Diameter: 4.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996702669
Pump Set At:
Static Level: 23.0
Final Level After Pumping: 23.0
Recommended Pump Depth:
Pumping Rate: 10.0
Flowing Rate:
Recommended Pump Rate:
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 1
Pumping Duration HR:
Pumping Duration MIN:
Flowing: No

Water Details

Water ID: 933955015
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 120.0
Water Found Depth UOM: ft

32	1 of 1	WSW/100.8	324.5 / 13.64	lot 31 con 8 ON	WWIS

Well ID: 6702670
Construction Date:
Primary Water Use: Domestic
Sec. Water Use: 0
Final Well Status: Water Supply
Water Type:
Casing Material:
Audit No:
Tag:
Construction Method:
Elevation (m):
Elevation Reliability:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Flowing (Y/N):
Flow Rate:
Clear/Cloudy:

Data Entry Status:
Data Src: 1
Date Received: 6/20/1958
Selected Flag: TRUE
Abandonment Rec:
Contractor: 4208
Form Version: 1
Owner:
Street Name:
County: WELLINGTON
Municipality: PUSLINCH TOWNSHIP
Site Info:
Lot: 031
Concession: 08
Concession Name: CON
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6702670.pdf

Additional Detail(s) (Map)

Well Completed Date: 1958/05/01
Year Completed: 1958
Depth (m): 35.9664
Latitude: 43.4487327131054
Longitude: -80.115118619184
Path: 670\6702670.pdf

Bore Hole Information

Bore Hole ID: 10466813
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 01-May-1958 00:00:00
Remarks:
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 17
East83: 571598.30
North83: 4811028.00
Org CS:
UTMRC: 9
UTMRC Desc: unknown UTM
Location Method: p9

Overburden and Bedrock Materials Interval

Formation ID: 932614814
Layer: 3
Color:
General Color:
Mat1: 15
Most Common Material: LIMESTONE
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 115.0
Formation End Depth: 118.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614813
Layer: 2
Color:
General Color:
Mat1: 09
Most Common Material: MEDIUM SAND
Mat2: 11
Mat2 Desc: GRAVEL
Mat3:
Mat3 Desc:
Formation Top Depth: 60.0
Formation End Depth: 115.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID:	932614812
Layer:	1
Color:	
General Color:	
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	60.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966702670
Method Construction Code:	1
Method Construction:	Cable Tool
Other Method Construction:	

Pipe Information

Pipe ID:	11015383
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930759210
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	
Depth To:	118.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	930759209
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	115.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996702670
Pump Set At:	

Static Level:	35.0
Final Level After Pumping:	100.0
Recommended Pump Depth:	
Pumping Rate:	6.0
Flowing Rate:	
Recommended Pump Rate:	
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Water Details

Water ID:	933955016
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	115.0
Water Found Depth UOM:	ft

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33 | **1 of 1** | **SW/107.4** | **314.8 / 4.00** | **lot 31 con 7 ON** | **WWIS**

Well ID:	6705423	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	3/11/1975
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	4005
Casing Material:		**Form Version:**	1
Audit No:		**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	07
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6705423.pdf

Additional Detail(s) (Map)

Well Completed Date:	1975/01/20
Year Completed:	1975
Depth (m):	20.4216
Latitude:	43.4459244459329
Longitude:	-80.1152584248191
Path:	670\6705423.pdf

Bore Hole Information

Bore Hole ID:	10469516	**Elevation:**	

DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571590.30
Code OB Desc:		**North83:**	4810716.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	4
Date Completed:	20-Jan-1975 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	p4
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932626252
Layer:	4
Color:	2
General Color:	GREY
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	66.0
Formation End Depth:	67.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932626250
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	28
Mat2 Desc:	SAND
Mat3:	
Mat3 Desc:	
Formation Top Depth:	6.0
Formation End Depth:	22.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932626249
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0

Formation End Depth:	6.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932626251
Layer:	3
Color:	6
General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	22.0
Formation End Depth:	66.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966705423
Method Construction Code:	1
Method Construction:	Cable Tool
Other Method Construction:	

Pipe Information

Pipe ID:	11018086
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930764013
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	67.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996705423
Pump Set At:	
Static Level:	22.0
Final Level After Pumping:	35.0
Recommended Pump Depth:	60.0
Pumping Rate:	24.0
Flowing Rate:	
Recommended Pump Rate:	10.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	2
Water State After Test:	CLOUDY
Pumping Test Method:	2

Pumping Duration HR: 3
Pumping Duration MIN: 0
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 934341473
Test Type: Recovery
Test Duration: 15
Test Level: 22.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934618173
Test Type: Recovery
Test Duration: 30
Test Level: 22.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 935137522
Test Type: Recovery
Test Duration: 60
Test Level: 22.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934872120
Test Type: Recovery
Test Duration: 45
Test Level: 22.0
Test Level UOM: ft

Water Details

Water ID: 933958203
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 67.0
Water Found Depth UOM: ft

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34 ***1 of 1*** ***WSW/108.3*** ***317.1 / 6.25*** ***s.21***
54 Queen St Morriston
Puslinch ON NA ***SPL***

Ref No: 8348-BAHK6R
Site No: 3364-BAHK8S
Incident Dt: 3/19/2019
Year:
Incident Cause:
Incident Event:
Contaminant Code:
Contaminant Name:
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Environment Impact:

Discharger Report:
Material Group:
Health/Env Conseq: 0 - No Impact
Client Type: Individual
Sector Type:
Agency Involved:
Nearest Watercourse:
Site Address: 54 Queen St Morriston
Site District Office: Guelph
Site Postal Code: NA
Site Region: West Central
Site Municipality: Puslinch

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Nature of Impact:		**Site Lot:**	
Receiving Medium:		**Site Conc:**	NA
Receiving Env:		**Northing:**	NA
MOE Response:	No	**Easting:**	NA
Dt MOE Arvl on Scn:		**Site Geo Ref Accu:**	NA
MOE Reported Dt:	3/19/2019	**Site Map Datum:**	NA
Dt Document Closed:	6/27/2019	**SAC Action Class:**	
Incident Reason:		**Source Type:**	
Site Name:	54 Queen Street Morriston		
Site County/District:	County of Wellington		
Site Geo Ref Meth:	NA		
Incident Summary:	DWMD Wells - fuel odour complaint		
Contaminant Qty:			

35	1 of 1	W/109.3	329.9 / 19.08	lot 31 con 8 ON	WWIS

Well ID:	6703544	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	11/19/1969
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	3316
Casing Material:		**Form Version:**	1
Audit No:		**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6703544.pdf

Additional Detail(s) (Map)

Well Completed Date:	1969/07/30
Year Completed:	1969
Depth (m):	38.1
Latitude:	43.4503000616855
Longitude:	-80.1140328735195
Path:	670\6703544.pdf

Bore Hole Information

Bore Hole ID:	10467681	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571684.30
Code OB Desc:		**North83:**	4811203.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	4
Date Completed:	30-Jul-1969 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	p4
Elevrc Desc:			
Location Source Date:			

Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Overburden and Bedrock Materials Interval

Formation ID: 932618375
Layer: 2
Color:
General Color:
Mat1: 05
Most Common Material: CLAY
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 48.0
Formation End Depth: 101.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932618376
Layer: 3
Color: 6
General Color: BROWN
Mat1: 15
Most Common Material: LIMESTONE
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 101.0
Formation End Depth: 125.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932618374
Layer: 1
Color:
General Color:
Mat1: 11
Most Common Material: GRAVEL
Mat2: 09
Mat2 Desc: MEDIUM SAND
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 48.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966703544
Method Construction Code: 2
Method Construction: Rotary (Convent.)

Other Method Construction:

Pipe Information

Pipe ID: 11016251
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930760842
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 125.0
Casing Diameter: 4.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930760841
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 105.0
Casing Diameter: 4.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996703544
Pump Set At:
Static Level: 54.0
Final Level After Pumping: 54.0
Recommended Pump Depth: 75.0
Pumping Rate: 10.0
Flowing Rate:
Recommended Pump Rate: 10.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code:
Water State After Test:
Pumping Test Method: 2
Pumping Duration HR: 1
Pumping Duration MIN: 0
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 934345740
Test Type: Draw Down
Test Duration: 15
Test Level: 54.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 935123289
Test Type: Draw Down
Test Duration: 60
Test Level: 54.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934604311
Test Type: Draw Down
Test Duration: 30
Test Level: 54.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934858500
Test Type: Draw Down
Test Duration: 45
Test Level: 54.0
Test Level UOM: ft

Water Details

Water ID: 933956037
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 123.0
Water Found Depth UOM: ft

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36 | ***1 of 1*** | ***WSW/110.8*** | ***325.9 / 15.00*** | ***lot 31 con 8 ON*** | ***WWIS***

Well ID: 6711879
Construction Date:
Primary Water Use: Domestic
Sec. Water Use: 0
Final Well Status: Water Supply
Water Type:
Casing Material:
Audit No: 152913
Tag:
Construction Method:
Elevation (m):
Elevation Reliability:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Flowing (Y/N):
Flow Rate:
Clear/Cloudy:

Data Entry Status:
Data Src: 1
Date Received: 12/15/1995
Selected Flag: TRUE
Abandonment Rec:
Contractor: 2663
Form Version: 1
Owner:
Street Name:
County: WELLINGTON
Municipality: PUSLINCH TOWNSHIP
Site Info:
Lot: 031
Concession: 08
Concession Name: CON
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6711879.pdf

Additional Detail(s) (Map)

Well Completed Date: 1995/11/09
Year Completed: 1995

Depth (m):	30.7848
Latitude:	43.4487430551234
Longitude:	-80.1152914932748
Path:	671\6711879.pdf

Bore Hole Information

Bore Hole ID:	10475712	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571584.30
Code OB Desc:		**North83:**	4811029.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	3
Date Completed:	09-Nov-1995 00:00:00	**UTMRC Desc:**	margin of error : 10 - 30 m
Remarks:		**Location Method:**	gps
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932654604
Layer:	1
Color:	
General Color:	
Mat1:	02
Most Common Material:	TOPSOIL
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	1.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932654605
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	1.0
Formation End Depth:	79.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932654606
Layer:	3

Color:	6
General Color:	BROWN
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	79.0
Formation End Depth:	101.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966711879
Method Construction Code:	4
Method Construction:	Rotary (Air)
Other Method Construction:	

Pipe Information

Pipe ID:	11024282
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930774904
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	
Depth To:	101.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	930774903
Layer:	1
Material:	2
Open Hole or Material:	GALVANIZED
Depth From:	
Depth To:	80.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996711879
Pump Set At:	
Static Level:	44.0
Final Level After Pumping:	80.0
Recommended Pump Depth:	85.0
Pumping Rate:	25.0
Flowing Rate:	
Recommended Pump Rate:	25.0
Levels UOM:	ft

Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	934615124
Test Type:	Draw Down
Test Duration:	30
Test Level:	65.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	935137151
Test Type:	Draw Down
Test Duration:	60
Test Level:	80.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934341622
Test Type:	Draw Down
Test Duration:	15
Test Level:	58.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934867383
Test Type:	Draw Down
Test Duration:	45
Test Level:	78.0
Test Level UOM:	ft

Water Details

Water ID:	933965970
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	101.0
Water Found Depth UOM:	ft

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37 ***1 of 1*** ***SW/113.2*** ***315.9 / 5.00*** ***lot 31 con 7 ON*** ***WWIS***

Well ID:	6707594	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	1/19/1982
Sec. Water Use:	0	***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	4208
Casing Material:		***Form Version:***	1
Audit No:		***Owner:***	
Tag:		***Street Name:***	

Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	031
Well Depth:		***Concession:***	07
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6707594.pdf

Additional Detail(s) (Map)

Well Completed Date:	1981/09/23
Year Completed:	1981
Depth (m):	29.8704
Latitude:	43.4457955368393
Longitude:	-80.1137278721777
Path:	670\6707594.pdf

Bore Hole Information

Bore Hole ID:	10471632	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571714.30
Code OB Desc:		***North83:***	4810703.00
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	4
Date Completed:	23-Sep-1981 00:00:00	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	p4
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932636192
Layer:	3
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	55.0
Formation End Depth:	91.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID: 932636191

Layer:	2
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	81
Mat3 Desc:	SANDY
Formation Top Depth:	15.0
Formation End Depth:	55.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932636190
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	81
Mat2 Desc:	SANDY
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	15.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932636193
Layer:	4
Color:	2
General Color:	GREY
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	91.0
Formation End Depth:	98.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966707594
Method Construction Code:	4
Method Construction:	Rotary (Air)
Other Method Construction:	

Pipe Information

Pipe ID:	11020202
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930767507
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	91.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996707594
Pump Set At:	
Static Level:	22.0
Final Level After Pumping:	90.0
Recommended Pump Depth:	
Pumping Rate:	75.0
Flowing Rate:	
Recommended Pump Rate:	
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	
Water State After Test:	
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	30
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	934875434
Test Type:	Recovery
Test Duration:	45
Test Level:	22.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	935133767
Test Type:	Recovery
Test Duration:	60
Test Level:	22.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934346948
Test Type:	Recovery
Test Duration:	15
Test Level:	22.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934613335
Test Type:	Recovery
Test Duration:	30
Test Level:	22.0
Test Level UOM:	ft

Water Details

Water ID:	933960789
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	95.0
Water Found Depth UOM:	ft

38	1 of 1	W/115.2	329.9 / 19.04	lot 31 con 8 ON	WWIS

Well ID:	6707595	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	1/19/1982
Sec. Water Use:	0	***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	4208
Casing Material:		***Form Version:***	1
Audit No:		***Owner:***	
Tag:		***Street Name:***	
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	031
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6707595.pdf

Additional Detail(s) (Map)

Well Completed Date:	1981/10/06
Year Completed:	1981
Depth (m):	31.6992
Latitude:	43.4501209531136
Longitude:	-80.1141590800819
Path:	670\6707595.pdf

Bore Hole Information

Bore Hole ID:	10471633	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571674.30
Code OB Desc:		***North83:***	4811183.00
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	4
Date Completed:	06-Oct-1981 00:00:00	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	p4
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932636194
Layer:	1
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	25.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932636195
Layer:	2
Color:	2
General Color:	GREY
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	68
Mat2 Desc:	DRY
Mat3:	
Mat3 Desc:	
Formation Top Depth:	25.0
Formation End Depth:	40.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932636197
Layer:	4
Color:	2
General Color:	GREY
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	101.0
Formation End Depth:	104.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932636196
Layer:	3
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	81

Mat2 Desc:	SANDY
Mat3:	
Mat3 Desc:	
Formation Top Depth:	40.0
Formation End Depth:	101.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966707595
Method Construction Code:	4
Method Construction:	Rotary (Air)
Other Method Construction:	

Pipe Information

Pipe ID:	11020203
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930767508
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	104.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996707595
Pump Set At:	
Static Level:	55.0
Final Level After Pumping:	100.0
Recommended Pump Depth:	85.0
Pumping Rate:	30.0
Flowing Rate:	
Recommended Pump Rate:	20.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	934346949
Test Type:	Recovery
Test Duration:	15
Test Level:	60.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934613336
Test Type:	Recovery
Test Duration:	30
Test Level:	55.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	935133768
Test Type:	Recovery
Test Duration:	60
Test Level:	55.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934875435
Test Type:	Recovery
Test Duration:	45
Test Level:	55.0
Test Level UOM:	ft

Water Details

Water ID:	933960790
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	104.0
Water Found Depth UOM:	ft

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39 | ***1 of 1*** | ***W/115.3*** | ***329.6 / 18.77*** | ***lot 31 con 8 ON*** | ***WWIS***

Well ID:	6712163	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	1/17/1997
Sec. Water Use:	0	***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	4207
Casing Material:		***Form Version:***	1
Audit No:	174329	***Owner:***	
Tag:		***Street Name:***	
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	031
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6712163.pdf

Additional Detail(s) (Map)

Well Completed Date: 1996/10/02

Year Completed:	1996
Depth (m):	25.908
Latitude:	43.4497605338368
Longitude:	-80.1141272631764
Path:	671\6712163.pdf

Bore Hole Information

Bore Hole ID:	10475996	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571677.30
Code OB Desc:		**North83:**	4811143.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	3
Date Completed:	02-Oct-1996 00:00:00	**UTMRC Desc:**	margin of error : 10 - 30 m
Remarks:		**Location Method:**	gps
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932655888
Layer:	1
Color:	8
General Color:	BLACK
Mat1:	06
Most Common Material:	SILT
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	20.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932655890
Layer:	3
Color:	1
General Color:	WHITE
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	85
Mat2 Desc:	SOFT
Mat3:	
Mat3 Desc:	
Formation Top Depth:	80.0
Formation End Depth:	85.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932655889

Layer:	2
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	06
Mat2 Desc:	SILT
Mat3:	11
Mat3 Desc:	GRAVEL
Formation Top Depth:	20.0
Formation End Depth:	80.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966712163
Method Construction Code:	4
Method Construction:	Rotary (Air)
Other Method Construction:	

Pipe Information

Pipe ID:	11024566
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930775402
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	83.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	930775403
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	
Depth To:	85.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996712163
Pump Set At:	
Static Level:	41.0
Final Level After Pumping:	85.0
Recommended Pump Depth:	75.0
Pumping Rate:	75.0
Flowing Rate:	
Recommended Pump Rate:	15.0

Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	934342250
Test Type:	
Test Duration:	15
Test Level:	41.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934615744
Test Type:	
Test Duration:	30
Test Level:	41.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	935137792
Test Type:	
Test Duration:	60
Test Level:	41.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934868004
Test Type:	
Test Duration:	45
Test Level:	41.0
Test Level UOM:	ft

Water Details

Water ID:	933966354
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	84.0
Water Found Depth UOM:	ft

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40 ***1 of 1*** ***WSW/123.3*** ***319.9 / 9.03*** ***lot 31 con 7 ON*** ***WWIS***

Well ID:	6703313	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	1/9/1969
Sec. Water Use:	0	***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	4208
Casing Material:		***Form Version:***	1
Audit No:		***Owner:***	

Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	07
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6703313.pdf

Additional Detail(s) (Map)

Well Completed Date:	1968/10/07
Year Completed:	1968
Depth (m):	30.7848
Latitude:	43.4477973040602
Longitude:	-80.1164175637882
Path:	670\6703313.pdf

Bore Hole Information

Bore Hole ID:	10467455	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571494.30
Code OB Desc:		**North83:**	4810923.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	5
Date Completed:	07-Oct-1968 00:00:00	**UTMRC Desc:**	margin of error : 100 m - 300 m
Remarks:		**Location Method:**	p5
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932617452
Layer:	1
Color:	
General Color:	
Mat1:	01
Most Common Material:	FILL
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	5.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932617456
Layer:	5
Color:	2
General Color:	GREY
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	84.0
Formation End Depth:	101.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932617453
Layer:	2
Color:	
General Color:	
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	5.0
Formation End Depth:	60.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932617454
Layer:	3
Color:	
General Color:	
Mat1:	09
Most Common Material:	MEDIUM SAND
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	60.0
Formation End Depth:	70.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932617455
Layer:	4
Color:	
General Color:	
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	70.0
Formation End Depth:	84.0

Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966703313
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 11016025
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930760424
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 84.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930760425
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 101.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996703313
Pump Set At:
Static Level: 13.0
Final Level After Pumping: 14.0
Recommended Pump Depth: 25.0
Pumping Rate: 30.0
Flowing Rate:
Recommended Pump Rate: 20.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 1
Pumping Duration HR: 0
Pumping Duration MIN: 30
Flowing: No

Water Details

Water ID:	933955774
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	97.0
Water Found Depth UOM:	ft

Water Details

Water ID:	933955775
Layer:	2
Kind Code:	1
Kind:	FRESH
Water Found Depth:	100.0
Water Found Depth UOM:	ft

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41 | ***1 of 1*** | ***SW/125.1*** | ***315.9 / 5.00*** | ***66 QUEEN ST lot 31 con 7 MORRISTON ON*** | ***WWIS***

Well ID:	7314680	**Data Entry Status:**	
Construction Date:		**Data Src:**	
Primary Water Use:		**Date Received:**	7/16/2018
Sec. Water Use:		**Selected Flag:**	TRUE
Final Well Status:	Abandoned-Other	**Abandonment Rec:**	Yes
Water Type:		**Contractor:**	7221
Casing Material:		**Form Version:**	7
Audit No:	Z293136	**Owner:**	
Tag:	A090746	**Street Name:**	66 QUEEN ST
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	07
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map):

Additional Detail(s) (Map)

Well Completed Date:	2018/07/04
Year Completed:	2018
Depth (m):	
Latitude:	43.4456332187098
Longitude:	-80.1136968747149
Path:	

Bore Hole Information

Bore Hole ID:	1007164576	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571717.00
Code OB Desc:		**North83:**	4810685.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	04-Jul-2018 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m

Remarks: ***Location Method:*** wwr
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Overburden and Bedrock Materials Interval

Formation ID: 1007394312
Layer:
Color:
General Color:
Mat1:
Most Common Material:
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth:
Formation End Depth:
Formation End Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1007394318
Layer: 1
Plug From: 0.0
Plug To: 4.5
Plug Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 1007394319
Layer: 1
Plug From: 0.0
Plug To: 4.5
Plug Depth UOM: m

Method of Construction & Well Use

Method Construction ID: 1007394317
Method Construction Code:
Method Construction:
Other Method Construction:

Pipe Information

Pipe ID: 1007394311
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1007394315

Layer:	1
Material:	5
Open Hole or Material:	PLASTIC
Depth From:	3.0
Depth To:	
Casing Diameter:	5.099999904632568
Casing Diameter UOM:	cm
Casing Depth UOM:	m

Construction Record - Screen

Screen ID:	1007394316
Layer:	
Slot:	
Screen Top Depth:	
Screen End Depth:	
Screen Material:	
Screen Depth UOM:	m
Screen Diameter UOM:	cm
Screen Diameter:	

Water Details

Water ID:	1007394314
Layer:	
Kind Code:	
Kind:	
Water Found Depth:	
Water Found Depth UOM:	m

Hole Diameter

Hole ID:	1007394313
Diameter:	
Depth From:	
Depth To:	
Hole Depth UOM:	m
Hole Diameter UOM:	cm

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42 | **1 of 1** | **W/125.2** | **329.8 / 18.91** | **lot 32 con 8 ON** | **WWIS**

Well ID:	6714294	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Not Used	**Date Received:**	11/18/2002
Sec. Water Use:		**Selected Flag:**	TRUE
Final Well Status:	Abandoned-Other	**Abandonment Rec:**	
Water Type:		**Contractor:**	2663
Casing Material:		**Form Version:**	1
Audit No:	247507	**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	032
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6714294.pdf

Additional Detail(s) (Map)

Well Completed Date: 2002/10/21
Year Completed: 2002
Depth (m):
Latitude: 43.450256739775
Longitude: -80.1142522642419
Path: 671\6714294.pdf

Bore Hole Information

Bore Hole ID: 10536501
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 21-Oct-2002 00:00:00
Remarks:
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 17
East83: 571666.60
North83: 4811198.00
Org CS:
UTMRC: 5
UTMRC Desc: margin of error : 100 m - 300 m
Location Method: gis

Method of Construction & Well Use

Method Construction ID: 966714294
Method Construction Code: 0
Method Construction: Not Known
Other Method Construction:

Pipe Information

Pipe ID: 11085071
Casing No: 1
Comment:
Alt Name:

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43 | ***1 of 1*** | ***WSW/125.9*** | ***315.4 / 4.51*** | ***lot 31 con 7 ON*** | ***WWIS***

Well ID: 6702540
Construction Date:
Primary Water Use: Domestic
Sec. Water Use: 0
Final Well Status: Water Supply
Water Type:
Casing Material:
Audit No:
Tag:
Construction Method:
Elevation (m):
Elevation Reliability:
Depth to Bedrock:
Well Depth:

Data Entry Status:
Data Src: 1
Date Received: 11/10/1953
Selected Flag: TRUE
Abandonment Rec:
Contractor: 2414
Form Version: 1
Owner:
Street Name:
County: WELLINGTON
Municipality: PUSLINCH TOWNSHIP
Site Info:
Lot: 031
Concession: 07

Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6702540.pdf

Additional Detail(s) (Map)

Well Completed Date:	1953/09/04
Year Completed:	1953
Depth (m):	42.672
Latitude:	43.4468968774598
Longitude:	-80.1164183125923
Path:	670\6702540.pdf

Bore Hole Information

Bore Hole ID:	10466683	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571495.30
Code OB Desc:		**North83:**	4810823.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	9
Date Completed:	04-Sep-1953 00:00:00	**UTMRC Desc:**	unknown UTM
Remarks:		**Location Method:**	p9
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932614256
Layer:	4
Color:	
General Color:	
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	05
Mat2 Desc:	CLAY
Mat3:	
Mat3 Desc:	
Formation Top Depth:	38.0
Formation End Depth:	54.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932614262
Layer:	10
Color:	8
General Color:	BLACK
Mat1:	15
Most Common Material:	LIMESTONE

Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 134.0
Formation End Depth: 140.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614255
Layer: 3
Color:
General Color:
Mat1: 05
Most Common Material: CLAY
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 9.0
Formation End Depth: 38.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614258
Layer: 6
Color:
General Color:
Mat1: 11
Most Common Material: GRAVEL
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 62.0
Formation End Depth: 76.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614261
Layer: 9
Color: 6
General Color: BROWN
Mat1: 15
Most Common Material: LIMESTONE
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 91.0
Formation End Depth: 134.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID:	932614253
Layer:	1
Color:	
General Color:	
Mat1:	02
Most Common Material:	TOPSOIL
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	3.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932614259
Layer:	7
Color:	
General Color:	
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	76.0
Formation End Depth:	89.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932614254
Layer:	2
Color:	
General Color:	
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	3.0
Formation End Depth:	9.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932614257
Layer:	5
Color:	
General Color:	
Mat1:	09
Most Common Material:	MEDIUM SAND
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	54.0
Formation End Depth:	62.0

Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614260
Layer: 8
Color:
General Color:
Mat1: 11
Most Common Material: GRAVEL
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 89.0
Formation End Depth: 91.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966702540
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 11015253
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930758962
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 140.0
Casing Diameter: 5.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930758961
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 91.0
Casing Diameter: 5.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996702540

Pump Set At:	
Static Level:	23.0
Final Level After Pumping:	26.0
Recommended Pump Depth:	
Pumping Rate:	7.0
Flowing Rate:	
Recommended Pump Rate:	
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	2
Pumping Duration MIN:	30
Flowing:	No

Water Details

Water ID:	933954878
Layer:	1
Kind Code:	3
Kind:	SULPHUR
Water Found Depth:	100.0
Water Found Depth UOM:	ft

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44 ***1 of 1*** ***SSW/126.8*** ***312.2 / 1.31*** ***91 HWY 6 ON*** ***WWIS***

Well ID:	7254633	***Data Entry Status:***	
Construction Date:		***Data Src:***	
Primary Water Use:	Domestic	***Date Received:***	12/19/2015
Sec. Water Use:		***Selected Flag:***	TRUE
Final Well Status:	0	***Abandonment Rec:***	
Water Type:		***Contractor:***	7570
Casing Material:		***Form Version:***	7
Audit No:	Z222841	***Owner:***	
Tag:	A190394	***Street Name:***	91 HWY 6
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	
Well Depth:		***Concession:***	
Overburden/Bedrock:		***Concession Name:***	
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/725\7254633.pdf

Additional Detail(s) (Map)

Well Completed Date:	2015/09/18
Year Completed:	2015
Depth (m):	31.3944
Latitude:	43.445329291183
Longitude:	-80.111662205418
Path:	725\7254633.pdf

Bore Hole Information

Bore Hole ID:	1005842110	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571882.00
Code OB Desc:		**North83:**	4810653.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	18-Sep-2015 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1005897836
Layer:	3
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	21.0
Formation End Depth:	67.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1005897835
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	9.0
Formation End Depth:	21.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1005897838
Layer:	5
Color:	6
General Color:	BROWN
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	

Formation Top Depth: 94.0
Formation End Depth: 103.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1005897834
Layer: 1
Color:
General Color:
Mat1: 01
Most Common Material: FILL
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 9.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1005897837
Layer: 4
Color:
General Color:
Mat1: 34
Most Common Material: TILL
Mat2: 12
Mat2 Desc: STONES
Mat3:
Mat3 Desc:
Formation Top Depth: 67.0
Formation End Depth: 94.0
Formation End Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1005897862
Layer: 1
Plug From: 0.0
Plug To: 20.0
Plug Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1005897863
Layer: 2
Plug From: 20.0
Plug To: 95.0
Plug Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1005897861
Layer: 1
Plug From:

Plug To:
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 1005897860
Method Construction Code: 2
Method Construction: Rotary (Convent.)
Other Method Construction:

Pipe Information

Pipe ID: 1005897832
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1005897843
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From: -2.0
Depth To: 95.0
Casing Diameter: 6.125
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Screen

Screen ID: 1005897844
Layer:
Slot:
Screen Top Depth:
Screen End Depth:
Screen Material:
Screen Depth UOM: ft
Screen Diameter UOM: inch
Screen Diameter:

Results of Well Yield Testing

Pump Test ID: 1005897833
Pump Set At: 60.0
Static Level: 22.0
Final Level After Pumping: 30.200000762939453
Recommended Pump Depth: 60.0
Pumping Rate: 15.0
Flowing Rate:
Recommended Pump Rate: 15.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 0
Pumping Duration HR: 2
Pumping Duration MIN:
Flowing:

Draw Down & Recovery

Pump Test Detail ID: 1005897855
Test Type: Draw Down
Test Duration: 10
Test Level: 29.399999618530273
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1005897856
Test Type: Draw Down
Test Duration: 15
Test Level: 29.700000762939453
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1005897852
Test Type: Recovery
Test Duration: 4
Test Level: 22.799999237060547
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1005897857
Test Type: Draw Down
Test Duration: 20
Test Level: 30.200000762939453
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1005897850
Test Type: Recovery
Test Duration: 3
Test Level: 24.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1005897853
Test Type: Draw Down
Test Duration: 5
Test Level: 28.899999618530273
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1005897858
Test Type: Draw Down
Test Duration: 25
Test Level: 30.200000762939453
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1005897845
Test Type: Draw Down

Test Duration: 1
Test Level: 24.700000762939453
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1005897851
Test Type: Draw Down
Test Duration: 4
Test Level: 28.100000381469727
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1005897854
Test Type: Recovery
Test Duration: 5
Test Level: 22.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1005897847
Test Type: Draw Down
Test Duration: 2
Test Level: 26.200000762939453
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1005897848
Test Type: Recovery
Test Duration: 2
Test Level: 25.100000381469727
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1005897846
Test Type: Recovery
Test Duration: 1
Test Level: 26.399999618530273
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1005897849
Test Type: Draw Down
Test Duration: 3
Test Level: 27.5
Test Level UOM: ft

Water Details

Water ID: 1005897842
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 100.0
Water Found Depth UOM: ft

Hole Diameter

Hole ID:	1005897841
Diameter:	6.125
Depth From:	95.0
Depth To:	103.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

Hole Diameter

Hole ID:	1005897839
Diameter:	10.0
Depth From:	0.0
Depth To:	20.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

Hole Diameter

Hole ID:	1005897840
Diameter:	8.75
Depth From:	20.0
Depth To:	95.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

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45 ***1 of 1*** ***WSW/126.9*** ***315.4 / 4.51*** ***lot 31 con 7 ON*** ***WWIS***

Well ID:	6708055	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	11/8/1983
Sec. Water Use:	0	***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	2336
Casing Material:		***Form Version:***	1
Audit No:		***Owner:***	
Tag:		***Street Name:***	
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	031
Well Depth:		***Concession:***	07
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map):

Additional Detail(s) (Map)

Well Completed Date:	1983/10/11
Year Completed:	1983
Depth (m):	15.24
Latitude:	43.4468969729471
Longitude:	-80.1164306697457
Path:	

Bore Hole Information

Bore Hole ID:	10471998	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571494.30
Code OB Desc:		***North83:***	4810823.00
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	4
Date Completed:	11-Oct-1983 00:00:00	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	p4
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932637834
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	15.0
Formation End Depth:	35.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932637833
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	15.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932637836
Layer:	4
Color:	
General Color:	
Mat1:	28
Most Common Material:	SAND

Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 48.0
Formation End Depth: 49.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932637837
Layer: 5
Color:
General Color:
Mat1: 11
Most Common Material: GRAVEL
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 49.0
Formation End Depth: 50.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932637835
Layer: 3
Color: 6
General Color: BROWN
Mat1: 05
Most Common Material: CLAY
Mat2: 28
Mat2 Desc: SAND
Mat3: 11
Mat3 Desc: GRAVEL
Formation Top Depth: 35.0
Formation End Depth: 48.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966708055
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 11020568
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930768166
Layer: 1
Material: 1

Open Hole or Material:	STEEL
Depth From:	
Depth To:	50.0
Casing Diameter:	5.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996708055
Pump Set At:	
Static Level:	21.0
Final Level After Pumping:	30.0
Recommended Pump Depth:	40.0
Pumping Rate:	10.0
Flowing Rate:	
Recommended Pump Rate:	8.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	2
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	934347597
Test Type:	Recovery
Test Duration:	15
Test Level:	21.0
Test Level UOM:	ft

Water Details

Water ID:	933961243
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	50.0
Water Found Depth UOM:	ft

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46 | ***1 of 1*** | ***NW/129.8*** | ***326.9 / 16.08*** | ***lot 30 con 8 ON*** | ***WWIS***

Well ID:	6702663	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	1/5/1965
Sec. Water Use:	0	***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	4208
Casing Material:		***Form Version:***	1
Audit No:		***Owner:***	
Tag:		***Street Name:***	
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	030
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	

Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6702663.pdf

Additional Detail(s) (Map)

Well Completed Date:	1964/11/10
Year Completed:	1964
Depth (m):	27.432
Latitude:	43.4523278002707
Longitude:	-80.1119392102323
Path:	670\6702663.pdf

Bore Hole Information

Bore Hole ID:	10466806	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571851.30
Code OB Desc:		***North83:***	4811430.00
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	5
Date Completed:	10-Nov-1964 00:00:00	***UTMRC Desc:***	margin of error : 100 m - 300 m
Remarks:		***Location Method:***	p5
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932614787
Layer:	4
Color:	
General Color:	
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	80.0
Formation End Depth:	90.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932614785
Layer:	2
Color:	
General Color:	
Mat1:	02
Most Common Material:	TOPSOIL
Mat2:	05
Mat2 Desc:	CLAY

Mat3: 12
Mat3 Desc: STONES
Formation Top Depth: 6.0
Formation End Depth: 30.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614786
Layer: 3
Color:
General Color:
Mat1: 05
Most Common Material: CLAY
Mat2: 11
Mat2 Desc: GRAVEL
Mat3:
Mat3 Desc:
Formation Top Depth: 30.0
Formation End Depth: 80.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614784
Layer: 1
Color:
General Color:
Mat1: 23
Most Common Material: PREVIOUSLY DUG
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 6.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966702663
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 11015376
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930759199
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:

Depth To:	80.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	930759200
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	
Depth To:	90.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996702663
Pump Set At:	
Static Level:	40.0
Final Level After Pumping:	50.0
Recommended Pump Depth:	60.0
Pumping Rate:	20.0
Flowing Rate:	
Recommended Pump Rate:	10.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Water Details

Water ID:	933955009
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	87.0
Water Found Depth UOM:	ft

47 | ***1 of 1*** | ***WSW/134.8*** | ***322.3 / 11.41*** | ***lot 31 con 8 ON*** | ***WWIS***

Well ID:	6702674	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	6/3/1964
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	4208
Casing Material:		**Form Version:**	1
Audit No:		**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	08

Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6702674.pdf

Additional Detail(s) (Map)

Well Completed Date:	1964/03/09
Year Completed:	1964
Depth (m):	26.5176
Latitude:	43.4482018800438
Longitude:	-80.1163375213959
Path:	670\6702674.pdf

Bore Hole Information

Bore Hole ID:	10466817	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571500.30
Code OB Desc:		**North83:**	4810968.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	5
Date Completed:	09-Mar-1964 00:00:00	**UTMRC Desc:**	margin of error : 100 m - 300 m
Remarks:		**Location Method:**	p5
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932614828
Layer:	3
Color:	
General Color:	
Mat1:	09
Most Common Material:	MEDIUM SAND
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	60.0
Formation End Depth:	85.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932614827
Layer:	2
Color:	
General Color:	
Mat1:	05
Most Common Material:	CLAY

Mat2:	09
Mat2 Desc:	MEDIUM SAND
Mat3:	
Mat3 Desc:	
Formation Top Depth:	20.0
Formation End Depth:	60.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932614829
Layer:	4
Color:	
General Color:	
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	85.0
Formation End Depth:	87.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932614826
Layer:	1
Color:	
General Color:	
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	09
Mat3 Desc:	MEDIUM SAND
Formation Top Depth:	0.0
Formation End Depth:	20.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966702674
Method Construction Code:	1
Method Construction:	Cable Tool
Other Method Construction:	

Pipe Information

Pipe ID:	11015387
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930759217
Layer:	1
Material:	1

Open Hole or Material:	STEEL
Depth From:	
Depth To:	87.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996702674
Pump Set At:	
Static Level:	55.0
Final Level After Pumping:	70.0
Recommended Pump Depth:	70.0
Pumping Rate:	20.0
Flowing Rate:	
Recommended Pump Rate:	8.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	0
Pumping Duration MIN:	30
Flowing:	No

Water Details

Water ID:	933955020
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	87.0
Water Found Depth UOM:	ft

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48 **1 of 1** **NNW/135.3** **329.9 / 19.00** **lot 30 con 8 ON** **WWIS**

Well ID:	6710353	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	7/12/1990
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	4005
Casing Material:		**Form Version:**	1
Audit No:	76624	**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	030
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6710353.pdf

Additional Detail(s) (Map)

Well Completed Date: 1990/05/08
Year Completed: 1990
Depth (m): 34.1376
Latitude: 43.4528901107702
Longitude: -80.1113006337497
Path: 671\6710353.pdf

Bore Hole Information

Bore Hole ID: 10474198
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 08-May-1990 00:00:00
Remarks:
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 17
East83: 571902.30
North83: 4811493.00
Org CS:
UTMRC: 5
UTMRC Desc: margin of error : 100 m - 300 m
Location Method: gps

Overburden and Bedrock Materials Interval

Formation ID: 932647509
Layer: 2
Color: 6
General Color: BROWN
Mat1: 05
Most Common Material: CLAY
Mat2: 11
Mat2 Desc: GRAVEL
Mat3: 77
Mat3 Desc: LOOSE
Formation Top Depth: 24.0
Formation End Depth: 36.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932647508
Layer: 1
Color: 6
General Color: BROWN
Mat1: 28
Most Common Material: SAND
Mat2: 11
Mat2 Desc: GRAVEL
Mat3: 77
Mat3 Desc: LOOSE
Formation Top Depth: 0.0
Formation End Depth: 24.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID:	932647510
Layer:	3
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	77
Mat3 Desc:	LOOSE
Formation Top Depth:	36.0
Formation End Depth:	79.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932647511
Layer:	4
Color:	2
General Color:	GREY
Mat1:	28
Most Common Material:	SAND
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	13
Mat3 Desc:	BOULDERS
Formation Top Depth:	79.0
Formation End Depth:	107.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932647512
Layer:	5
Color:	2
General Color:	GREY
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	73
Mat2 Desc:	HARD
Mat3:	
Mat3 Desc:	
Formation Top Depth:	107.0
Formation End Depth:	112.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966710353
Method Construction Code:	5
Method Construction:	Air Percussion
Other Method Construction:	

Pipe Information

Pipe ID:	11022768
Casing No:	1
Comment:	

Alt Name:

Construction Record - Casing

Casing ID:	930772153
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	
Depth To:	112.0
Casing Diameter:	
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	930772152
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	107.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996710353
Pump Set At:	
Static Level:	22.0
Final Level After Pumping:	70.0
Recommended Pump Depth:	105.0
Pumping Rate:	30.0
Flowing Rate:	
Recommended Pump Rate:	30.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	2
Water State After Test:	CLOUDY
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	934872210
Test Type:	Recovery
Test Duration:	45
Test Level:	22.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934619935
Test Type:	Recovery
Test Duration:	30
Test Level:	22.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934345936
Test Type:	Recovery
Test Duration:	15
Test Level:	22.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	935132213
Test Type:	Recovery
Test Duration:	60
Test Level:	22.0
Test Level UOM:	ft

Water Details

Water ID:	933963967
Layer:	1
Kind Code:	5
Kind:	Not stated
Water Found Depth:	109.0
Water Found Depth UOM:	ft

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49 | ***1 of 1*** | ***W/138.1*** | ***325.1 / 14.25*** | ***BACK ST. lot 31 con 8 MORRISTON ON*** | ***WWIS***

Well ID:	7114629	***Data Entry Status:***	
Construction Date:		***Data Src:***	
Primary Water Use:	Domestic	***Date Received:***	11/10/2008
Sec. Water Use:		***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	7385
Casing Material:		***Form Version:***	7
Audit No:	Z90631	***Owner:***	
Tag:	A066879	***Street Name:***	BACK ST.
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	031
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/711\7114629.pdf

Additional Detail(s) (Map)

Well Completed Date:	2008/10/21
Year Completed:	2008
Depth (m):	27.1272
Latitude:	43.4492587706828
Longitude:	-80.1144472700737
Path:	711\7114629.pdf

Bore Hole Information

Bore Hole ID:	1001864608	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571652.00
Code OB Desc:		**North83:**	4811087.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	3
Date Completed:	21-Oct-2008 00:00:00	**UTMRC Desc:**	margin of error : 10 - 30 m
Remarks:		**Location Method:**	wwr
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1001873833
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	30.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1001873836
Layer:	4
Color:	6
General Color:	BROWN
Mat1:	26
Most Common Material:	ROCK
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	80.0
Formation End Depth:	89.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1001873835
Layer:	3
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	28
Mat2 Desc:	SAND
Mat3:	11
Mat3 Desc:	GRAVEL

Formation Top Depth: 70.0
Formation End Depth: 80.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 1001873834
Layer: 2
Color: 2
General Color: GREY
Mat1: 05
Most Common Material: CLAY
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 30.0
Formation End Depth: 70.0
Formation End Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1001873838
Layer: 1
Plug From: 0.0
Plug To: 20.0
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 1001873870
Method Construction Code: B
Method Construction: Other Method
Other Method Construction: AIR ROTARY

Pipe Information

Pipe ID: 1001873831
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1001873840
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From: -2.0
Depth To: 82.0
Casing Diameter: 6.125
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 1001873841
Layer: 2

Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	82.0
Depth To:	89.0
Casing Diameter:	6.125
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Screen

Screen ID:	1001873842
Layer:	
Slot:	
Screen Top Depth:	
Screen End Depth:	
Screen Material:	
Screen Depth UOM:	ft
Screen Diameter UOM:	inch
Screen Diameter:	

Results of Well Yield Testing

Pump Test ID:	1001873832
Pump Set At:	60.0
Static Level:	38.0
Final Level After Pumping:	39.0
Recommended Pump Depth:	60.0
Pumping Rate:	12.0
Flowing Rate:	
Recommended Pump Rate:	12.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	0
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	1001873846
Test Type:	Recovery
Test Duration:	2
Test Level:	38.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1001873849
Test Type:	Draw Down
Test Duration:	4
Test Level:	39.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1001873864
Test Type:	Recovery
Test Duration:	40
Test Level:	38.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID: 1001873855
Test Type: Draw Down
Test Duration: 15
Test Level: 39.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873847
Test Type: Draw Down
Test Duration: 3
Test Level: 39.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873851
Test Type: Draw Down
Test Duration: 5
Test Level: 39.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873859
Test Type: Draw Down
Test Duration: 25
Test Level: 39.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873860
Test Type: Recovery
Test Duration: 25
Test Level: 38.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873853
Test Type: Draw Down
Test Duration: 10
Test Level: 39.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873854
Test Type: Recovery
Test Duration: 10
Test Level: 38.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873862
Test Type: Recovery
Test Duration: 30
Test Level: 38.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873843
Test Type: Draw Down
Test Duration: 1
Test Level: 39.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873856
Test Type: Recovery
Test Duration: 15
Test Level: 38.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873858
Test Type: Recovery
Test Duration: 20
Test Level: 38.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873865
Test Type: Draw Down
Test Duration: 50
Test Level: 39.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873866
Test Type: Recovery
Test Duration: 50
Test Level: 38.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873845
Test Type: Draw Down
Test Duration: 2
Test Level: 39.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873861
Test Type: Draw Down
Test Duration: 30
Test Level: 39.0

Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873844
Test Type: Recovery
Test Duration: 1
Test Level: 38.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873848
Test Type: Recovery
Test Duration: 3
Test Level: 38.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873852
Test Type: Recovery
Test Duration: 5
Test Level: 38.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873850
Test Type: Recovery
Test Duration: 4
Test Level: 38.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873857
Test Type: Draw Down
Test Duration: 20
Test Level: 39.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873863
Test Type: Draw Down
Test Duration: 40
Test Level: 39.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1001873867
Test Type: Draw Down
Test Duration: 60
Test Level: 39.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID:	1001873868
Test Type:	Recovery
Test Duration:	60
Test Level:	38.0
Test Level UOM:	ft

Water Details

Water ID:	1001873839
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	89.0
Water Found Depth UOM:	ft

Hole Diameter

Hole ID:	1001873837
Diameter:	
Depth From:	
Depth To:	
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

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50 | ***1 of 1*** | ***SSW/138.3*** | ***319.2 / 8.36*** | ***lot 32 con 7 ON*** | ***WWIS***

Well ID:	6702546	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Livestock	**Date Received:**	10/11/1966
Sec. Water Use:	Domestic	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	4208
Casing Material:		**Form Version:**	1
Audit No:		**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	032
Well Depth:		**Concession:**	07
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6702546.pdf

Additional Detail(s) (Map)

Well Completed Date:	1966/09/09
Year Completed:	1966
Depth (m):	30.48
Latitude:	43.4451132936737
Longitude:	-80.1128356859509
Path:	670\6702546.pdf

Bore Hole Information

Bore Hole ID:	10466689	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571787.30
Code OB Desc:		**North83:**	4810628.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	5
Date Completed:	09-Sep-1966 00:00:00	**UTMRC Desc:**	margin of error : 100 m - 300 m
Remarks:		**Location Method:**	p5
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932614285
Layer:	2
Color:	
General Color:	
Mat1:	09
Most Common Material:	MEDIUM SAND
Mat2:	03
Mat2 Desc:	MUCK
Mat3:	
Mat3 Desc:	
Formation Top Depth:	45.0
Formation End Depth:	88.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932614284
Layer:	1
Color:	
General Color:	
Mat1:	23
Most Common Material:	PREVIOUSLY DUG
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	45.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932614286
Layer:	3
Color:	
General Color:	
Mat1:	14
Most Common Material:	HARDPAN
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	

Formation Top Depth: 88.0
Formation End Depth: 96.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614287
Layer: 4
Color:
General Color:
Mat1: 15
Most Common Material: LIMESTONE
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 96.0
Formation End Depth: 100.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966702546
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 11015259
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930758973
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 100.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930758972
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 96.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID:	996702546
Pump Set At:	
Static Level:	35.0
Final Level After Pumping:	45.0
Recommended Pump Depth:	60.0
Pumping Rate:	20.0
Flowing Rate:	
Recommended Pump Rate:	10.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Water Details

Water ID:	933954885
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	98.0
Water Found Depth UOM:	ft

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51 **1 of 1** **WSW/139.1** **315.3 / 4.44** **lot 31 con 7 ON** **WWIS**

Well ID:	6709858	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	8/24/1989
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	4207
Casing Material:		**Form Version:**	1
Audit No:	42561	**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	07
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6709858.pdf

Additional Detail(s) (Map)

Well Completed Date:	1989/06/23
Year Completed:	1989
Depth (m):	18.8976
Latitude:	43.4474388902077
Longitude:	-80.1166452369946
Path:	670\6709858.pdf

Bore Hole Information

Bore Hole ID:	10473706	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571476.30
Code OB Desc:		***North83:***	4810883.00
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	3
Date Completed:	23-Jun-1989 00:00:00	***UTMRC Desc:***	margin of error : 10 - 30 m
Remarks:		***Location Method:***	gps
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932645379
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	02
Most Common Material:	TOPSOIL
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	1.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932645382
Layer:	4
Color:	2
General Color:	GREY
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	28
Mat2 Desc:	SAND
Mat3:	
Mat3 Desc:	
Formation Top Depth:	57.0
Formation End Depth:	62.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932645381
Layer:	3
Color:	6
General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	11
Mat2 Desc:	GRAVEL

Mat3:	06
Mat3 Desc:	SILT
Formation Top Depth:	30.0
Formation End Depth:	57.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932645380
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	12
Mat2 Desc:	STONES
Mat3:	05
Mat3 Desc:	CLAY
Formation Top Depth:	1.0
Formation End Depth:	30.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966709858
Method Construction Code:	4
Method Construction:	Rotary (Air)
Other Method Construction:	

Pipe Information

Pipe ID:	11022276
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930771252
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	62.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996709858
Pump Set At:	
Static Level:	19.0
Final Level After Pumping:	60.0
Recommended Pump Depth:	50.0
Pumping Rate:	15.0
Flowing Rate:	
Recommended Pump Rate:	15.0
Levels UOM:	ft
Rate UOM:	GPM

Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	934344263
Test Type:	Recovery
Test Duration:	15
Test Level:	21.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934870646
Test Type:	Recovery
Test Duration:	45
Test Level:	19.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	935130598
Test Type:	Recovery
Test Duration:	60
Test Level:	19.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934618363
Test Type:	Recovery
Test Duration:	30
Test Level:	19.0
Test Level UOM:	ft

Water Details

Water ID:	933963357
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	62.0
Water Found Depth UOM:	ft

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52 | ***1 of 1*** | ***WSW/147.6*** | ***322.0 / 11.15*** | ***lot 31 con 8 ON*** | ***WWIS***

Well ID:	6702667	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	9/25/1951
Sec. Water Use:	0	***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	2411
Casing Material:		***Form Version:***	1
Audit No:		***Owner:***	
Tag:		***Street Name:***	
Construction Method:		***County:***	WELLINGTON

Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6702667.pdf

Additional Detail(s) (Map)

Well Completed Date:	1951/08/25
Year Completed:	1951
Depth (m):	24.6888
Latitude:	43.4482748614453
Longitude:	-80.1164600471206
Path:	670\6702667.pdf

Bore Hole Information

Bore Hole ID:	10466810	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571490.30
Code OB Desc:		**North83:**	4810976.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	9
Date Completed:	25-Aug-1951 00:00:00	**UTMRC Desc:**	unknown UTM
Remarks:		**Location Method:**	p9
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932614800
Layer:	1
Color:	
General Color:	
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	20.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932614802
Layer:	3

Color:
General Color:
Mat1: 11
Most Common Material: GRAVEL
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 80.0
Formation End Depth: 81.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614801
Layer: 2
Color:
General Color:
Mat1: 07
Most Common Material: QUICKSAND
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 20.0
Formation End Depth: 80.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966702667
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 11015380
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930759205
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 80.0
Casing Diameter: 4.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996702667
Pump Set At:
Static Level: 0.0
Final Level After Pumping:

Recommended Pump Depth:
Pumping Rate:
Flowing Rate:
Recommended Pump Rate:
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code:
Water State After Test:
Pumping Test Method:
Pumping Duration HR:
Pumping Duration MIN:
Flowing: No

Water Details

Water ID: 933955013
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 80.0
Water Found Depth UOM: ft

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53 | ***1 of 1*** | ***WSW/148.2*** | ***323.2 / 12.31*** | ***lot 31 con 8 ON*** | ***WWIS***

Well ID: 6706778
Construction Date:
Primary Water Use: Domestic
Sec. Water Use: 0
Final Well Status: Water Supply
Water Type:
Casing Material:
Audit No:
Tag:
Construction Method:
Elevation (m):
Elevation Reliability:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Flowing (Y/N):
Flow Rate:
Clear/Cloudy:

Data Entry Status:
Data Src: 1
Date Received: 9/8/1978
Selected Flag: TRUE
Abandonment Rec:
Contractor: 2904
Form Version: 1
Owner:
Street Name:
County: WELLINGTON
Municipality: PUSLINCH TOWNSHIP
Site Info:
Lot: 031
Concession: 08
Concession Name: CON
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6706778.pdf

Additional Detail(s) (Map)

Well Completed Date: 1978/08/08
Year Completed: 1978
Depth (m): 31.3944
Latitude: 43.4483375026582
Longitude: -80.1164096999228
Path: 670\6706778.pdf

Bore Hole Information

Bore Hole ID: 10470849
DP2BR:
Spatial Status:

Elevation:
Elevrc:
Zone: 17

Code OB:		***East83:***	571494.30
Code OB Desc:		***North83:***	4810983.00
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	4
Date Completed:	08-Aug-1978 00:00:00	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	p4
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932632479
Layer:	5
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	85
Mat2 Desc:	SOFT
Mat3:	
Mat3 Desc:	
Formation Top Depth:	50.0
Formation End Depth:	60.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932632482
Layer:	8
Color:	6
General Color:	BROWN
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	85
Mat2 Desc:	SOFT
Mat3:	
Mat3 Desc:	
Formation Top Depth:	83.0
Formation End Depth:	101.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932632477
Layer:	3
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	13
Mat3 Desc:	BOULDERS
Formation Top Depth:	15.0
Formation End Depth:	22.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932632483
Layer:	9
Color:	
General Color:	
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	85
Mat2 Desc:	SOFT
Mat3:	
Mat3 Desc:	
Formation Top Depth:	101.0
Formation End Depth:	103.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932632476
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	85
Mat3 Desc:	SOFT
Formation Top Depth:	3.0
Formation End Depth:	15.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932632475
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	02
Most Common Material:	TOPSOIL
Mat2:	85
Mat2 Desc:	SOFT
Mat3:	65
Mat3 Desc:	DARK-COLOURED
Formation Top Depth:	0.0
Formation End Depth:	3.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932632481
Layer:	7
Color:	2
General Color:	GREY
Mat1:	10
Most Common Material:	COARSE SAND
Mat2:	05

Mat2 Desc:	CLAY
Mat3:	
Mat3 Desc:	
Formation Top Depth:	74.0
Formation End Depth:	83.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932632480
Layer:	6
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	13
Mat2 Desc:	BOULDERS
Mat3:	
Mat3 Desc:	
Formation Top Depth:	60.0
Formation End Depth:	74.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932632478
Layer:	4
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	73
Mat2 Desc:	HARD
Mat3:	
Mat3 Desc:	
Formation Top Depth:	22.0
Formation End Depth:	50.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966706778
Method Construction Code:	4
Method Construction:	Rotary (Air)
Other Method Construction:	

Pipe Information

Pipe ID:	11019419
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930766164
Layer:	1
Material:	1
Open Hole or Material:	STEEL

Depth From:
Depth To: 85.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930766165
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 103.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996706778
Pump Set At:
Static Level: 21.0
Final Level After Pumping: 87.0
Recommended Pump Depth: 50.0
Pumping Rate: 100.0
Flowing Rate:
Recommended Pump Rate: 20.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 1
Pumping Duration HR: 3
Pumping Duration MIN: 0
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 934620900
Test Type: Draw Down
Test Duration: 30
Test Level: 87.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 935131546
Test Type: Draw Down
Test Duration: 60
Test Level: 87.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934345253
Test Type: Draw Down
Test Duration: 15
Test Level: 87.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID:	934874397
Test Type:	Draw Down
Test Duration:	45
Test Level:	87.0
Test Level UOM:	ft

Water Details

Water ID:	933959798
Layer:	2
Kind Code:	1
Kind:	FRESH
Water Found Depth:	102.0
Water Found Depth UOM:	ft

Water Details

Water ID:	933959797
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	89.0
Water Found Depth UOM:	ft

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54 ***1 of 1*** ***NNW/150.1*** ***330.6 / 19.78*** ***lot 30 con 8 ON*** ***WWIS***

Well ID:	6710440	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	9/28/1990
Sec. Water Use:	0	***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	4005
Casing Material:		***Form Version:***	1
Audit No:	76386	***Owner:***	
Tag:		***Street Name:***	
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	030
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6710440.pdf

Additional Detail(s) (Map)

Well Completed Date:	1990/09/11
Year Completed:	1990
Depth (m):	33.528
Latitude:	43.4529901074096
Longitude:	-80.1114227672206
Path:	671\6710440.pdf

Bore Hole Information

Bore Hole ID:	10474285	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571892.30
Code OB Desc:		**North83:**	4811504.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	5
Date Completed:	11-Sep-1990 00:00:00	**UTMRC Desc:**	margin of error : 100 m - 300 m
Remarks:		**Location Method:**	gps
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932647924
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	77
Mat3 Desc:	LOOSE
Formation Top Depth:	22.0
Formation End Depth:	37.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932647925
Layer:	3
Color:	2
General Color:	GREY
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	28
Mat2 Desc:	SAND
Mat3:	77
Mat3 Desc:	LOOSE
Formation Top Depth:	37.0
Formation End Depth:	92.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932647926
Layer:	4
Color:	6
General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	77

Mat3 Desc:	LOOSE
Formation Top Depth:	92.0
Formation End Depth:	104.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932647927
Layer:	5
Color:	2
General Color:	GREY
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	73
Mat2 Desc:	HARD
Mat3:	
Mat3 Desc:	
Formation Top Depth:	104.0
Formation End Depth:	110.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932647923
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	81
Mat2 Desc:	SANDY
Mat3:	11
Mat3 Desc:	GRAVEL
Formation Top Depth:	0.0
Formation End Depth:	22.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966710440
Method Construction Code:	5
Method Construction:	Air Percussion
Other Method Construction:	

Pipe Information

Pipe ID:	11022855
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930772312
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	104.0

Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930772313
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 110.0
Casing Diameter:
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996710440
Pump Set At:
Static Level: 66.0
Final Level After Pumping: 95.0
Recommended Pump Depth:
Pumping Rate: 15.0
Flowing Rate:
Recommended Pump Rate:
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code:
Water State After Test:
Pumping Test Method: 1
Pumping Duration HR: 1
Pumping Duration MIN:
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 934619998
Test Type: Recovery
Test Duration: 30
Test Level: 66.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934872272
Test Type: Recovery
Test Duration: 45
Test Level: 66.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934346010
Test Type: Recovery
Test Duration: 15
Test Level: 66.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID:	935132702
Test Type:	Recovery
Test Duration:	60
Test Level:	66.0
Test Level UOM:	ft

Water Details

Water ID:	933964078
Layer:	1
Kind Code:	5
Kind:	Not stated
Water Found Depth:	107.0
Water Found Depth UOM:	ft

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55 | ***1 of 1*** | ***WSW/150.5*** | ***328.2 / 17.37*** | ***lot 31 con 8 ON*** | ***WWIS***

Well ID:	6711667	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	2/9/1995
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	4005
Casing Material:		**Form Version:**	1
Audit No:	124540	**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6711667.pdf

Additional Detail(s) (Map)

Well Completed Date:	1994/12/08
Year Completed:	1994
Depth (m):	28.3464
Latitude:	43.4489443779466
Longitude:	-80.1157087633844
Path:	671\6711667.pdf

Bore Hole Information

Bore Hole ID:	10475500	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571550.30
Code OB Desc:		**North83:**	4811051.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	3
Date Completed:	08-Dec-1994 00:00:00	**UTMRC Desc:**	margin of error : 10 - 30 m
Remarks:		**Location Method:**	gps
Elevrc Desc:			

Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Overburden and Bedrock Materials Interval

Formation ID:	932653595
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	77
Mat3 Desc:	LOOSE
Formation Top Depth:	0.0
Formation End Depth:	15.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932653597
Layer:	3
Color:	2
General Color:	GREY
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	28
Mat2 Desc:	SAND
Mat3:	
Mat3 Desc:	
Formation Top Depth:	81.0
Formation End Depth:	91.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932653596
Layer:	2
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	28
Mat2 Desc:	SAND
Mat3:	77
Mat3 Desc:	LOOSE
Formation Top Depth:	15.0
Formation End Depth:	81.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932653598
Layer:	4

Color:	2
General Color:	GREY
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	73
Mat2 Desc:	HARD
Mat3:	
Mat3 Desc:	
Formation Top Depth:	91.0
Formation End Depth:	93.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966711667
Method Construction Code:	5
Method Construction:	Air Percussion
Other Method Construction:	

Pipe Information

Pipe ID:	11024070
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930774515
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	
Depth To:	93.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	930774514
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	91.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996711667
Pump Set At:	
Static Level:	52.0
Final Level After Pumping:	85.0
Recommended Pump Depth:	87.0
Pumping Rate:	20.0
Flowing Rate:	
Recommended Pump Rate:	10.0
Levels UOM:	ft

Rate UOM:	GPM
Water State After Test Code:	2
Water State After Test:	CLOUDY
Pumping Test Method:	1
Pumping Duration HR:	0
Pumping Duration MIN:	30
Flowing:	No

Water Details

Water ID:	933965703
Layer:	1
Kind Code:	5
Kind:	Not stated
Water Found Depth:	92.0
Water Found Depth UOM:	ft

56 | ***1 of 1*** | ***W/151.7*** | ***324.3 / 13.48*** | ***lot 30 con 8 ON*** | ***WWIS***

Well ID:	6710473	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	11/19/1990
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	4005
Casing Material:		**Form Version:**	1
Audit No:	76432	**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	030
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6710473.pdf

Additional Detail(s) (Map)

Well Completed Date:	1990/11/13
Year Completed:	1990
Depth (m):	36.576
Latitude:	43.4509132435665
Longitude:	-80.1141475159216
Path:	671\6710473.pdf

Bore Hole Information

Bore Hole ID:	10474318	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571674.30
Code OB Desc:		**North83:**	4811271.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	5
Date Completed:	13-Nov-1990 00:00:00	**UTMRC Desc:**	margin of error : 100 m - 300 m

Remarks: ***Location Method:*** gps
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Overburden and Bedrock Materials Interval

Formation ID: 932648084
Layer: 5
Color: 2
General Color: GREY
Mat1: 15
Most Common Material: LIMESTONE
Mat2: 77
Mat2 Desc: LOOSE
Mat3:
Mat3 Desc:
Formation Top Depth: 111.0
Formation End Depth: 114.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932648080
Layer: 1
Color: 6
General Color: BROWN
Mat1: 28
Most Common Material: SAND
Mat2: 31
Mat2 Desc: COARSE GRAVEL
Mat3: 77
Mat3 Desc: LOOSE
Formation Top Depth: 0.0
Formation End Depth: 62.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932648083
Layer: 4
Color: 6
General Color: BROWN
Mat1: 11
Most Common Material: GRAVEL
Mat2: 28
Mat2 Desc: SAND
Mat3:
Mat3 Desc:
Formation Top Depth: 102.0
Formation End Depth: 111.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID:	932648085
Layer:	6
Color:	2
General Color:	GREY
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	73
Mat2 Desc:	HARD
Mat3:	
Mat3 Desc:	
Formation Top Depth:	114.0
Formation End Depth:	120.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932648081
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	77
Mat2 Desc:	LOOSE
Mat3:	
Mat3 Desc:	
Formation Top Depth:	62.0
Formation End Depth:	83.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932648082
Layer:	3
Color:	6
General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	77
Mat2 Desc:	LOOSE
Mat3:	
Mat3 Desc:	
Formation Top Depth:	83.0
Formation End Depth:	102.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966710473
Method Construction Code:	5
Method Construction:	Air Percussion
Other Method Construction:	

Pipe Information

Pipe ID:	11022888
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930772373
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	111.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	930772374
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	
Depth To:	114.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996710473
Pump Set At:	
Static Level:	63.0
Final Level After Pumping:	91.0
Recommended Pump Depth:	115.0
Pumping Rate:	25.0
Flowing Rate:	
Recommended Pump Rate:	10.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	2
Water State After Test:	CLOUDY
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	934872285
Test Type:	Recovery
Test Duration:	45
Test Level:	63.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934346032
Test Type:	Recovery
Test Duration:	15
Test Level:	63.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID: 935132723
Test Type: Recovery
Test Duration: 60
Test Level: 63.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934620011
Test Type: Recovery
Test Duration: 30
Test Level: 63.0
Test Level UOM: ft

Water Details

Water ID: 933964120
Layer: 1
Kind Code: 5
Kind: Not stated
Water Found Depth: 117.0
Water Found Depth UOM: ft

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57 | **1 of 1** | **W/154.6** | **328.3 / 17.44** | **lot 31 con 8 ON** | **WWIS**

Well ID: 6708922
Construction Date:
Primary Water Use: Domestic
Sec. Water Use: 0
Final Well Status: Water Supply
Water Type:
Casing Material:
Audit No: 15512
Tag:
Construction Method:
Elevation (m):
Elevation Reliability:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Flowing (Y/N):
Flow Rate:
Clear/Cloudy:

Data Entry Status:
Data Src: 1
Date Received: 9/30/1987
Selected Flag: TRUE
Abandonment Rec:
Contractor: 4005
Form Version: 1
Owner:
Street Name:
County: WELLINGTON
Municipality: PUSLINCH TOWNSHIP
Site Info:
Lot: 031
Concession: 08
Concession Name: CON
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6708922.pdf

Additional Detail(s) (Map)

Well Completed Date: 1987/08/27
Year Completed: 1987
Depth (m): 33.8328
Latitude: 43.4491584500654
Longitude: -80.1154461053806
Path: 670\6708922.pdf

Bore Hole Information

Bore Hole ID: 10472802
Elevation:

DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571571.30
Code OB Desc:		***North83:***	4811075.00
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	3
Date Completed:	27-Aug-1987 00:00:00	***UTMRC Desc:***	margin of error : 10 - 30 m
Remarks:		***Location Method:***	gps
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932641340
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	77
Mat3 Desc:	LOOSE
Formation Top Depth:	5.0
Formation End Depth:	19.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932641342
Layer:	4
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	28
Mat2 Desc:	SAND
Mat3:	79
Mat3 Desc:	PACKED
Formation Top Depth:	75.0
Formation End Depth:	92.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932641343
Layer:	5
Color:	2
General Color:	GREY
Mat1:	28
Most Common Material:	SAND
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	77
Mat3 Desc:	LOOSE
Formation Top Depth:	92.0

Formation End Depth: 104.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932641339
Layer: 1
Color: 6
General Color: BROWN
Mat1: 05
Most Common Material: CLAY
Mat2: 28
Mat2 Desc: SAND
Mat3: 77
Mat3 Desc: LOOSE
Formation Top Depth: 0.0
Formation End Depth: 5.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932641341
Layer: 3
Color: 6
General Color: BROWN
Mat1: 05
Most Common Material: CLAY
Mat2: 28
Mat2 Desc: SAND
Mat3: 77
Mat3 Desc: LOOSE
Formation Top Depth: 19.0
Formation End Depth: 75.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932641344
Layer: 6
Color: 2
General Color: GREY
Mat1: 15
Most Common Material: LIMESTONE
Mat2: 73
Mat2 Desc: HARD
Mat3:
Mat3 Desc:
Formation Top Depth: 104.0
Formation End Depth: 111.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966708922
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 11021372
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930769593
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 111.0
Casing Diameter:
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930769592
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 104.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996708922
Pump Set At:
Static Level: 55.0
Final Level After Pumping: 60.0
Recommended Pump Depth: 107.0
Pumping Rate: 24.0
Flowing Rate:
Recommended Pump Rate: 10.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 2
Water State After Test: CLOUDY
Pumping Test Method: 2
Pumping Duration HR: 1
Pumping Duration MIN:
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 935137110
Test Type: Recovery
Test Duration: 60
Test Level: 55.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934868916
Test Type: Recovery

Test Duration: 45
Test Level: 55.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934341479
Test Type: Recovery
Test Duration: 15
Test Level: 55.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934616161
Test Type: Recovery
Test Duration: 30
Test Level: 55.0
Test Level UOM: ft

Water Details

Water ID: 933962231
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 109.0
Water Found Depth UOM: ft

---

58 | **1 of 1** | **N/156.5** | **330.4 / 19.56** | **lot 30 con 8 ON** | **WWIS**

Well ID: 6710441
Construction Date:
Primary Water Use: Domestic
Sec. Water Use: 0
Final Well Status: Water Supply
Water Type:
Casing Material:
Audit No: 76387
Tag:
Construction Method:
Elevation (m):
Elevation Reliability:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Flowing (Y/N):
Flow Rate:
Clear/Cloudy:

Data Entry Status:
Data Src: 1
Date Received: 9/28/1990
Selected Flag: TRUE
Abandonment Rec:
Contractor: 4005
Form Version: 1
Owner:
Street Name:
County: WELLINGTON
Municipality: PUSLINCH TOWNSHIP
Site Info:
Lot: 030
Concession: 08
Concession Name: CON
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6710441.pdf

Additional Detail(s) (Map)

Well Completed Date: 1990/09/10
Year Completed: 1990
Depth (m): 37.7952
Latitude: 43.4543459180122
Longitude: -80.109771386724

Path: 671\6710441.pdf

Bore Hole Information

Bore Hole ID:	10474286	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	572024.30
Code OB Desc:		***North83:***	4811656.00
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	5
Date Completed:	10-Sep-1990 00:00:00	***UTMRC Desc:***	margin of error : 100 m - 300 m
Remarks:		***Location Method:***	gps
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932647928
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	81
Mat2 Desc:	SANDY
Mat3:	11
Mat3 Desc:	GRAVEL
Formation Top Depth:	0.0
Formation End Depth:	22.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932647933
Layer:	6
Color:	2
General Color:	GREY
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	114.0
Formation End Depth:	124.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932647931
Layer:	4
Color:	2
General Color:	GREY
Mat1:	28

Most Common Material:	SAND
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	13
Mat3 Desc:	BOULDERS
Formation Top Depth:	82.0
Formation End Depth:	109.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932647929
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	22.0
Formation End Depth:	35.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932647932
Layer:	5
Color:	6
General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	77
Mat3 Desc:	LOOSE
Formation Top Depth:	109.0
Formation End Depth:	114.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932647930
Layer:	3
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	77
Mat3 Desc:	LOOSE
Formation Top Depth:	35.0
Formation End Depth:	82.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID: 966710441
Method Construction Code: 5
Method Construction: Air Percussion
Other Method Construction:

Pipe Information

Pipe ID: 11022856
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930772314
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 114.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930772315
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 124.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996710441
Pump Set At:
Static Level: 69.0
Final Level After Pumping: 111.0
Recommended Pump Depth: 120.0
Pumping Rate: 15.0
Flowing Rate:
Recommended Pump Rate: 15.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 2
Water State After Test: CLOUDY
Pumping Test Method: 1
Pumping Duration HR: 1
Pumping Duration MIN: 0
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 934346011
Test Type: Recovery
Test Duration: 15
Test Level: 69.0

Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934619999
Test Type: Recovery
Test Duration: 30
Test Level: 69.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 935132703
Test Type: Recovery
Test Duration: 60
Test Level: 69.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934872273
Test Type: Recovery
Test Duration: 45
Test Level: 69.0
Test Level UOM: ft

Water Details

Water ID: 933964080
Layer: 2
Kind Code: 5
Kind: Not stated
Water Found Depth: 121.0
Water Found Depth UOM: ft

Water Details

Water ID: 933964079
Layer: 1
Kind Code: 5
Kind: Not stated
Water Found Depth: 117.0
Water Found Depth UOM: ft

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59 | ***1 of 1*** | ***WSW/157.7*** | ***324.2 / 13.34*** | ***lot 31 con 8 ON*** | ***WWIS***

Well ID: 6702665
Construction Date:
Primary Water Use: Domestic
Sec. Water Use: 0
Final Well Status: Water Supply
Water Type:
Casing Material:
Audit No:
Tag:
Construction Method:
Elevation (m):
Elevation Reliability:
Depth to Bedrock:
Well Depth:

Data Entry Status:
Data Src: 1
Date Received: 1/3/1967
Selected Flag: TRUE
Abandonment Rec:
Contractor: 4208
Form Version: 1
Owner:
Street Name:
County: WELLINGTON
Municipality: PUSLINCH TOWNSHIP
Site Info:
Lot: 031
Concession: 08

Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6702665.pdf

Additional Detail(s) (Map)

Well Completed Date:	1966/12/28
Year Completed:	1966
Depth (m):	32.004
Latitude:	43.4485171868672
Longitude:	-80.1163576486532
Path:	670\6702665.pdf

Bore Hole Information

Bore Hole ID:	10466808	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571498.30
Code OB Desc:		**North83:**	4811003.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	5
Date Completed:	28-Dec-1966 00:00:00	**UTMRC Desc:**	margin of error : 100 m - 300 m
Remarks:		**Location Method:**	p5
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932614794
Layer:	3
Color:	
General Color:	
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	12.0
Formation End Depth:	85.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932614796
Layer:	5
Color:	
General Color:	
Mat1:	15
Most Common Material:	LIMESTONE

Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 93.0
Formation End Depth: 105.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614792
Layer: 1
Color:
General Color:
Mat1: 23
Most Common Material: PREVIOUSLY DUG
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 4.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614793
Layer: 2
Color:
General Color:
Mat1: 05
Most Common Material: CLAY
Mat2: 12
Mat2 Desc: STONES
Mat3:
Mat3 Desc:
Formation Top Depth: 4.0
Formation End Depth: 12.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614795
Layer: 4
Color:
General Color:
Mat1: 05
Most Common Material: CLAY
Mat2: 11
Mat2 Desc: GRAVEL
Mat3:
Mat3 Desc:
Formation Top Depth: 85.0
Formation End Depth: 93.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966702665
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 11015378
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930759203
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 105.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930759202
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 93.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996702665
Pump Set At:
Static Level: 35.0
Final Level After Pumping: 40.0
Recommended Pump Depth: 50.0
Pumping Rate: 20.0
Flowing Rate:
Recommended Pump Rate: 10.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 1
Pumping Duration HR: 0
Pumping Duration MIN: 30
Flowing: No

Water Details

Water ID: 933955011
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 102.0

Water Found Depth UOM: ft

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60 | **1 of 1** | **WSW/159.4** | **325.9 / 15.00** | **lot 31 con 8 ON** | **WWIS**

Well ID:	6702671	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	1/26/1960
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	4208
Casing Material:		**Form Version:**	1
Audit No:		**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6702671.pdf

Additional Detail(s) (Map)

Well Completed Date:	1959/08/11
Year Completed:	1959
Depth (m):	34.7472
Latitude:	43.4487225437923
Longitude:	-80.1161321984738
Path:	670\6702671.pdf

Bore Hole Information

Bore Hole ID:	10466814	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571516.30
Code OB Desc:		**North83:**	4811026.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	5
Date Completed:	11-Aug-1959 00:00:00	**UTMRC Desc:**	margin of error : 100 m - 300 m
Remarks:		**Location Method:**	p5
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932614816
Layer:	2
Color:	
General Color:	

Mat1:	05
Most Common Material:	CLAY
Mat2:	09
Mat2 Desc:	MEDIUM SAND
Mat3:	11
Mat3 Desc:	GRAVEL
Formation Top Depth:	35.0
Formation End Depth:	108.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932614815
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	35.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932614817
Layer:	3
Color:	
General Color:	
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	108.0
Formation End Depth:	114.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966702671
Method Construction Code:	1
Method Construction:	Cable Tool
Other Method Construction:	

Pipe Information

Pipe ID:	11015384
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930759212

Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	
Depth To:	114.0
Casing Diameter:	7.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	930759211
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	108.0
Casing Diameter:	7.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996702671
Pump Set At:	
Static Level:	37.0
Final Level After Pumping:	100.0
Recommended Pump Depth:	80.0
Pumping Rate:	5.0
Flowing Rate:	
Recommended Pump Rate:	3.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Water Details

Water ID:	933955017
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	110.0
Water Found Depth UOM:	ft

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61 | ***1 of 2*** | ***W/161.4*** | ***329.6 / 18.70*** | ***C5 CORP***
41 BADENOCH ST E,,MORRISTON,ON,N0B 2C0,
CA
ON | ***PINC***

Incident ID:		**Pipe Material:**	
Incident No:	1951442	**Fuel Category:**	Natural Gas
Incident Reported Dt:	9/29/2016	**Health Impact:**	
Type:	FS-Pipeline Incident	**Environment Impact:**	
Status Code:		**Property Damage:**	Yes
Tank Status:	Pipeline Damage Reason Est	**Service Interrupt:**	
Task No:	6363754	**Enforce Policy:**	Yes
Spills Action Centre:		**Public Relation:**	

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Fuel Type:		**Pipeline System:**	
Fuel Occurrence Tp:		**PSIG:**	
Date of Occurrence:		**Attribute Category:**	FS-Perform P-line Inc Invest
Occurrence Start Dt:	2016/09/30	**Regulator Location:**	
Depth:		**Method Details:**	E-mail
Customer Acct Name:	C5 CORP		
Incident Address:	41 BADENOCH ST E,,MORRISTON,ON,N0B 2C0,CA		
Operation Type:			
Pipeline Type:			
Regulator Type:			
Summary:	41 BADENOCH ST, GUELPH -PIPELINE HIT 1/2"		
Reported By:	RICK BIGELOW - UNION GAS		
Affiliation:			
Occurrence Desc:			
Damage Reason:	Excavation practices not sufficient		
Notes:			

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61 **2 of 2** **W/161.4** **329.6 / 18.70** **Union Gas Limited 41 Badenoch Street Guelph ON** **SPL**

Ref No:	0128-AE8P6N	**Discharger Report:**	
Site No:	NA	**Material Group:**	
Incident Dt:	9/28/2016	**Health/Env Conseq:**	
Year:		**Client Type:**	
Incident Cause:		**Sector Type:**	Miscellaneous Communal
Incident Event:	Leak/Break	**Agency Involved:**	
Contaminant Code:	35	**Nearest Watercourse:**	
Contaminant Name:	NATURAL GAS (METHANE)	**Site Address:**	41 Badenoch Street
Contaminant Limit 1:		**Site District Office:**	
Contam Limit Freq 1:		**Site Postal Code:**	
Contaminant UN No 1:		**Site Region:**	
Environment Impact:		**Site Municipality:**	Guelph
Nature of Impact:		**Site Lot:**	
Receiving Medium:		**Site Conc:**	
Receiving Env:	Air	**Northing:**	
MOE Response:		**Easting:**	
Dt MOE Arvl on Scn:		**Site Geo Ref Accu:**	
MOE Reported Dt:	9/28/2016	**Site Map Datum:**	
Dt Document Closed:		**SAC Action Class:**	TSSA - Fuel Safety Branch - Hydrocarbon Fuel Release/Spill
Incident Reason:	Operator/Human Error	**Source Type:**	
Site Name:	Residence<UNOFFICIAL>		
Site County/District:			
Site Geo Ref Meth:			
Incident Summary:	TSSA: FSB 0.5" PL strike, Made Safe		
Contaminant Qty:	0 other - see incident description		

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62 **1 of 1** **SSW/162.4** **320.3 / 9.44** **lot 32 con 7 ON** **WWIS**

Well ID:	6702545	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	8/29/1964
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	4208
Casing Material:		**Form Version:**	1
Audit No:		**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP

Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	032
Well Depth:		**Concession:**	07
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6702545.pdf

Additional Detail(s) (Map)

Well Completed Date:	1964/06/23
Year Completed:	1964
Depth (m):	27.432
Latitude:	43.4448658888537
Longitude:	-80.1122831858917
Path:	670\6702545.pdf

Bore Hole Information

Bore Hole ID:	10466688	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571832.30
Code OB Desc:		**North83:**	4810601.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	5
Date Completed:	23-Jun-1964 00:00:00	**UTMRC Desc:**	margin of error : 100 m - 300 m
Remarks:		**Location Method:**	p5
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932614280
Layer:	1
Color:	
General Color:	
Mat1:	02
Most Common Material:	TOPSOIL
Mat2:	09
Mat2 Desc:	MEDIUM SAND
Mat3:	11
Mat3 Desc:	GRAVEL
Formation Top Depth:	0.0
Formation End Depth:	30.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932614281
Layer:	2
Color:	

General Color:
Mat1: 11
Most Common Material: GRAVEL
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 30.0
Formation End Depth: 60.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614283
Layer: 4
Color:
General Color:
Mat1: 15
Most Common Material: LIMESTONE
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 88.0
Formation End Depth: 90.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614282
Layer: 3
Color:
General Color:
Mat1: 05
Most Common Material: CLAY
Mat2: 09
Mat2 Desc: MEDIUM SAND
Mat3:
Mat3 Desc:
Formation Top Depth: 60.0
Formation End Depth: 88.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966702545
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 11015258
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID:	930758971
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	
Depth To:	90.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	930758970
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	88.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996702545
Pump Set At:	
Static Level:	30.0
Final Level After Pumping:	40.0
Recommended Pump Depth:	50.0
Pumping Rate:	20.0
Flowing Rate:	
Recommended Pump Rate:	5.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	2
Water State After Test:	CLOUDY
Pumping Test Method:	1
Pumping Duration HR:	2
Pumping Duration MIN:	0
Flowing:	No

Water Details

Water ID:	933954884
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	88.0
Water Found Depth UOM:	ft

63	***1 of 1***	***WSW/166.0***	***325.9 / 15.00***	***lot 31 con 8 ON***	***WWIS***

Well ID:	6702672	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	1/16/1961
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	4208
Casing Material:		**Form Version:**	1
Audit No:		**Owner:**	
Tag:		**Street Name:**	

Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	031
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6702672.pdf

Additional Detail(s) (Map)

Well Completed Date:	1960/09/01
Year Completed:	1960
Depth (m):	26.8224
Latitude:	43.4488125768741
Longitude:	-80.1161308873791
Path:	670\6702672.pdf

Bore Hole Information

Bore Hole ID:	10466815	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571516.30
Code OB Desc:		***North83:***	4811036.00
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	5
Date Completed:	01-Sep-1960 00:00:00	***UTMRC Desc:***	margin of error : 100 m - 300 m
Remarks:		***Location Method:***	p5
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932614819
Layer:	2
Color:	
General Color:	
Mat1:	05
Most Common Material:	CLAY
Mat2:	09
Mat2 Desc:	MEDIUM SAND
Mat3:	
Mat3 Desc:	
Formation Top Depth:	25.0
Formation End Depth:	78.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID: 932614820

Layer:	3
Color:	
General Color:	
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	78.0
Formation End Depth:	88.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932614818
Layer:	1
Color:	
General Color:	
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	25.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966702672
Method Construction Code:	1
Method Construction:	Cable Tool
Other Method Construction:	

Pipe Information

Pipe ID:	11015385
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930759214
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	
Depth To:	88.0
Casing Diameter:	7.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	930759213
Layer:	1
Material:	1

Open Hole or Material:	STEEL
Depth From:	
Depth To:	78.0
Casing Diameter:	7.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996702672
Pump Set At:	
Static Level:	25.0
Final Level After Pumping:	40.0
Recommended Pump Depth:	30.0
Pumping Rate:	15.0
Flowing Rate:	
Recommended Pump Rate:	5.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Water Details

Water ID:	933955018
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	85.0
Water Found Depth UOM:	ft

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64 | ***1 of 2*** | ***W/166.9*** | ***330.9 / 20.02*** | ***1719303 Ontario Inc***
31 Wellington Road 36 (Badenock Road)
Puslinch ON N1H 6H9 | ***ECA***

Approval No:	8250-ACGK7H	**MOE District:**	
Approval Date:	2016-08-08	**City:**	
Status:	Revoked and/or Replaced	**Longitude:**	
Record Type:	ECA	**Latitude:**	
Link Source:	IDS	**Geometry X:**	
SWP Area Name:		**Geometry Y:**	

Approval Type:	ECA-MUNICIPAL AND PRIVATE SEWAGE WORKS
Project Type:	MUNICIPAL AND PRIVATE SEWAGE WORKS
Business Name:	1719303 Ontario Inc
Address:	31 Wellington Road 36 (Badenock Road)
Full Address:	
Full PDF Link:	https://www.accessenvironment.ene.gov.on.ca/instruments/5969-AAFNER-14.pdf
PDF Site Location:	

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64 | ***2 of 2*** | ***W/166.9*** | ***330.9 / 20.02*** | ***1719303 Ontario Inc***
31 Wellington Road 36 (Badenock Road)
Puslinch ON N1H 6H9 | ***ECA***

Approval No:	0360-ACNJBX	**MOE District:**	
Approval Date:	2016-08-09	**City:**	
Status:	Approved	**Longitude:**	
Record Type:	ECA	**Latitude:**	
Link Source:	IDS	**Geometry X:**	

SWP Area Name:	**Geometry Y:**
Approval Type:	ECA-MUNICIPAL AND PRIVATE SEWAGE WORKS
Project Type:	MUNICIPAL AND PRIVATE SEWAGE WORKS
Business Name:	1719303 Ontario Inc
Address:	31 Wellington Road 36 (Badenock Road)
Full Address:	
Full PDF Link:	https://www.accessenvironment.ene.gov.on.ca/instruments/6605-AAFNL9-14.pdf
PDF Site Location:	

65 | **1 of 1** | **W/167.6** | **329.5 / 18.64** | **lot 31 con 8 ON** | **WWIS**

Well ID:	6702673	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	9/12/1962
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	4208
Casing Material:		**Form Version:**	1
Audit No:		**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6702673.pdf

Additional Detail(s) (Map)

Well Completed Date:	1962/09/08
Year Completed:	1962
Depth (m):	32.004
Latitude:	43.4492581555777
Longitude:	-80.1155311654511
Path:	670\6702673.pdf

Bore Hole Information

Bore Hole ID:	10466816	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571564.30
Code OB Desc:		**North83:**	4811086.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	5
Date Completed:	08-Sep-1962 00:00:00	**UTMRC Desc:**	margin of error : 100 m - 300 m
Remarks:		**Location Method:**	p5
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID: 932614822
Layer: 2
Color:
General Color:
Mat1: 05
Most Common Material: CLAY
Mat2: 12
Mat2 Desc: STONES
Mat3:
Mat3 Desc:
Formation Top Depth: 7.0
Formation End Depth: 30.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614824
Layer: 4
Color:
General Color:
Mat1: 05
Most Common Material: CLAY
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 80.0
Formation End Depth: 95.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614823
Layer: 3
Color:
General Color:
Mat1: 05
Most Common Material: CLAY
Mat2: 09
Mat2 Desc: MEDIUM SAND
Mat3:
Mat3 Desc:
Formation Top Depth: 30.0
Formation End Depth: 80.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614821
Layer: 1
Color:
General Color:
Mat1: 23
Most Common Material: PREVIOUSLY DUG
Mat2:
Mat2 Desc:

Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 7.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614825
Layer: 5
Color: 1
General Color: WHITE
Mat1: 15
Most Common Material: LIMESTONE
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 95.0
Formation End Depth: 105.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966702673
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 11015386
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930759215
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 95.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930759216
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 105.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID:	996702673
Pump Set At:	
Static Level:	60.0
Final Level After Pumping:	80.0
Recommended Pump Depth:	80.0
Pumping Rate:	24.0
Flowing Rate:	
Recommended Pump Rate:	4.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	0
Pumping Duration MIN:	30
Flowing:	No

Water Details

Water ID:	933955019
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	100.0
Water Found Depth UOM:	ft

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66 ***1 of 1*** ***W/168.0*** ***329.5 / 18.64*** ***lot 31 con 8 ON*** ***WWIS***

Well ID:	6706256	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	12/31/1976
Sec. Water Use:	0	***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	4208
Casing Material:		***Form Version:***	1
Audit No:		***Owner:***	
Tag:		***Street Name:***	
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	031
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6706256.pdf

Additional Detail(s) (Map)

Well Completed Date:	1976/12/24
Year Completed:	1976
Depth (m):	36.576
Latitude:	43.4493202227705
Longitude:	-80.1154066706078
Path:	670\6706256.pdf

Bore Hole Information

Bore Hole ID:	10470336	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571574.30
Code OB Desc:		***North83:***	4811093.00
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	4
Date Completed:	24-Dec-1976 00:00:00	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	p4
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932629961
Layer:	1
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	30.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932629963
Layer:	3
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	14
Mat3 Desc:	HARDPAN
Formation Top Depth:	100.0
Formation End Depth:	106.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932629962
Layer:	2
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY

Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 30.0
Formation End Depth: 100.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932629964
Layer: 4
Color: 2
General Color: GREY
Mat1: 15
Most Common Material: LIMESTONE
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 106.0
Formation End Depth: 120.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966706256
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 11018906
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930765343
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 106.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996706256
Pump Set At:
Static Level: 58.0
Final Level After Pumping: 60.0
Recommended Pump Depth: 70.0
Pumping Rate: 30.0
Flowing Rate:
Recommended Pump Rate: 10.0

Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	2
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	935130925
Test Type:	Recovery
Test Duration:	60
Test Level:	58.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934873211
Test Type:	Recovery
Test Duration:	45
Test Level:	58.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934619275
Test Type:	Recovery
Test Duration:	30
Test Level:	58.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934344121
Test Type:	Recovery
Test Duration:	15
Test Level:	58.0
Test Level UOM:	ft

Water Details

Water ID:	933959175
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	118.0
Water Found Depth UOM:	ft

67 | ***1 of 1*** | ***NNE/169.3*** | ***325.4 / 14.53*** | ***lot 30 con 8 ON*** | ***WWIS***

Well ID:	6703857	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	1/5/1971
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	4208
Casing Material:		**Form Version:**	1
Audit No:		**Owner:**	

Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	030
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6703857.pdf

Additional Detail(s) (Map)

Well Completed Date:	1970/07/22
Year Completed:	1970
Depth (m):	24.384
Latitude:	43.4552986767429
Longitude:	-80.1083977815086
Path:	670\6703857.pdf

Bore Hole Information

Bore Hole ID:	10467987	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	572134.30
Code OB Desc:		**North83:**	4811763.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	4
Date Completed:	22-Jul-1970 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	p4
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932619687
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	20.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932619691
Layer:	5
Color:	2
General Color:	GREY
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	79.0
Formation End Depth:	80.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932619688
Layer:	2
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	20.0
Formation End Depth:	60.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932619689
Layer:	3
Color:	6
General Color:	BROWN
Mat1:	09
Most Common Material:	MEDIUM SAND
Mat2:	03
Mat2 Desc:	MUCK
Mat3:	
Mat3 Desc:	
Formation Top Depth:	60.0
Formation End Depth:	70.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932619690
Layer:	4
Color:	2
General Color:	GREY
Mat1:	14
Most Common Material:	HARDPAN
Mat2:	05
Mat2 Desc:	CLAY
Mat3:	11
Mat3 Desc:	GRAVEL
Formation Top Depth:	70.0
Formation End Depth:	79.0

Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966703857
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 11016557
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930761399
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 80.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996703857
Pump Set At:
Static Level: 28.0
Final Level After Pumping: 45.0
Recommended Pump Depth: 60.0
Pumping Rate: 20.0
Flowing Rate:
Recommended Pump Rate: 10.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 2
Pumping Duration HR: 1
Pumping Duration MIN: 0
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 935132980
Test Type: Recovery
Test Duration: 60
Test Level: 28.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934859522
Test Type: Recovery
Test Duration: 45

Test Level: 28.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934346782
Test Type: Recovery
Test Duration: 15
Test Level: 28.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934605337
Test Type: Recovery
Test Duration: 30
Test Level: 28.0
Test Level UOM: ft

Water Details

Water ID: 933956368
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 80.0
Water Found Depth UOM: ft

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68 | **1 of 1** | **SSW/169.4** | **321.2 / 10.39** | **84 QUEEN ST. ` MORRISTON ON** | **WWIS**

Well ID: 7319287
Construction Date:
Primary Water Use: Domestic
Sec. Water Use: Livestock
Final Well Status: Water Supply
Water Type:
Casing Material:
Audit No: Z285624
Tag: A247642
Construction Method:
Elevation (m):
Elevation Reliability:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Flowing (Y/N):
Flow Rate:
Clear/Cloudy:

Data Entry Status:
Data Src:
Date Received: 10/2/2018
Selected Flag: TRUE
Abandonment Rec:
Contractor: 6013
Form Version: 7
Owner:
Street Name: 84 QUEEN ST. `
County: WELLINGTON
Municipality: PUSLINCH TOWNSHIP
Site Info:
Lot:
Concession:
Concession Name:
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/731\7319287.pdf

Additional Detail(s) (Map)

Well Completed Date: 2018/09/18
Year Completed: 2018
Depth (m):
Latitude: 43.4448055800324
Longitude: -80.1126338025382
Path: 731\7319287.pdf

Bore Hole Information

Bore Hole ID:	1007291294	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571804.00
Code OB Desc:		***North83:***	4810594.00
Open Hole:		***Org CS:***	UTM83
Cluster Kind:		***UTMRC:***	4
Date Completed:	18-Sep-2018 00:00:00	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	wwr
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1007536872
Layer:	
Color:	
General Color:	
Mat1:	
Most Common Material:	
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	
Formation End Depth:	
Formation End Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1007536881
Layer:	1
Plug From:	0.0
Plug To:	6.0
Plug Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	1007536880
Method Construction Code:	
Method Construction:	
Other Method Construction:	

Pipe Information

Pipe ID:	1007536870
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID: 1007536876
Layer: 2
Material: 1
Open Hole or Material: STEEL
Depth From: 8.0
Depth To:
Casing Diameter: 6.25
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 1007536875
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From: -2.0
Depth To: 8.0
Casing Diameter: 6.25
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Screen

Screen ID: 1007536877
Layer:
Slot:
Screen Top Depth:
Screen End Depth:
Screen Material:
Screen Depth UOM: ft
Screen Diameter UOM: inch
Screen Diameter:

Results of Well Yield Testing

Pump Test ID: 1007536871
Pump Set At: 65.0
Static Level: 33.0
Final Level After Pumping:
Recommended Pump Depth: 65.0
Pumping Rate: 8.0
Flowing Rate:
Recommended Pump Rate: 8.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 0
Pumping Duration HR:
Pumping Duration MIN:
Flowing:

Water Details

Water ID: 1007536874
Layer: 1
Kind Code:
Kind:
Water Found Depth:
Water Found Depth UOM: ft

Hole Diameter

Hole ID:	1007536873
Diameter:	6.25
Depth From:	0.0
Depth To:	74.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

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69 | ***1 of 1*** | ***WSW/172.1*** | ***325.9 / 15.00*** | ***lot 31 con 8 ON*** | ***WWIS***

Well ID:	6708057	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	11/23/1983
Sec. Water Use:	0	***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	4005
Casing Material:		***Form Version:***	1
Audit No:		***Owner:***	
Tag:		***Street Name:***	
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	031
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map):

Additional Detail(s) (Map)

Well Completed Date:	1983/10/19
Year Completed:	1983
Depth (m):	30.48
Latitude:	43.4488757910729
Longitude:	-80.1161546847198
Path:	

Bore Hole Information

Bore Hole ID:	10472000	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571514.30
Code OB Desc:		***North83:***	4811043.00
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	4
Date Completed:	19-Oct-1983 00:00:00	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	p4
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932637841
Layer:	1
Color:	8
General Color:	BLACK
Mat1:	02
Most Common Material:	TOPSOIL
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	1.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932637844
Layer:	4
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	85
Mat2 Desc:	SOFT
Mat3:	
Mat3 Desc:	
Formation Top Depth:	22.0
Formation End Depth:	65.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932637846
Layer:	6
Color:	2
General Color:	GREY
Mat1:	28
Most Common Material:	SAND
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	73
Mat3 Desc:	HARD
Formation Top Depth:	72.0
Formation End Depth:	80.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932637848
Layer:	8
Color:	2
General Color:	GREY
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	73

Mat2 Desc: HARD
Mat3:
Mat3 Desc:
Formation Top Depth: 90.0
Formation End Depth: 100.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932637842
Layer: 2
Color: 6
General Color: BROWN
Mat1: 28
Most Common Material: SAND
Mat2: 11
Mat2 Desc: GRAVEL
Mat3:
Mat3 Desc:
Formation Top Depth: 1.0
Formation End Depth: 18.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932637847
Layer: 7
Color: 2
General Color: GREY
Mat1: 31
Most Common Material: COARSE GRAVEL
Mat2: 10
Mat2 Desc: COARSE SAND
Mat3:
Mat3 Desc:
Formation Top Depth: 80.0
Formation End Depth: 90.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932637845
Layer: 5
Color: 2
General Color: GREY
Mat1: 05
Most Common Material: CLAY
Mat2: 73
Mat2 Desc: HARD
Mat3:
Mat3 Desc:
Formation Top Depth: 65.0
Formation End Depth: 72.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932637843

Layer:	3
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	18.0
Formation End Depth:	22.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966708057
Method Construction Code:	1
Method Construction:	Cable Tool
Other Method Construction:	

Pipe Information

Pipe ID:	11020570
Casing No:	1
Comment:	
Alt Name:	

Results of Well Yield Testing

Pump Test ID:	996708057
Pump Set At:	
Static Level:	40.0
Final Level After Pumping:	45.0
Recommended Pump Depth:	
Pumping Rate:	25.0
Flowing Rate:	
Recommended Pump Rate:	
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	2
Water State After Test:	CLOUDY
Pumping Test Method:	2
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	934867823
Test Type:	Draw Down
Test Duration:	45
Test Level:	45.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934614490
Test Type:	Draw Down
Test Duration:	30
Test Level:	45.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934347599
Test Type:	Draw Down
Test Duration:	15
Test Level:	45.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	935134873
Test Type:	Draw Down
Test Duration:	60
Test Level:	45.0
Test Level UOM:	ft

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70 ***1 of 1*** ***W/173.1*** ***327.6 / 16.70*** ***12 BADENOCH ST lot 31 con 8 MORRISTON ON*** ***WWIS***

Well ID:	7311547	***Data Entry Status:***	
Construction Date:		***Data Src:***	
Primary Water Use:		***Date Received:***	5/25/2018
Sec. Water Use:		***Selected Flag:***	TRUE
Final Well Status:	Alteration	***Abandonment Rec:***	
Water Type:		***Contractor:***	7556
Casing Material:		***Form Version:***	7
Audit No:	Z267395	***Owner:***	
Tag:	A233101	***Street Name:***	12 BADENOCH ST
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	031
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/731\7311547.pdf

Additional Detail(s) (Map)

Well Completed Date:	2018/04/10
Year Completed:	2018
Depth (m):	
Latitude:	43.4490275385529
Longitude:	-80.1159831569706
Path:	731\7311547.pdf

Bore Hole Information

Bore Hole ID:	1007060295	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571528.00
Code OB Desc:		***North83:***	4811060.00
Open Hole:		***Org CS:***	UTM83
Cluster Kind:		***UTMRC:***	4
Date Completed:	10-Apr-2018 00:00:00	***UTMRC Desc:***	margin of error : 30 m - 100 m

Remarks: ***Location Method:*** wwr
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Overburden and Bedrock Materials Interval

Formation ID: 1007278284
Layer:
Color:
General Color:
Mat1:
Most Common Material:
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth:
Formation End Depth:
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 1007278289
Method Construction Code:
Method Construction:
Other Method Construction:

Pipe Information

Pipe ID: 1007278283
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1007278287
Layer:
Material:
Open Hole or Material:
Depth From:
Depth To:
Casing Diameter:
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Screen

Screen ID: 1007278288
Layer:
Slot:
Screen Top Depth:
Screen End Depth:
Screen Material:
Screen Depth UOM: ft
Screen Diameter UOM: inch

Screen Diameter:

Water Details

Water ID: 1007278286
Layer:
Kind Code:
Kind:
Water Found Depth:
Water Found Depth UOM: ft

Hole Diameter

Hole ID: 1007278285
Diameter:
Depth From:
Depth To:
Hole Depth UOM: ft
Hole Diameter UOM: inch

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71 | 1 of 1 | W/178.2 | 329.2 / 18.39 | 24 BADENOCK ST lot 31 con 8 MORRISTON ON | WWIS

Well ID: 7166392
Construction Date:
Primary Water Use: Domestic
Sec. Water Use:
Final Well Status: Water Supply
Water Type:
Casing Material:
Audit No: Z132869
Tag: A117275
Construction Method:
Elevation (m):
Elevation Reliability:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Flowing (Y/N):
Flow Rate:
Clear/Cloudy:

Data Entry Status:
Data Src:
Date Received: 8/3/2011
Selected Flag: TRUE
Abandonment Rec:
Contractor: 6013
Form Version: 7
Owner:
Street Name: 24 BADENOCK ST
County: WELLINGTON
Municipality: PUSLINCH TOWNSHIP
Site Info:
Lot: 031
Concession: 08
Concession Name: CON
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/716\7166392.pdf

Additional Detail(s) (Map)

Well Completed Date: 2011/07/12
Year Completed: 2011
Depth (m):
Latitude: 43.449551181801
Longitude: -80.114999162417
Path: 716\7166392.pdf

Bore Hole Information

Bore Hole ID: 1003542401
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:

Elevation:
Elevrc:
Zone: 17
East83: 571607.00
North83: 4811119.00

Open Hole:		**Org CS:**	dms83
Cluster Kind:		**UTMRC:**	5
Date Completed:	12-Jul-2011 00:00:00	**UTMRC Desc:**	margin of error : 100 m - 300 m
Remarks:		**Location Method:**	wwr
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Annular Space/Abandonment Sealing Record

Plug ID:	1003869973
Layer:	1
Plug From:	0.0
Plug To:	4.0
Plug Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	1003869972
Method Construction Code:	
Method Construction:	
Other Method Construction:	

Pipe Information

Pipe ID:	1003869963
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	1003869969
Layer:	2
Material:	1
Open Hole or Material:	STEEL
Depth From:	5.5
Depth To:	
Casing Diameter:	6.25
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	1003869968
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	-1.5
Depth To:	5.5
Casing Diameter:	6.25
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Screen

Screen ID:	1003869970
Layer:	
Slot:	
Screen Top Depth:	
Screen End Depth:	
Screen Material:	
Screen Depth UOM:	ft
Screen Diameter UOM:	inch
Screen Diameter:	

Results of Well Yield Testing

Pump Test ID:	1003869964
Pump Set At:	100.0
Static Level:	55.0
Final Level After Pumping:	
Recommended Pump Depth:	
Pumping Rate:	
Flowing Rate:	
Recommended Pump Rate:	
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	0
Water State After Test:	
Pumping Test Method:	0
Pumping Duration HR:	
Pumping Duration MIN:	
Flowing:	

Water Details

Water ID:	1003869967
Layer:	
Kind Code:	
Kind:	
Water Found Depth:	
Water Found Depth UOM:	ft

Hole Diameter

Hole ID:	1003869966
Diameter:	6.25
Depth From:	1.5
Depth To:	117.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

72	1 of 1	W/182.8	329.3 / 18.44	lot 31 con 8 ON	WWIS

Well ID:	6702668	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	1/7/1952
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	2414
Casing Material:		**Form Version:**	1
Audit No:		**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	

Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6702668.pdf

Additional Detail(s) (Map)

Well Completed Date:	1951/09/25
Year Completed:	1951
Depth (m):	18.288
Latitude:	43.4493936830904
Longitude:	-80.1155909857266
Path:	670\6702668.pdf

Bore Hole Information

Bore Hole ID:	10466811	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571559.30
Code OB Desc:		**North83:**	4811101.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	9
Date Completed:	25-Sep-1951 00:00:00	**UTMRC Desc:**	unknown UTM
Remarks:		**Location Method:**	p9
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932614808
Layer:	6
Color:	
General Color:	
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	56.0
Formation End Depth:	60.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932614806
Layer:	4
Color:	
General Color:	

Mat1: 05
Most Common Material: CLAY
Mat2: 12
Mat2 Desc: STONES
Mat3:
Mat3 Desc:
Formation Top Depth: 40.0
Formation End Depth: 50.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614805
Layer: 3
Color:
General Color:
Mat1: 09
Most Common Material: MEDIUM SAND
Mat2: 11
Mat2 Desc: GRAVEL
Mat3:
Mat3 Desc:
Formation Top Depth: 28.0
Formation End Depth: 40.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614807
Layer: 5
Color:
General Color:
Mat1: 09
Most Common Material: MEDIUM SAND
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 50.0
Formation End Depth: 56.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614803
Layer: 1
Color:
General Color:
Mat1: 11
Most Common Material: GRAVEL
Mat2: 05
Mat2 Desc: CLAY
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 12.0
Formation End Depth UOM: ft

Overburden and Bedrock

Materials Interval

Formation ID:	932614804
Layer:	2
Color:	
General Color:	
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	12.0
Formation End Depth:	28.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966702668
Method Construction Code:	1
Method Construction:	Cable Tool
Other Method Construction:	

Pipe Information

Pipe ID:	11015381
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930759206
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	59.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996702668
Pump Set At:	
Static Level:	30.0
Final Level After Pumping:	45.0
Recommended Pump Depth:	
Pumping Rate:	5.0
Flowing Rate:	
Recommended Pump Rate:	
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	2
Water State After Test:	CLOUDY
Pumping Test Method:	1
Pumping Duration HR:	3
Pumping Duration MIN:	0
Flowing:	No

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Water Details

Water ID:	933955014
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	60.0
Water Found Depth UOM:	ft

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
73	1 of 1	WSW/185.9	313.9 / 3.00	5 VICTORIA ST lot 31 con 7 MORRISTON ON	WWIS

Well ID:	7190634	***Data Entry Status:***	
Construction Date:		***Data Src:***	
Primary Water Use:	Domestic	***Date Received:***	10/31/2012
Sec. Water Use:		***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	2663
Casing Material:		***Form Version:***	7
Audit No:	Z152015	***Owner:***	
Tag:	A126454	***Street Name:***	5 VICTORIA ST
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	031
Well Depth:		***Concession:***	07
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/719\7190634.pdf

Additional Detail(s) (Map)

Well Completed Date:	2012/08/16
Year Completed:	2012
Depth (m):	29.2608
Latitude:	43.4471728277667
Longitude:	-80.1171718777994
Path:	719\7190634.pdf

Bore Hole Information

Bore Hole ID:	1004191357	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571434.00
Code OB Desc:		***North83:***	4810853.00
Open Hole:		***Org CS:***	UTM83
Cluster Kind:		***UTMRC:***	4
Date Completed:	16-Aug-2012 00:00:00	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	wwr
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1004530867
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	02
Most Common Material:	TOPSOIL
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	2.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1004530871
Layer:	5
Color:	2
General Color:	GREY
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	28
Mat2 Desc:	SAND
Mat3:	
Mat3 Desc:	
Formation Top Depth:	25.0
Formation End Depth:	75.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1004530870
Layer:	4
Color:	6
General Color:	BROWN
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	06
Mat2 Desc:	SILT
Mat3:	
Mat3 Desc:	
Formation Top Depth:	13.0
Formation End Depth:	25.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1004530868
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	06
Most Common Material:	SILT
Mat2:	05
Mat2 Desc:	CLAY
Mat3:	12

Mat3 Desc:	STONES
Formation Top Depth:	2.0
Formation End Depth:	10.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1004530869
Layer:	3
Color:	6
General Color:	BROWN
Mat1:	06
Most Common Material:	SILT
Mat2:	05
Mat2 Desc:	CLAY
Mat3:	12
Mat3 Desc:	STONES
Formation Top Depth:	10.0
Formation End Depth:	13.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1004530873
Layer:	7
Color:	2
General Color:	GREY
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	81.0
Formation End Depth:	96.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1004530872
Layer:	6
Color:	6
General Color:	BROWN
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	75.0
Formation End Depth:	81.0
Formation End Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1004530897
Layer:	1
Plug From:	0.0

Plug To: 20.0
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 1004530896
Method Construction Code: 2
Method Construction: Rotary (Convent.)
Other Method Construction:

Pipe Information

Pipe ID: 1004530865
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1004530878
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From: 81.0
Depth To: 96.0
Casing Diameter: 6.125
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 1004530877
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From: -2.0
Depth To: 81.0
Casing Diameter: 6.25
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Screen

Screen ID: 1004530879
Layer:
Slot:
Screen Top Depth:
Screen End Depth:
Screen Material:
Screen Depth UOM: ft
Screen Diameter UOM: inch
Screen Diameter:

Results of Well Yield Testing

Pump Test ID: 1004530866
Pump Set At: 90.0
Static Level: 15.800000190734863
Final Level After Pumping: 16.700000762939453
Recommended Pump Depth: 60.0

Pumping Rate: 30.0
Flowing Rate:
Recommended Pump Rate: 30.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 0
Pumping Duration HR: 1
Pumping Duration MIN:
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 1004530894
Test Type: Draw Down
Test Duration: 60
Test Level: 16.700000762939453
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004530890
Test Type: Draw Down
Test Duration: 25
Test Level: 16.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004530893
Test Type: Draw Down
Test Duration: 50
Test Level: 16.700000762939453
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004530880
Test Type: Draw Down
Test Duration: 1
Test Level: 16.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004530888
Test Type: Draw Down
Test Duration: 15
Test Level: 16.399999618530273
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004530884
Test Type: Draw Down
Test Duration: 3
Test Level: 16.200000762939453
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004530886
Test Type: Draw Down
Test Duration: 5
Test Level: 16.299999237060547
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004530889
Test Type: Draw Down
Test Duration: 20
Test Level: 16.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004530883
Test Type: Recovery
Test Duration: 2
Test Level: 15.800000190734863
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004530885
Test Type: Draw Down
Test Duration: 4
Test Level: 16.299999237060547
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004530881
Test Type: Recovery
Test Duration: 1
Test Level: 15.899999618530273
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004530892
Test Type: Draw Down
Test Duration: 40
Test Level: 16.600000381469727
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004530882
Test Type: Draw Down
Test Duration: 2
Test Level: 16.200000762939453
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1004530887
Test Type: Draw Down

Test Duration:	10
Test Level:	16.399999618530273
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1004530891
Test Type:	Draw Down
Test Duration:	30
Test Level:	16.600000381469727
Test Level UOM:	ft

Water Details

Water ID:	1004530876
Layer:	1
Kind Code:	8
Kind:	Untested
Water Found Depth:	96.0
Water Found Depth UOM:	ft

Hole Diameter

Hole ID:	1004530875
Diameter:	6.125
Depth From:	20.0
Depth To:	96.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

Hole Diameter

Hole ID:	1004530874
Diameter:	10.0
Depth From:	0.0
Depth To:	20.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

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74 **1 of 1** **WSW/186.4** **315.2 / 4.39** **lot 31 con 7 ON** **WWIS**

Well ID:	6709991	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	10/2/1989
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	4005
Casing Material:		**Form Version:**	1
Audit No:	55640	**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	07
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6709991.pdf

Additional Detail(s) (Map)

Well Completed Date: 1989/09/16
Year Completed: 1989
Depth (m): 26.2128
Latitude: 43.4468215745112
Longitude: -80.1171609204376
Path: 670\6709991.pdf

Bore Hole Information

Bore Hole ID: 10473839
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 16-Sep-1989 00:00:00
Remarks:
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 17
East83: 571435.30
North83: 4810814.00
Org CS:
UTMRC: 3
UTMRC Desc: margin of error : 10 - 30 m
Location Method: gps

Overburden and Bedrock Materials Interval

Formation ID: 932645949
Layer: 7
Color: 2
General Color: GREY
Mat1: 11
Most Common Material: GRAVEL
Mat2: 79
Mat2 Desc: PACKED
Mat3:
Mat3 Desc:
Formation Top Depth: 72.0
Formation End Depth: 83.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932645946
Layer: 4
Color: 6
General Color: BROWN
Mat1: 28
Most Common Material: SAND
Mat2: 77
Mat2 Desc: LOOSE
Mat3:
Mat3 Desc:
Formation Top Depth: 35.0
Formation End Depth: 53.0

Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932645947
Layer: 5
Color: 6
General Color: BROWN
Mat1: 28
Most Common Material: SAND
Mat2: 11
Mat2 Desc: GRAVEL
Mat3: 77
Mat3 Desc: LOOSE
Formation Top Depth: 53.0
Formation End Depth: 60.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932645950
Layer: 8
Color: 2
General Color: GREY
Mat1: 15
Most Common Material: LIMESTONE
Mat2: 73
Mat2 Desc: HARD
Mat3:
Mat3 Desc:
Formation Top Depth: 83.0
Formation End Depth: 86.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932645943
Layer: 1
Color: 6
General Color: BROWN
Mat1: 28
Most Common Material: SAND
Mat2: 77
Mat2 Desc: LOOSE
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 14.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932645945
Layer: 3
Color: 6
General Color: BROWN
Mat1: 28
Most Common Material: SAND

Mat2: 11
Mat2 Desc: GRAVEL
Mat3: 13
Mat3 Desc: BOULDERS
Formation Top Depth: 26.0
Formation End Depth: 35.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932645944
Layer: 2
Color: 6
General Color: BROWN
Mat1: 28
Most Common Material: SAND
Mat2: 11
Mat2 Desc: GRAVEL
Mat3: 77
Mat3 Desc: LOOSE
Formation Top Depth: 14.0
Formation End Depth: 26.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932645948
Layer: 6
Color: 2
General Color: GREY
Mat1: 11
Most Common Material: GRAVEL
Mat2: 77
Mat2 Desc: LOOSE
Mat3:
Mat3 Desc:
Formation Top Depth: 60.0
Formation End Depth: 72.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966709991
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 11022409
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930771495
Layer: 1
Material: 1

Open Hole or Material: STEEL
Depth From:
Depth To: 83.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930771496
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 86.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996709991
Pump Set At:
Static Level: 30.0
Final Level After Pumping: 40.0
Recommended Pump Depth: 83.0
Pumping Rate: 20.0
Flowing Rate:
Recommended Pump Rate: 10.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 2
Water State After Test: CLOUDY
Pumping Test Method: 2
Pumping Duration HR: 2
Pumping Duration MIN:
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 934344368
Test Type: Recovery
Test Duration: 15
Test Level: 30.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934618865
Test Type: Recovery
Test Duration: 30
Test Level: 30.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934871146
Test Type: Recovery
Test Duration: 45
Test Level: 30.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID:	935131118
Test Type:	Recovery
Test Duration:	60
Test Level:	30.0
Test Level UOM:	ft

Water Details

Water ID:	933963513
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	85.0
Water Found Depth UOM:	ft

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75 | ***1 of 1*** | ***WSW/189.0*** | ***320.3 / 9.47*** | ***lot 31 con 7 ON*** | ***WWIS***

Well ID:	6702539	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	1/5/1959
Sec. Water Use:	0	***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	4208
Casing Material:		***Form Version:***	1
Audit No:		***Owner:***	
Tag:		***Street Name:***	
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	031
Well Depth:		***Concession:***	07
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6702539.pdf

Additional Detail(s) (Map)

Well Completed Date:	1958/08/03
Year Completed:	1958
Depth (m):	25.6032
Latitude:	43.448100044917
Longitude:	-80.1171423252263
Path:	670\6702539.pdf

Bore Hole Information

Bore Hole ID:	10466682	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571435.30
Code OB Desc:		***North83:***	4810956.00
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	5
Date Completed:	03-Aug-1958 00:00:00	***UTMRC Desc:***	margin of error : 100 m - 300 m

Remarks: ***Location Method:*** p5
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Overburden and Bedrock Materials Interval

Formation ID: 932614250
Layer: 1
Color:
General Color:
Mat1: 11
Most Common Material: GRAVEL
Mat2: 05
Mat2 Desc: CLAY
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 70.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614252
Layer: 3
Color:
General Color:
Mat1: 15
Most Common Material: LIMESTONE
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 75.0
Formation End Depth: 84.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614251
Layer: 2
Color:
General Color:
Mat1: 09
Most Common Material: MEDIUM SAND
Mat2: 11
Mat2 Desc: GRAVEL
Mat3:
Mat3 Desc:
Formation Top Depth: 70.0
Formation End Depth: 75.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966702539
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 11015252
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930758959
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 75.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930758960
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 84.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996702539
Pump Set At:
Static Level: 25.0
Final Level After Pumping: 50.0
Recommended Pump Depth:
Pumping Rate: 15.0
Flowing Rate:
Recommended Pump Rate:
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 1
Pumping Duration HR: 1
Pumping Duration MIN: 0
Flowing: No

Water Details

Water ID: 933954877
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 82.0

Water Found Depth UOM: ft

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76 | **1 of 1** | **N/189.1** | **331.9 / 21.00** | **lot 30 con 8 ON** | **WWIS**

Well ID:	6711984	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	6/27/1996
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	2663
Casing Material:		**Form Version:**	1
Audit No:	169089	**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	030
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6711984.pdf

Additional Detail(s) (Map)

Well Completed Date:	1996/06/18
Year Completed:	1996
Depth (m):	31.3944
Latitude:	43.4541808186115
Longitude:	-80.1105401303262
Path:	671\6711984.pdf

Bore Hole Information

Bore Hole ID:	10475817	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571962.30
Code OB Desc:		**North83:**	4811637.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	5
Date Completed:	18-Jun-1996 00:00:00	**UTMRC Desc:**	margin of error : 100 m - 300 m
Remarks:		**Location Method:**	gps
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932655064
Layer:	2
Color:	6
General Color:	BROWN

Mat1:	05
Most Common Material:	CLAY
Mat2:	28
Mat2 Desc:	SAND
Mat3:	11
Mat3 Desc:	GRAVEL
Formation Top Depth:	65.0
Formation End Depth:	103.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932655063
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	28
Mat2 Desc:	SAND
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	65.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966711984
Method Construction Code:	3
Method Construction:	Rotary (Reverse)
Other Method Construction:	

Pipe Information

Pipe ID:	11024387
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930775086
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	103.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996711984
Pump Set At:	
Static Level:	44.0
Final Level After Pumping:	85.0
Recommended Pump Depth:	90.0
Pumping Rate:	15.0

Flowing Rate:	
Recommended Pump Rate:	15.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	2
Water State After Test:	CLOUDY
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	934867454
Test Type:	Draw Down
Test Duration:	45
Test Level:	79.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934615194
Test Type:	Draw Down
Test Duration:	30
Test Level:	67.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	935137232
Test Type:	Draw Down
Test Duration:	60
Test Level:	85.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934341694
Test Type:	Draw Down
Test Duration:	15
Test Level:	54.0
Test Level UOM:	ft

Water Details

Water ID:	933966095
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	
Water Found Depth UOM:	ft

77	***1 of 1***	***W/193.8***	***325.6 / 14.76***	***lot 30 con 8 ON***	***WWIS***

Well ID:	6704136	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	1/27/1972
Sec. Water Use:	0	***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	4208

Casing Material:		***Form Version:***	1
Audit No:		***Owner:***	
Tag:		***Street Name:***	
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	030
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6704136.pdf

Additional Detail(s) (Map)

Well Completed Date:	1971/11/17
Year Completed:	1971
Depth (m):	28.0416
Latitude:	43.4489677342898
Longitude:	-80.1164005251372
Path:	670\6704136.pdf

Bore Hole Information

Bore Hole ID:	10468249	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571494.30
Code OB Desc:		***North83:***	4811053.00
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	4
Date Completed:	17-Nov-1971 00:00:00	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	p4
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932620823
Layer:	2
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	15.0
Formation End Depth:	77.0
Formation End Depth UOM:	ft

Overburden and Bedrock

Materials Interval

Formation ID:	932620822
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	15.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932620824
Layer:	3
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	13
Mat3 Desc:	BOULDERS
Formation Top Depth:	77.0
Formation End Depth:	88.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932620825
Layer:	4
Color:	2
General Color:	GREY
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	88.0
Formation End Depth:	92.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966704136
Method Construction Code:	1
Method Construction:	Cable Tool
Other Method Construction:	

Pipe Information

Pipe ID:	11016819
Casing No:	1

Comment:
Alt Name:

Construction Record - Casing

Casing ID:	930761880
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	
Depth To:	92.0
Casing Diameter:	
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	930761879
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	90.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996704136
Pump Set At:	
Static Level:	40.0
Final Level After Pumping:	41.0
Recommended Pump Depth:	60.0
Pumping Rate:	25.0
Flowing Rate:	
Recommended Pump Rate:	10.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	2
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	934860093
Test Type:	Recovery
Test Duration:	45
Test Level:	40.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934614839
Test Type:	Recovery
Test Duration:	30
Test Level:	40.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	935133570
Test Type:	Recovery
Test Duration:	60
Test Level:	40.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934347386
Test Type:	Recovery
Test Duration:	15
Test Level:	40.0
Test Level UOM:	ft

Water Details

Water ID:	933956681
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	91.0
Water Found Depth UOM:	ft

---

78 | ***1 of 1*** | ***W/194.3*** | ***330.9 / 20.00*** | ***lot 30 con 8 ON*** | ***WWIS***

Well ID:	6707588	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	1/15/1982
Sec. Water Use:	0	***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	4208
Casing Material:		***Form Version:***	1
Audit No:		***Owner:***	
Tag:		***Street Name:***	
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	030
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6707588.pdf

Additional Detail(s) (Map)

Well Completed Date:	1981/02/26
Year Completed:	1981
Depth (m):	32.9184
Latitude:	43.4495903219302
Longitude:	-80.115402733995
Path:	670\6707588.pdf

Bore Hole Information

Bore Hole ID:	10471626	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571574.30
Code OB Desc:		**North83:**	4811123.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	4
Date Completed:	26-Feb-1981 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	p4
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932636173
Layer:	1
Color:	
General Color:	
Mat1:	23
Most Common Material:	PREVIOUSLY DUG
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	27.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932636174
Layer:	2
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	27.0
Formation End Depth:	106.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932636175
Layer:	3
Color:	2
General Color:	GREY
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	17
Mat2 Desc:	SHALE
Mat3:	

Mat3 Desc:
Formation Top Depth: 106.0
Formation End Depth: 108.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966707588
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 11020196
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930767501
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 106.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996707588
Pump Set At:
Static Level: 54.0
Final Level After Pumping: 60.0
Recommended Pump Depth: 80.0
Pumping Rate: 20.0
Flowing Rate:
Recommended Pump Rate: 10.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 2
Pumping Duration HR: 1
Pumping Duration MIN: 0
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 935133761
Test Type: Recovery
Test Duration: 60
Test Level: 54.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934613329
Test Type: Recovery
Test Duration: 30
Test Level: 54.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934875428
Test Type: Recovery
Test Duration: 45
Test Level: 54.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934346942
Test Type: Recovery
Test Duration: 15
Test Level: 54.0
Test Level UOM: ft

Water Details

Water ID: 933960782
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 107.0
Water Found Depth UOM: ft

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79 | ***1 of 1*** | ***W/195.1*** | ***331.0 / 20.11*** | ***27 BAPENOCH ST lot 30 con 8 MORRISTON ON*** | ***WWIS***

Well ID: 6715529
Construction Date:
Primary Water Use: Domestic
Sec. Water Use:
Final Well Status: Water Supply
Water Type:
Casing Material:
Audit No: Z26952
Tag: A005656
Construction Method:
Elevation (m):
Elevation Reliability:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Flowing (Y/N):
Flow Rate:
Clear/Cloudy:

Data Entry Status:
Data Src:
Date Received: 10/25/2005
Selected Flag: TRUE
Abandonment Rec:
Contractor: 6865
Form Version: 3
Owner:
Street Name: 27 BAPENOCH ST
County: WELLINGTON
Municipality: PUSLINCH TOWNSHIP
Site Info:
Lot: 030
Concession: 08
Concession Name:
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6715529.pdf

Additional Detail(s) (Map)

Well Completed Date: 2005/05/09
Year Completed: 2005
Depth (m): 33.2

Latitude: 43.4499755803844
Longitude: -80.115153643224
Path: 671\6715529.pdf

Bore Hole Information

Bore Hole ID: 11327315
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 09-May-2005 00:00:00
Remarks:
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 17
East83: 571594.00
North83: 4811166.00
Org CS: UTM83
UTMRC: 4
UTMRC Desc: margin of error : 30 m - 100 m
Location Method: wwr

Overburden and Bedrock Materials Interval

Formation ID: 933035650
Layer: 1
Color: 6
General Color: BROWN
Mat1: 11
Most Common Material: GRAVEL
Mat2: 28
Mat2 Desc: SAND
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 7.599999904632568
Formation End Depth UOM: m

Overburden and Bedrock Materials Interval

Formation ID: 933035652
Layer: 3
Color: 6
General Color: BROWN
Mat1: 05
Most Common Material: CLAY
Mat2: 84
Mat2 Desc: SILTY
Mat3:
Mat3 Desc:
Formation Top Depth: 9.100000381469727
Formation End Depth: 16.200000762939453
Formation End Depth UOM: m

Overburden and Bedrock Materials Interval

Formation ID: 933035655
Layer: 6
Color: 6

General Color:	BROWN
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	28
Mat2 Desc:	SAND
Mat3:	
Mat3 Desc:	
Formation Top Depth:	32.29999923706055
Formation End Depth:	33.20000076293945
Formation End Depth UOM:	m

Overburden and Bedrock Materials Interval

Formation ID:	933035653
Layer:	4
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	84
Mat2 Desc:	SILTY
Mat3:	12
Mat3 Desc:	STONES
Formation Top Depth:	16.200000762939453
Formation End Depth:	27.399999618530273
Formation End Depth UOM:	m

Overburden and Bedrock Materials Interval

Formation ID:	933035651
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	7.599999904632568
Formation End Depth:	9.100000381469727
Formation End Depth UOM:	m

Overburden and Bedrock Materials Interval

Formation ID:	933035654
Layer:	5
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	27.399999618530273
Formation End Depth:	32.29999923706055
Formation End Depth UOM:	m

Annular Space/Abandonment Sealing Record

Plug ID:	933279930
Layer:	1
Plug From:	0.0
Plug To:	33.0
Plug Depth UOM:	m

Method of Construction & Well Use

Method Construction ID:	966715529
Method Construction Code:	2
Method Construction:	Rotary (Convent.)
Other Method Construction:	

Pipe Information

Pipe ID:	11342170
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930872141
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	-0.800000011920929
Depth To:	32.29999923706055
Casing Diameter:	15.899999618530273
Casing Diameter UOM:	cm
Casing Depth UOM:	m

Construction Record - Screen

Screen ID:	933415275
Layer:	1
Slot:	12
Screen Top Depth:	32.29999923706055
Screen End Depth:	33.20000076293945
Screen Material:	1
Screen Depth UOM:	m
Screen Diameter UOM:	cm
Screen Diameter:	14.0

Results of Well Yield Testing

Pump Test ID:	11353078
Pump Set At:	30.0
Static Level:	18.799999237060547
Final Level After Pumping:	23.489999771118164
Recommended Pump Depth:	30.0
Pumping Rate:	45.0
Flowing Rate:	
Recommended Pump Rate:	45.0
Levels UOM:	m
Rate UOM:	LPM
Water State After Test Code:	1
Water State After Test:	CLEAR

Pumping Test Method: 1
Pumping Duration HR: 1
Pumping Duration MIN: 0
Flowing:

Draw Down & Recovery

Pump Test Detail ID: 11482038
Test Type: Recovery
Test Duration: 2
Test Level: 20.420000076293945
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482047
Test Type: Draw Down
Test Duration: 20
Test Level: 23.489999771118164
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482035
Test Type: Recovery
Test Duration: 1
Test Level: 21.3799991607666
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482040
Test Type: Recovery
Test Duration: 3
Test Level: 19.829999923706055
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482043
Test Type: Recovery
Test Duration: 5
Test Level: 19.18000030517578
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482049
Test Type: Recovery
Test Duration: 15
Test Level: 18.829999923706055
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482027
Test Type: Draw Down
Test Duration: 50
Test Level: 23.489999771118164
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482030
Test Type: Recovery
Test Duration: 25
Test Level: 18.81999969482422
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482031
Test Type: Draw Down
Test Duration: 25
Test Level: 23.510000228881836
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482034
Test Type: Recovery
Test Duration: 50
Test Level: 18.81999969482422
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482041
Test Type: Draw Down
Test Duration: 4
Test Level: 22.59000015258789
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482048
Test Type: Recovery
Test Duration: 20
Test Level: 18.81999969482422
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482032
Test Type: Recovery
Test Duration: 40
Test Level: 18.81999969482422
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482037
Test Type: Draw Down
Test Duration: 2
Test Level: 21.530000686645508
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482042
Test Type: Draw Down
Test Duration: 5
Test Level: 22.8700008392334
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482024
Test Type: Recovery
Test Duration: 30
Test Level: 18.81999969482422
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482025
Test Type: Recovery
Test Duration: 60
Test Level: 18.81999969482422
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482036
Test Type: Draw Down
Test Duration: 1
Test Level: 20.520000457763672
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482046
Test Type: Draw Down
Test Duration: 15
Test Level: 23.5
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482026
Test Type: Draw Down
Test Duration: 60
Test Level: 23.489999771118164
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482028
Test Type: Draw Down
Test Duration: 40
Test Level: 23.510000228881836
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482029
Test Type: Draw Down
Test Duration: 30
Test Level: 23.530000686645508

Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482033
Test Type: Recovery
Test Duration: 4
Test Level: 19.43000030517578
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482044
Test Type: Draw Down
Test Duration: 10
Test Level: 23.399999618530273
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482045
Test Type: Recovery
Test Duration: 10
Test Level: 18.850000381469727
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11482039
Test Type: Draw Down
Test Duration: 3
Test Level: 22.18000030517578
Test Level UOM: m

Water Details

Water ID: 934066847
Layer: 1
Kind Code:
Kind:
Water Found Depth: 33.0
Water Found Depth UOM: m

Hole Diameter

Hole ID: 11548295
Diameter: 25.399999618530273
Depth From: 0.0
Depth To: 6.099999904632568
Hole Depth UOM: m
Hole Diameter UOM: cm

Hole Diameter

Hole ID: 11548296
Diameter: 20.0
Depth From: 6.099999904632568
Depth To: 33.0
Hole Depth UOM: m
Hole Diameter UOM: cm

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
80	1 of 1	W/197.1	329.5 / 18.61	17 BADENOCH ST lot 30 con 8 MORRISTON ON	WWIS

Well ID: 7342709
Construction Date:
Primary Water Use: Domestic
Sec. Water Use:
Final Well Status: Water Supply
Water Type:
Casing Material:
Audit No: Z316731
Tag: A090039
Construction Method:
Elevation (m):
Elevation Reliability:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Flowing (Y/N):
Flow Rate:
Clear/Cloudy:

Data Entry Status:
Data Src:
Date Received: 9/20/2019
Selected Flag: TRUE
Abandonment Rec:
Contractor: 7221
Form Version: 7
Owner:
Street Name: 17 BADENOCH ST
County: WELLINGTON
Municipality: PUSLINCH TOWNSHIP
Site Info:
Lot: 030
Concession: 08
Concession Name: CON
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/734\7342709.pdf

Additional Detail(s) (Map)

Well Completed Date: 2019/09/10
Year Completed: 2019
Depth (m):
Latitude: 43.449449260733
Longitude: -80.115791628598
Path: 734\7342709.pdf

Bore Hole Information

Bore Hole ID: 1007665832
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 10-Sep-2019 00:00:00
Remarks:
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 17
East83: 571543.00
North83: 4811107.00
Org CS: UTM83
UTMRC: 4
UTMRC Desc: margin of error : 30 m - 100 m
Location Method: wwr

Pipe Information

Pipe ID: 1008050862
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID:	1008052966
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	6.666999816894531
Depth To:	-2.0
Casing Diameter:	6.0
Casing Diameter UOM:	Inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	1008052967
Layer:	2
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	6.666999816894531
Casing Diameter:	6.0
Casing Diameter UOM:	Inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	1008053693
Pump Set At:	
Static Level:	
Final Level After Pumping:	
Recommended Pump Depth:	
Pumping Rate:	
Flowing Rate:	
Recommended Pump Rate:	
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	
Water State After Test:	
Pumping Test Method:	0
Pumping Duration HR:	
Pumping Duration MIN:	
Flowing:	

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81 ***1 of 1*** ***WSW/199.4*** ***320.3 / 9.47*** ***TRANSPORT TRUCK HIGHWAY 6 & CALFASS ROAD MOTOR VEHICLE (OPERATING FLUID) PUSLINCH TOWNSHIP ON*** ***SPL***

Ref No:	96175	***Discharger Report:***	
Site No:		***Material Group:***	
Incident Dt:	2/9/1994	***Health/Env Conseq:***	
Year:		***Client Type:***	
Incident Cause:	OTHER TRANSPORTATION ACCIDENT	***Sector Type:***	
Incident Event:		***Agency Involved:***	
Contaminant Code:		***Nearest Watercourse:***	
Contaminant Name:		***Site Address:***	
Contaminant Limit 1:		***Site District Office:***	
Contam Limit Freq 1:		***Site Postal Code:***	
Contaminant UN No 1:		***Site Region:***	
Environment Impact:	NOT ANTICIPATED	***Site Municipality:***	75612
Nature of Impact:		***Site Lot:***	
Receiving Medium:	LAND	***Site Conc:***	
Receiving Env:		***Northing:***	
MOE Response:		***Easting:***	FIRE DEPT., OPP, MOEE

Dt MOE Arvl on Scn:		**Site Geo Ref Accu:**	
MOE Reported Dt:	2/9/1994	**Site Map Datum:**	
Dt Document Closed:		**SAC Action Class:**	
Incident Reason:	UNKNOWN	**Source Type:**	
Site Name:			
Site County/District:			
Site Geo Ref Meth:			
Incident Summary:	PRO TRANSIT - UNK QTY DIESEL FUEL TO ROAD, CURB & SIDEWALK		
Contaminant Qty:			

82 **1 of 1** **W/201.1** **325.6 / 14.76** **lot 30 con 8 ON** **WWIS**

Well ID:	6702662	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	8/1/1961
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	4208
Casing Material:		**Form Version:**	1
Audit No:		**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	030
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6702662.pdf

Additional Detail(s) (Map)

Well Completed Date:	1961/07/19
Year Completed:	1961
Depth (m):	32.004
Latitude:	43.4490578628673
Longitude:	-80.1164115720226
Path:	670\6702662.pdf

Bore Hole Information

Bore Hole ID:	10466805	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571493.30
Code OB Desc:		**North83:**	4811063.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	5
Date Completed:	19-Jul-1961 00:00:00	**UTMRC Desc:**	margin of error : 100 m - 300 m
Remarks:		**Location Method:**	p5
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID: 932614780
Layer: 1
Color:
General Color:
Mat1: 05
Most Common Material: CLAY
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 15.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614783
Layer: 4
Color:
General Color:
Mat1: 11
Most Common Material: GRAVEL
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 100.0
Formation End Depth: 105.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614782
Layer: 3
Color:
General Color:
Mat1: 05
Most Common Material: CLAY
Mat2: 09
Mat2 Desc: MEDIUM SAND
Mat3:
Mat3 Desc:
Formation Top Depth: 30.0
Formation End Depth: 100.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614781
Layer: 2
Color:
General Color:
Mat1: 11
Most Common Material: GRAVEL
Mat2: 05

Mat2 Desc:	CLAY
Mat3:	
Mat3 Desc:	
Formation Top Depth:	15.0
Formation End Depth:	30.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966702662
Method Construction Code:	1
Method Construction:	Cable Tool
Other Method Construction:	

Pipe Information

Pipe ID:	11015375
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930759198
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	105.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996702662
Pump Set At:	
Static Level:	55.0
Final Level After Pumping:	80.0
Recommended Pump Depth:	80.0
Pumping Rate:	20.0
Flowing Rate:	
Recommended Pump Rate:	7.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Water Details

Water ID:	933955008
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	105.0
Water Found Depth UOM:	ft

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
83	1 of 1	N/202.2	330.5 / 19.61	lot 30 con 8 ON	WWIS

Well ID:	6711290	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	10/7/1993
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	2663
Casing Material:		**Form Version:**	1
Audit No:	124316	**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	030
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6711290.pdf

Additional Detail(s) (Map)

Well Completed Date:	1993/09/07
Year Completed:	1993
Depth (m):	31.3944
Latitude:	43.4546817331534
Longitude:	-80.1101125438371
Path:	671\6711290.pdf

Bore Hole Information

Bore Hole ID:	10475124	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571996.30
Code OB Desc:		**North83:**	4811693.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	3
Date Completed:	07-Sep-1993 00:00:00	**UTMRC Desc:**	margin of error : 10 - 30 m
Remarks:		**Location Method:**	gps
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932651873
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY

Mat2: 12
Mat2 Desc: STONES
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 35.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932651876
Layer: 4
Color:
General Color:
Mat1: 11
Most Common Material: GRAVEL
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 100.0
Formation End Depth: 103.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932651874
Layer: 2
Color: 6
General Color: BROWN
Mat1: 08
Most Common Material: FINE SAND
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 35.0
Formation End Depth: 65.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932651875
Layer: 3
Color: 6
General Color: BROWN
Mat1: 08
Most Common Material: FINE SAND
Mat2: 11
Mat2 Desc: GRAVEL
Mat3:
Mat3 Desc:
Formation Top Depth: 65.0
Formation End Depth: 100.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966711290
Method Construction Code: 4
Method Construction: Rotary (Air)
Other Method Construction:

Pipe Information

Pipe ID: 11023694
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930773854
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 103.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930773853
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 102.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996711290
Pump Set At:
Static Level: 42.0
Final Level After Pumping: 42.0
Recommended Pump Depth: 80.0
Pumping Rate: 20.0
Flowing Rate:
Recommended Pump Rate: 20.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 1
Pumping Duration HR: 1
Pumping Duration MIN:
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 934348741
Test Type: Recovery
Test Duration: 15
Test Level: 42.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID:	934613476
Test Type:	Recovery
Test Duration:	30
Test Level:	42.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934874503
Test Type:	Recovery
Test Duration:	45
Test Level:	42.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	935135033
Test Type:	Recovery
Test Duration:	60
Test Level:	42.0
Test Level UOM:	ft

Water Details

Water ID:	933965202
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	103.0
Water Found Depth UOM:	ft

84	1 of 1	W/202.3	329.5 / 18.61	lot 30 con 8 ON	WWIS

Well ID:	6709100	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	1/11/1988
Sec. Water Use:	0	***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	2336
Casing Material:		***Form Version:***	1
Audit No:	18889	***Owner:***	
Tag:		***Street Name:***	
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	030
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6709100.pdf

Additional Detail(s) (Map)

Well Completed Date: 1987/11/26
Year Completed: 1987
Depth (m): 32.004
Latitude: 43.4495210673903
Longitude: -80.1157621566154
Path: 670\6709100.pdf

Bore Hole Information

Bore Hole ID: 10472972
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 26-Nov-1987 00:00:00
Remarks:
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 17
East83: 571545.30
North83: 4811115.00
Org CS:
UTMRC: 3
UTMRC Desc: margin of error : 10 - 30 m
Location Method: gps

Overburden and Bedrock Materials Interval

Formation ID: 932642139
Layer: 1
Color: 6
General Color: BROWN
Mat1: 11
Most Common Material: GRAVEL
Mat2: 12
Mat2 Desc: STONES
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 30.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932642140
Layer: 2
Color: 6
General Color: BROWN
Mat1: 05
Most Common Material: CLAY
Mat2: 11
Mat2 Desc: GRAVEL
Mat3:
Mat3 Desc:
Formation Top Depth: 30.0
Formation End Depth: 90.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932642141
Layer: 3
Color: 6
General Color: BROWN
Mat1: 26
Most Common Material: ROCK
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 90.0
Formation End Depth: 105.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966709100
Method Construction Code: 4
Method Construction: Rotary (Air)
Other Method Construction:

Pipe Information

Pipe ID: 11021542
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930769915
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 91.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930769916
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 105.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996709100
Pump Set At:
Static Level: 51.0
Final Level After Pumping: 70.0
Recommended Pump Depth: 80.0
Pumping Rate: 25.0

Flowing Rate:	
Recommended Pump Rate:	15.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	934342034
Test Type:	Recovery
Test Duration:	15
Test Level:	51.0
Test Level UOM:	ft

Water Details

Water ID:	933962436
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	105.0
Water Found Depth UOM:	ft

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85 **1 of 1** **WSW/203.7** **315.4 / 4.52** **5 VICTORIA ST lot 31 con 7 MORRISTON ON** **WWIS**

Well ID:	7190638	**Data Entry Status:**	
Construction Date:		**Data Src:**	
Primary Water Use:		**Date Received:**	10/31/2012
Sec. Water Use:		**Selected Flag:**	TRUE
Final Well Status:	Abandoned-Quality	**Abandonment Rec:**	Yes
Water Type:		**Contractor:**	2663
Casing Material:		**Form Version:**	7
Audit No:	Z158925	**Owner:**	
Tag:		**Street Name:**	5 VICTORIA ST
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	07
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/719\7190638.pdf

Additional Detail(s) (Map)

Well Completed Date:	2012/08/18
Year Completed:	2012
Depth (m):	
Latitude:	43.4475261510062
Longitude:	-80.1174509883234
Path:	719\7190638.pdf

Bore Hole Information

Bore Hole ID:	1004191369	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571411.00
Code OB Desc:		***North83:***	4810892.00
Open Hole:		***Org CS:***	UTM83
Cluster Kind:		***UTMRC:***	4
Date Completed:	18-Aug-2012 00:00:00	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	gis
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Annular Space/Abandonment Sealing Record

Plug ID:	1004530946
Layer:	1
Plug From:	-6.0
Plug To:	27.0
Plug Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1004530947
Layer:	2
Plug From:	0.0
Plug To:	-6.0
Plug Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	1004530945
Method Construction Code:	
Method Construction:	
Other Method Construction:	

Pipe Information

Pipe ID:	1004530939
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	1004530943
Layer:	
Material:	
Open Hole or Material:	
Depth From:	
Depth To:	
Casing Diameter:	

Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Screen

Screen ID: 1004530944
Layer:
Slot:
Screen Top Depth:
Screen End Depth:
Screen Material:
Screen Depth UOM: ft
Screen Diameter UOM: inch
Screen Diameter:

Water Details

Water ID: 1004530942
Layer:
Kind Code:
Kind:
Water Found Depth:
Water Found Depth UOM: ft

Hole Diameter

Hole ID: 1004530941
Diameter:
Depth From:
Depth To:
Hole Depth UOM: ft
Hole Diameter UOM: inch

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86 | ***1 of 1*** | ***NNW/203.8*** | ***330.4 / 19.55*** | ***lot 30 con 8 ON*** | ***WWIS***

Well ID: 6709927
Construction Date:
Primary Water Use: Domestic
Sec. Water Use: 0
Final Well Status: Water Supply
Water Type:
Casing Material:
Audit No: 69129
Tag:
Construction Method:
Elevation (m):
Elevation Reliability:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Flowing (Y/N):
Flow Rate:
Clear/Cloudy:

Data Entry Status:
Data Src: 1
Date Received: 9/27/1989
Selected Flag: TRUE
Abandonment Rec:
Contractor: 2663
Form Version: 1
Owner:
Street Name:
County: WELLINGTON
Municipality: PUSLINCH TOWNSHIP
Site Info:
Lot: 030
Concession: 08
Concession Name: CON
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6709927.pdf

Additional Detail(s) (Map)

Well Completed Date: 1989/09/01

Year Completed:	1989
Depth (m):	32.3088
Latitude:	43.4533269736587
Longitude:	-80.1118998689716
Path:	670\6709927.pdf

Bore Hole Information

Bore Hole ID:	10473775	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571853.30
Code OB Desc:		**North83:**	4811541.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	5
Date Completed:	01-Sep-1989 00:00:00	**UTMRC Desc:**	margin of error : 100 m - 300 m
Remarks:		**Location Method:**	gps
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932645669
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	12
Mat3 Desc:	STONES
Formation Top Depth:	5.0
Formation End Depth:	60.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932645670
Layer:	3
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	13
Mat2 Desc:	BOULDERS
Mat3:	12
Mat3 Desc:	STONES
Formation Top Depth:	60.0
Formation End Depth:	99.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932645668

Layer:	1
Color:	
General Color:	
Mat1:	01
Most Common Material:	FILL
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	5.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932645671
Layer:	4
Color:	6
General Color:	BROWN
Mat1:	26
Most Common Material:	ROCK
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	99.0
Formation End Depth:	106.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966709927
Method Construction Code:	4
Method Construction:	Rotary (Air)
Other Method Construction:	

Pipe Information

Pipe ID:	11022345
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930771378
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	100.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	930771379
Layer:	2
Material:	4

Open Hole or Material:	OPEN HOLE
Depth From:	
Depth To:	106.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996709927
Pump Set At:	
Static Level:	70.0
Final Level After Pumping:	
Recommended Pump Depth:	91.0
Pumping Rate:	15.0
Flowing Rate:	
Recommended Pump Rate:	15.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	1
Pumping Duration HR:	1
Pumping Duration MIN:	
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	934344319
Test Type:	Recovery
Test Duration:	15
Test Level:	70.0
Test Level UOM:	ft

Water Details

Water ID:	933963438
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	106.0
Water Found Depth UOM:	ft

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87 | ***1 of 1*** | ***W/204.3*** | ***330.6 / 19.72*** | ***27 Badenoch St Morriston ON N0B 2C0*** | ***EHS***

Order No:	20100405087	**Nearest Intersection:**	Hwy 6 and Badenoch St/Wellington Rd 36
Status:	C	**Municipality:**	township of Puslinch
Report Type:	Standard Report	**Client Prov/State:**	ON
Report Date:	4/14/2010	**Search Radius (km):**	0.25
Date Received:	4/5/2010	**X:**	-80.115116
Previous Site Name:		**Y:**	43.450636
Lot/Building Size:	~3 ha		
Additional Info Ordered:			

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88 | ***1 of 1*** | ***S/205.0*** | ***311.2 / 0.39*** | ***lot 32 con 8 ON*** | ***WWIS***

Well ID:	6704652	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	7/11/1973

Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	2406
Casing Material:		**Form Version:**	1
Audit No:		**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	032
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6704652.pdf

Additional Detail(s) (Map)

Well Completed Date:	1973/06/27
Year Completed:	1973
Depth (m):	24.384
Latitude:	43.4455320808919
Longitude:	-80.1099500897603
Path:	670\6704652.pdf

Bore Hole Information

Bore Hole ID:	10468759	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	572020.30
Code OB Desc:		**North83:**	4810677.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	4
Date Completed:	27-Jun-1973 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	p4
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932622948
Layer:	4
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	70.0
Formation End Depth:	77.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932622949
Layer:	5
Color:	
General Color:	
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	77.0
Formation End Depth:	80.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932622946
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	27.0
Formation End Depth:	45.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932622945
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	27.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932622947
Layer:	3
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	08

Mat2 Desc:	FINE SAND
Mat3:	
Mat3 Desc:	
Formation Top Depth:	45.0
Formation End Depth:	70.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966704652
Method Construction Code:	1
Method Construction:	Cable Tool
Other Method Construction:	

Pipe Information

Pipe ID:	11017329
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930762794
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	
Depth To:	80.0
Casing Diameter:	6.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996704652
Pump Set At:	
Static Level:	23.0
Final Level After Pumping:	50.0
Recommended Pump Depth:	65.0
Pumping Rate:	10.0
Flowing Rate:	
Recommended Pump Rate:	10.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	2
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Draw Down & Recovery

Pump Test Detail ID:	934349039
Test Type:	Recovery
Test Duration:	15
Test Level:	23.0
Test Level UOM:	ft

Water Details

Water ID:	933957332
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	80.0
Water Found Depth UOM:	ft

89 | ***1 of 1*** | ***WSW/205.1*** | ***314.6 / 3.78*** | ***lot 31 con 7 ON*** | ***WWIS***

Well ID:	6703703	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	7/13/1970
Sec. Water Use:	0	***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	2406
Casing Material:		***Form Version:***	1
Audit No:		***Owner:***	
Tag:		***Street Name:***	
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	031
Well Depth:		***Concession:***	07
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6703703.pdf

Additional Detail(s) (Map)

Well Completed Date:	1970/06/26
Year Completed:	1970
Depth (m):	40.2336
Latitude:	43.4471747070258
Longitude:	-80.1174153148888
Path:	670\6703703.pdf

Bore Hole Information

Bore Hole ID:	10467837	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571414.30
Code OB Desc:		***North83:***	4810853.00
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	4
Date Completed:	26-Jun-1970 00:00:00	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	p4
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932619041
Layer:	4
Color:	
General Color:	
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	47.0
Formation End Depth:	52.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932619040
Layer:	3
Color:	6
General Color:	BROWN
Mat1:	09
Most Common Material:	MEDIUM SAND
Mat2:	05
Mat2 Desc:	CLAY
Mat3:	
Mat3 Desc:	
Formation Top Depth:	22.0
Formation End Depth:	47.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932619045
Layer:	8
Color:	6
General Color:	BROWN
Mat1:	26
Most Common Material:	ROCK
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	95.0
Formation End Depth:	115.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932619038
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	08
Most Common Material:	FINE SAND
Mat2:	
Mat2 Desc:	
Mat3:	

Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 7.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932619044
Layer: 7
Color:
General Color:
Mat1: 14
Most Common Material: HARDPAN
Mat2: 12
Mat2 Desc: STONES
Mat3:
Mat3 Desc:
Formation Top Depth: 85.0
Formation End Depth: 95.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932619042
Layer: 5
Color:
General Color:
Mat1: 05
Most Common Material: CLAY
Mat2: 11
Mat2 Desc: GRAVEL
Mat3:
Mat3 Desc:
Formation Top Depth: 52.0
Formation End Depth: 68.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932619046
Layer: 9
Color: 8
General Color: BLACK
Mat1: 26
Most Common Material: ROCK
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 115.0
Formation End Depth: 132.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932619043
Layer: 6
Color: 6

General Color:	BROWN
Mat1:	09
Most Common Material:	MEDIUM SAND
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	68.0
Formation End Depth:	85.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932619039
Layer:	2
Color:	
General Color:	
Mat1:	13
Most Common Material:	BOULDERS
Mat2:	05
Mat2 Desc:	CLAY
Mat3:	
Mat3 Desc:	
Formation Top Depth:	7.0
Formation End Depth:	22.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966703703
Method Construction Code:	1
Method Construction:	Cable Tool
Other Method Construction:	

Pipe Information

Pipe ID:	11016407
Casing No:	1
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	930761134
Layer:	2
Material:	
Open Hole or Material:	
Depth From:	
Depth To:	132.0
Casing Diameter:	
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	930761133
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	

Depth To:	98.0
Casing Diameter:	4.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Results of Well Yield Testing

Pump Test ID:	996703703
Pump Set At:	
Static Level:	18.0
Final Level After Pumping:	20.0
Recommended Pump Depth:	25.0
Pumping Rate:	10.0
Flowing Rate:	
Recommended Pump Rate:	10.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	2
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	No

Water Details

Water ID:	933956207
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	132.0
Water Found Depth UOM:	ft

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90 | ***1 of 1*** | ***W/209.0*** | ***326.9 / 16.01*** | ***BADENOCH STREET MORRISTON ON*** | ***WWIS***

Well ID:	7154838	**Data Entry Status:**	
Construction Date:		**Data Src:**	
Primary Water Use:		**Date Received:**	11/22/2010
Sec. Water Use:		**Selected Flag:**	TRUE
Final Well Status:	Observation Wells	**Abandonment Rec:**	
Water Type:		**Contractor:**	7238
Casing Material:		**Form Version:**	7
Audit No:	Z123600	**Owner:**	
Tag:	A109996	**Street Name:**	BADENOCH STREET
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	
Well Depth:		**Concession:**	
Overburden/Bedrock:		**Concession Name:**	
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/715\7154838.pdf

Additional Detail(s) (Map)

Well Completed Date: 2010/11/03

Year Completed:	2010
Depth (m):	7.62
Latitude:	43.4510540638077
Longitude:	-80.1148907316765
Path:	715\7154838.pdf

Bore Hole Information

Bore Hole ID:	1003411723	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571614.00
Code OB Desc:		**North83:**	4811286.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	3
Date Completed:	03-Nov-2010 00:00:00	**UTMRC Desc:**	margin of error : 10 - 30 m
Remarks:		**Location Method:**	wwr
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1003551247
Layer:	1
Color:	8
General Color:	BLACK
Mat1:	06
Most Common Material:	SILT
Mat2:	28
Mat2 Desc:	SAND
Mat3:	11
Mat3 Desc:	GRAVEL
Formation Top Depth:	0.0
Formation End Depth:	18.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1003551248
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	06
Mat2 Desc:	SILT
Mat3:	
Mat3 Desc:	
Formation Top Depth:	18.0
Formation End Depth:	25.0
Formation End Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1003551250

Layer:	1
Plug From:	0.0
Plug To:	14.0
Plug Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	1003551254
Method Construction Code:	B
Method Construction:	Other Method
Other Method Construction:	AUGER

Pipe Information

Pipe ID:	1003551246
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	1003551252
Layer:	1
Material:	5
Open Hole or Material:	PLASTIC
Depth From:	0.0
Depth To:	15.0
Casing Diameter:	2.0
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Screen

Screen ID:	1003551253
Layer:	1
Slot:	10
Screen Top Depth:	15.0
Screen End Depth:	25.0
Screen Material:	5
Screen Depth UOM:	ft
Screen Diameter UOM:	inch
Screen Diameter:	2.0

Water Details

Water ID:	1003551251
Layer:	1
Kind Code:	
Kind:	
Water Found Depth:	20.0
Water Found Depth UOM:	ft

Hole Diameter

Hole ID:	1003551249
Diameter:	8.0
Depth From:	0.0
Depth To:	25.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
91	1 of 1	N/212.1	331.9 / 21.00	ON	WWIS

Well ID:	6712612	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	8/4/1998
Sec. Water Use:		**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	2663
Casing Material:		**Form Version:**	1
Audit No:	192831	**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	
Well Depth:		**Concession:**	
Overburden/Bedrock:		**Concession Name:**	
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6712612.pdf

Additional Detail(s) (Map)

Well Completed Date:	1998/07/24
Year Completed:	1998
Depth (m):	73.4568
Latitude:	43.4546562909053
Longitude:	-80.1103143869361
Path:	671\6712612.pdf

Bore Hole Information

Bore Hole ID:	10476445	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571980.00
Code OB Desc:		**North83:**	4811690.00
Open Hole:		**Org CS:**	N83
Cluster Kind:		**UTMRC:**	3
Date Completed:	24-Jul-1998 00:00:00	**UTMRC Desc:**	margin of error : 10 - 30 m
Remarks:		**Location Method:**	
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932658032
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	05

Most Common Material:	CLAY
Mat2:	28
Mat2 Desc:	SAND
Mat3:	11
Mat3 Desc:	GRAVEL
Formation Top Depth:	20.0
Formation End Depth:	70.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932658036
Layer:	6
Color:	6
General Color:	BROWN
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	110.0
Formation End Depth:	241.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932658033
Layer:	3
Color:	6
General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	70.0
Formation End Depth:	85.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932658031
Layer:	1
Color:	
General Color:	
Mat1:	05
Most Common Material:	CLAY
Mat2:	28
Mat2 Desc:	SAND
Mat3:	12
Mat3 Desc:	STONES
Formation Top Depth:	0.0
Formation End Depth:	20.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID: 932658034
Layer: 4
Color: 6
General Color: BROWN
Mat1: 05
Most Common Material: CLAY
Mat2: 28
Mat2 Desc: SAND
Mat3: 11
Mat3 Desc: GRAVEL
Formation Top Depth: 85.0
Formation End Depth: 106.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932658035
Layer: 5
Color: 6
General Color: BROWN
Mat1: 15
Most Common Material: LIMESTONE
Mat2: 71
Mat2 Desc: FRACTURED
Mat3:
Mat3 Desc:
Formation Top Depth: 106.0
Formation End Depth: 110.0
Formation End Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 933210875
Layer: 1
Plug From: 0.0
Plug To: 20.0
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966712612
Method Construction Code: 4
Method Construction: Rotary (Air)
Other Method Construction:

Pipe Information

Pipe ID: 11025015
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930776208
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE

Depth From:
Depth To: 241.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930776207
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 110.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996712612
Pump Set At:
Static Level: 85.0
Final Level After Pumping: 145.0
Recommended Pump Depth: 150.0
Pumping Rate: 20.0
Flowing Rate:
Recommended Pump Rate: 20.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 1
Pumping Duration HR: 1
Pumping Duration MIN: 0
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 934352774
Test Type: Draw Down
Test Duration: 15
Test Level: 90.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934869606
Test Type: Draw Down
Test Duration: 45
Test Level: 145.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934617358
Test Type: Draw Down
Test Duration: 30
Test Level: 100.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID:	935130652
Test Type:	Draw Down
Test Duration:	60
Test Level:	145.0
Test Level UOM:	ft

Water Details

Water ID:	933967057
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	125.0
Water Found Depth UOM:	ft

Water Details

Water ID:	933967058
Layer:	2
Kind Code:	1
Kind:	FRESH
Water Found Depth:	235.0
Water Found Depth UOM:	ft

Water Details

Water ID:	933967059
Layer:	3
Kind Code:	1
Kind:	FRESH
Water Found Depth:	241.0
Water Found Depth UOM:	ft

92 ***1 of 1*** ***WSW/212.8*** ***320.8 / 9.95*** ***lot 30 con 8 ON*** ***WWIS***

Well ID:	6702661	***Data Entry Status:***	
Construction Date:		***Data Src:***	1
Primary Water Use:	Domestic	***Date Received:***	9/25/1951
Sec. Water Use:	0	***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	2411
Casing Material:		***Form Version:***	1
Audit No:		***Owner:***	
Tag:		***Street Name:***	
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	030
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6702661.pdf

Additional Detail(s) (Map)

Well Completed Date: 1951/09/15
Year Completed: 1951
Depth (m): 31.6992
Latitude: 43.4485952270377
Longitude: -80.1171351225275
Path: 670\6702661.pdf

Bore Hole Information

Bore Hole ID: 10466804
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 15-Sep-1951 00:00:00
Remarks:
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 17
East83: 571435.30
North83: 4811011.00
Org CS:
UTMRC: 9
UTMRC Desc: unknown UTM
Location Method: p9

Overburden and Bedrock Materials Interval

Formation ID: 932614777
Layer: 1
Color:
General Color:
Mat1: 05
Most Common Material: CLAY
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 20.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614778
Layer: 2
Color:
General Color:
Mat1: 07
Most Common Material: QUICKSAND
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 20.0
Formation End Depth: 80.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614779
Layer: 3
Color:
General Color:
Mat1: 15
Most Common Material: LIMESTONE
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 80.0
Formation End Depth: 104.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966702661
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 11015374
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930759196
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 80.0
Casing Diameter: 4.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930759197
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 104.0
Casing Diameter: 4.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996702661
Pump Set At:
Static Level: 25.0
Final Level After Pumping:
Recommended Pump Depth:
Pumping Rate:

Flowing Rate:	
Recommended Pump Rate:	
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	
Water State After Test:	
Pumping Test Method:	
Pumping Duration HR:	
Pumping Duration MIN:	
Flowing:	No

Water Details

Water ID:	933955007
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	104.0
Water Found Depth UOM:	ft

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93 | ***1 of 1*** | ***WNW/216.8*** | ***323.9 / 13.02*** | ***Ikonkar Place con 8 MORRISTON ON*** | ***WWIS***

Well ID:	7353621	**Data Entry Status:**	
Construction Date:		**Data Src:**	
Primary Water Use:	Domestic	**Date Received:**	2/18/2020
Sec. Water Use:		**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	7556
Casing Material:		**Form Version:**	7
Audit No:	Z318720	**Owner:**	
Tag:	A251101	**Street Name:**	Ikonkar Place
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map):

Additional Detail(s) (Map)

Well Completed Date:	2020/01/27
Year Completed:	2020
Depth (m):	34.1376
Latitude:	43.4512247438803
Longitude:	-80.1148388047725
Path:	

Bore Hole Information

Bore Hole ID:	1008156878	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571618.00
Code OB Desc:		**North83:**	4811305.00

Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	27-Jan-2020 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1008240530
Layer:	3
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	40.0
Formation End Depth:	50.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1008240533
Layer:	6
Color:	2
General Color:	GREY
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	75.0
Formation End Depth:	92.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1008240532
Layer:	5
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	60.0
Formation End Depth:	75.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1008240531
Layer:	4
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	50.0
Formation End Depth:	60.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1008240529
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	30.0
Formation End Depth:	40.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1008240528
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	11
Mat3 Desc:	GRAVEL
Formation Top Depth:	0.0
Formation End Depth:	30.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1008240534
Layer:	7
Color:	2
General Color:	GREY
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	

Mat3 Desc:
Formation Top Depth: 92.0
Formation End Depth: 112.0
Formation End Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1008240865
Layer: 1
Plug From: 0.0
Plug To: 20.0
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 1008241205
Method Construction Code: B
Method Construction: Other Method
Other Method Construction: Dual Rotary

Pipe Information

Pipe ID: 1008240241
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1008241329
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From: 96.0
Depth To: 112.0
Casing Diameter: 6.0
Casing Diameter UOM: Inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 1008241328
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From: -2.0
Depth To: 96.0
Casing Diameter: 6.125
Casing Diameter UOM: Inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 1008241643
Pump Set At: 100.0
Static Level: 62.0
Final Level After Pumping: 62.0
Recommended Pump Depth: 100.0
Pumping Rate: 23.0

Flowing Rate:
Recommended Pump Rate: 23.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 0
Pumping Duration HR: 1
Pumping Duration MIN: 0
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 1008242164
Test Type: Draw Down
Test Duration: 1
Test Level: 62.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1008242166
Test Type: Draw Down
Test Duration: 3
Test Level: 62.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1008242174
Test Type: Draw Down
Test Duration: 40
Test Level: 62.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1008242176
Test Type: Draw Down
Test Duration: 60
Test Level: 62.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1008242173
Test Type: Draw Down
Test Duration: 30
Test Level: 62.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1008242175
Test Type: Draw Down
Test Duration: 50
Test Level: 62.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1008242171
Test Type: Draw Down
Test Duration: 20
Test Level: 62.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1008242168
Test Type: Draw Down
Test Duration: 5
Test Level: 62.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1008242165
Test Type: Draw Down
Test Duration: 2
Test Level: 62.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1008242167
Test Type: Draw Down
Test Duration: 4
Test Level: 62.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1008242169
Test Type: Draw Down
Test Duration: 10
Test Level: 62.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1008242170
Test Type: Draw Down
Test Duration: 15
Test Level: 62.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1008242172
Test Type: Draw Down
Test Duration: 25
Test Level: 62.0
Test Level UOM: ft

Water Details

Water ID: 1008241534
Layer: 1
Kind Code: 8

Kind: Untested
Water Found Depth: 112.0
Water Found Depth UOM: ft

Hole Diameter

Hole ID: 1008241048
Diameter: 6.625
Depth From: 20.0
Depth To: 96.0
Hole Depth UOM: ft
Hole Diameter UOM: Inch

Hole Diameter

Hole ID: 1008241049
Diameter: 6.0
Depth From: 96.0
Depth To: 112.0
Hole Depth UOM: ft
Hole Diameter UOM: Inch

Hole Diameter

Hole ID: 1008241047
Diameter: 10.0
Depth From: 0.0
Depth To: 20.0
Hole Depth UOM: ft
Hole Diameter UOM: Inch

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94 ***1 of 1*** ***W/217.1*** ***327.6 / 16.73*** ***11 BADENOCH ST lot 30 con 8 MORRISTON ON*** ***WWIS***

Well ID: 7320421
Construction Date:
Primary Water Use: Domestic
Sec. Water Use:
Final Well Status: Water Supply
Water Type:
Casing Material:
Audit No: Z293269
Tag: A240537
Construction Method:
Elevation (m):
Elevation Reliability:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Flowing (Y/N):
Flow Rate:
Clear/Cloudy:

Data Entry Status:
Data Src:
Date Received: 9/14/2018
Selected Flag: TRUE
Abandonment Rec:
Contractor: 7385
Form Version: 7
Owner:
Street Name: 11 BADENOCH ST
County: WELLINGTON
Municipality: PUSLINCH TOWNSHIP
Site Info:
Lot: 030
Concession: 08
Concession Name: CON
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/732\7320421.pdf

Additional Detail(s) (Map)

Well Completed Date: 2018/08/08
Year Completed: 2018
Depth (m): 28.3464

Latitude:	43.4492917865403
Longitude:	-80.1163871562118
Path:	732\7320421.pdf

Bore Hole Information

Bore Hole ID:	1007297912	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571495.00
Code OB Desc:		**North83:**	4811089.00
Open Hole:		**Org CS:**	UTM83
Cluster Kind:		**UTMRC:**	4
Date Completed:	08-Aug-2018 00:00:00	**UTMRC Desc:**	margin of error : 30 m - 100 m
Remarks:		**Location Method:**	wwr
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1007538889
Layer:	3
Color:	6
General Color:	BROWN
Mat1:	26
Most Common Material:	ROCK
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	92.0
Formation End Depth:	93.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1007538888
Layer:	2
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	20.0
Formation End Depth:	92.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1007538887
Layer:	1
Color:	6

General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	28
Mat2 Desc:	SAND
Mat3:	12
Mat3 Desc:	STONES
Formation Top Depth:	0.0
Formation End Depth:	20.0
Formation End Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1007538925
Layer:	1
Plug From:	0.0
Plug To:	20.0
Plug Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	1007538924
Method Construction Code:	4
Method Construction:	Rotary (Air)
Other Method Construction:	

Pipe Information

Pipe ID:	1007538885
Casing No:	0
Comment:	
Alt Name:	

Construction Record - Casing

Casing ID:	1007538895
Layer:	2
Material:	4
Open Hole or Material:	OPEN HOLE
Depth From:	92.0
Depth To:	93.0
Casing Diameter:	6.125
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Casing

Casing ID:	1007538894
Layer:	1
Material:	1
Open Hole or Material:	STEEL
Depth From:	-2.0
Depth To:	92.0
Casing Diameter:	6.25
Casing Diameter UOM:	inch
Casing Depth UOM:	ft

Construction Record - Screen

Screen ID:	1007538896
Layer:	
Slot:	
Screen Top Depth:	
Screen End Depth:	
Screen Material:	
Screen Depth UOM:	ft
Screen Diameter UOM:	inch
Screen Diameter:	

Results of Well Yield Testing

Pump Test ID:	1007538886
Pump Set At:	60.0
Static Level:	48.0
Final Level After Pumping:	49.0
Recommended Pump Depth:	60.0
Pumping Rate:	15.0
Flowing Rate:	
Recommended Pump Rate:	15.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	0
Pumping Duration HR:	1
Pumping Duration MIN:	
Flowing:	

Draw Down & Recovery

Pump Test Detail ID:	1007538901
Test Type:	Draw Down
Test Duration:	3
Test Level:	49.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1007538903
Test Type:	Draw Down
Test Duration:	4
Test Level:	49.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1007538906
Test Type:	Recovery
Test Duration:	5
Test Level:	48.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1007538911
Test Type:	Draw Down
Test Duration:	20
Test Level:	49.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID: 1007538912
Test Type: Recovery
Test Duration: 20
Test Level: 48.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1007538916
Test Type: Recovery
Test Duration: 30
Test Level: 48.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1007538899
Test Type: Draw Down
Test Duration: 2
Test Level: 49.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1007538920
Test Type: Recovery
Test Duration: 50
Test Level: 48.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1007538902
Test Type: Recovery
Test Duration: 3
Test Level: 48.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1007538908
Test Type: Recovery
Test Duration: 10
Test Level: 48.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1007538904
Test Type: Recovery
Test Duration: 4
Test Level: 48.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1007538914
Test Type: Recovery

Test Duration: 25
Test Level: 48.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1007538917
Test Type: Draw Down
Test Duration: 40
Test Level: 49.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1007538918
Test Type: Recovery
Test Duration: 40
Test Level: 48.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1007538922
Test Type: Recovery
Test Duration: 60
Test Level: 48.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1007538898
Test Type: Recovery
Test Duration: 1
Test Level: 48.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1007538909
Test Type: Draw Down
Test Duration: 15
Test Level: 49.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1007538897
Test Type: Draw Down
Test Duration: 1
Test Level: 49.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1007538907
Test Type: Draw Down
Test Duration: 10
Test Level: 49.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1007538915
Test Type: Draw Down
Test Duration: 30
Test Level: 49.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1007538900
Test Type: Recovery
Test Duration: 2
Test Level: 48.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1007538919
Test Type: Draw Down
Test Duration: 50
Test Level: 49.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1007538905
Test Type: Draw Down
Test Duration: 5
Test Level: 49.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1007538910
Test Type: Recovery
Test Duration: 15
Test Level: 48.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1007538913
Test Type: Draw Down
Test Duration: 25
Test Level: 49.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1007538921
Test Type: Draw Down
Test Duration: 60
Test Level: 49.0
Test Level UOM: ft

Water Details

Water ID: 1007538893

Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	93.0
Water Found Depth UOM:	ft

Hole Diameter

Hole ID:	1007538891
Diameter:	6.25
Depth From:	20.0
Depth To:	92.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

Hole Diameter

Hole ID:	1007538890
Diameter:	10.0
Depth From:	0.0
Depth To:	20.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

Hole Diameter

Hole ID:	1007538892
Diameter:	6.125
Depth From:	92.0
Depth To:	93.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

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95 | ***1 of 1*** | ***WNW/222.8*** | ***325.0 / 14.18*** | ***lot 30 con 8 ON*** | ***WWIS***

Well ID:	6711486	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	8/23/1994
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	2663
Casing Material:		**Form Version:**	1
Audit No:	141432	**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	030
Well Depth:		**Concession:**	08
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6711486.pdf

Additional Detail(s) (Map)

Well Completed Date: 1994/08/02

Year Completed:	1994
Depth (m):	42.0624
Latitude:	43.4523667015972
Longitude:	-80.1134712384083
Path:	671\6711486.pdf

Bore Hole Information

Bore Hole ID:	10475319	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571727.30
Code OB Desc:		**North83:**	4811433.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	5
Date Completed:	02-Aug-1994 00:00:00	**UTMRC Desc:**	margin of error : 100 m - 300 m
Remarks:		**Location Method:**	gps
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932652832
Layer:	5
Color:	6
General Color:	BROWN
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	97.0
Formation End Depth:	138.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932652830
Layer:	3
Color:	6
General Color:	BROWN
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	93.0
Formation End Depth:	96.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932652828

Layer: 1
Color:
General Color:
Mat1: 02
Most Common Material: TOPSOIL
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 1.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932652831
Layer: 4
Color: 6
General Color: BROWN
Mat1: 15
Most Common Material: LIMESTONE
Mat2: 28
Mat2 Desc: SAND
Mat3: 71
Mat3 Desc: FRACTURED
Formation Top Depth: 96.0
Formation End Depth: 97.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932652829
Layer: 2
Color:
General Color:
Mat1: 28
Most Common Material: SAND
Mat2: 11
Mat2 Desc: GRAVEL
Mat3: 05
Mat3 Desc: CLAY
Formation Top Depth: 1.0
Formation End Depth: 93.0
Formation End Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 933210384
Layer: 1
Plug From: 0.0
Plug To: 20.0
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966711486
Method Construction Code: 4
Method Construction: Rotary (Air)

Other Method Construction:

Pipe Information

Pipe ID: 11023889
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930774192
Layer: 2
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 102.0
Casing Diameter: 5.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930774191
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 93.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930774193
Layer: 3
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 138.0
Casing Diameter: 5.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996711486
Pump Set At:
Static Level: 53.0
Final Level After Pumping: 100.0
Recommended Pump Depth: 103.0
Pumping Rate: 15.0
Flowing Rate:
Recommended Pump Rate: 15.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 1
Pumping Duration HR: 1
Pumping Duration MIN: 0

Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 934614016
Test Type: Recovery
Test Duration: 30
Test Level: 53.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 935135590
Test Type: Recovery
Test Duration: 60
Test Level: 53.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934349284
Test Type: Recovery
Test Duration: 15
Test Level: 53.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934875040
Test Type: Recovery
Test Duration: 45
Test Level: 53.0
Test Level UOM: ft

Water Details

Water ID: 933965478
Layer: 3
Kind Code: 1
Kind: FRESH
Water Found Depth: 138.0
Water Found Depth UOM: ft

Water Details

Water ID: 933965477
Layer: 2
Kind Code: 1
Kind: FRESH
Water Found Depth: 120.0
Water Found Depth UOM: ft

Water Details

Water ID: 933965476
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 103.0
Water Found Depth UOM: ft

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
96	1 of 1	WSW/231.0	313.8 / 2.97	lot 31 con 7 ON	WWIS

Well ID:	6702541	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	6/12/1956
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	1648
Casing Material:		**Form Version:**	1
Audit No:		**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	07
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6702541.pdf

Additional Detail(s) (Map)

Well Completed Date:	1956/05/26
Year Completed:	1956
Depth (m):	42.0624
Latitude:	43.4471140679241
Longitude:	-80.1177251612994
Path:	670\6702541.pdf

Bore Hole Information

Bore Hole ID:	10466684	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17
Code OB:		**East83:**	571389.30
Code OB Desc:		**North83:**	4810846.00
Open Hole:		**Org CS:**	
Cluster Kind:		**UTMRC:**	9
Date Completed:	26-May-1956 00:00:00	**UTMRC Desc:**	unknown UTM
Remarks:		**Location Method:**	p9
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932614264
Layer:	2
Color:	
General Color:	
Mat1:	05

Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	25.0
Formation End Depth:	75.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932614265
Layer:	3
Color:	
General Color:	
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	75.0
Formation End Depth:	92.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932614266
Layer:	4
Color:	
General Color:	
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	92.0
Formation End Depth:	138.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932614263
Layer:	1
Color:	
General Color:	
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	25.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID: 966702541
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 11015254
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930758963
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 92.0
Casing Diameter: 4.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930758964
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From:
Depth To: 138.0
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996702541
Pump Set At:
Static Level: 19.0
Final Level After Pumping: 24.0
Recommended Pump Depth:
Pumping Rate: 8.0
Flowing Rate:
Recommended Pump Rate:
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 1
Pumping Duration HR: 3
Pumping Duration MIN: 0
Flowing: No

Water Details

Water ID: 933954879
Layer: 1
Kind Code: 1
Kind: FRESH

Water Found Depth: 138.0
Water Found Depth UOM: ft

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97 | **1 of 1** | **W/232.5** | **330.6 / 19.73** | **27 lot 30 con 8 MORRISTON ON** | **WWIS**

Well ID: 7119802
Construction Date:
Primary Water Use: Domestic
Sec. Water Use:
Final Well Status: Water Supply
Water Type:
Casing Material:
Audit No: Z83731
Tag: A077235
Construction Method:
Elevation (m):
Elevation Reliability:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Flowing (Y/N):
Flow Rate:
Clear/Cloudy:

Data Entry Status:
Data Src:
Date Received: 2/26/2009
Selected Flag: TRUE
Abandonment Rec:
Contractor: 2663
Form Version: 7
Owner:
Street Name: 27
County: WELLINGTON
Municipality: PUSLINCH TOWNSHIP
Site Info:
Lot: 030
Concession: 08
Concession Name: CON
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/711\7119802.pdf

Additional Detail(s) (Map)

Well Completed Date: 2009/01/03
Year Completed: 2009
Depth (m): 50.292
Latitude: 43.4506803240328
Longitude: -80.1154647106667
Path: 711\7119802.pdf

Bore Hole Information

Bore Hole ID: 1002021851
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 03-Jan-2009 00:00:00
Remarks:
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 17
East83: 571568.00
North83: 4811244.00
Org CS: UTM83
UTMRC: 3
UTMRC Desc: margin of error : 10 - 30 m
Location Method: wwr

Overburden and Bedrock Materials Interval

Formation ID: 1002499235
Layer: 5
Color: 6

General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	110.0
Formation End Depth:	114.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1002499234
Layer:	4
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	28
Mat2 Desc:	SAND
Mat3:	
Mat3 Desc:	
Formation Top Depth:	35.0
Formation End Depth:	110.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1002499232
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	11
Mat3 Desc:	GRAVEL
Formation Top Depth:	2.0
Formation End Depth:	22.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1002499233
Layer:	3
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	22.0
Formation End Depth:	35.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1002499236
Layer:	6
Color:	6
General Color:	BROWN
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	75
Mat2 Desc:	LIGHT-COLOURED
Mat3:	71
Mat3 Desc:	FRACTURED
Formation Top Depth:	114.0
Formation End Depth:	142.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1002499237
Layer:	7
Color:	6
General Color:	BROWN
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	65
Mat2 Desc:	DARK-COLOURED
Mat3:	
Mat3 Desc:	
Formation Top Depth:	142.0
Formation End Depth:	165.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1002499231
Layer:	1
Color:	8
General Color:	BLACK
Mat1:	02
Most Common Material:	TOPSOIL
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	2.0
Formation End Depth UOM:	ft

Annular Space/Abandonment Sealing Record

Plug ID:	1002499240
Layer:	1
Plug From:	0.0
Plug To:	20.0
Plug Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID: 1002499261
Method Construction Code: 4
Method Construction: Rotary (Air)
Other Method Construction:

Pipe Information

Pipe ID: 1002499229
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1002499245
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From: 113.0
Depth To:
Casing Diameter: 6.25
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 1002499244
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From: -4.0
Depth To: 113.0
Casing Diameter: 6.25
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Screen

Screen ID: 1002499246
Layer:
Slot:
Screen Top Depth:
Screen End Depth:
Screen Material:
Screen Depth UOM: ft
Screen Diameter UOM: inch
Screen Diameter:

Results of Well Yield Testing

Pump Test ID: 1002499230
Pump Set At: 90.0
Static Level: 67.5
Final Level After Pumping: 67.5
Recommended Pump Depth: 90.0
Pumping Rate: 20.0
Flowing Rate:
Recommended Pump Rate: 20.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1

Water State After Test: CLEAR
Pumping Test Method: 0
Pumping Duration HR: 1
Pumping Duration MIN: 0
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 1002499255
Test Type: Draw Down
Test Duration: 25
Test Level: 67.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1002499248
Test Type: Draw Down
Test Duration: 2
Test Level: 67.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1002499250
Test Type: Draw Down
Test Duration: 4
Test Level: 67.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1002499251
Test Type: Draw Down
Test Duration: 5
Test Level: 67.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1002499256
Test Type: Draw Down
Test Duration: 30
Test Level: 67.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1002499258
Test Type: Draw Down
Test Duration: 50
Test Level: 67.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1002499252
Test Type: Draw Down
Test Duration: 10
Test Level: 67.5

Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1002499257
Test Type: Draw Down
Test Duration: 40
Test Level: 67.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1002499247
Test Type: Draw Down
Test Duration: 1
Test Level: 67.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1002499259
Test Type: Draw Down
Test Duration: 60
Test Level: 67.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1002499253
Test Type: Draw Down
Test Duration: 15
Test Level: 67.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1002499254
Test Type: Draw Down
Test Duration: 20
Test Level: 67.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1002499249
Test Type: Draw Down
Test Duration: 3
Test Level: 67.5
Test Level UOM: ft

Water Details

Water ID: 1002499241
Layer: 1
Kind Code: 8
Kind: Untested
Water Found Depth: 10.0
Water Found Depth UOM: ft

Water Details

Water ID:	1002499242
Layer:	2
Kind Code:	8
Kind:	Untested
Water Found Depth:	140.0
Water Found Depth UOM:	ft

Water Details

Water ID:	1002499243
Layer:	3
Kind Code:	8
Kind:	Untested
Water Found Depth:	158.0
Water Found Depth UOM:	ft

Hole Diameter

Hole ID:	1002499239
Diameter:	6.25
Depth From:	20.0
Depth To:	
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

Hole Diameter

Hole ID:	1002499238
Diameter:	10.0
Depth From:	0.0
Depth To:	20.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

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98 ***1 of 1*** ***WNW/233.4*** ***325.2 / 14.30*** ***11 KONKER PLACE lot 30 con 8 MORRISTON ON*** ***WWIS***

Well ID:	7299228	***Data Entry Status:***	
Construction Date:		***Data Src:***	
Primary Water Use:	Domestic	***Date Received:***	11/16/2017
Sec. Water Use:		***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	7556
Casing Material:		***Form Version:***	7
Audit No:	Z266435	***Owner:***	
Tag:	A199517	***Street Name:***	11 KONKER PLACE
Construction Method:		***County:***	WELLINGTON
Elevation (m):		***Municipality:***	PUSLINCH TOWNSHIP
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	030
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	CON
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/729\7299228.pdf

Additional Detail(s) (Map)

Well Completed Date:	2017/10/23
Year Completed:	2017
Depth (m):	31.3944
Latitude:	43.4512088416099
Longitude:	-80.1151109439739
Path:	729\7299228.pdf

Bore Hole Information

Bore Hole ID:	1006797592	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	17
Code OB:		***East83:***	571596.00
Code OB Desc:		***North83:***	4811303.00
Open Hole:		***Org CS:***	UTM83
Cluster Kind:		***UTMRC:***	4
Date Completed:	23-Oct-2017 00:00:00	***UTMRC Desc:***	margin of error : 30 m - 100 m
Remarks:		***Location Method:***	gis
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	1006989637
Layer:	3
Color:	6
General Color:	BROWN
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	05
Mat2 Desc:	CLAY
Mat3:	
Mat3 Desc:	
Formation Top Depth:	20.0
Formation End Depth:	50.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1006989635
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	0.0
Formation End Depth:	15.0
Formation End Depth UOM:	ft

Overburden and Bedrock

Materials Interval

Formation ID:	1006989640
Layer:	6
Color:	2
General Color:	GREY
Mat1:	15
Most Common Material:	LIMESTONE
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	94.0
Formation End Depth:	103.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1006989638
Layer:	4
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	50.0
Formation End Depth:	90.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1006989636
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	12
Mat2 Desc:	STONES
Mat3:	
Mat3 Desc:	
Formation Top Depth:	15.0
Formation End Depth:	20.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	1006989639
Layer:	5
Color:	6
General Color:	BROWN
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	28
Mat2 Desc:	SAND
Mat3:	
Mat3 Desc:	

Formation Top Depth: 90.0
Formation End Depth: 94.0
Formation End Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1006989670
Layer: 2
Plug From:
Plug To:
Plug Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1006989669
Layer: 1
Plug From: 0.0
Plug To: 20.0
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 1006989668
Method Construction Code: B
Method Construction: Other Method
Other Method Construction: DUAL ROTARY

Pipe Information

Pipe ID: 1006989633
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1006989646
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From: 97.0
Depth To: 103.0
Casing Diameter:
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 1006989645
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From: -2.0
Depth To: 97.0
Casing Diameter: 6.125
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Screen

Screen ID:	1006989647
Layer:	
Slot:	
Screen Top Depth:	
Screen End Depth:	
Screen Material:	
Screen Depth UOM:	ft
Screen Diameter UOM:	inch
Screen Diameter:	

Results of Well Yield Testing

Pump Test ID:	1006989634
Pump Set At:	90.0
Static Level:	60.0
Final Level After Pumping:	62.599998474121094
Recommended Pump Depth:	90.0
Pumping Rate:	30.0
Flowing Rate:	
Recommended Pump Rate:	30.0
Levels UOM:	ft
Rate UOM:	GPM
Water State After Test Code:	1
Water State After Test:	CLEAR
Pumping Test Method:	0
Pumping Duration HR:	1
Pumping Duration MIN:	0
Flowing:	

Draw Down & Recovery

Pump Test Detail ID:	1006989650
Test Type:	Draw Down
Test Duration:	2
Test Level:	62.599998474121094
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1006989652
Test Type:	Draw Down
Test Duration:	3
Test Level:	62.599998474121094
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1006989661
Test Type:	Draw Down
Test Duration:	20
Test Level:	62.599998474121094
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	1006989662
Test Type:	Draw Down
Test Duration:	25
Test Level:	62.599998474121094

Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006989666
Test Type: Draw Down
Test Duration: 60
Test Level: 62.599998474121094
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006989658
Test Type: Draw Down
Test Duration: 10
Test Level: 62.599998474121094
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006989649
Test Type: Recovery
Test Duration: 1
Test Level: 62.400001525878906
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006989653
Test Type: Recovery
Test Duration: 3
Test Level: 62.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006989665
Test Type: Draw Down
Test Duration: 50
Test Level: 62.599998474121094
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006989648
Test Type: Draw Down
Test Duration: 1
Test Level: 62.400001525878906
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006989664
Test Type: Draw Down
Test Duration: 40
Test Level: 62.599998474121094
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006989656
Test Type: Draw Down
Test Duration: 5
Test Level: 62.599998474121094
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006989651
Test Type: Recovery
Test Duration: 2
Test Level: 62.20000076293945
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006989654
Test Type: Draw Down
Test Duration: 4
Test Level: 62.599998474121094
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006989655
Test Type: Recovery
Test Duration: 4
Test Level: 61.5
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006989657
Test Type: Recovery
Test Duration: 5
Test Level: 61.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006989660
Test Type: Draw Down
Test Duration: 15
Test Level: 62.599998474121094
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006989663
Test Type: Draw Down
Test Duration: 30
Test Level: 62.599998474121094
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 1006989659
Test Type: Recovery
Test Duration: 10

Test Level:	60.0
Test Level UOM:	ft

Water Details

Water ID:	1006989644
Layer:	1
Kind Code:	8
Kind:	Untested
Water Found Depth:	103.0
Water Found Depth UOM:	ft

Hole Diameter

Hole ID:	1006989643
Diameter:	6.0
Depth From:	97.0
Depth To:	103.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

Hole Diameter

Hole ID:	1006989641
Diameter:	10.0
Depth From:	0.0
Depth To:	20.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

Hole Diameter

Hole ID:	1006989642
Diameter:	6.125
Depth From:	20.0
Depth To:	97.0
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

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99 **1 of 1** **WSW/234.5** **315.4 / 4.59** **lot 31 con 7 ON** ***WWIS***

Well ID:	6702537	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	5/25/1959
Sec. Water Use:	0	**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	4208
Casing Material:		**Form Version:**	1
Audit No:		**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	07
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/670\6702537.pdf

Additional Detail(s) (Map)

Well Completed Date: 1959/05/05
Year Completed: 1959
Depth (m): 10.9728
Latitude: 43.4475020685224
Longitude: -80.1178307495542
Path: 670\6702537.pdf

Bore Hole Information

Bore Hole ID: 10466680
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 05-May-1959 00:00:00
Remarks:
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone: 17
East83: 571380.30
North83: 4810889.00
Org CS:
UTMRC: 5
UTMRC Desc: margin of error : 100 m - 300 m
Location Method: p5

Overburden and Bedrock Materials Interval

Formation ID: 932614245
Layer: 1
Color:
General Color:
Mat1: 05
Most Common Material: CLAY
Mat2: 11
Mat2 Desc: GRAVEL
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 30.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614247
Layer: 3
Color:
General Color:
Mat1: 11
Most Common Material: GRAVEL
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 34.0
Formation End Depth: 36.0

Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932614246
Layer: 2
Color:
General Color:
Mat1: 09
Most Common Material: MEDIUM SAND
Mat2: 11
Mat2 Desc: GRAVEL
Mat3:
Mat3 Desc:
Formation Top Depth: 30.0
Formation End Depth: 34.0
Formation End Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966702537
Method Construction Code: 1
Method Construction: Cable Tool
Other Method Construction:

Pipe Information

Pipe ID: 11015250
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930758957
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To: 36.0
Casing Diameter: 7.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996702537
Pump Set At:
Static Level: 12.0
Final Level After Pumping: 21.0
Recommended Pump Depth: 15.0
Pumping Rate: 20.0
Flowing Rate:
Recommended Pump Rate: 3.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 1
Pumping Duration HR: 1

Pumping Duration MIN: 0
Flowing: No

Water Details

Water ID: 933954875
Layer: 1
Kind Code: 1
Kind: FRESH
Water Found Depth: 34.0
Water Found Depth UOM: ft

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100 | ***1 of 1*** | ***WNW/241.9*** | ***325.0 / 14.16*** | ***lot 32 con 8 ON*** | ***WWIS***

Well ID: 6713456
Construction Date:
Primary Water Use: Domestic
Sec. Water Use:
Final Well Status: Water Supply
Water Type:
Casing Material:
Audit No: 220626
Tag:
Construction Method:
Elevation (m):
Elevation Reliability:
Depth to Bedrock:
Well Depth:
Overburden/Bedrock:
Pump Rate:
Static Water Level:
Flowing (Y/N):
Flow Rate:
Clear/Cloudy:

Data Entry Status:
Data Src: 1
Date Received: 9/18/2000
Selected Flag: TRUE
Abandonment Rec:
Contractor: 2663
Form Version: 1
Owner:
Street Name:
County: WELLINGTON
Municipality: PUSLINCH TOWNSHIP
Site Info:
Lot: 032
Concession: 08
Concession Name: CON
Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6713456.pdf

Additional Detail(s) (Map)

Well Completed Date: 2000/08/14
Year Completed: 2000
Depth (m): 21.336
Latitude: 43.4522889576261
Longitude: -80.1138963097814
Path: 671\6713456.pdf

Bore Hole Information

Bore Hole ID: 10477289
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 14-Aug-2000 00:00:00
Remarks:
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:

Elevation:
Elevrc:
Zone: 17
East83: 571693.00
North83: 4811424.00
Org CS: N83
UTMRC: 3
UTMRC Desc: margin of error : 10 - 30 m
Location Method:

Source Revision Comment:
Supplier Comment:

Overburden and Bedrock Materials Interval

Formation ID: 932662261
Layer: 2
Color:
General Color:
Mat1: 31
Most Common Material: COARSE GRAVEL
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 60.0
Formation End Depth: 70.0
Formation End Depth UOM: ft

Overburden and Bedrock Materials Interval

Formation ID: 932662260
Layer: 1
Color: 6
General Color: BROWN
Mat1: 05
Most Common Material: CLAY
Mat2: 12
Mat2 Desc: STONES
Mat3:
Mat3 Desc:
Formation Top Depth: 0.0
Formation End Depth: 60.0
Formation End Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 933211428
Layer: 1
Plug From: 0.0
Plug To: 20.0
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 966713456
Method Construction Code: 4
Method Construction: Rotary (Air)
Other Method Construction:

Pipe Information

Pipe ID: 11025859
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930777675
Layer: 2
Material:
Open Hole or Material:
Depth From:
Depth To:
Casing Diameter:
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Casing

Casing ID: 930777674
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To:
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996713456
Pump Set At:
Static Level: 46.0
Final Level After Pumping: 48.0
Recommended Pump Depth: 65.0
Pumping Rate: 11.0
Flowing Rate:
Recommended Pump Rate: 20.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 1
Pumping Duration HR: 1
Pumping Duration MIN:
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 934872410
Test Type: Draw Down
Test Duration: 45
Test Level: 48.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 935133465
Test Type: Draw Down
Test Duration: 60
Test Level: 48.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934355581

Test Type:	Draw Down
Test Duration:	15
Test Level:	48.0
Test Level UOM:	ft

Draw Down & Recovery

Pump Test Detail ID:	934620147
Test Type:	Draw Down
Test Duration:	30
Test Level:	48.0
Test Level UOM:	ft

Water Details

Water ID:	933968237
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	70.0
Water Found Depth UOM:	ft

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101 | ***1 of 1*** | ***WSW/245.4*** | ***313.3 / 2.50*** | ***lot 31 con 7 ON*** | ***WWIS***

Well ID:	6714286	**Data Entry Status:**	
Construction Date:		**Data Src:**	1
Primary Water Use:	Domestic	**Date Received:**	11/26/2002
Sec. Water Use:		**Selected Flag:**	TRUE
Final Well Status:	Water Supply	**Abandonment Rec:**	
Water Type:		**Contractor:**	4005
Casing Material:		**Form Version:**	1
Audit No:	241396	**Owner:**	
Tag:		**Street Name:**	
Construction Method:		**County:**	WELLINGTON
Elevation (m):		**Municipality:**	PUSLINCH TOWNSHIP
Elevation Reliability:		**Site Info:**	
Depth to Bedrock:		**Lot:**	031
Well Depth:		**Concession:**	07
Overburden/Bedrock:		**Concession Name:**	CON
Pump Rate:		**Easting NAD83:**	
Static Water Level:		**Northing NAD83:**	
Flowing (Y/N):		**Zone:**	
Flow Rate:		**UTM Reliability:**	
Clear/Cloudy:			

PDF URL (Map): https://d2khazk8e83rdv.cloudfront.net/moe_mapping/downloads/2Water/Wells_pdfs/671\6714286.pdf

Additional Detail(s) (Map)

Well Completed Date:	2002/11/14
Year Completed:	2002
Depth (m):	24.6888
Latitude:	43.4473409335576
Longitude:	-80.1179529701855
Path:	671\6714286.pdf

Bore Hole Information

Bore Hole ID:	10536493	**Elevation:**	
DP2BR:		**Elevrc:**	
Spatial Status:		**Zone:**	17

Code OB:		***East83:***	571370.60
Code OB Desc:		***North83:***	4810871.00
Open Hole:		***Org CS:***	
Cluster Kind:		***UTMRC:***	5
Date Completed:	14-Nov-2002 00:00:00	***UTMRC Desc:***	margin of error : 100 m - 300 m
Remarks:		***Location Method:***	gis
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			
Source Revision Comment:			
Supplier Comment:			

Overburden and Bedrock Materials Interval

Formation ID:	932902291
Layer:	3
Color:	6
General Color:	BROWN
Mat1:	28
Most Common Material:	SAND
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	
Mat3 Desc:	
Formation Top Depth:	30.0
Formation End Depth:	42.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932902293
Layer:	5
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	81
Mat3 Desc:	SANDY
Formation Top Depth:	75.0
Formation End Depth:	79.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932902289
Layer:	1
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	11
Mat2 Desc:	GRAVEL
Mat3:	81
Mat3 Desc:	SANDY
Formation Top Depth:	0.0
Formation End Depth:	15.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932902290
Layer:	2
Color:	6
General Color:	BROWN
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	15.0
Formation End Depth:	30.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932902294
Layer:	6
Color:	6
General Color:	BROWN
Mat1:	11
Most Common Material:	GRAVEL
Mat2:	28
Mat2 Desc:	SAND
Mat3:	
Mat3 Desc:	
Formation Top Depth:	79.0
Formation End Depth:	81.0
Formation End Depth UOM:	ft

Overburden and Bedrock Materials Interval

Formation ID:	932902292
Layer:	4
Color:	2
General Color:	GREY
Mat1:	05
Most Common Material:	CLAY
Mat2:	
Mat2 Desc:	
Mat3:	
Mat3 Desc:	
Formation Top Depth:	42.0
Formation End Depth:	75.0
Formation End Depth UOM:	ft

Method of Construction & Well Use

Method Construction ID:	966714286
Method Construction Code:	5
Method Construction:	Air Percussion
Other Method Construction:	

Pipe Information

Pipe ID: 11085063
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930778933
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From:
Depth To:
Casing Diameter: 6.0
Casing Diameter UOM: inch
Casing Depth UOM: ft

Results of Well Yield Testing

Pump Test ID: 996714286
Pump Set At:
Static Level: 34.0
Final Level After Pumping: 65.0
Recommended Pump Depth:
Pumping Rate: 12.0
Flowing Rate:
Recommended Pump Rate:
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code:
Water State After Test:
Pumping Test Method: 1
Pumping Duration HR: 1
Pumping Duration MIN: 0
Flowing: No

Draw Down & Recovery

Pump Test Detail ID: 935136178
Test Type: Recovery
Test Duration: 60
Test Level: 34.0
Test Level UOM: ft

Draw Down & Recovery

Pump Test Detail ID: 934357891
Test Type: Recovery
Test Duration: 15
Test Level: 34.0
Test Level UOM: ft

Water Details

Water ID: 934029969
Layer: 1
Kind Code: 5
Kind: Not stated
Water Found Depth: 81.0
Water Found Depth UOM: ft

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
102	1 of 1	W/249.5	326.9 / 16.00	Makhan Singh Jassal No Municipal Address PUSLINCH ON	RSC

RSC ID:	100318	**Cert Date:**	3-Dec-10
RA No:		**Cert Prop Use No:**	No CPU
RSC Type:		**Intended Prop Use:**	Residential
Curr Property Use:	Agriculture/Other	**Qual Person Name:**	
Ministry District:	PUSLINCH	**Stratified (Y/N):**	
Filing Date:	31-May-11	**Audit (Y/N):**	
Date Ack:		**Entire Leg Prop. (Y/N):**	Yes
Date Returned:		**Accuracy Estimate:**	0 to 1 meters
Restoration Type:		**Telephone:**	519-7604224
Soil Type:		**Fax:**	519-7800605
Criteria:		**Email:**	hu0299@hotmail.com
CPU Issued Sect 1686:	No		

Asmt Roll No: 23 01 000 005 08700 0000
Prop ID No (PIN): 71195-0316 (LT)
Property Municipal Address: No Municipal Address
Mailing Address: 4360 Guildwood Way, Mississauga, Ontario L5R 2A6
Latitude & Latitude: 43.45112120N 80.11542120W (converted from UTM)
UTM Coordinates: NAD83 17-571571-4811293
Consultant:
Legal Desc: PART OF LOTS OF 68, 69, 75, 76, 77, 103, 104, 105, 106, 107, 112 & 131, ALL OF LOTS 72, 73, 74, 108, 109, 110, 111, 132, 133, 134 & 135, AND PART OF MARY STREET, JAMES STREET, HILL STREET AND NORTH STREET (ALL THESE STREETS BEING PERMANENTLY CLOSED BY COURT ORDER (2522/01) REGISTERED AS INSTRUMENT LT60470), JOHN McEDWARD'S PORTION, REGISTERED PLAN 135, FORMERLY VILLAGE OF MORRISTON AND PART OF LOT 30, CONCESSION 8, TOWNSHIP OF PUSLINCH, COUNTY OF WELLINGTON, BEING PART 1 ON REFERENCE PLAN 61R-10929 as in PIN 71195-0316 (LT)
Measurement Method: Digitized from a map
Applicable Standards: Full Depth Site Conditions Standard, with Potable Ground Water, Coarse Textured Soil, for Residential/Parkland/Institutional property use
RSC PDF:

Unplottable Summary

Total: 38 Unplottable sites

DB	Company Name/Site Name	Address	City	Postal
CA	The Corporation of the Township of Centre Wellington	Church Street St Elora	Centre Wellington ON	
CA	WELLINGTON VILLAGE	MAIN STREET	WELLINGTON VILL. ON	
DTNK	THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD	LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA	ON	
DTNK	BOUCHER & JONES INC	LOT 30 CON 7 HWY 6 PUSLINCH TWP	MORRISTON ON	
DTNK	HUETHERS GARAGE LTD	LOT 30 CON 7 HWY 6 PUSLINCH TWP	MORRISTON ON	N0B 2C0
DTNK	SUNCOR ENERGY PRODUCTS INC	MAIN ST HWY 33 WELLINGTON ON CA	ON	
DTNK	THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD	LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA	ON	
DTNK	THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD	LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA	ON	
DTNK	THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD	LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA	ON	
DTNK	THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD	LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA	ON	
EXP		LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0	ON	
EXP		LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0	ON	
EXP		LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0	ON	
FST	THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD	LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA	ON	
FST	THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD	LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA	ON	
FST	THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD	LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA	ON	

FST	THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD	LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA	ON	
FST	THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD	LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA	ON	
GEN	TCG MATERIALS (SEE & USE ON0346409)	HWY 6, EAST OF COUNTY ROAD 34	PUSCHLINCH TWP. ON	N3C 2V4
GEN	TCG MATERIALS LIMITED	HWY 6, EAST OF COUNTY ROAD 34	PUSCHLINCH TWP. ON	N3C 2V4
GEN	TCG MATERIALS (SEE & USE ON0346409)	HWY 6, EAST OF COUNTY ROAD 34	PUSCHLINCH TWP. ON	N3C 2V4
GEN	UPI INC.	LOT 30, CONC. 7 HWY 6 SOUTH	PULINCH TOWNSHIP ON	N0R 2C0
GEN	UPI INC.	LOT 30, CONCESSION 7 HIGHWAY 6 SOUTH	PUSLINCH TOWNSHIP ON	N0R 2C0
GEN	UPI ENERGY LP	LOT 30, CONCESSION 7 HIGHWAY 6 SOUTH	PUSLINCH TOWNSHIP ON	N0R 2C0
LIMO	Police Village of Morriston The Corporation of the County of Wellington	Township of Puslinch Concession 8 Lot 30; 60m Northof intersection of Back and Badenoch Wellington	ON	
PRT	TWP OF PUSLINCH	CON 7 REAR PRT 20	PUSLINCH TWP ON	
PRT	HUETHERS GARAGE LTD	LOT 30 CON 7 MORRISTON	PUSLINCH ON	
PRT	W SZAJNOWSKI WESTLAKE VARIETY	LOT 31 CON 7 HWY 6	MORRISTON ON	
PRT	CLIVE HARDING	LOT 30 CON 7	MORRISON TWP ON	
SPL	Clarkway Construction Limited	4 KM EAST OF HWY 6 SOUTH, EASTBOUND 401<UNOFFICIAL>	Puslinch ON	
SPL	Inkoor Trucking Inc<UNOFFICIAL>	west of Hwy 6	Puslinch ON	
SPL	TRANSPORT TRUCK	AT GRAVEL PIT 1/2 KM WEST OF HWY. 6 MOTOR VEHICLE (OPERATING FLUID)	PUSLINCH TOWNSHIP ON	
SPL	SAFETY-KLEEN CANADA INC.	HIGHWAY 6, CONC 8. TRANSPORT TRUCK (CARGO)	CENTRE WELLINGTON TOWNSHIP ON	
SPL	HYDRO ONE	LOT WEST HALF 7 CON. 7, WEST LUTHER TWP. TRANSFORMER	WELLINGTON COUNTY ON	
SPL	Union Gas Limited		Puslinch ON	
SPL	A. CAPETO	HWY #6 TRANSPORT TRUCK (CARGO)	PUSLINCH TWP. ON	
WWIS		lot 30 con 8	MORRISTON ON	
WWIS		BADENOCH STREET	MORRISTON ON	

Unplottable Report

Site: *The Corporation of the Township of Centre Wellington*
Church Street St Elora Centre Wellington ON

Database: *CA*

Certificate #:	1523-7UFJRJ
Application Year:	2009
Issue Date:	8/6/2009
Approval Type:	Municipal and Private Sewage Works
Status:	Approved
Application Type:	
Client Name:	
Client Address:	
Client City:	
Client Postal Code:	
Project Description:	
Contaminants:	
Emission Control:	

Site: *WELLINGTON VILLAGE*
MAIN STREET WELLINGTON VILL. ON

Database: *CA*

Certificate #:	7-0375-87-
Application Year:	87
Issue Date:	6/25/1987
Approval Type:	Municipal water
Status:	Approved
Application Type:	
Client Name:	
Client Address:	
Client City:	
Client Postal Code:	
Project Description:	
Contaminants:	
Emission Control:	

Site: *THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD*
LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA ON

Database: *DTNK*

Site: *BOUCHER & JONES INC*
LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON ON

Database: *DTNK*

Delisted Expired Fuel Safety Facilities

Instance No:	10139962	***Expired Date:***	
Status:	EXPIRED	***Max Hazard Rank:***	
Instance ID:	12620	***Facility Location:***	
Instance Type:	FS Facility	***Facility Type:***	
Instance Creation Dt:		***Fuel Type 2:***	
Instance Install Dt:		***Fuel Type 3:***	
Item Description:		***Panam Related:***	
Manufacturer:		***Panam Venue Nm:***	
Model:		***External Identifier:***	
Serial No:		***Item:***	

ULC Standard:
Quantity:
Unit of Measure:
Overfill Prot Type:
Creation Date:
Next Periodic Str DT:
TSSA Base Sched Cycle 2:
TSSAMax Hazard Rank 1:
TSSA Risk Based Periodic Yn:
TSSA Volume of Directives:
TSSA Periodic Exempt:
TSSA Statutory Interval:
TSSA Recd Insp Interva:
TSSA Recd Tolerance:
TSSA Program Area:
TSSA Program Area 2:
Description: FS Gasoline Station - Card/Keylock
Original Source: EXP
Record Date: Up to Mar 2012

Piping Steel:
Piping Galvanized:
Tank Single Wall St:
Piping Underground:
Tank Underground:
Source:

Site: ***HUETHERS GARAGE LTD***
LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON ON N0B 2C0

Database: ***DTNK***

Delisted Expired Fuel Safety Facilities

Instance No: 9857775
Status: EXPIRED
Instance ID:
Instance Type: FS Facility
Instance Creation Dt:
Instance Install Dt:
Item Description:
Manufacturer:
Model:
Serial No:
ULC Standard:
Quantity:
Unit of Measure:
Overfill Prot Type:
Creation Date:
Next Periodic Str DT:
TSSA Base Sched Cycle 2:
TSSAMax Hazard Rank 1:
TSSA Risk Based Periodic Yn:
TSSA Volume of Directives:
TSSA Periodic Exempt:
TSSA Statutory Interval:
TSSA Recd Insp Interva:
TSSA Recd Tolerance:
TSSA Program Area:
TSSA Program Area 2:
Description:
Original Source: EXP
Record Date: Up to May 2013

Expired Date: 7/3/1996
Max Hazard Rank:
Facility Location:
Facility Type:
Fuel Type 2:
Fuel Type 3:
Panam Related:
Panam Venue Nm:
External Identifier:
Item:
Piping Steel:
Piping Galvanized:
Tank Single Wall St:
Piping Underground:
Tank Underground:
Source:

Site: ***SUNCOR ENERGY PRODUCTS INC***
MAIN ST HWY 33 WELLINGTON ON CA ON

Database: ***DTNK***

Site: ***THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD***
LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA ON

Database: ***DTNK***

Site: ***THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD***
LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA ON

Database: DTNK

Site: ***THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD***
LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA ON

Database: DTNK

Site: ***THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD***
LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA ON

Database: DTNK

Site:
LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON

Database: EXP

Instance No:	10168146	***Model:***	
Status:	Expired-No Env Recd	***Quantity:***	
Instance ID:		***Unit of Measure:***	
Instance Type:		***Fuel Type2:***	
Instance Creation Dt:		***Fuel Type3:***	
Instance Install Dt:		***Piping Steel:***	2
Item:	FS GASOLINE STATION - SELF SERVE	***Piping Galvanized:***	0
Item Description:		***Tank Single Wall St:***	0
Facility Type:	FS Piping	***Piping Underground:***	2
Overfill Prot Type:		***Tank Underground:***	0
Creation Date:		***Panam Related:***	
Expired Date:		***Panam Venue Nm:***	
Manufacturer:			
Description:			
Serial No:			
Ulc Standard:			
Facility Location:	LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0		
Source:	FS Expired Facilities		

Site:
LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON

Database: EXP

Instance No:	10168146	***Model:***	
Status:	Expired-No Env Recd	***Quantity:***	
Instance ID:		***Unit of Measure:***	
Instance Type:		***Fuel Type2:***	
Instance Creation Dt:		***Fuel Type3:***	
Instance Install Dt:		***Piping Steel:***	0
Item:	FS GASOLINE STATION - SELF SERVE	***Piping Galvanized:***	0
Item Description:		***Tank Single Wall St:***	0
Facility Type:	FS Liquid Fuel Tank	***Piping Underground:***	0
Overfill Prot Type:		***Tank Underground:***	5
Creation Date:		***Panam Related:***	
Expired Date:		***Panam Venue Nm:***	
Manufacturer:			
Description:			
Serial No:			
Ulc Standard:			
Facility Location:	LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0		
Source:	FS Expired Facilities		

Site:
LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON

Database: EXP

Instance No:	10168146	***Model:***	
Status:	Expired-No Env Recd	***Quantity:***	
Instance ID:		***Unit of Measure:***	
Instance Type:		***Fuel Type2:***	
Instance Creation Dt:		***Fuel Type3:***	

Instance Install Dt:		***Piping Steel:***	2
Item:	FS GASOLINE STATION - SELF SERVE	***Piping Galvanized:***	0
Item Description:		***Tank Single Wall St:***	0
Facility Type:		***Piping Underground:***	2
Overfill Prot Type:		***Tank Underground:***	5
Creation Date:		***Panam Related:***	
Expired Date:		***Panam Venue Nm:***	
Manufacturer:			
Description:			
Serial No:			
Ulc Standard:			
Facility Location:	LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0		
Source:	FS All Facility		

Site: ***THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD***
LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA ON

Database: ***FST***

Instance No:	11470163	***Manufacturer:***	
Status:		***Serial No:***	
Cont Name:		***Ulc Standard:***	
Instance Type:	FS Liquid Fuel Tank	***Quantity:***	
Item:	FS LIQUID FUEL TANK	***Unit of Measure:***	
Item Description:	FS Liquid Fuel Tank	***Fuel Type:***	Gasoline
Tank Type:	Single Wall UST	***Fuel Type2:***	NULL
Install Date:	5/27/2009	***Fuel Type3:***	NULL
Install Year:	1988	***Piping Steel:***	
Years in Service:		***Piping Galvanized:***	
Model:	NULL	***Tanks Single Wall St:***	
Description:		***Piping Underground:***	
Capacity:	13600	***Num Underground:***	
Tank Material:	Fiberglass (FRP)	***Panam Related:***	
Corrosion Protect:		***Panam Venue:***	
Overfill Protect:			
Facility Type:	FS Liquid Fuel Tank		
Parent Facility Type:	FS GASOLINE STATION - SELF SERVE		
Facility Location:			
Device Installed Location:	LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA		

Fuel Storage Tank Details

Owner Account Name:	THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD

Liquid Fuel Tank Details

Overfill Protection:	
Owner Account Name:	THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD
Item:	FS LIQUID FUEL TANK

Site: ***THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD***
LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA ON

Database: ***FST***

Instance No:	11470104	***Manufacturer:***	
Status:		***Serial No:***	
Cont Name:		***Ulc Standard:***	
Instance Type:	FS Liquid Fuel Tank	***Quantity:***	
Item:	FS LIQUID FUEL TANK	***Unit of Measure:***	
Item Description:	FS Liquid Fuel Tank	***Fuel Type:***	Gasoline
Tank Type:	Single Wall UST	***Fuel Type2:***	NULL
Install Date:	5/27/2009	***Fuel Type3:***	NULL
Install Year:	1988	***Piping Steel:***	
Years in Service:		***Piping Galvanized:***	
Model:	NULL	***Tanks Single Wall St:***	
Description:		***Piping Underground:***	
Capacity:	36300	***Num Underground:***	
Tank Material:	Fiberglass (FRP)	***Panam Related:***	

Corrosion Protect: ***Panam Venue:***
Overfill Protect:
Facility Type: FS Liquid Fuel Tank
Parent Facility Type: FS GASOLINE STATION - SELF SERVE
Facility Location:
Device Installed Location: LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA

Fuel Storage Tank Details

Owner Account Name: THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD

Liquid Fuel Tank Details

Overfill Protection:
Owner Account Name: THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD
Item: FS LIQUID FUEL TANK

Site: ***THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD***
LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA ON

Database: ***FST***

Instance No: 11470126
Status:
Cont Name:
Instance Type: FS Liquid Fuel Tank
Item: FS LIQUID FUEL TANK
Item Description: FS Liquid Fuel Tank
Tank Type: Single Wall UST
Install Date: 5/27/2009
Install Year: 1988
Years in Service:
Model: NULL
Description:
Capacity: 13600
Tank Material: Fiberglass (FRP)
Corrosion Protect:
Overfill Protect:
Manufacturer:
Serial No:
Ulc Standard:
Quantity:
Unit of Measure:
Fuel Type: Gasoline
Fuel Type2: NULL
Fuel Type3: NULL
Piping Steel:
Piping Galvanized:
Tanks Single Wall St:
Piping Underground:
Num Underground:
Panam Related:
Panam Venue:
Facility Type: FS Liquid Fuel Tank
Parent Facility Type: FS GASOLINE STATION - SELF SERVE
Facility Location:
Device Installed Location: LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA

Fuel Storage Tank Details

Owner Account Name: THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD

Liquid Fuel Tank Details

Overfill Protection:
Owner Account Name: THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD
Item: FS LIQUID FUEL TANK

Site: ***THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD***
LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA ON

Database: ***FST***

Instance No: 11470178
Status:
Cont Name:
Instance Type: FS Liquid Fuel Tank
Item: FS LIQUID FUEL TANK
Item Description: FS Liquid Fuel Tank
Tank Type: Single Wall UST
Install Date: 5/27/2009
Install Year: 1988
Years in Service:
Manufacturer:
Serial No:
Ulc Standard:
Quantity:
Unit of Measure:
Fuel Type: Gasoline
Fuel Type2: NULL
Fuel Type3: NULL
Piping Steel:
Piping Galvanized:

Model:	NULL	***Tanks Single Wall St:***	
Description:		***Piping Underground:***	
Capacity:	36300	***Num Underground:***	
Tank Material:	Fiberglass (FRP)	***Panam Related:***	
Corrosion Protect:		***Panam Venue:***	
Overfill Protect:			

Facility Type: FS Liquid Fuel Tank
Parent Facility Type: FS GASOLINE STATION - SELF SERVE
Facility Location:
Device Installed Location: LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA

Fuel Storage Tank Details

Owner Account Name: THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD

Liquid Fuel Tank Details

Overfill Protection:
Owner Account Name: THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD
Item: FS LIQUID FUEL TANK

Site: ***THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD***
LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA ON

Database: ***FST***

Instance No:	11470146	***Manufacturer:***	
Status:		***Serial No:***	
Cont Name:		***Ulc Standard:***	
Instance Type:	FS Liquid Fuel Tank	***Quantity:***	
Item:	FS LIQUID FUEL TANK	***Unit of Measure:***	
Item Description:	FS Liquid Fuel Tank	***Fuel Type:***	Gasoline
Tank Type:	Single Wall UST	***Fuel Type2:***	NULL
Install Date:	5/27/2009	***Fuel Type3:***	NULL
Install Year:	1988	***Piping Steel:***	
Years in Service:		***Piping Galvanized:***	
Model:	NULL	***Tanks Single Wall St:***	
Description:		***Piping Underground:***	
Capacity:	13600	***Num Underground:***	
Tank Material:	Fiberglass (FRP)	***Panam Related:***	
Corrosion Protect:		***Panam Venue:***	
Overfill Protect:			

Facility Type: FS Liquid Fuel Tank
Parent Facility Type: FS GASOLINE STATION - SELF SERVE
Facility Location:
Device Installed Location: LOT 30 CON 7 HWY 6 PUSLINCH TWP MORRISTON N0B 2C0 ON CA

Fuel Storage Tank Details

Owner Account Name: THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD

Liquid Fuel Tank Details

Overfill Protection:
Owner Account Name: THE MORRISTON VILLAGE STORE 953464 ONTARIO LTD
Item: FS LIQUID FUEL TANK

Site: ***TCG MATERIALS (SEE & USE ON0346409)***
HWY 6, EAST OF COUNTY ROAD 34 PUSCHLINCH TWP. ON N3C 2V4

Database: ***GEN***

Generator No:	ON0683404	***Status:***	
SIC Code:	0821	***Co Admin:***	
SIC Description:	SAND & GRAVEL PITS	***Choice of Contact:***	
Approval Years:	99	***Phone No Admin:***	
PO Box No:		***Contam. Facility:***	
Country:		***MHSW Facility:***	

Detail(s)

Waste Class: 213
Waste Class Desc: PETROLEUM DISTILLATES

Waste Class: 252
Waste Class Desc: WASTE OILS & LUBRICANTS

Site: ***TCG MATERIALS LIMITED***
HWY 6, EAST OF COUNTY ROAD 34 PUSCHLINCH TWP. ON N3C 2V4

Database: ***GEN***

Generator No: ON0683404
SIC Code: 0821
SIC Description: SAND & GRAVEL PITS
Approval Years: 92,93,97
PO Box No:
Country:

Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contam. Facility:
MHSW Facility:

Detail(s)

Waste Class: 213
Waste Class Desc: PETROLEUM DISTILLATES

Waste Class: 252
Waste Class Desc: WASTE OILS & LUBRICANTS

Site: ***TCG MATERIALS (SEE & USE ON0346409)***
HWY 6, EAST OF COUNTY ROAD 34 PUSCHLINCH TWP. ON N3C 2V4

Database: ***GEN***

Generator No: ON0683404
SIC Code: 0821
SIC Description: SAND & GRAVEL PITS
Approval Years: 98
PO Box No:
Country:

Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contam. Facility:
MHSW Facility:

Detail(s)

Waste Class: 252
Waste Class Desc: WASTE OILS & LUBRICANTS

Waste Class: 213
Waste Class Desc: PETROLEUM DISTILLATES

Site: ***UPI INC.***
LOT 30, CONC. 7 HWY 6 SOUTH PULINCH TOWNSHIP ON N0R 2C0

Database: ***GEN***

Generator No: ON2125417
SIC Code: 5111
SIC Description: PETROLEUM PROD., WH.
Approval Years: 96,97,98
PO Box No:
Country:

Status:
Co Admin:
Choice of Contact:
Phone No Admin:
Contam. Facility:
MHSW Facility:

Detail(s)

Waste Class: 221
Waste Class Desc: LIGHT FUELS

Site: ***UPI INC.***
LOT 30, CONCESSION 7 HIGHWAY 6 SOUTH PUSLINCH TOWNSHIP ON N0R 2C0

Database: ***GEN***

Generator No:	ON2125417	***Status:***	
SIC Code:	5111	***Co Admin:***	
SIC Description:	PETROLEUM PROD., WH.	***Choice of Contact:***	
Approval Years:	99,00,01,02,03	***Phone No Admin:***	
PO Box No:		***Contam. Facility:***	
Country:		***MHSW Facility:***	

Detail(s)

Waste Class:	221
Waste Class Desc:	LIGHT FUELS

Site: ***UPI ENERGY LP***
LOT 30, CONCESSION 7 HIGHWAY 6 SOUTH PUSLINCH TOWNSHIP ON N0R 2C0

Database: ***GEN***

Generator No:	ON2125417	***Status:***	
SIC Code:	447110	***Co Admin:***	
SIC Description:	Gasoline Stations with Convenience Stores	***Choice of Contact:***	
Approval Years:	04	***Phone No Admin:***	
PO Box No:		***Contam. Facility:***	
Country:		***MHSW Facility:***	

Detail(s)

Waste Class:	221
Waste Class Desc:	LIGHT FUELS

Site: ***Police Village of Morriston The Corporation of the County of Wellington***
Township of Puslinch Concession 8 Lot 30; 60m Northof intersection of Back and Badenoch Wellington ON

Database: ***LIMO***

ECA/Instrument No:	A175501	***Natural Attenuation:***	
Oper Status 2016:	Closed	***Liners:***	
C of A Issue Date:		***Cover Material:***	
C of A Issued to:		***Leachate Off-Site:***	
Lndfl Gas Mgmt (P):		***Leachate On Site:***	
Lndfl Gas Mgmt (F):		***Req Coll Lndfll Gas:***	
Lndfl Gas Mgmt (E):		***Lndfll Gas Coll:***	
Lndfl Gas Mgmt Sys:		***Total Waste Rec:***	
Landfill Gas Mntr:		***TWR Methodology:***	
Leachate Coll Sys:		***TWR Unit:***	
ERC Est Vol (m3):		***Tot Aprv Cap Unit:***	
ERC Volume Unit:		***Financial Assurance:***	
ERC Dt Last Det:		***Last Report Year:***	
Landfill Type:		***MOE Region:***	
Source File Type:		***MOE District:***	
Fill Rate:		***Site County:***	
Fill Rate Unit:		***Lot:***	
Tot Fill Area (ha):		***Concession:***	
Tot Site Area (ha):		***Latitude:***	
Footprint:		***Longitude:***	
Tot Apprv Cap (m3):		***Easting:***	
Contam Atten Zone:		***Northing:***	
Grndwtr Mntr:		***UTM Zone:***	
Surf Wtr Mntr:		***Data Source:***	
Air Emis Monitor:			
Approved Waste Type:			
Client Site Name:			
ERC Methodology:			
Site Name:	Police Village of Morriston The Corporation of the County of Wellington Township of Puslinch		
Site Location Details:			
Service Area:			
Page URL:			

Site: ***TWP OF PUSLINCH***
CON 7 REAR PRT 20 PUSLINCH TWP ON

Database: ***PRT***

Location ID: 12141
Type: private
Expiry Date:
Capacity (L): 9000.00
Licence #: 0001033272

Site: ***HUETHERS GARAGE LTD***
LOT 30 CON 7 MORRISTON PUSLINCH ON

Database: ***PRT***

Location ID: 17661
Type: retail
Expiry Date: 1995-06-30
Capacity (L): 113650
Licence #: 0060006001

Site: ***W SZAJNOWSKI WESTLAKE VARIETY***
LOT 31 CON 7 HWY 6 MORRISTON ON

Database: ***PRT***

Location ID: 9403
Type: retail
Expiry Date: 1991-08-31
Capacity (L): 0
Licence #: 0026123001

Site: ***CLIVE HARDING***
LOT 30 CON 7 MORRISON TWP ON

Database: ***PRT***

Location ID: 9398
Type: retail
Expiry Date: 1991-03-31
Capacity (L): 0
Licence #: 0015735001

Site: ***Clarkway Construction Limited***
4 KM EAST OF HWY 6 SOUTH, EASTBOUND 401<UNOFFICIAL> Puslinch ON

Database: ***SPL***

Ref No: 3783-6RLUUC
Site No:
Incident Dt: 7/11/2006
Year:
Incident Cause: Other Transport Accident
Incident Event:
Contaminant Code: 13
Contaminant Name: DIESEL FUEL
Contaminant Limit 1:
Contam Limit Freq 1:
Contaminant UN No 1:
Environment Impact: Possible
Nature of Impact: Soil Contamination
Receiving Medium: Land
Receiving Env:
MOE Response:
Dt MOE Arvl on Scn:
MOE Reported Dt: 7/11/2006
Dt Document Closed:
Incident Reason: Other - Reason not otherwise defined
Site Name:
Site County/District:
Site Geo Ref Meth:

Discharger Report:
Material Group: Oils
Health/Env Conseq:
Client Type:
Sector Type: Transport Truck
Agency Involved:
Nearest Watercourse:
Site Address:
Site District Office: Guelph
Site Postal Code:
Site Region:
Site Municipality: Puslinch
Site Lot:
Site Conc:
Northing:
Easting:
Site Geo Ref Accu:
Site Map Datum:
SAC Action Class:
Source Type:

Incident Summary: MVA Hwy. 401 eastbound, diesel to CB
Contaminant Qty: Not Specifed

Site: ***Inkoor Trucking Inc<UNOFFICIAL>***
west of Hwy 6 Puslinch ON

Database: ***SPL***

Ref No:	0001-85TJ2S	***Discharger Report:***	
Site No:		***Material Group:***	
Incident Dt:		***Health/Env Conseq:***	
Year:		***Client Type:***	
Incident Cause:	Overflow (Tanks Lagoons)	***Sector Type:***	Transport Truck
Incident Event:		***Agency Involved:***	
Contaminant Code:	15	***Nearest Watercourse:***	
Contaminant Name:	HYDRAULIC OIL	***Site Address:***	
Contaminant Limit 1:		***Site District Office:***	
Contam Limit Freq 1:		***Site Postal Code:***	
Contaminant UN No 1:		***Site Region:***	
Environment Impact:	Confirmed	***Site Municipality:***	
Nature of Impact:	Soil Contamination	***Site Lot:***	
Receiving Medium:		***Site Conc:***	
Receiving Env:		***Northing:***	
MOE Response:	Planned Field Response	***Easting:***	
Dt MOE Arvl on Scn:		***Site Geo Ref Accu:***	
MOE Reported Dt:	5/26/2010	***Site Map Datum:***	
Dt Document Closed:	6/25/2010	***SAC Action Class:***	Land Spills
Incident Reason:	Equipment/Vehicles	***Source Type:***	
Site Name:	Wellington Rd 34<UNOFFICIAL>		
Site County/District:			
Site Geo Ref Meth:			
Incident Summary:	Wellington Rd 34 - 40 L hydraulic fuel to gravel		
Contaminant Qty:	40 L		

Site: ***TRANSPORT TRUCK***
AT GRAVEL PIT 1/2 KM WEST OF HWY. 6 MOTOR VEHICLE (OPERATING FLUID) PUSLINCH TOWNSHIP ON

Database: ***SPL***

Ref No:	159019	***Discharger Report:***	
Site No:		***Material Group:***	
Incident Dt:	8/14/1998	***Health/Env Conseq:***	
Year:		***Client Type:***	
Incident Cause:	OTHER CONTAINER LEAK	***Sector Type:***	
Incident Event:		***Agency Involved:***	
Contaminant Code:		***Nearest Watercourse:***	
Contaminant Name:		***Site Address:***	
Contaminant Limit 1:		***Site District Office:***	
Contam Limit Freq 1:		***Site Postal Code:***	
Contaminant UN No 1:		***Site Region:***	
Environment Impact:	POSSIBLE	***Site Municipality:***	75612
Nature of Impact:	Soil contamination	***Site Lot:***	
Receiving Medium:	LAND	***Site Conc:***	
Receiving Env:		***Northing:***	
MOE Response:		***Easting:***	OPP, MTO
Dt MOE Arvl on Scn:		***Site Geo Ref Accu:***	
MOE Reported Dt:	8/14/1998	***Site Map Datum:***	
Dt Document Closed:		***SAC Action Class:***	
Incident Reason:	EQUIPMENT FAILURE	***Source Type:***	
Site Name:			
Site County/District:			
Site Geo Ref Meth:			
Incident Summary:	COX FARMS - 450 L OF DIESEL FUEL TO HWY. 6 & GROUND FROM SADDLE TANKS.		
Contaminant Qty:			

Site: ***SAFETY-KLEEN CANADA INC.***
HIGHWAY 6, CONC 8. TRANSPORT TRUCK (CARGO) CENTRE WELLINGTON TOWNSHIP ON

Database: ***SPL***

Ref No:	173547	***Discharger Report:***	
Site No:		***Material Group:***	
Incident Dt:	10/7/1999	***Health/Env Conseq:***	
Year:		***Client Type:***	
Incident Cause:	OTHER CONTAINER LEAK	***Sector Type:***	
Incident Event:		***Agency Involved:***	
Contaminant Code:		***Nearest Watercourse:***	
Contaminant Name:		***Site Address:***	
Contaminant Limit 1:		***Site District Office:***	
Contam Limit Freq 1:		***Site Postal Code:***	
Contaminant UN No 1:		***Site Region:***	
Environment Impact:	POSSIBLE	***Site Municipality:***	75614
Nature of Impact:	Other	***Site Lot:***	
Receiving Medium:	LAND	***Site Conc:***	
Receiving Env:		***Northing:***	
MOE Response:		***Easting:***	
Dt MOE Arvl on Scn:		***Site Geo Ref Accu:***	
MOE Reported Dt:	10/7/1999	***Site Map Datum:***	
Dt Document Closed:		***SAC Action Class:***	
Incident Reason:	MATERIAL FAILURE	***Source Type:***	
Site Name:			
Site County/District:			
Site Geo Ref Meth:			
Incident Summary:	SAFETY KLEEN CANADA:TRUCK SPILLED 24 L SOLVENT TO ROAD. EVAPORATED.		
Contaminant Qty:			

Site: ***HYDRO ONE***
LOT WEST HALF 7 CON. 7, WEST LUTHER TWP. TRANSFORMER WELLINGTON COUNTY ON

Database: ***SPL***

Ref No:	233878	***Discharger Report:***	
Site No:		***Material Group:***	
Incident Dt:	7/29/2002	***Health/Env Conseq:***	
Year:		***Client Type:***	
Incident Cause:	COOLING SYSTEM LEAK	***Sector Type:***	
Incident Event:		***Agency Involved:***	
Contaminant Code:		***Nearest Watercourse:***	
Contaminant Name:		***Site Address:***	
Contaminant Limit 1:		***Site District Office:***	
Contam Limit Freq 1:		***Site Postal Code:***	
Contaminant UN No 1:		***Site Region:***	
Environment Impact:	POSSIBLE	***Site Municipality:***	75000
Nature of Impact:	Soil contamination	***Site Lot:***	
Receiving Medium:	LAND	***Site Conc:***	
Receiving Env:		***Northing:***	
MOE Response:		***Easting:***	
Dt MOE Arvl on Scn:		***Site Geo Ref Accu:***	
MOE Reported Dt:	7/30/2002	***Site Map Datum:***	
Dt Document Closed:		***SAC Action Class:***	
Incident Reason:	OTHER	***Source Type:***	
Site Name:			
Site County/District:			
Site Geo Ref Meth:			
Incident Summary:	HYDRO ONE:TRANSFORMER LEAKED 30L OF TRANSFORMER OIL TO GROUND.		
Contaminant Qty:			

Site: ***Union Gas Limited***
Puslinch ON

Database: ***SPL***

Ref No:	7325-9LCL2R	***Discharger Report:***	
Site No:	NA	***Material Group:***	
Incident Dt:	2014/06/23	***Health/Env Conseq:***	
Year:		***Client Type:***	
Incident Cause:	Leak/Break	***Sector Type:***	Pipeline/Components
Incident Event:		***Agency Involved:***	
Contaminant Code:	35	***Nearest Watercourse:***	
Contaminant Name:	NATURAL GAS (METHANE)	***Site Address:***	

Contaminant Limit 1:		***Site District Office:***	
Contam Limit Freq 1:		***Site Postal Code:***	
Contaminant UN No 1:		***Site Region:***	
Environment Impact:	Not Anticipated	***Site Municipality:***	Puslinch
Nature of Impact:	Air Pollution	***Site Lot:***	
Receiving Medium:		***Site Conc:***	
Receiving Env:		***Northing:***	
MOE Response:	Not Moe mandate	***Easting:***	
Dt MOE Arvl on Scn:		***Site Geo Ref Accu:***	
MOE Reported Dt:	2014/06/23	***Site Map Datum:***	
Dt Document Closed:	2014/07/15	***SAC Action Class:***	TSSA - Fuel Safety Branch - Hydrocarbon Fuel Release/Spill
Incident Reason:	Operator/Human Error	***Source Type:***	
Site Name:	8 Nicholas Beaver Road<UNOFFICIAL>		
Site County/District:			
Site Geo Ref Meth:			
Incident Summary:	TSSA: 1.25 inch damage, made safe		
Contaminant Qty:	0 other - see incident description		

Site: ***A. CAPETO***
HWY #6 TRANSPORT TRUCK (CARGO) PUSLINCH TWP. ON

Database: ***SPL***

Ref No:	12329	***Discharger Report:***	
Site No:		***Material Group:***	
Incident Dt:	11/30/1988	***Health/Env Conseq:***	
Year:		***Client Type:***	
Incident Cause:	OTHER TRANSPORTATION ACCIDENT	***Sector Type:***	
Incident Event:		***Agency Involved:***	
Contaminant Code:		***Nearest Watercourse:***	
Contaminant Name:		***Site Address:***	
Contaminant Limit 1:		***Site District Office:***	
Contam Limit Freq 1:		***Site Postal Code:***	
Contaminant UN No 1:		***Site Region:***	
Environment Impact:		***Site Municipality:***	75612
Nature of Impact:		***Site Lot:***	
Receiving Medium:	LAND	***Site Conc:***	
Receiving Env:		***Northing:***	
MOE Response:		***Easting:***	MTO, OPP
Dt MOE Arvl on Scn:		***Site Geo Ref Accu:***	
MOE Reported Dt:	11/30/1988	***Site Map Datum:***	
Dt Document Closed:		***SAC Action Class:***	
Incident Reason:	ERROR	***Source Type:***	
Site Name:			
Site County/District:			
Site Geo Ref Meth:			
Incident Summary:	TRACTOR TRAILER		
Contaminant Qty:			

Site:
lot 30 con 8 MORRISTON ON

Database: ***WWIS***

Well ID:	6715817	***Data Entry Status:***	
Construction Date:		***Data Src:***	
Primary Water Use:	Domestic	***Date Received:***	7/14/2006
Sec. Water Use:		***Selected Flag:***	TRUE
Final Well Status:	Water Supply	***Abandonment Rec:***	
Water Type:		***Contractor:***	2663
Casing Material:		***Form Version:***	3
Audit No:	Z41555	***Owner:***	
Tag:	A017835	***Street Name:***	
Construction Method:		***County:***	HALTON
Elevation (m):		***Municipality:***	HALTON HILLS TOWN (ESQUESING)
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	030
Well Depth:		***Concession:***	08
Overburden/Bedrock:		***Concession Name:***	CON

Pump Rate:
Static Water Level:
Flowing (Y/N):
Flow Rate:
Clear/Cloudy:

Easting NAD83:
Northing NAD83:
Zone:
UTM Reliability:

Bore Hole Information

Bore Hole ID: 11558338
DP2BR:
Spatial Status:
Code OB:
Code OB Desc:
Open Hole:
Cluster Kind:
Date Completed: 14-Feb-2005 00:00:00
Remarks:
Elevrc Desc:
Location Source Date:
Improvement Location Source:
Improvement Location Method:
Source Revision Comment:
Supplier Comment:

Elevation:
Elevrc:
Zone:
East83:
North83:
Org CS:
UTMRC: 9
UTMRC Desc: unknown UTM
Location Method: na

Overburden and Bedrock Materials Interval

Formation ID: 933052782
Layer: 1
Color: 6
General Color: BROWN
Mat1: 05
Most Common Material: CLAY
Mat2: 12
Mat2 Desc: STONES
Mat3: 28
Mat3 Desc: SAND
Formation Top Depth: 0.0
Formation End Depth: 27.729999542236328
Formation End Depth UOM: m

Overburden and Bedrock Materials Interval

Formation ID: 933052783
Layer: 2
Color: 6
General Color: BROWN
Mat1: 15
Most Common Material: LIMESTONE
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 27.729999542236328
Formation End Depth: 56.380001068115234
Formation End Depth UOM: m

Overburden and Bedrock Materials Interval

Formation ID: 933052784
Layer: 3
Color: 2
General Color: GREY

Mat1: 15
Most Common Material: LIMESTONE
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth: 56.380001068115234
Formation End Depth: 67.05000305175781
Formation End Depth UOM: m

Annular Space/Abandonment Sealing Record

Plug ID: 933292705
Layer: 1
Plug From: 0.0
Plug To: 6.090000152587891
Plug Depth UOM: m

Method of Construction & Well Use

Method Construction ID: 966715817
Method Construction Code: 4
Method Construction: Rotary (Air)
Other Method Construction:

Pipe Information

Pipe ID: 11567945
Casing No: 1
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 930878658
Layer: 1
Material: 1
Open Hole or Material: STEEL
Depth From: 0.6000000238418579
Depth To: 27.729999542236328
Casing Diameter: 15.869999885559082
Casing Diameter UOM: cm
Casing Depth UOM: m

Construction Record - Casing

Casing ID: 930878659
Layer: 2
Material: 4
Open Hole or Material: OPEN HOLE
Depth From: 27.729999542236328
Depth To: 67.05000305175781
Casing Diameter:
Casing Diameter UOM: cm
Casing Depth UOM: m

Results of Well Yield Testing

Pump Test ID: 11574430
Pump Set At: 120.0
Static Level: 84.0
Final Level After Pumping: 84.0

Recommended Pump Depth: 120.0
Pumping Rate: 20.0
Flowing Rate:
Recommended Pump Rate: 20.0
Levels UOM: ft
Rate UOM: GPM
Water State After Test Code: 1
Water State After Test: CLEAR
Pumping Test Method: 1
Pumping Duration HR: 1
Pumping Duration MIN:
Flowing:

Draw Down & Recovery

Pump Test Detail ID: 11615862
Test Type: Draw Down
Test Duration: 50
Test Level: 84.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11615850
Test Type: Draw Down
Test Duration: 1
Test Level: 84.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11615854
Test Type: Draw Down
Test Duration: 4
Test Level: 84.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11615856
Test Type: Draw Down
Test Duration: 10
Test Level: 84.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11615859
Test Type: Draw Down
Test Duration: 25
Test Level: 84.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11615863
Test Type: Draw Down
Test Duration: 60
Test Level: 84.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11615851
Test Type: Recovery
Test Duration: 1
Test Level: 84.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11615853
Test Type: Draw Down
Test Duration: 3
Test Level: 84.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11615855
Test Type: Draw Down
Test Duration: 5
Test Level: 84.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11615860
Test Type: Draw Down
Test Duration: 30
Test Level: 84.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11615852
Test Type: Draw Down
Test Duration: 2
Test Level: 84.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11615858
Test Type: Draw Down
Test Duration: 20
Test Level: 84.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11615857
Test Type: Draw Down
Test Duration: 15
Test Level: 84.0
Test Level UOM: m

Draw Down & Recovery

Pump Test Detail ID: 11615861
Test Type: Draw Down
Test Duration: 40
Test Level: 84.0
Test Level UOM: m

Water Details

Water ID:	934077789
Layer:	1
Kind Code:	1
Kind:	FRESH
Water Found Depth:	67.05000305175781
Water Found Depth UOM:	m

Hole Diameter

Hole ID:	11690452
Diameter:	15.800000190734863
Depth From:	6.090000152587891
Depth To:	67.05000305175781
Hole Depth UOM:	m
Hole Diameter UOM:	cm

Hole Diameter

Hole ID:	11690451
Diameter:	25.399999618530273
Depth From:	0.0
Depth To:	6.090000152587891
Hole Depth UOM:	m
Hole Diameter UOM:	cm

Site:
BADENOCH STREET MORRISTON ON

Database:
WWIS

Well ID:	7271834	***Data Entry Status:***	
Construction Date:		***Data Src:***	
Primary Water Use:		***Date Received:***	9/21/2016
Sec. Water Use:		***Selected Flag:***	TRUE
Final Well Status:	Abandoned-Other	***Abandonment Rec:***	Yes
Water Type:		***Contractor:***	7556
Casing Material:		***Form Version:***	7
Audit No:	Z226327	***Owner:***	
Tag:	A110017	***Street Name:***	BADENOCH STREET
Construction Method:		***County:***	
Elevation (m):		***Municipality:***	
Elevation Reliability:		***Site Info:***	
Depth to Bedrock:		***Lot:***	
Well Depth:		***Concession:***	
Overburden/Bedrock:		***Concession Name:***	
Pump Rate:		***Easting NAD83:***	
Static Water Level:		***Northing NAD83:***	
Flowing (Y/N):		***Zone:***	
Flow Rate:		***UTM Reliability:***	
Clear/Cloudy:			

Bore Hole Information

Bore Hole ID:	1006249878	***Elevation:***	
DP2BR:		***Elevrc:***	
Spatial Status:		***Zone:***	
Code OB:		***East83:***	
Code OB Desc:		***North83:***	
Open Hole:		***Org CS:***	UTM83
Cluster Kind:		***UTMRC:***	9
Date Completed:	16-Jun-2016 00:00:00	***UTMRC Desc:***	unknown UTM
Remarks:		***Location Method:***	wwr
Elevrc Desc:			
Location Source Date:			
Improvement Location Source:			
Improvement Location Method:			

Source Revision Comment:
Supplier Comment:

Overburden and Bedrock Materials Interval

Formation ID: 1006333792
Layer:
Color:
General Color:
Mat1:
Most Common Material:
Mat2:
Mat2 Desc:
Mat3:
Mat3 Desc:
Formation Top Depth:
Formation End Depth:
Formation End Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1006333799
Layer: 2
Plug From: 7.0
Plug To: 35.0
Plug Depth UOM: ft

Annular Space/Abandonment Sealing Record

Plug ID: 1006333798
Layer: 1
Plug From: 0.0
Plug To: 7.0
Plug Depth UOM: ft

Method of Construction & Well Use

Method Construction ID: 1006333797
Method Construction Code:
Method Construction:
Other Method Construction:

Pipe Information

Pipe ID: 1006333791
Casing No: 0
Comment:
Alt Name:

Construction Record - Casing

Casing ID: 1006333795
Layer:
Material:
Open Hole or Material:
Depth From:
Depth To:
Casing Diameter:
Casing Diameter UOM: inch
Casing Depth UOM: ft

Construction Record - Screen

Screen ID:	1006333796
Layer:	
Slot:	
Screen Top Depth:	
Screen End Depth:	
Screen Material:	
Screen Depth UOM:	ft
Screen Diameter UOM:	inch
Screen Diameter:	

Water Details

Water ID:	1006333794
Layer:	
Kind Code:	
Kind:	
Water Found Depth:	
Water Found Depth UOM:	ft

Hole Diameter

Hole ID:	1006333793
Diameter:	
Depth From:	
Depth To:	
Hole Depth UOM:	ft
Hole Diameter UOM:	inch

Appendix: Database Descriptions

Environmental Risk Information Services (ERIS) can search the following databases. The extent of historical information varies with each database and current information is determined by what is publicly available to ERIS at the time of update. ***Note:*** *Databases denoted with " * " indicates that the database will no longer be updated. See the individual database description for more information.*

Abandoned Aggregate Inventory: Provincial AAGR

The MAAP Program maintains a database of abandoned pits and quarries. Please note that the database is only referenced by lot and concession and city/town location. The database provides information regarding the location, type, size, land use, status and general comments.*

Government Publication Date: Sept 2002*

Aggregate Inventory: Provincial AGR

The Ontario Ministry of Natural Resources maintains a database of all active pits and quarries. The database provides information regarding the registered owner/operator, location name, operation type, approval type, and maximum annual tonnage.

Government Publication Date: Up to Nov 2021

Abandoned Mine Information System: Provincial AMIS

The Abandoned Mines Information System contains data on known abandoned and inactive mines located on both Crown and privately held lands. The information was provided by the Ministry of Northern Development and Mines (MNDM), with the following disclaimer: "the database provided has been compiled from various sources, and the Ministry of Northern Development and Mines makes no representation and takes no responsibility that such information is accurate, current or complete". Reported information includes official mine name, status, background information, mine start/end date, primary commodity, mine features, hazards and remediation.

Government Publication Date: 1800-Oct 2018

Anderson's Waste Disposal Sites: Private ANDR

The information provided in this database was collected by examining various historical documents which aimed to characterize the likely position of former waste disposal sites from 1860 to present. The research initiative behind the creation of this database was to identify those sites that are missing from the Ontario MOE Waste Disposal Site Inventory, as well as to provide revisions and corrections to the positions and descriptions of sites currently listed in the MOE inventory. In addition to historic waste disposal facilities, the database also identifies certain auto wreckers and scrap yards that have been extrapolated from documentary sources. Please note that the data is not warranted to be complete, exhaustive or authoritative. The information was collected for research purposes only.

Government Publication Date: 1860s-Present

Aboveground Storage Tanks: Provincial AST

Historical listing of aboveground storage tanks made available by the Department of Natural Resources and Forestry. Includes tanks used to hold water or petroleum. This dataset has been retired as of September 25, 2014 and will no longer be updated.

Government Publication Date: May 31, 2014

Automobile Wrecking & Supplies: Private AUWR

This database provides an inventory of known locations that are involved in the scrap metal, automobile wrecking/recycling, and automobile parts & supplies industry. Information is provided on the company name, location and business type.

Government Publication Date: 1999-Sep 30, 2021

Borehole: Provincial BORE

A borehole is the generalized term for any narrow shaft drilled in the ground, either vertically or horizontally. The information here includes geotechnical investigations or environmental site assessments, mineral exploration, or as a pilot hole for installing piers or underground utilities. Information is from many sources such as the Ministry of Transportation (MTO) boreholes from engineering reports and projects from the 1950 to 1990's in Southern Ontario. Boreholes from the Ontario Geological Survey (OGS) including The Urban Geology Analysis Information System (UGAIS) and the York Peel Durham Toronto (YPDT) database of the Conservation Authority Moraine Coalition. This database will include fields such as location, stratigraphy, depth, elevation, year drilled, etc. For all water well data or oil and gas well data for Ontario please refer to WWIS and OOGW.

Government Publication Date: 1875-Jul 2018

Certificates of Approval: Provincial CA

This database contains the following types of approvals: Air & Noise, Industrial Sewage, Municipal & Private Sewage, Waste Management Systems and Renewable Energy Approvals. The MOE in Ontario states that any facility that releases emissions to the atmosphere, discharges contaminants to ground or surface water, provides potable water supplies, or stores, transports or disposes of waste, must have a Certificate of Approval before it can operate lawfully. Fields include approval number, business name, address, approval date, approval type and status. This database will no longer be updated, as CofA's have been replaced by either Environmental Activity and Sector Registry (EASR) or Environmental Compliance Approval (ECA). Please refer to those individual databases for any information after Oct.31, 2011.

Government Publication Date: 1985-Oct 30, 2011*

Dry Cleaning Facilities: Federal CDRY

List of dry cleaning facilities made available by Environment and Climate Change Canada. Environment and Climate Change Canada's Tetrachloroethylene (Use in Dry Cleaning and Reporting Requirements) Regulations (SOR/2003-79) are intended to reduce releases of tetrachloroethylene to the environment from dry cleaning facilities.

Government Publication Date: Jan 2004-Dec 2019

Commercial Fuel Oil Tanks: Provincial CFOT

Locations of commercial underground fuel oil tanks. This is not a comprehensive or complete inventory of commercial fuel tanks in the province; this listing is a copy of records of registered commercial underground fuel oil tanks obtained under Access to Public Information.
Note that the following types of tanks do not require registration: waste oil tanks in apartments, office buildings, residences, etc.; aboveground gas or diesel tanks. Records are not verified for accuracy or completeness.

Government Publication Date: May 31, 2021

Chemical Manufacturers and Distributors: Private CHEM

This database includes information from both a one time study conducted in 1992 and private source and is a listing of facilities that manufacture or distribute chemicals. The production of these chemical substances may involve one or more chemical reactions and/or chemical separation processes (i.e. fractionation, solvent extraction, crystallization, etc.).

Government Publication Date: 1999-Jan 31, 2020

Chemical Register: Private CHM

This database includes a listing of locations of facilities within the Province or Territory that either manufacture and/or distributes chemicals.

Government Publication Date: 1999-Sep 30, 2021

Compressed Natural Gas Stations: Private CNG

Canada has a network of public access compressed natural gas (CNG) refuelling stations. These stations dispense natural gas in compressed form at 3,000 pounds per square inch (psi), the pressure which is allowed within the current Canadian codes and standards. The majority of natural gas refuelling is located at existing retail gasoline that have a separate refuelling island for natural gas. This list of stations is made available by the Canadian Natural Gas Vehicle Alliance.

Government Publication Date: Dec 2012 -Nov 2021

Inventory of Coal Gasification Plants and Coal Tar Sites: Provincial COAL

This inventory includes both the "Inventory of Coal Gasification Plant Waste Sites in Ontario-April 1987" and the Inventory of Industrial Sites Producing or Using Coal Tar and Related Tars in Ontario-November 1988) collected by the MOE. It identifies industrial sites that produced and continue to produce or use coal tar and other related tars. Detailed information is available and includes: facility type, size, land use, information on adjoining properties, soil condition, site operators/occupants, site description, potential environmental impacts and historic maps available. This was a one-time inventory.*

Government Publication Date: Apr 1987 and Nov 1988*

Compliance and Convictions: Provincial CONV

This database summarizes the fines and convictions handed down by the Ontario courts beginning in 1989. Companies and individuals named here have been found guilty of environmental offenses in Ontario courts of law.

Government Publication Date: 1989-Jul 2021

Certificates of Property Use: Provincial CPU

This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include all CPU's on the registry such as (EPA s. 168.6) - Certificate of Property Use.

Government Publication Date: 1994 - Jan 31, 2022

Drill Hole Database: Provincial DRL

The Ontario Drill Hole Database contains information on more than 113,000 percussion, overburden, sonic and diamond drill holes from assessment files on record with the department of Mines and Minerals. Please note that limited data is available for southern Ontario, as it was the last area to be completed. The database was created when surveys submitted to the Ministry were converted in the Assessment File Research Image Database (AFRI) project. However, the degree of accuracy (coordinates) as to the exact location of drill holes is dependent upon the source document submitted to the MNDM. Levels of accuracy used to locate holes are: centering on the mining claim; a sketch of the mining claim; a 1:50,000 map; a detailed company map; or from submitted a "Report of Work".

Government Publication Date: 1886 - Sep 2020

Delisted Fuel Tanks: Provincial DTNK

List of fuel storage tank sites that were once found in - and have since been removed from - the list of fuel storage tanks made available by the regulatory agency under Access to Public Information.

Government Publication Date: May 31, 2021

Environmental Activity and Sector Registry: Provincial EASR

On October 31, 2011, a smarter, faster environmental approvals system came into effect in Ontario. The EASR allows businesses to register certain activities with the ministry, rather than apply for an approval. The registry is available for common systems and processes, to which preset rules of operation can be applied. The EASR is currently available for: heating systems, standby power systems and automotive refinishing. Businesses whose activities aren't subject to the EASR may apply for an ECA (Environmental Compliance Approval), Please see our ECA database.

Government Publication Date: Oct 2011- Jan 31, 2021

Environmental Registry: Provincial EBR

The Environmental Registry lists proposals, decisions and exceptions regarding policies, Acts, instruments, or regulations that could significantly affect the environment. Through the Registry, thirteen provincial ministries notify the public of upcoming proposals and invite their comments. For example, if a local business is requesting a permit, license, or certificate of approval to release substances into the air or water; these are notified on the registry. Data includes: Approval for discharge into the natural environment other than water (i.e. Air) - EPA s. 9, Approval for sewage works - OWRA s. 53(1), and EPA s. 27 - Approval for a waste disposal site. For information regarding Permit to Take Water (PTTW), Certificate of Property Use (CPU) and (ORD) Orders please refer to those individual databases.

Government Publication Date: 1994 - Jan 31, 2022

Environmental Compliance Approval: Provincial ECA

On October 31, 2011, a smarter, faster environmental approvals system came into effect in Ontario. In the past, a business had to apply for multiple approvals (known as certificates of approval) for individual processes and pieces of equipment. Today, a business either registers itself, or applies for a single approval, depending on the types of activities it conducts. Businesses whose activities aren't subject to the EASR may apply for an ECA. A single ECA addresses all of a business's emissions, discharges and wastes. Separate approvals for air, noise and waste are no longer required. This database will also include Renewable Energy Approvals. For certificates of approval prior to Nov 1st, 2011, please refer to the CA database. For all Waste Disposal Sites please refer to the WDS database.

Government Publication Date: Oct 2011- Jan 31, 2021

Environmental Effects Monitoring: Federal EEM

The Environmental Effects Monitoring program assesses the effects of effluent from industrial or other sources on fish, fish habitat and human usage of fisheries resources. Since 1992, pulp and paper mills have been required to conduct EEM studies under the Pulp and Paper Effluent Regulations. This database provides information on the mill name, geographical location and sub-lethal toxicity data.

Government Publication Date: 1992-2007*

ERIS Historical Searches: Private EHS

ERIS has compiled a database of all environmental risk reports completed since March 1999. Available fields for this database include: site location, date of report, type of report, and search radius. As per all other databases, the ERIS database can be referenced on both the map and "Statistical Profile" page.

Government Publication Date: 1999-Nov 30, 2021

Environmental Issues Inventory System: Federal EIIS

The Environmental Issues Inventory System was developed through the implementation of the Environmental Issues and Remediation Plan. This plan was established to determine the location and severity of contaminated sites on inhabited First Nation reserves, and where necessary, to remediate those that posed a risk to health and safety; and to prevent future environmental problems. The EIIS provides information on the reserve under investigation, inventory number, name of site, environmental issue, site action (Remediation, Site Assessment), and date investigation completed.

Government Publication Date: 1992-2001*

Emergency Management Historical Event: Provincial EMHE

List of locations of historical occurrences of emergency events, including those assigned to the Ministry of Natural Resources by Order-In-Council (OIC) under the Emergency Management and Civil Protection Act, as well as events where MNR provided requested emergency response assistance. Many of these events will have involved community evacuations, significant structural loss, and/or involvement of MNR emergency response staff. These events fall into one of ten (10) type categories: Dam Failure; Drought / Low Water; Erosion; Flood; Forest Fire; Soil and Bedrock Instability; Petroleum Resource Center Event, EMO Requested Assistance, Continuity of Operations Event, Other Requested Assistance. EMHE record details are reproduced by ERIS under License with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2017.

Government Publication Date: Dec 31, 2016

Environmental Penalty Annual Report: Provincial EPAR

This database contains data from Ontario's annual environmental penalty report published by the Ministry of the Environment and Climate Change. These reports provide information on environmental penalties for land or water violations issued to companies in one of the nine industrial sectors covered by the Municipal Industrial Strategy for Abatement (MISA) regulations.

Government Publication Date: Jan 1, 2011 - Dec 31, 2020

List of Expired Fuels Safety Facilities: Provincial EXP

List of facilities and tanks for which there was once a fuel registration. This is not a comprehensive or complete inventory of expired tanks/tank facilities in the province; this listing is a copy of previously registered tanks and facilities obtained under Access to Public Information. Includes private fuel outlets, bulk plants, fuel oil tanks, gasoline stations, marinas, propane filling stations, liquid fuel tanks, piping systems, etc; includes tanks which have been removed from the ground.
Notes: registration was not required for private fuel underground/aboveground storage tanks prior to January 1990, nor for furnace oil tanks prior to May 1, 2002; registration is not required for waste oil tanks in apartments, office buildings, residences, etc., or aboveground gas or diesel tanks. Records are not verified for accuracy or completeness.

Government Publication Date: May 31, 2020

Federal Convictions: Federal FCON

Environment Canada maintains a database referred to as the "Environmental Registry" that details prosecutions under the Canadian Environmental Protection Act (CEPA) and the Fisheries Act (FA). Information is provided on the company name, location, charge date, offence and penalty.

Government Publication Date: 1988-Jun 2007*

Contaminated Sites on Federal Land: Federal FCS

The Federal Contaminated Sites Inventory includes information on known federal contaminated sites under the custodianship of departments, agencies and consolidated Crown corporations as well as those that are being or have been investigated to determine whether they have contamination arising from past use that could pose a risk to human health or the environment. The inventory also includes non-federal contaminated sites for which the Government of Canada has accepted some or all financial responsibility. It does not include sites where contamination has been caused by, and which are under the control of, enterprise Crown corporations, private individuals, firms or other levels of government. Includes fire training sites and sites at which Per- and Polyfluoroalkyl Substances (PFAS) are a concern.

Government Publication Date: Jun 2000-Nov 2021

Fisheries & Oceans Fuel Tanks: Federal FOFT

Fisheries & Oceans Canada maintains an inventory of aboveground & underground fuel storage tanks located on Fisheries & Oceans property or controlled by DFO. Our inventory provides information on the site name, location, tank owner, tank operator, facility type, storage tank location, tank contents & capacity, and date of tank installation.

Government Publication Date: 1964-Sep 2019

Federal Identification Registry for Storage Tank Systems (FIRSTS): Federal FRST

A list of federally regulated Storage tanks from the Federal Identification Registry for Storage Tank Systems (FIRSTS). FIRSTS is Environment and Climate Change Canada's database of storage tank systems subject to the Storage Tank for Petroleum Products and Allied Petroleum Products Regulations. The main objective of the Regulations is to prevent soil and groundwater contamination from storage tank systems located on federal and aboriginal lands. Storage tank systems that do not have a valid identification number displayed in a readily visible location on or near the storage tank system may be refused product delivery.

Government Publication Date: May 31, 2018

Fuel Storage Tank: Provincial FST

List of registered private and retail fuel storage tanks. This is not a comprehensive or complete inventory of private and retail fuel storage tanks in the province; this listing is a copy of registered private and retail fuel storage tanks, obtained under Access to Public Information.
Notes: registration was not required for private fuel underground/aboveground storage tanks prior to January 1990, nor for furnace oil tanks prior to May 1, 2002; registration is not required for waste oil tanks in apartments, office buildings, residences, etc., or aboveground gas or diesel tanks. Records are not verified for accuracy or completeness.

Government Publication Date: May 31, 2021

Fuel Storage Tank - Historic: Provincial FSTH

The Fuels Safety Branch of the Ontario Ministry of Consumer and Commercial Relations maintained a database of all registered private fuel storage tanks. Public records of private fuel storage tanks are only available since the registration became effective in September 1989. This information is now collected by the Technical Standards and Safety Authority.

Government Publication Date: Pre-Jan 2010*

Ontario Regulation 347 Waste Generators Summary: Provincial GEN

Regulation 347 of the Ontario EPA defines a waste generation site as any site, equipment and/or operation involved in the production, collection, handling and/or storage of regulated wastes. A generator of regulated waste is required to register the waste generation site and each waste produced, collected, handled, or stored at the site. This database contains the registration number, company name and address of registered generators including the types of hazardous wastes generated. It includes data on waste generating facilities such as: drycleaners, waste treatment and disposal facilities, machine shops, electric power distribution etc. This information is a summary of all years from 1986 including the most currently available data. Some records may contain, within the company name, the phrase "See & Use..." followed by a series of letters and numbers. This occurs when one company is amalgamated with or taken over by another registered company. The number listed as "See & Use", refers to the new ownership and the other identification number refers to the original ownership. This phrase serves as a link between the 2 companies until operations have been fully transferred.

Government Publication Date: 1986-Nov 30, 2021

Greenhouse Gas Emissions from Large Facilities: Federal GHG

List of greenhouse gas emissions from large facilities made available by Environment Canada. Greenhouse gas emissions in kilotonnes of carbon dioxide equivalents (kt CO2 eq).

Government Publication Date: 2013-Dec 2019

TSSA Historic Incidents: Provincial HINC

List of historic incidences of spills and leaks of diesel, fuel oil, gasoline, natural gas, propane, and hydrogen recorded by the TSSA in their previous incident tracking system. The TSSA's Fuels Safety Program administers the Technical Standards & Safety Act 2000, providing fuel-related safety services associated with the safe transportation, storage, handling and use of fuels such as gasoline, diesel, propane, natural gas and hydrogen. Under this Act, the TSSA regulates fuel suppliers, storage facilities, transport trucks, pipelines, contractors and equipment or appliances that use fuels. Records are not verified for accuracy or completeness. This is not a comprehensive or complete inventory of historical fuel spills and leaks in the province. This listing is a copy of the data captured at one moment in time and is hence limited by the record date provided here.

Government Publication Date: 2006-June 2009*

Indian & Northern Affairs Fuel Tanks: Federal IAFT

The Department of Indian & Northern Affairs Canada (INAC) maintains an inventory of aboveground & underground fuel storage tanks located on both federal and crown land. Our inventory provides information on the reserve name, location, facility type, site/facility name, tank type, material & ID number, tank contents & capacity, and date of tank installation.

Government Publication Date: 1950-Aug 2003*

Fuel Oil Spills and Leaks: Provincial INC

Listing of spills and leaks of diesel, fuel oil, gasoline, natural gas, propane, and hydrogen reported to the Spills Action Centre (SAC). This is not a comprehensive or complete inventory of fuel-related leaks, spills, and incidents in the province; this listing in a copy of incidents reported to the SAC, obtained under Access to Public Information. Includes incidents from fuel-related hazards such as spills, fires, and explosions. Records are not verified for accuracy or completeness.

Government Publication Date: May 31, 2021

Landfill Inventory Management Ontario: Provincial LIMO

The Landfill Inventory Management Ontario (LIMO) database is updated every year, as the Ministry of the Environment, Conservation and Parks compiles new and updated information. Includes small and large landfills currently operating as well as those which are closed and historic. Operators of larger landfills provide landfill information for the previous operating year to the ministry for LIMO including: estimated amount of total waste received, landfill capacity, estimated total remaining landfill capacity, fill rates, engineering designs, reporting and monitoring details, size of location, service area, approved waste types, leachate of site treatment, contaminant attenuation zone and more. The small landfills include information such as site owner, site location and certificate of approval # and status.

Government Publication Date: Feb 28, 2019

Canadian Mine Locations: Private MINE

This information is collected from the Canadian & American Mines Handbook. The Mines database is a national database that provides over 290 listings on mines (listed as public companies) dealing primarily with precious metals and hard rocks. Listed are mines that are currently in operation, closed, suspended, or are still being developed (advanced projects). Their locations are provided as geographic coordinates (x, y and/or longitude, latitude). As of 2002, data pertaining to Canadian smelters and refineries has been appended to this database.

Government Publication Date: 1998-2009*

Mineral Occurrences: Provincial MNR

In the early 70's, the Ministry of Northern Development and Mines created an inventory of approximately 19,000 mineral occurrences in Ontario, in regard to metallic and industrial minerals, as well as some information on building stones and aggregate deposits. Please note that the "Horizontal Positional Accuracy" is approximately +/- 200 m. Many reference elements for each record were derived from field sketches using pace or chain/tape measurements against claim posts or topographic features in the area. The primary limiting factor for the level of positional accuracy is the scale of the source material. The testing of horizontal accuracy of the source materials was accomplished by comparing the plan metric (X and Y) coordinates of that point with the coordinates of the same point as defined from a source of higher accuracy.

Government Publication Date: 1846-Dec 2020

National Analysis of Trends in Emergencies System (NATES): Federal NATE

In 1974 Environment Canada established the National Analysis of Trends in Emergencies System (NATES) database, for the voluntary reporting of significant spill incidents. The data was to be used to assist in directing the work of the emergencies program. NATES ran from 1974 to 1994. Extensive information is available within this database including company names, place where the spill occurred, date of spill, cause, reason and source of spill, damage incurred, and amount, concentration, and volume of materials released.

Government Publication Date: 1974-1994*

Non-Compliance Reports: Provincial NCPL

The Ministry of the Environment provides information about non-compliant discharges of contaminants to air and water that exceed legal allowable limits, from regulated industrial and municipal facilities. A reported non-compliance failure may be in regard to a Control Order, Certificate of Approval, Sectoral Regulation or specific regulation/act.

Government Publication Date: Dec 31, 2020

National Defense & Canadian Forces Fuel Tanks: Federal NDFT

The Department of National Defense and the Canadian Forces maintains an inventory of all aboveground & underground fuel storage tanks located on DND lands. Our inventory provides information on the base name, location, tank type & capacity, tank contents, tank class, date of tank installation, date tank last used, and status of tank as of May 2001. This database will no longer be updated due to the new National Security protocols which have prohibited any release of this database.

Government Publication Date: Up to May 2001*

National Defense & Canadian Forces Spills: Federal NDSP

The Department of National Defense and the Canadian Forces maintains an inventory of spills to land and water. All spill sites have been classified under the "Transportation of Dangerous Goods Act - 1992". Our inventory provides information on the facility name, location, spill ID #, spill date, type of spill, as well as the quantity of substance spilled & recovered.

Government Publication Date: Mar 1999-Apr 2018

National Defence & Canadian Forces Waste Disposal Sites: Federal NDWD

The Department of National Defence and the Canadian Forces maintains an inventory of waste disposal sites located on DND lands. Where available, our inventory provides information on the base name, location, type of waste received, area of site, depth of site, year site opened/closed and status.

Government Publication Date: 2001-Apr 2007*

National Energy Board Pipeline Incidents: Federal NEBI

Locations of pipeline incidents from 2008 to present, made available by the Canada Energy Regulator (CER) - previously the National Energy Board (NEB). Includes incidents reported under the Onshore Pipeline Regulations and the Processing Plant Regulations related to pipelines under federal jurisdiction, does not include incident data related to pipelines under provincial or territorial jurisdiction.

Government Publication Date: 2008-Jun 30, 2021

National Energy Board Wells: Federal NEBP

The NEBW database contains information on onshore & offshore oil and gas wells that are outside provincial jurisdiction(s) and are thereby regulated by the National Energy Board. Data is provided regarding the operator, well name, well ID No./UWI, status, classification, well depth, spud and release date.

Government Publication Date: 1920-Feb 2003*

National Environmental Emergencies System (NEES): Federal NEES

In 2000, the Emergencies program implemented NEES, a reporting system for spills of hazardous substances. For the most part, this system only captured data from the Atlantic Provinces, some from Quebec and Ontario and a portion from British Columbia. Data for Alberta, Saskatchewan, Manitoba and the Territories was not captured. However, NEES is also a repository for previous Environment Canada spill datasets. NEES is composed of the historic datasets ' or Trends ' which dates from approximately 1974 to present. NEES Trends is a compilation of historic databases, which were merged and includes data from NATES (National Analysis of Trends in Emergencies System), ARTS (Atlantic Regional Trends System), and NEES. In 2001, the Emergencies Program determined that variations in reporting regimes and requirements between federal and provincial agencies made national spill reporting and trend analysis difficult to achieve. As a consequence, the department has focused efforts on capturing data on spills of substances which fall under its legislative authority only (CEPA and FA). As such, the NEES database will be decommissioned in December 2004.

Government Publication Date: 1974-2003*

National PCB Inventory: Federal NPCB

Environment Canada's National PCB inventory includes information on in-use PCB containing equipment in Canada including federal, provincial and private facilities. Federal out-of-service PCB containing equipment and PCB waste owned by the federal government or by federally regulated industries such as airlines, railway companies, broadcasting companies, telephone and telecommunications companies, pipeline companies, etc. are also listed. Although it is not Environment Canada's mandate to collect data on non-federal PCB waste, the National PCB inventory includes some information on provincial and private PCB waste and storage sites. Some addresses provided may be Head Office addresses and are not necessarily the location of where the waste is being used or stored.

Government Publication Date: 1988-2008*

National Pollutant Release Inventory: Federal NPRI

Environment Canada has defined the National Pollutant Release Inventory ("NPRI") as a federal government initiative designed to collect comprehensive national data regarding releases to air, water, or land, and waste transfers for recycling for more than 300 listed substances.

Government Publication Date: 1993-May 2017

Oil and Gas Wells: Private OGWE

The Nickle's Energy Group (publisher of the Daily Oil Bulletin) collects information on drilling activity including operator and well statistics. The well information database includes name, location, class, status and depth. The main Nickle's database is updated on a daily basis, however, this database is updated on a monthly basis. More information is available at www.nickles.com.

Government Publication Date: 1988-Nov 30, 2021

Ontario Oil and Gas Wells: Provincial OOGW

In 1998, the MNR handed over to the Ontario Oil, Gas and Salt Resources Corporation, the responsibility of maintaining a database of oil and gas wells drilled in Ontario. The OGSR Library has over 20,000+ wells in their database. Information available for all wells in the ERIS database include well owner/operator, location, permit issue date, and well cap date, license No., status, depth and the primary target (rock unit) of the well being drilled. All geology/stratigraphy table information, plus all water table information is also provide for each well record.

Government Publication Date: 1800-Jan 2021

Inventory of PCB Storage Sites: Provincial OPCB

The Ontario Ministry of Environment, Waste Management Branch, maintains an inventory of PCB storage sites within the province. Ontario Regulation 11/82 (Waste Management - PCB) and Regulation 347 (Generator Waste Management) under the Ontario EPA requires the registration of inactive PCB storage equipment and/or disposal sites of PCB waste with the Ontario Ministry of Environment. This database contains information on: 1) waste quantities; 2) major and minor sites storing liquid or solid waste; and 3) a waste storage inventory.

Government Publication Date: 1987-Oct 2004; 2012-Dec 2013

Orders: Provincial ORD

This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include all Orders on the registry such as (EPA s. 17) - Order for remedial work, (EPA s. 18) - Order for preventative measures, (EPA s. 43) - Order for removal of waste and restoration of site, (EPA s. 44) - Order for conformity with Act for waste disposal sites, (EPA s. 136) - Order for performance of environmental measures.

Government Publication Date: 1994 - Jan 31, 2022

Canadian Pulp and Paper: Private PAP

This information is part of the Pulp and Paper Canada Directory. The Directory provides a comprehensive listing of the locations of pulp and paper mills and the products that they produce.

Government Publication Date: 1999, 2002, 2004, 2005, 2009-2014

Parks Canada Fuel Storage Tanks: Federal PCFT

Canadian Heritage maintains an inventory of known fuel storage tanks operated by Parks Canada, in both National Parks and at National Historic Sites. The database details information on site name, location, tank install/removal date, capacity, fuel type, facility type, tank design and owner/operator.

Government Publication Date: 1920-Jan 2005*

Pesticide Register: Provincial PES

The Ontario Ministry of the Environment and Climate Change maintains a database of licensed operators and vendors of registered pesticides.

Government Publication Date: Oct 2011- Jan 31, 2021

Pipeline Incidents: Provincial PINC

List of pipeline incidents (strikes, leaks, spills). This is not a comprehensive or complete inventory of pipeline incidents in the province; this listing in an historical copy of records previously obtained under Access to Public Information. Records are not verified for accuracy or completeness.

Government Publication Date: May 31, 2021

Private and Retail Fuel Storage Tanks: Provincial PRT

The Fuels Safety Branch of the Ontario Ministry of Consumer and Commercial Relations maintained a database of all registered private fuel storage tanks and licensed retail fuel outlets. This database includes an inventory of locations that have gasoline, oil, waste oil, natural gas and/or propane storage tanks on their property. The MCCR no longer collects this information. This information is now collected by the Technical Standards and Safety Authority (TSSA).

Government Publication Date: 1989-1996*

Permit to Take Water: Provincial PTTW

This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include all PTTW's on the registry such as OWRA s. 34 - Permit to take water.

Government Publication Date: 1994 - Jan 31, 2022

Ontario Regulation 347 Waste Receivers Summary: Provincial REC

Part V of the Ontario Environmental Protection Act ("EPA") regulates the disposal of regulated waste through an operating waste management system or a waste disposal site operated or used pursuant to the terms and conditions of a Certificate of Approval or a Provisional Certificate of Approval. Regulation 347 of the Ontario EPA defines a waste receiving site as any site or facility to which waste is transferred by a waste carrier. A receiver of regulated waste is required to register the waste receiving facility. This database represents registered receivers of regulated wastes, identified by registration number, company name and address, and includes receivers of waste such as: landfills, incinerators, transfer stations, PCB storage sites, sludge farms and water pollution control plants. This information is a summary of all years from 1986 including the most currently available data.

Government Publication Date: 1986-1990, 1992-2019

Record of Site Condition: Provincial RSC

The Record of Site Condition (RSC) is part of the Ministry of the Environment's Brownfields Environmental Site Registry. Protection from environmental cleanup orders for property owners is contingent upon documentation known as a record of site condition (RSC) being filed in the Environmental Site Registry. In order to file an RSC, the property must have been properly assessed and shown to meet the soil, sediment and groundwater standards appropriate for the use (such as residential) proposed to take place on the property. The Record of Site Condition Regulation (O. Reg. 153/04) details requirements related to site assessment and clean up.
RSCs filed after July 1, 2011 will also be included as part of the new (O.Reg. 511/09).

Government Publication Date: 1997-Sept 2001, Oct 2004-Jan 2022

Retail Fuel Storage Tanks: Private RST

This database includes an inventory of retail fuel outlet locations (including marinas) that have on their property gasoline, oil, waste oil, natural gas and / or propane storage tanks.

Government Publication Date: 1999-Sep 30, 2021

Scott's Manufacturing Directory: Private SCT

Scott's Directories is a data bank containing information on over 200,000 manufacturers across Canada. Even though Scott's listings are voluntary, it is the most comprehensive database of Canadian manufacturers available. Information concerning a company's address, plant size, and main products are included in this database.

Government Publication Date: 1992-Mar 2011*

Ontario Spills: Provincial SPL

List of spills and incidents made available the Ministry of the Environment, Conservation and Parks. This database identifies information such as location (approximate), type and quantity of contaminant, date of spill, environmental impact, cause, nature of impact, etc. Information from 1988-2002 was part of the ORIS (Occurrence Reporting Information System). The SAC (Spills Action Centre) handles all spills reported in Ontario. Regulations for spills in Ontario are part of the MOE's Environmental Protection Act, Part X.

Government Publication Date: 1988-Sep 2020

Wastewater Discharger Registration Database: Provincial SRDS

Information under this heading is combination of the following 2 programs. The Municipal/Industrial Strategy for Abatement (MISA) division of the Ontario Ministry of Environment maintained a database of all direct dischargers of toxic pollutants within nine sectors including: Electric Power Generation; Mining; Petroleum Refining; Organic Chemicals; Inorganic Chemicals; Pulp & Paper; Metal Casting; Iron & Steel; and Quarries. All sampling information is now collected and stored within the Sample Result Data Store (SRDS).

Government Publication Date: 1990-Dec 31, 2019

Anderson's Storage Tanks: Private TANK

The information provided in this database was collected by examining various historical documents, which identified the location of former storage tanks, containing substances such as fuel, water, gas, oil, and other various types of miscellaneous products. Information is available in regard to business operating at tank site, tank location, permit year, permit & installation type, no. of tanks installed & configuration and tank capacity. Data contained within this database pertains only to the city of Toronto and is not warranted to be complete, exhaustive or authoritative. The information was collected for research purposes only.

Government Publication Date: 1915-1953*

Transport Canada Fuel Storage Tanks: Federal TCFT

List of fuel storage tanks currently or previously owned or operated by Transport Canada. This inventory also includes tanks on The Pickering Lands, which refers to 7,530 hectares (18,600 acres) of land in Pickering, Markham, and Uxbridge owned by the Government of Canada since 1972; properties on this land has been leased by the government since 1975, and falls under the Site Management Policy of Transport Canada, but is administered by Public Works and Government Services Canada. This inventory provides information on the site name, location, tank age, capacity and fuel type.

Government Publication Date: 1970 - Dec 2020

Variances for Abandonment of Underground Storage Tanks: Provincial VAR

Listing of variances granted for storage tank abandonment. This is not a comprehensive or complete inventory of tank abandonment variances in the province; this listing is a copy of tank abandonment variance records previously obtained under Access to Public Information. In Ontario, registered underground storage tanks must be removed within two years of disuse; if removal of a tank is not feasible, an application may be sought for a variance from this code requirement.
Records are not verified for accuracy or completeness.

Government Publication Date: May 31, 2021

Waste Disposal Sites - MOE CA Inventory: Provincial WDS

The Ontario Ministry of Environment, Waste Management Branch, maintains an inventory of known open (active or inactive) and closed disposal sites in the Province of Ontario. Active sites maintain a Certificate of Approval, are approved to receive and are receiving waste. Inactive sites maintain Certificate(s) of Approval but are not receiving waste. Closed sites are not receiving waste. The data contained within this database was compiled from the MOE's Certificate of Approval database. Locations of these sites may be cross-referenced to the Anderson database described under ERIS's Private Source Database section, by the CA number. All new Environmental Compliance Approvals handed out after Oct 31, 2011 for Waste Disposal Sites will still be found in this database.

Government Publication Date: Oct 2011- Jan 31, 2021

Waste Disposal Sites - MOE 1991 Historical Approval Inventory: Provincial WDSH

In June 1991, the Ontario Ministry of Environment, Waste Management Branch, published the "June 1991 Waste Disposal Site Inventory", of all known active and closed waste disposal sites as of October 30st, 1990. For each "active" site as of October 31st 1990, information is provided on site location, site/CA number, waste type, site status and site classification. For each "closed" site as of October 31st 1990, information is provided on site location, site/CA number, closure date and site classification. Locations of these sites may be cross-referenced to the Anderson database described under ERIS's Private Source Database section, by the CA number.

Government Publication Date: Up to Oct 1990*

Water Well Information System: Provincial WWIS

This database describes locations and characteristics of water wells found within Ontario in accordance with Regulation 903. It includes such information as coordinates, construction date, well depth, primary and secondary use, pump rate, static water level, well status, etc. Also included are detailed stratigraphy information, approximate depth to bedrock and the approximate depth to the water table.

Government Publication Date: Sep 30, 2021

Definitions

Database Descriptions: This section provides a detailed explanation for each database including: source, information available, time coverage, and acronyms used. They are listed in alphabetic order.

Detail Report: This is the section of the report which provides the most detail for each individual record. Records are summarized by location, starting with the project property followed by records in closest proximity.

Distance: The distance value is the distance between plotted points, not necessarily the distance between the sites' boundaries. All values are an approximation.

Direction: The direction value is the compass direction of the site in respect to the project property and/or center point of the report.

Elevation: The elevation value is taken from the location at which the records for the site address have been plotted. All values are an approximation. Source: Google Elevation API.

Executive Summary: This portion of the report is divided into 3 sections:

'Report Summary'- Displays a chart indicating how many records fall on the project property and, within the report search radii.

'Site Report Summary'-Project Property'- This section lists all the records which fall on the project property. For more details, see the 'Detail Report' section.

'Site Report Summary-Surrounding Properties'- This section summarizes all records on adjacent properties, listing them in order of proximity from the project property. For more details, see the 'Detail Report' section.

Map Key: The map key number is assigned according to closest proximity from the project property. Map Key numbers always start at #1. The project property will always have a map key of '1' if records are available. If there is a number in brackets beside the main number, this will indicate the number of records on that specific property. If there is no number in brackets, there is only one record for that property.

The symbol and colour used indicates 'elevation': the red inverted triangle will dictate 'ERIS Sites with Lower Elevation', the yellow triangle will dictate 'ERIS Sites with Higher Elevation' and the orange square will dictate 'ERIS Sites with Same Elevation.'

Unplottables: These are records that could not be mapped due to various reasons, including limited geographic information. These records may or may not be in your study area, and are included as reference.

APPENDIX D

AERIAL PHOTOGRAPHS

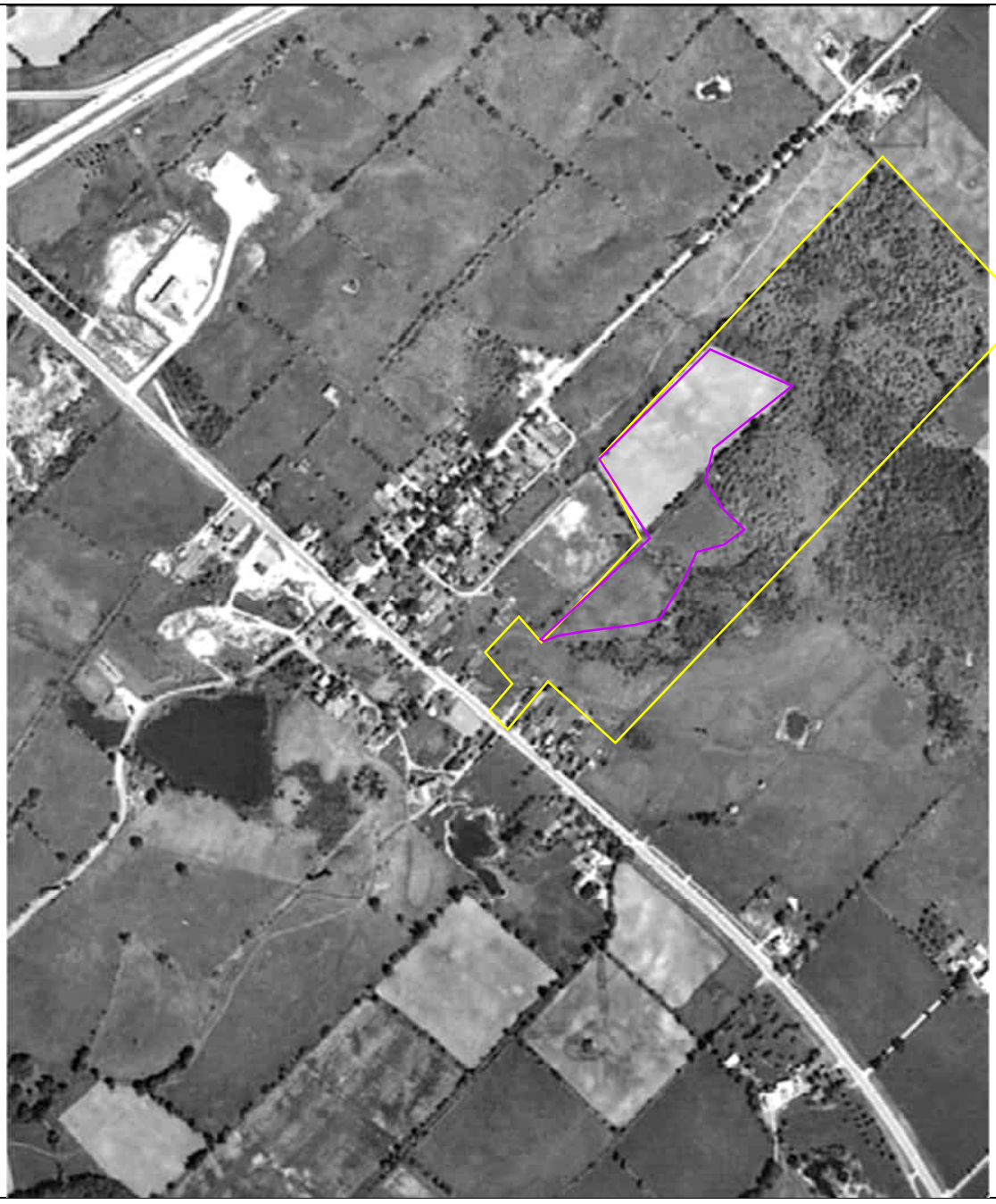
AERIAL PHOTOGRAPHS

Photograph No.1-1954

AERIAL PHOTOGRAPHS

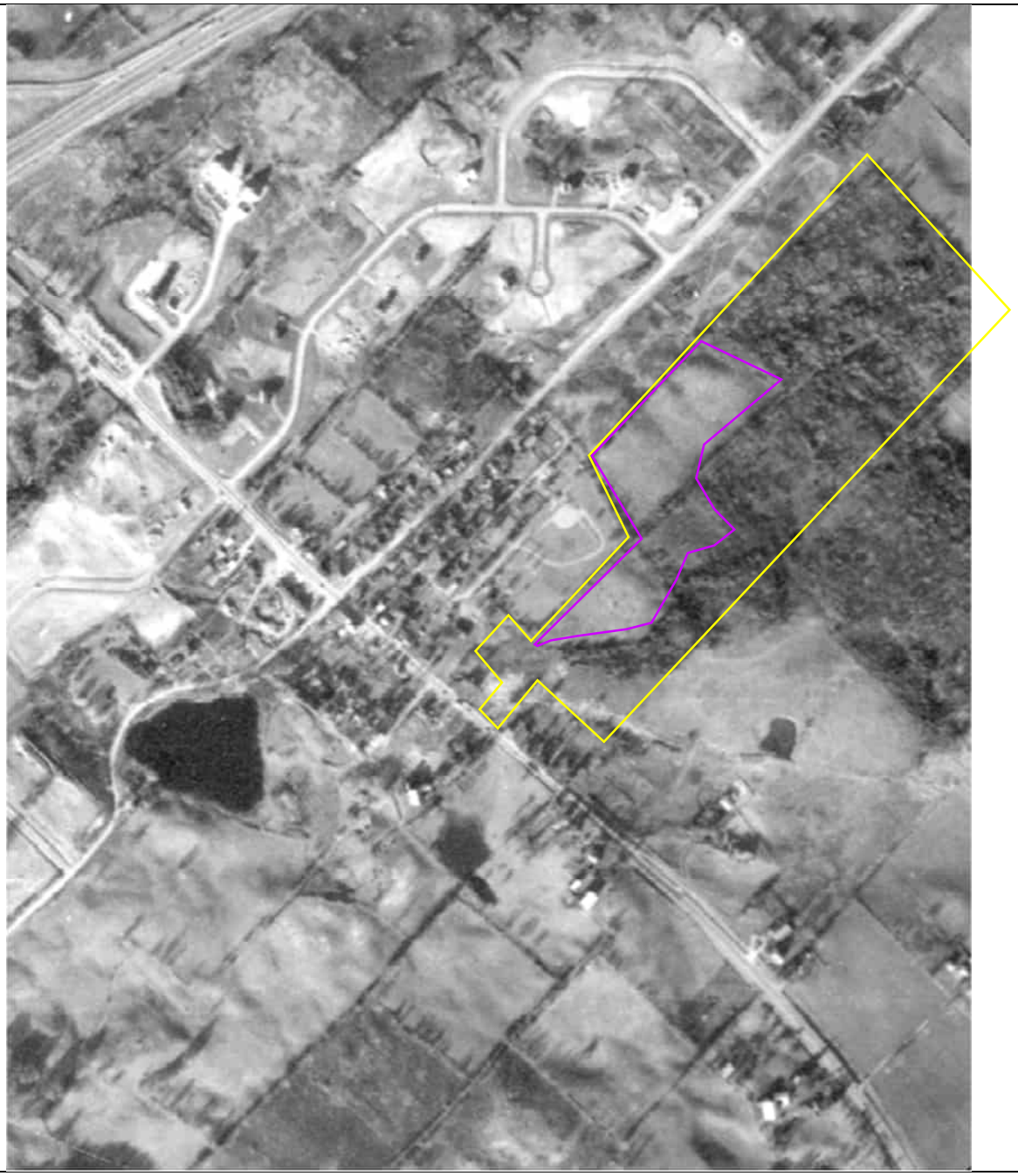
Photograph No.2-1966

AERIAL PHOTOGRAPHS



Photograph No.3-1972

AERIAL PHOTOGRAPHS

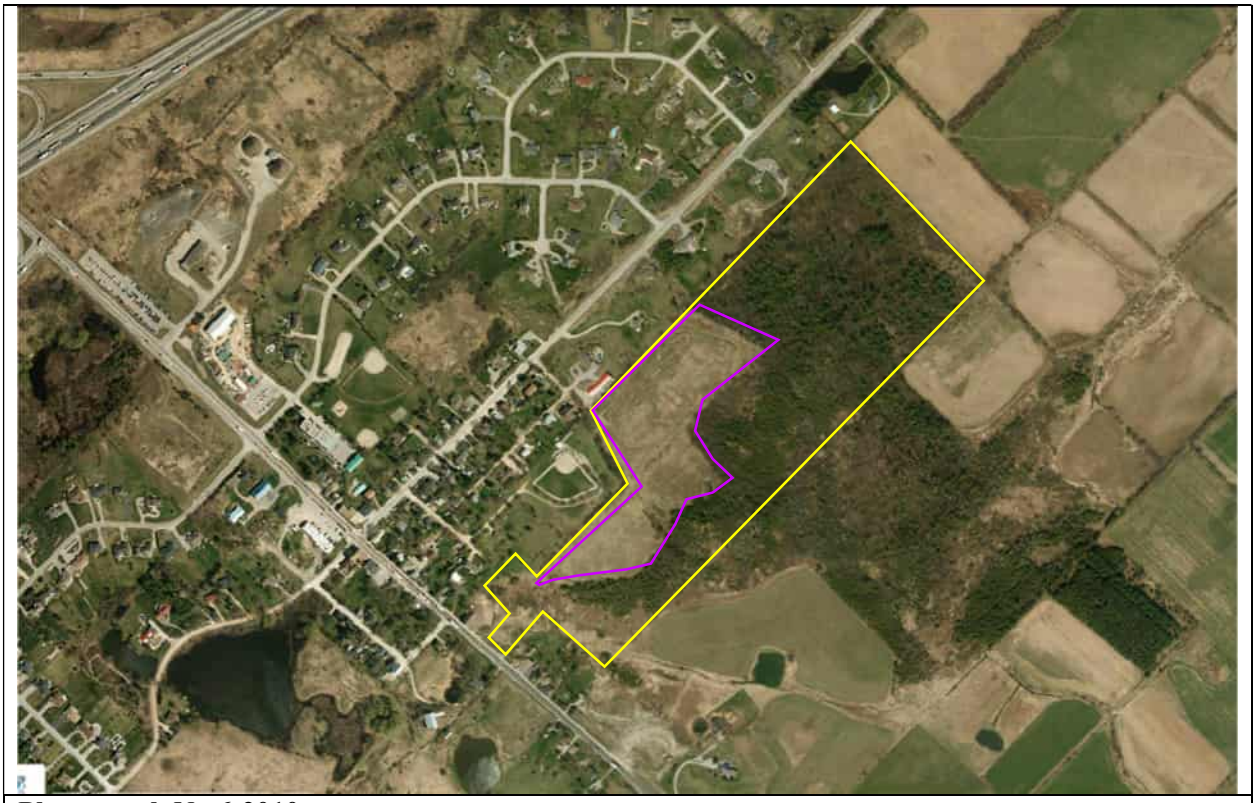


Photograph No.4-1989

AERIAL PHOTOGRAPHS

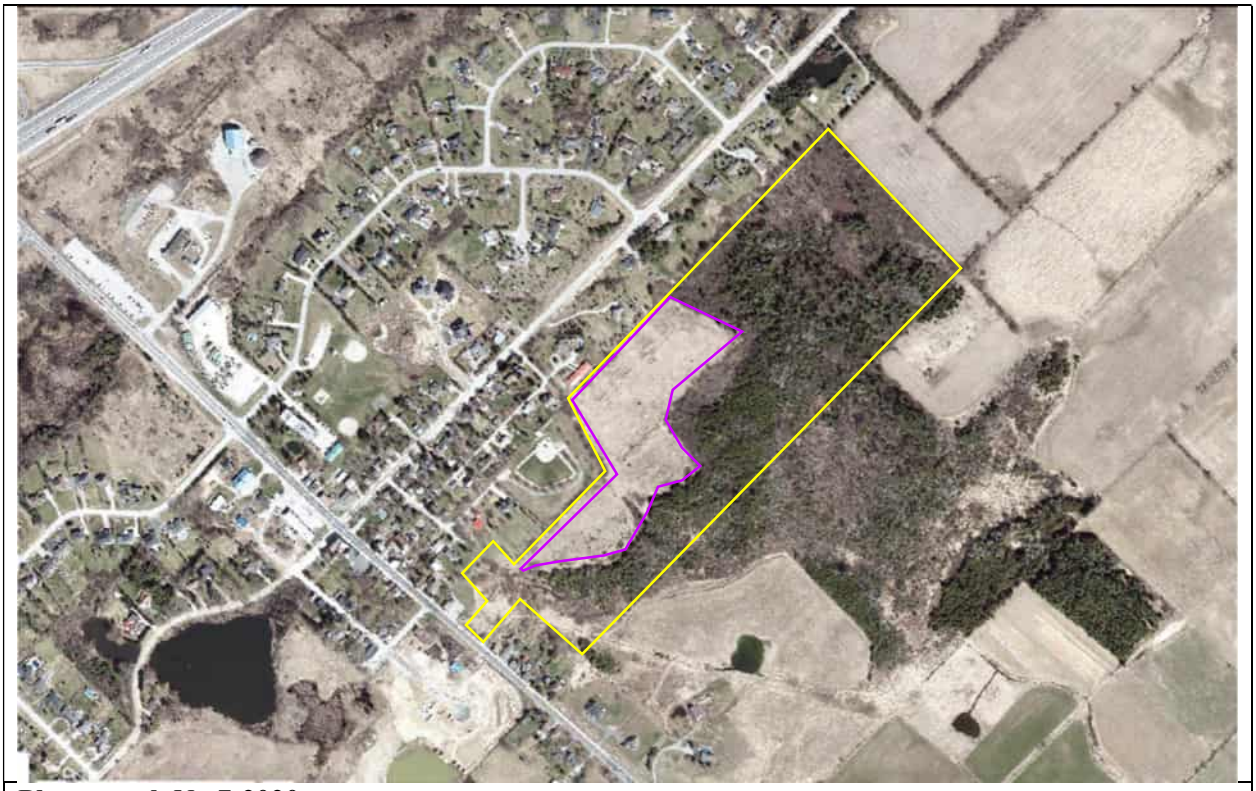
Photograph No.5-2000

AERIAL PHOTOGRAPHS



Photograph No.6-2010

AERIAL PHOTOGRAPHS

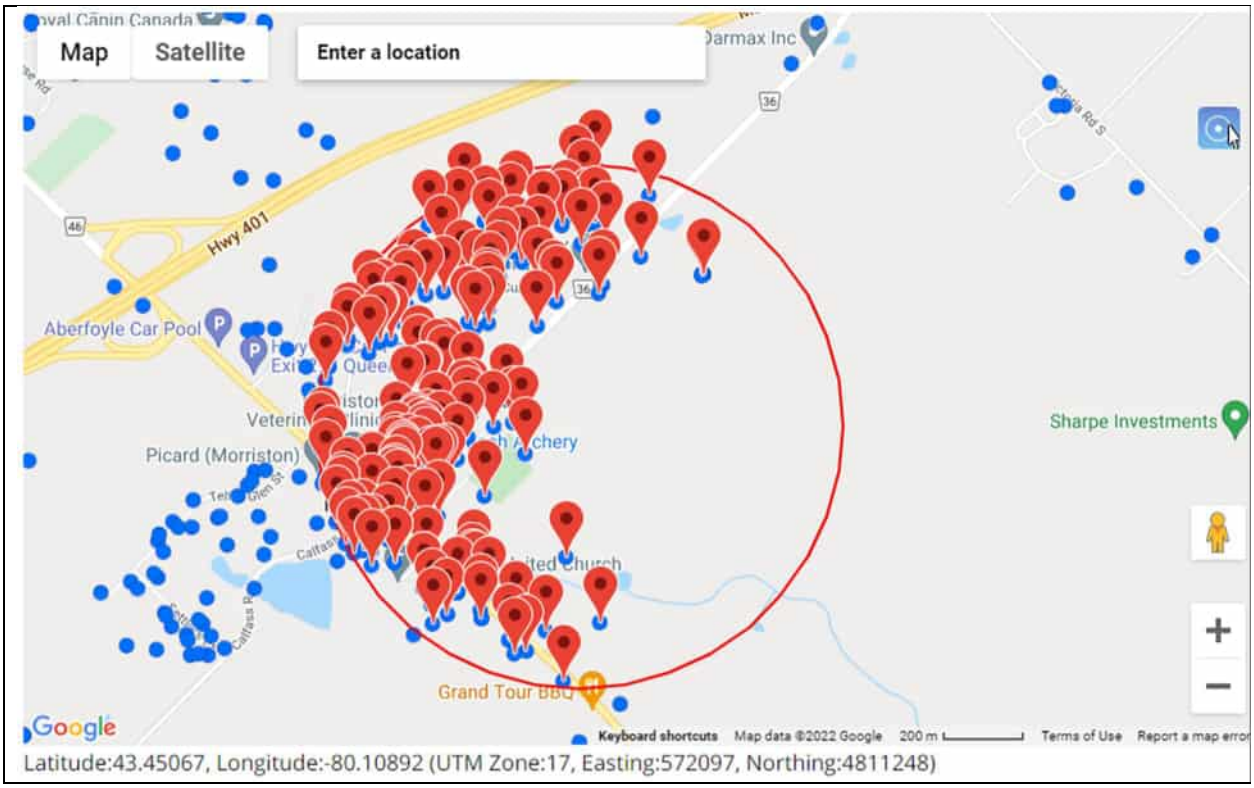


Photograph No.7-2020

APPENDIX E

WELL RECORDS

WATER WELL RECORDS



Ministry of the Environment
Ontario

47/79

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 6707089 MUNICIP 67012 CON. CON 08

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON	BLOCK, TRACT, SURVEY, ETC	LOT
[redacted]	Puslinch	8 (front)		031

DATE COMPLETED: DAY 24 MO Sept YR 79

[redacted] O. Morriston, Ontario.

RC 4 ELEVATION 0950 RC 4 BASIN CODE 23

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Clay sand			0	15
Brown	Clay sand	Stones		15	25
Brown	Clay sand	Gravel		25	73
Brown		Rock		73	89
		Total Depth			89

31 [redacted]

32 5" shoe

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
89	1 ☑ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
5"	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	75
5"	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☑ OPEN HOLE		75	89
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE-S. OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)

71 PUMPING TEST

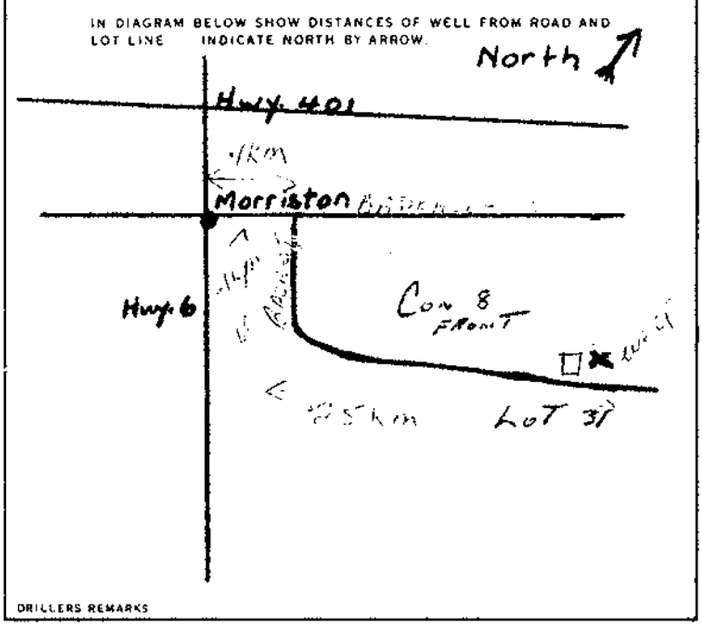
PUMPING TEST METHOD: 1 ☐ PUMP 2 ☑ BAILER
PUMPING RATE: 10 GPM
DURATION OF PUMPING: 1 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☒ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
35 FEET	65 FEET	35 FEET	FEET	FEET	FEET

IF FLOWING GIVE RATE: GPM
PUMP INTAKE SET AT: FEET
WATER AT END OF TEST: 1 ☑ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 80 FEET
RECOMMENDED PUMPING RATE: 10 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS

FINAL STATUS OF WELL: 1 ☑ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED INSUFFICIENT SUPPLY 6 ☐ ABANDONED POOR QUALITY 7 ☐ UNFINISHED

WATER USE: 1 ☐ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL 5 ☑ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING ☐ OTHER 9 ☐ NOT USED

METHOD OF DRILLING: 1 ☑ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Graham Well Drilling Ltd. LICENCE NUMBER: 2336
ADDRESS: Guelph, Ontario
NAME OF DRILLER OR BORER: Jim Hawkins 22W LICENCE NUMBER:
[redacted]
SUBMISSION DATE: DAY 24 MO Sept YR 79

OFFICE USE ONLY

DATA SOURCE 1 CONTRACTOR 2336 DATE RECEIVED 12 10 79
DATE OF INSPECTION: July 25, 1979 INSPECTOR:
REMARKS:

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506--4 -77

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11

6710046

MUNICIP 67012 CON. CON 198

COUNTY OR DISTRICT [redacted]

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE Winch

CON. BLOCK, TRACT, SURVEY, ETC. VIII

LOT 31

ADDRESS OF WELL LOCATION (STREET AND NUMBER) General Delivery Morriston Ont. NOR 2C0

DATE COMPLETED DAY 18 MO Sept YR 89

ELEVATION RC BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
Brown	clay	stones		0	18
Brown	gravel	silt clay		18	60
Grey	Silt	gravel		60	85
Grey	gravel	silt		85	93
Grey	limestone			93	94

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
94	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
6 1/4	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	188	0	93
6 1/8	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		93	
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD, PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ AIR 2 ☐ BAILER

PUMPING RATE: 100 GPM

DURATION OF PUMPING: 1 HOURS 0 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☒ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
15 FEET	90 FEET	15 FEET	15 FEET	15 FEET	15 FEET

IF FLOWING GIVE RATE: GPM

PUMP INTAKE SET AT: FEET

WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

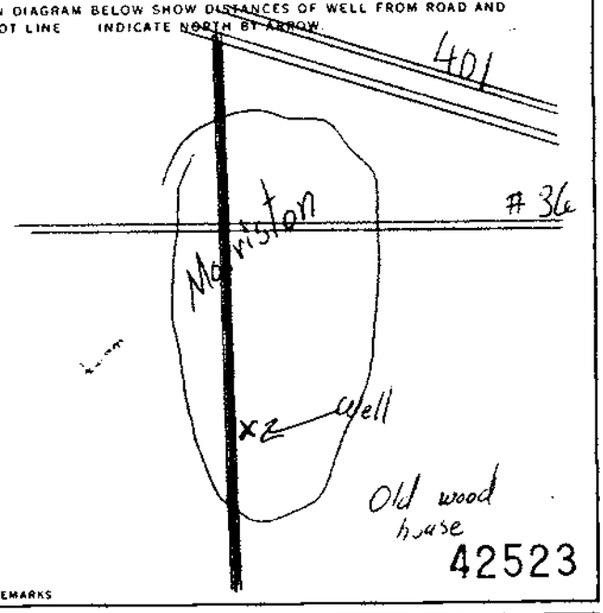
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☐ DEEP

RECOMMENDED PUMP SETTING: 30 FEET

RECOMMENDED PUMPING RATE: 20 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED INSUFFICIENT SUPPLY 6 ☐ ABANDONED POOR QUALITY 7 ☐ UNFINISHED ☐ DEWATERING

WATER USE

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF CONSTRUCTION

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☒ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: Packham Well Drilling Inc.

WELL CONTRACTOR'S LICENCE NUMBER: 4207

ADDRESS: 1235 Trinity Road Ancaster Ont

NAME OF WELL TECHNICIAN: Mervyn Packham

WELL TECHNICIAN'S LICENCE NUMBER: 10058

SIGNATURE OF TECHNICIAN/CONTRACTOR: [redacted]

SUBMISSION DATE: DAY 18 MO Sept YR 89

OFFICE USE ONLY

DATA SOURCE

CONTRACTOR: 4207

DATE RECEIVED: NOV 27 1989

DATE OF INSPECTION

INSPECTOR

REMARKS

CSS.ES

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Ontario — Ministry of Environment and Energy

The Ontario Water Resources Act
WATER WELL RECORD

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11 — 6714637 — Municipality 67012 — Con. CON 08

County or District: [redacted] | Township/Borough/City/Town/Village: PUSLINCH | Con. block tract survey, etc.: 8 | Lot: 31

Address of Well Location: 7515 Well Rd 3 L. Morriston.

Date completed: 30 day 09 month 03 year

21 — UTM Zone | Easting | Northing | RC | Elevation | RC | Basin Code | ii | iii | iv

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet From	Depth - feet To
BROWN	CLAY	SAND + STONES		0	54
BROWN	LIMESTONE		SOFT	54	82
			TOTAL = 82 FT.		
		6"/4" CASING	DRIVE SHOE		

31

32

41 WATER RECORD

Water found at - feet	Kind of water
65	1 Fresh ✓ 2 Salty 3 Sulphur 4 Minerals 5 Gas
82	1 Fresh ✓ 2 Salty 3 Sulphur 4 Minerals 5 Gas
UNTESTED	1 Fresh 2 Salty 3 Sulphur 4 Minerals 5 Gas
	1 Fresh 2 Salty 3 Sulphur 4 Minerals 5 Gas
	1 Fresh 2 Salty 3 Sulphur 4 Minerals 5 Gas

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
6¼	1 Steel ✓ 2 Galvanized 3 Concrete 4 Open hole 5 Plastic	.188	+2	54
6¼	1 Steel 2 Galvanized 3 Concrete 4 Open hole ✓ 5 Plastic		54	82
	1 Steel 2 Galvanized 3 Concrete 4 Open hole 5 Plastic			

SCREEN

Sizes of opening (Slot No.) | Diameter inches | Length feet

Material and type | Depth at top of screen feet

61 PLUGGING & SEALING RECORD

Annular space ✓ Abandonment

Depth set at - feet From	Depth set at - feet To	Material and type (Cement grout, bentonite, etc.)
8	20	BENSEAL

PUMPING TEST

71 — Pumping test method: 1 Pump ✓ 2 Bailer | Pumping rate: 25 GPM | Duration of pumping: 1 Hours Mins

Static level	Water level end of pumping	Water levels during: 1 Pumping ✓ 2 Recovery			
		15 minutes	30 minutes	45 minutes	60 minutes
21 feet	21.6 feet	21.6 feet	21.6 feet	21.6 feet	21.6 feet

If flowing give rate: GPM | Pump intake set at: feet | Water at end of test: ✓ Clear Cloudy

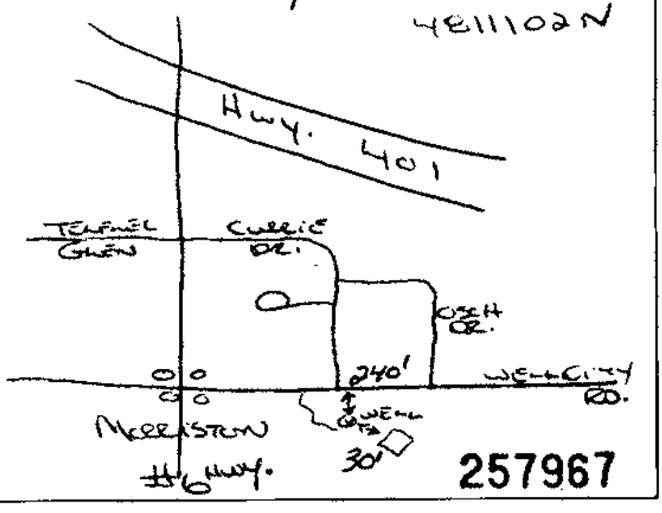
Recommended pump type: Shallow ✓ Deep | Recommended pump setting: 60 feet | Recommended pump rate: 25 GPM

LOCATION OF WELL

G.P.S.

In diagram below show distances of well from road and lot line. Indicate north by arrow.

43° 26932 N
080° 07.341 W
17571826E
4811102N



257967

FINAL STATUS OF WELL

1 ✓ Water supply; 2 Observation well; 3 Test hole; 4 Recharge well; 5 Abandoned, insufficient supply; 6 Abandoned, poor quality; 7 Abandoned (Other); 8 Dewatering; 9 Unfinished; 10 Replacement well

WATER USE

1 Domestic; 2 Stock; 3 Irrigation; 4 Industrial; 5 Commercial; 6 Municipal; 7 Public supply; 8 Cooling & air conditioning; 9 Not use; 10 Other

METHOD OF CONSTRUCTION

1 Cable tool; 2 Rotary (conventional); 3 Rotary (reverse); 4 ✓ Rotary (air); 5 Air percussion; 6 Boring; 7 Diamond; 8 Jetting; 9 Driving; 10 Digging; 11 Other

Name of Well Contractor: HANDEN WELL DRILLING LTD | Well Contractor's Licence No.: 2663

Address: RR #5 GUELPH N1H 6J2

Name of Well Technician: JOHN WHITNEY | Well Technician's Licence No.: T-2790

Submission date: 01 day 10 mo 03 yr

MINISTRY USE ONLY — Data source | Contractor: 2663 | Date received: OCT 22 2003

Date of inspection | Inspector

Remarks

2 - MINISTRY OF ENVIRONMENT AND ENERGY COPY

0506 (06/02) Front Form 9

APPENDIX F

SITE RECONNAISSANCE &

PHOTOGRAPHIC LOG

ENVIRONMENTAL SITE ASSESSMENT SITE RECONNAISSANCE

Project Information			
Site Address	Vacant Lot, Morriston, ON Northside of Highway 6.	**NSSL Project No.**	NS2212-01
		Date	03/01/2022

Surrounding Land Use Features	
North	agricultural land ball diamond residential
South	residential new subdivision under construction
East	residential, vacant land
West	commercial business, residential

Study Site Features	
Potable Water Source	Site is not serviced. Large potable sources.
Waste Water Source	N/A
Groundwater Monitoring Wells	none observed on-site
Fill Material	none observed
Surface Water Runoff (swales, catch basins)	site has varying degrees of elevations overall S-SE
Watercourses, ditches, standing water	Snow covered at time of site visit
Electrical Transformers on site? Company name, transformer #	none observed
Ground Cover	native field grass, woodlot, brush
Other	

PHOTOGRAPHIC LOG

PHASE ONE PROPERTY

Photograph No.1 – Study site, looking north. Photo taken standing on Highway 6.

PHOTOGRAPHIC LOG

PHASE ONE PROPERTY

Photograph No. 2 – Study site, looking north from Main Street.

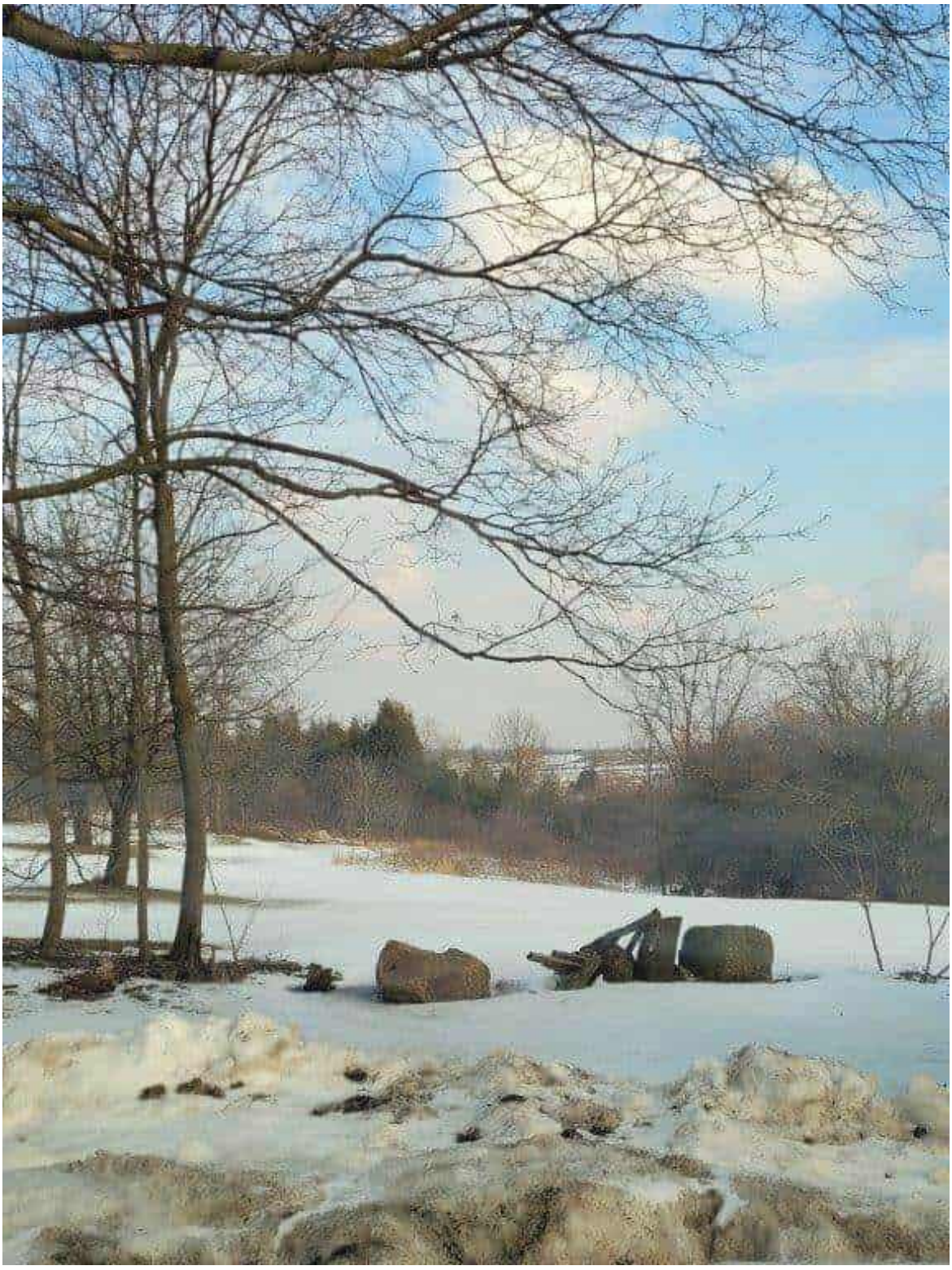
PHOTOGRAPHIC LOG

PHASE ONE PROPERTY

Photograph No.3 – Looking northwest across study site.

PHOTOGRAPHIC LOG

PHASE ONE PROPERTY



Photograph No.4 – Looking northeast across study site.

PHOTOGRAPHIC LOG

PHASE ONE PROPERTY

Photograph No.5 – Looking east across study site. Picture taken between residential properties located on Ochs Street.

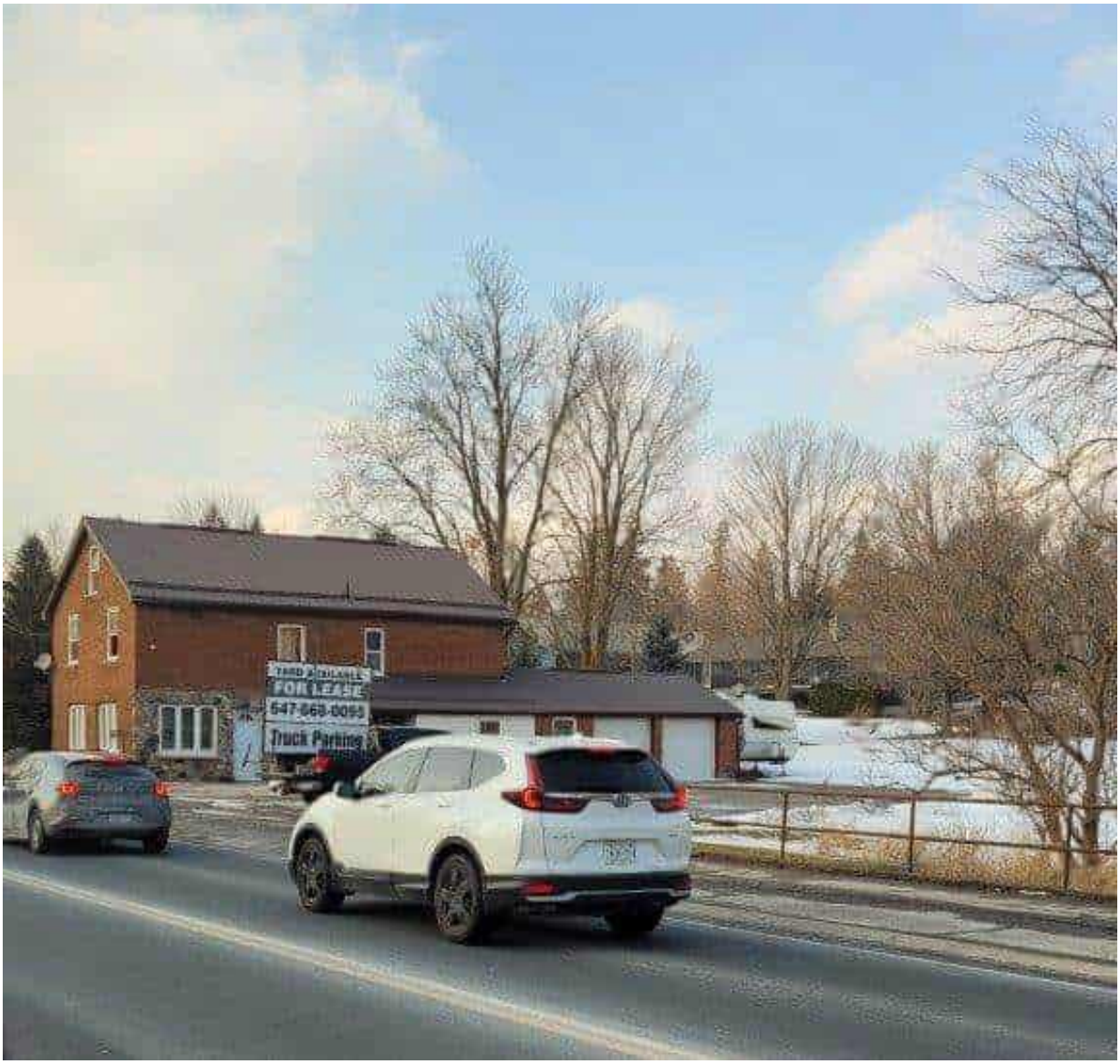
PHOTOGRAPHIC LOG

PHASE ONE PROPERTY

Photograph No.6 – Looking east across study site. Picture taken from Highway 36 [Badenoch Street] at crest of hilltop.

PHOTOGRAPHIC LOG

ADJACENT/SURROUNDING PROPERTIES



Photograph No 7. – West adjacent commercial site.

PHOTOGRAPHIC LOG

ADJACENT/SURROUNDING PROPERTIES

Photograph No 8. – West adjacent property – community ball diamond.

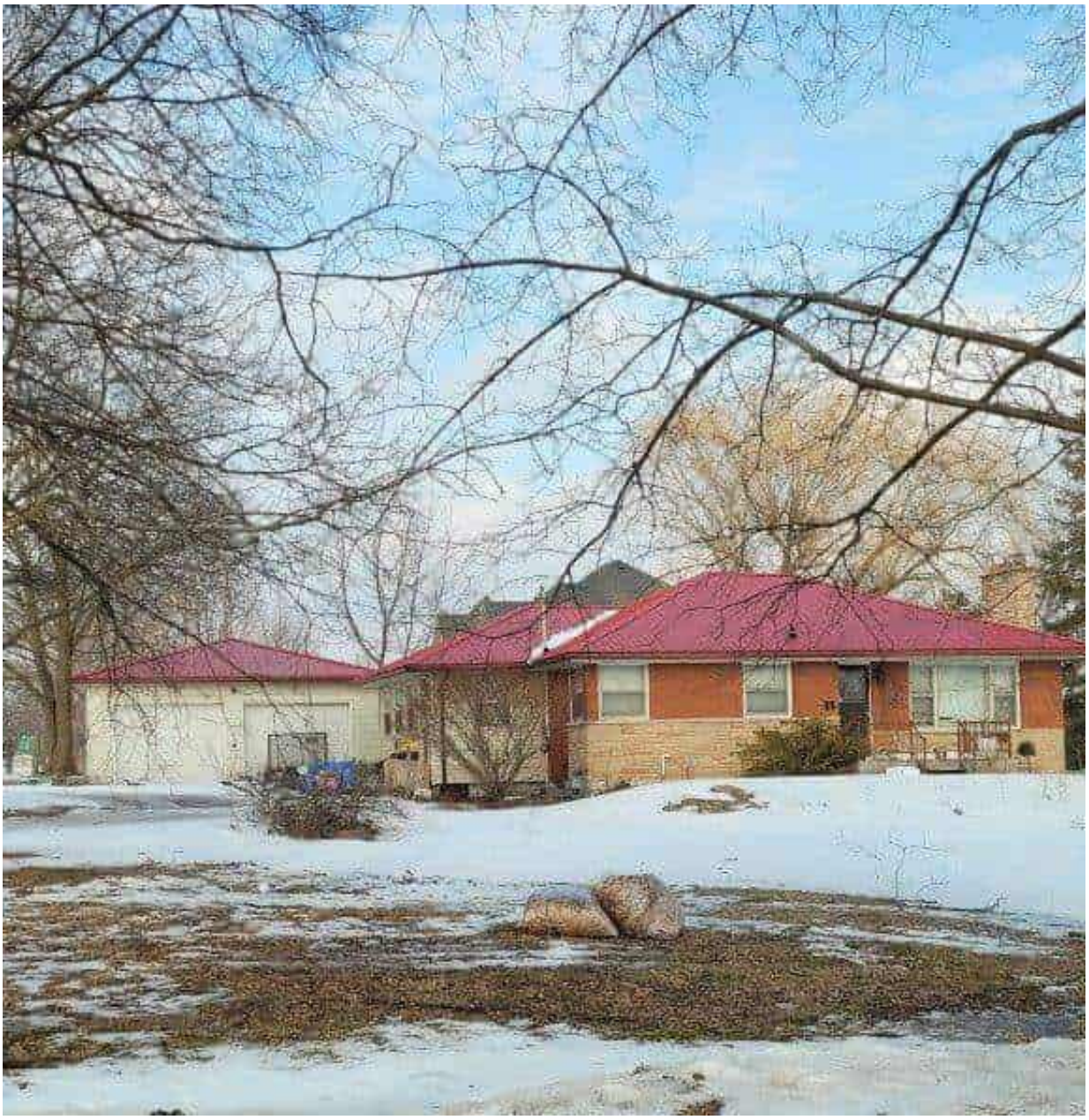
PHOTOGRAPHIC LOG

ADJACENT/SURROUNDING PROPERTIES

Photograph No 9. – South of study site, new construction residential neighbourhood.

PHOTOGRAPHIC LOG

ADJACENT/SURROUNDING PROPERTIES



Photograph No. 10– 11 Main Street, Morriston, residential property located west of study site.

PHOTOGRAPHIC LOG

ADJACENT/SURROUNDING PROPERTIES

Photograph No.11 – Residential properties located east of study site along Highway 6.

PHOTOGRAPHIC LOG

ADJACENT/SURROUNDING PROPERTIES

Photograph No. 12– Highway 6, looking east.

APPENDIX G

POTENTIALLY CONTAMINATING ACTIVITIES

POTENTIALLY CONTAMINATING ACTIVITIES

#	Activity	#	Activity
1.	Acid and Alkali Manufacturing, Processing and Bulk Storage	31.	Ink Manufacturing, Processing and Bulk Storage
2.	Adhesives and Resins Manufacturing, Processing and Bulk Storage	32.	Iron and Steel Manufacturing and Processing
3.	Airstrips and Hangars Operation	33.	Metal Treatment, Coating, Plating and Finishing
4.	Antifreeze and De-icing Manufacturing and Bulk Storage	34.	Metal Fabrication
5.	Asphalt and Bitumen Manufacturing	35.	Mining, Smelting and Refining; Ore Processing; Tailings Storage
6.	Battery Manufacturing, Recycling and Bulk Storage	36.	Oil Production
7.	Boat Manufacturing	37.	Operation of Dry Cleaning Equipment (where chemicals are used)
8.	Chemical Manufacturing, Processing and Bulk Storage	38.	Ordnance Use
9.	Coal Gasification	39.	Paints Manufacturing, Processing and Bulk Storage
10.	Commercial Autobody Shops	40.	Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications
11.	Commercial Trucking and Container Terminals	41.	Petroleum-derived Gas Refining, Manufacturing, Processing and Bulk Storage
12.	Concrete, Cement and Lime Manufacturing	42.	Pharmaceutical Manufacturing and Processing
13.	Cosmetics Manufacturing, Processing and Bulk Storage	43.	Plastics (including Fibreglass) Manufacturing and Processing
14.	Crude Oil Refining, Processing and Bulk Storage	44.	Port Activities, including Operation and Maintenance of Wharves and Docks
15.	Discharge of Brine related to oil and gas production	45.	Pulp, Paper and Paperboard Manufacturing and Processing
16.	Drum and Barrel and Tank Reconditioning and Recycling	46.	Rail Yards, Tracks and Spurs
17.	Dye Manufacturing, Processing and Bulk Storage	47.	Rubber Manufacturing and Processing
18.	Electricity Generation, Transformation and Power Stations	48.	Salt Manufacturing, Processing and Bulk Storage
19.	Electronic and Computer Equipment Manufacturing	49.	Salvage Yard, including automobile wrecking
20.	Explosives and Ammunition Manufacturing, Production and Bulk Storage	50.	Soap and Detergent Manufacturing, Processing and Bulk Storage
21.	Explosives and Firing Range	51.	Solvent Manufacturing, Processing and Bulk Storage
22.	Fertilizer Manufacturing, Processing and Bulk Storage	52.	Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems
23.	Fire Retardant Manufacturing, Processing and Bulk Storage	53.	Tannery
24.	Fire Training	54.	Textile Manufacturing and Processing
25.	Flocculants Manufacturing, Processing and Bulk Storage	55.	Transformer Manufacturing, Processing and Use
26.	Foam and Expanded Foam Manufacturing and Processing	56.	Treatment of Sewage equal to or greater than 10,000 litres per day
27.	Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles	57.	Vehicles and Associated Parts Manufacturing
28.	Gasoline and Associated Products Storage in Fixed Tanks	58.	Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosoils as soil conditioners
29.	Glass Manufacturing	59.	Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products
30.	Importation of Fill Material of Unknown Quality		

APPENDIX H

PHASE ONE CSM

PHASE ONE CONCEPTUAL SITE MODEL

A Phase One Conceptual Site Model (CSM) was prepared in accordance with Schedule D, Part V of O. Reg. 153/04 (as amended). The Phase One Conceptual Site Model is detailed below and should be read along with Figures 1-4. The Phase One CSM addresses the vacant property located on the northside of Highway 6, Morriston, Ontario herein referred to as the "Phase One Property" or the "Site". Refer to Figure 1 for the Site Location Map.

Site Description

The size of the entire land parcel is approximately 24.8 hectares, however only 4.5 hectares will be developed for residential purposes at this time. The developable area of the property is the primary focus of this Phase One ESA investigation. The property is currently vacant agricultural land with no structures on-site and is predominately comprised of open field and wooded lot. The vacant lot is situated at the east side of Brock Road South and southside of Badenoch Street. Initial land use was noted as partially agricultural with the remaining area remaining as vacant since 1954. Agricultural land use ceased pre-1966 following the development of the northern residential suburb. No infrastructure has ever been documented on the study site. The Ministry of Natural Resources identified a regulated wetland at the eastern boundary of the site. One [1] tributary/source of the Bronte Creek is noted at the southwestern boundary on the property. The site layout is illustrated on Figure 2.

Water Bodies & Areas of Natural Significance

The Phase One ESA research revealed the eastern boundary of the study site to be located within a "Regulated Wetland" as defined by the Ministry of Natural Resources. NSSL did not identify additional significant features including provincially significant wetlands, natural heritage features or Areas of Natural Significance onsite or within the Study Area. The Site is not considered a sensitive site based on the definition of O. Reg. 153/04.

Drinking Water Wells

The MECP provides the public with access to their well record inventory. The study site and area are serviced by the municipal drinking water system, however well records [if available] were accessed and reviewed for information pertaining to the area's hydrogeological and geological characteristics. One-hundred and fifty-eight [158] well records were found within the study area [250 m radius]. A record can contain descriptive information pertaining to soil stratigraphy and aquifer groundwater levels. An example summary from one of the onsite wells is presented below.

Well ID	Location	Description
6714637	Depicted as on-site, within the western boundary property line	0 – 16.5 m Clay 16.5 – 25 m Limestone

Roads Within the Phase One Study Area

Refer to Figure 3 for the names of the roads within the Phase One Study Area.

Uses of Properties Adjacent to the Site

The majority of the properties south, east and west of the site are residential. There are a few commercial businesses fronting Highway 6. All adjacent properties are highlighted on Figure 3.

Potentially Contaminating Activities

The Phase One ESA investigation revealed one off-site PCA, that did not result in on-site Areas of Potential Environmental Concern [APEC] to the Phase One property. Figures 3 highlights the PCA location.

- **PCA-1: #10 Commercial Autobody Shops & PCA-2: #33 Metal Treatment, Coating, Plating and Finishing:** The site reconnaissance and review of aerial photographs dated 2000, 2010, and 2020 a welding shop named "Abermor Manufacturing" was identified at 12 Main Street. Based on the review of the company website, "Abermor Manufacturing" was also noted to operate a small automotive repair workshop. The storage of hydraulic equipment, chemicals and oils related to metal manufacturing and automotive repair along with heavy equipment were also noted on the property. This land use was documented as operational since the early 2000s. Should this area of the entire land parcel be developed in the future, then NSSL would recommend a limited Phase Two ESA investigation to determine if any impact to the site's soil, groundwater and/or stream sediment has occurred. At this time, the distance away from the planned site development and inferred groundwater flow direction do not result in creating an onsite APEC to the study site.

Underground Utilities

The study site is currently vacant. The site has yet to be serviced with hydro, natural gas, municipal water, and municipal sanitary sewer.

Regional and Site Specific Geologic and Hydrogeological Information

A review of the Ministry of Northern Development Mines "Quaternary Geology, Cambridge Area, Map M2508", "Provincial Digital Elevation Model 2007", and "Ontario Geological Survey 2010" indicates that the Wentworth Till [Ontario – Erie Lobe], with sand silt to silt matrix, highly calcareous, clast content moderate to low. The northwestern area is considered within the "Hummocky topography" and the southeast boundary of the site is considered an ice-contact gravel: kames and eskers, and one [1] rock quarry as illustrated in M2508. The surrounding area may also include glaciofluvial outwash deposits, with gravel and sand, which include proglacial river and deltaic deposits. A review of a nearby Water Well [ID 6714637] located within the western portion of the site completed in 2003 reports clay over the top of limestone bedrock at 16.5 m bgs, and limestone noted to a maximum depth of 25 m bgs at borehole termination. The study site was found to be within the Galt Moraine with slight drumlin features facing

northwest to southeast. Bedrock Geology maps indicate the bedrock as the Guelph Formation that is consisted of interbedded sandstone, shale, dolostone and/or siltstone.

A review of the Geotechnical Report, prepared by AMEC, for the Proposed "New Salt/Sand Storage Structure at Morriston Patrol Yard, Morriston, Ontario, at BH4 of the report [500 m northwest of the subject site undertaken in 2009] found dense sand and gravel fill, with some silt at 0 – 1.4 m bgs. Till of sand, silty sand, and silt was found from 1.4 to 11.1 m bgs. The soil properties consisted of trace to some clay and gravel, some cobbles, compact to very dense, and damp to moist. The till composition became increasingly siltier and more clayey with depth and decreasing denseness. The maximum depth was estimated to be 94.5 m with no boreholes reaching bedrock at termination.

Regional groundwater flow is expected to be southeast towards Lake Ontario. The Phase One Property is not located within 30 m of a body of water and is found within the Bronte Creek Watershed. The source and tributaries of the Bronte Creek are noted on-site within the southwestern boundary of the property. Surface water runoff was noted as running off into the Bronte Creek. Ponded surface water was also encountered across the study site being infiltrated on-site into the groundwater, attributed to the commencement of spring melt.

Uncertainty or Absence of Information

There is no other uncertainty or absence of information obtained in each of the components of the Phase One ESA that could affect the results of the Phase One ESA.

Draft Plan of Subdivision and Zoning By-law Amendment Application (ZBA)

Second Submission Comments

Township of Puslinch & County of Wellington

Weston File: 10779

September 2024

Contents

1. GM Blueplan Engineering Parth Lad Feb 09, 2024		
Comment	**Consultant**	**Response**
3. Quality Control Functional Servicing & Preliminary SWM Report		
GMBP Comment (April 20, 2023) The FSR needs to demonstrate how Enhanced quality control is met (i.e. 80% total suspended solid removal). It appears that a treatment train is not created as grassed swales are the only method of quality control for the runoff being infiltrated. An additional mechanism such as but not limited to an oil/grit separator would be required to have a treatment train. Crozier Response (January 2024) Enhanced quality control will be met through the implementation of an oil grit separator upstream of the proposed stormwater management facility. The stormwater management facility will provide additional settling to meet the enhanced quality control requirements. GMBP Comment (February 9, 2024) The Functional Servicing & Preliminary SWM Report states that quality control will be provided by an oil grit separator in series with dry pond settling. However, the MOE SWMPD Manual states that dry ponds should not be used for combined quantity and quality control unless a forebay is included. Table 4.8 lists the forebay requirement for dry ponds. Conversely, Puslinch Municipal Development Standards support the use of oil-grit separators as part of a treatment train, not the only method of treatment. Please provide additional discussion on the treatment train proposed.	Crozier	Enhanced quality control will be met through the implementation of an oil grit separator upstream of the proposed stormwater management facility. The stormwater management facility will provide additional settling to meet the enhanced quality control requirements based on MOE criteria. Additional design sheets have been prepared to show the combination of the dry pond and oil-grit separator. Based on the New Jersey Stormwater Best Management Practices Manual Table 4.1 extended detentions (dry ponds) provide a TSS removal rate of 60%. Through a combination of the dry pond (60% TSS) and oil-grit separator (50% TSS) a total TSS removal of 80% will be met. Additionally, following treatment from the OGS and Dry Pond treated stormwater will outlet through a level spreader and then travel at least 30 meters overland through the existing woodlot prior to discharging to the watercourse. This flow path will provide additional TSS removal. Details will be provided through detailed design of the subdivision.

4. Infiltration Water Quality Functional Servicing & Preliminary SWM Report		
<u>GMBP Comment (April 20, 2023)</u> The proponent should be cognizant of any potential impacts of infiltrating road runoff which contains chlorides and other pollutants. There could be a potential for contaminant spills or oils to be infiltrated in the ground via the proposed infiltration trenches (no oil/grit separator is proposed in the FSR). We recommend infiltration of 'clean' runoff only (i.e. infiltration of building rooftop runoff and/or grassed areas only). In addition, the proposed drinking water wells are located at the front of the lot in close proximity to the infiltration trenches which introduces further concerns regarding infiltration of possible roadway contaminants. We defer to the Township Hydrogeologist and Wellington Source Water Protection for comments on the infiltration water quality and the effect on drinking water wells. <u>Crozier Response (January 2024)</u> Based on the Hydrogeological Report the soils on-site are not conducive to infiltration (10 mm/hr infiltration rates); therefore, lot level infiltration has not been proposed. All infiltration trenches have been removed and replace with storm sewer and an end of pipe stormwater management facility. <u>GMBP Comment (February 9, 2024)</u> The response to this comment states that infiltration is not proposed while the Hydrogeological Report recommends lot level soakaway pits for roof runoff. Please coordinate and revise reports accordingly.	Crozier	The in-situ hydraulic conductivity of the soils on-site ranged from 1.18 x 10^{-6} to 1.21 x 10^{-6} m/s which correlates to an infiltration rate of approximately 10 mm/hr. Therefore, the soils onsite are not conducive to infiltration, and it is recommended that end of pipe LID practices are not implemented onsite to meet the water balance objectives. Additional topsoil over the lots could also be implemented to increase void storage within the lots without having directing stormwater to a specific infiltration system. Lot level soak away pits are not being proposed for this subdivision. However, the design has been revised to include an infiltration facility downstream of the dry SWM facility to address the water balance. Details will be provided at detailed design but the footprint shown on the attached Figures is based on sufficient retention to balance the water budget for the site.
7. Roadway Grade Grading Plan		

GMBP Comment (April 20, 2023) Please note that the maximum allowable roadway grade is 6% in the Township of Puslinch. Crozier Response (January 2024) Maximum allowable roadway grades have been maintained everywhere possible. There are a few minor locations where the maximum grade exceeds 6%. GMBP Comment (February 9, 2024) The proposed “Street B” contains a grade of 7.6%. Please revise. Ochs Street contains grades of 8%. Please revise or provide cross-sections to justify deviation from the Township standard (see comment #19).	Crozier	The grading of the internal roadway has been revised.
10. Quantity Control of Stormwater FSR		
GMBP Comment (April 20, 2023) The post-development 2-year storm event does not appear to match pre-development flow rates. Please revise. Crozier Response (January 2024) The stormwater management modelling has been revised to incorporate the quantity controls within the proposed stormwater management facility. Based on the modelling the post-development flows have been reduced to the pre-development flows for all storm events. Details of the outlet control structure will be included during the detailed design stage. GMBP Comment (February 9, 2024) The design of the outlet control structure will impact volume of storage required. Please provide preliminary design of the structure or provide discussion on the volume of storage provided versus storage required.	Crozier	Detailed outlet control structure sizing has been completed and is included in Appendix D.
11. External Areas Functional Servicing & Preliminary SWM Report		

GMBP Comment (April 20, 2023) Please confirm if the external catchments are to be conveyed through the site in the proposed development. In the Visual OTTHYMO (VO) model, the external catchments are added in at the end of the model while the report text it states that the catchments will drain through the site to Bronte Creek. If these areas are conveyed through the site, the stormwater management calculations (quality and quantity control) need to demonstrate that the proposed stormwater management system can handle the conveyance of the two external areas without surcharging the system. Crozier Response (January 2024) The VO model and Functional Servicing and Stormwater Management Report have been updated to discuss the external catchment flows in greater detail. All storm events from Catchment EX1 are directed to a low-lying depression area located in the eastern corner of the Old Morriston Baseball Diamond. An earth berm along the south and east property limits of the baseball diamond allows stormwater to pond within the park limits. If the storage limits are reached, stormwater will drain southwest between the Lot 1 and Lot 2 towards the Bronte Creek tributary via sheet flow, consistent with predevelopment conditions. Note, a figure has been prepared and included in Appendix D of the revised report outlining this scenario. All storm events from Catchment EX2 are to be conveyed through the site by the proposed storm sewer infrastructure and internal roadway towards the proposed stormwater management facility, ultimately outletting to the Bronte Creek tributary. The stormwater modelling has been updated to reflect this scenario. Storm sewer design sheets will be completed at the detailed design stage to ensure the proposed storm sewer network can accept the additional external flows. GMBP Comment (February 9, 2024) Based on the grades shown in the Site Grading Plan at the property line along external catchment EX1, stormwater ponding at the corner of this external catchment will flow onto the site and enter the proposed storm sewer network. Additionally, Ochs Street in external catchment EX2 appears to be draining towards the existing Badenoch Street right-of-way rather than the proposed site. Please review and account for in stormwater management calculations. For clarity, add overland flow arrows to both external catchments in the drainage area plans (Figures 6 and 7).	Crozier	Acknowledged. The external catchment areas have been refined and are illustrated on Figures 6 and 7. SWM calculations have been updated accordingly. Overland flow arrows are also provided to demonstrate overland flow direction.

15. External Area Topography Engineering Plans		
GMBP Comment (February 9, 2024) The FSR states that, based on existing LiDAR contour mapping, runoff from external catchment EX1 ponds along existing berms and then drains southwest towards Bronte Creek. Please show these existing contours and berms on the Engineering Plans to confirm that this flow route will be maintained. Additional topographic survey may be required on the adjacent lands.	Crozier	The existing contour mapping (LiDAR) has been added to the engineering drawing set to show the external runoff drainage conditions.
16. Drainage Easement Engineering Plans		
GMBP Comment (February 9, 2024) Please confirm ownership of the small rectangular parcel in the south corner of catchment EX1. Please note that a drainage easement will be required between Lots 1 and 2 for the overland flow route from EX1 to the Bronte Creek tributary.	Crozier/JD Barnes	Acknowledged.
17. Ponding at Catchbasin Engineering Plans		
GMBP Comment (February 9, 2024) The Site Grading Plan shows that proposed catchbasin CB 36 has a T/G elevation of 316.89, which is 1.5m lower than the adjacent curb elevation proposed. Considering the proximity of CB 36 to the property line, there is concern that stormwater will pond onto the neighbouring property at catchment EX2. Please show that the storm sewer leaving CB 36 will have the capacity to convey the flow generated by EX2 with ponding contained to the subject property up to and including the 100yr storm event. Additional topographic survey may be required on the adjacent lands.	Crozier	CB 27 (formerly CB 36) and the receiving storm sewer system have been designed to convey the 100-year storm event. The sizing was complete utilizing Visual Otthymo and Flowmaster. Further details will be provided at detailed design.
18. Proposed Sidewalk Engineering Plans		

GMBP Comment (February 9, 2024) The Badenoch Street right-of-way includes an existing sidewalk that should be continued into the proposed development. Sidewalk is required on one side of local residential streets per Township of Puslinch Municipal Development standards. Please indicate proposed sidewalk on the Engineering Plans, including Ochs Street.	Crozier	Acknowledged. The proposed sidewalk is indicated on the draft plan and engineering plans.
19. Ochs Street Cross-Section Engineering Plans		
GMBP Comment (February 9, 2024) Please provide cross-sections for the proposed Ochs Street right-of-way, including proposed retaining walls and swales due to their close proximity to existing buildings.	Crozier	Cross-sections of the proposed Ochs Street right-of-way have been prepared and can be referenced on Figure 5.
20. Well Setback Engineering Plans		
GMBP Comment (February 9, 2024) The well location shown in Lot 21 does not appear to meet the 15m minimum setback from the septic bed in Lot 17. Additionally, OBC 8.2.1.6.A specifies a 5m setback from structures and 3m setback from property lines. Please revise.	Crozier	Acknowledged. The well has been relocated.
21. Conservation Regulation Limit Engineering Plans		
GMBP Comment (February 9, 2024) Please show the approximate regulation limit of Conservation Halton on the Engineering Plans.	Crozier	Conservation Halton regulation limits are available on their online portal. The Engineering Plans indicate the linework associated with the natural hazards only. Considering their regulation limits can change, we suggest leaving this information off of the engineered plans.
22. Storm Parameters Functional Servicing & Preliminary SWM Report		
GMBP Comment (February 9, 2024) The IDF curve parameters are outdated. Please revise stormwater quantity control	Crozier	Acknowledged. The updated Guelph IDF parameters have been used.

calculations using the latest City of Guelph Development Engineering Manual.		
23. Qualified Professional Engineering Plans		
GMBP Comment (February 9, 2024) All reports and drawings are to be signed and sealed by a qualified professional for future submissions.	Crozier	Acknowledged.
24. Sight Distance Figure Traffic Impact Study		
GMBP Comment (February 9, 2024) In Section 9 of the Traffic Impact Study (TIS), please include an additional figure that is similar to Figure 15 but enlarged to illustrate the extent of the sight distances described in Table 9.	GHD	A figure illustrating the full extent of the sightline assessment is provided in Appendix D.
25. Internal Road Geometry Figure Traffic Impact Study		
GMBP Comment (February 9, 2024) Section 10 of the TIS needs to be revised using the Township of Puslinch 20m wide urban road cross-section. Additionally, the TIS states that the proposed right-of-way is 18m wide. Please revise to 20m to be consistent with the engineering reports and drawings.	GHD	Report has been updated to reflect the proposed 20 metre right-of-way for Street A
Additional Commentary		
1. Please provide a copy of the review comments as received by Conservation Halton.		Acknowledged.
1. Right-of-way Profiles Grading Plans		
GMBP Comment (April 20, 2023)		Acknowledged.

The proposed development proposes an 18m wide rural cross section complete with roadside ditches and reduced pavement widths. A 20m wide urban cross-section complete with curb and gutter, storm sewer system and sidewalk is required per Township of Puslinch Municipal Development Standards and Township of Puslinch Standard Drawing 102 (STD-102). Please revise for the next submission. Crozier Response (January 2024) All drawings have been updated with a 20 m urban right-of-way per Standard Drawing 102 (STD-102). Storm sewer has been incorporated to direct stormwater runoff to the proposed stormwater management facility. GMBP Comment (February 9, 2024) Accepted, no further comment.		
2. Cul-de-sac Radius Grading Plans		
GMBP Comment (April 20, 2023) As per Township of Puslinch Municipal Development Standards, the cul-de-sac bulb right-of-way radius shall be revised from 18m to 20m. Crozier Response (January 2024) The cul-de-sac radius has been revised from 18m to 20m. GMBP Comment (February 9, 2024) Accepted, no further comment.		Acknowledged.
5. Infiltration Trenches / Galleries Servicing Plans / FSR		
GMBP Comment (April 20, 2023) The FSR proposes surface ponding up to 0.3m in the roadside ditches and subsurface storage/infiltration in a series of longitudinal infiltration galleries located below the proposed roadside ditches. While this concept could work in principle for a flat area, we express concerns in the ability to capture and store the runoff when some of the roads		Acknowledged.

are graded at close to an 8% slope. The stormwater management calculations assume that 0.3m ponding is available throughout the roadside ditches and that the sub-surface galleries can fill up with water. Even with the construction of check dams, terracing or elevated culverts as mentioned in the FSR, due to the steepness of the roads, the volume potential outlined in the stormwater management calculations would be extremely challenging to achieve. Furthermore, it is unclear how the 0.3m ponding in the ditch is proposed to work with driveway culverts. The Town is not in support of a roadside ditch system in urban centers and hamlets, let alone a roadside ditch system that has the potential to pond water for prolonged periods of time. Additional concerns with the location of infiltration galleries and utility infrastructure – this will introduce a maintenance concern for the Township. <u>Crozier Response (January 2024)</u> Acknowledged. All infiltration trenches have been removed and replace with storm sewer and an end of pipe stormwater management facility. <u>GMBP Comment (February 9, 2024)</u> Accepted, no further comment.		
6. Post-Development Drainage Plan FSR		
<u>GMBP Comment (April 20, 2023)</u> Please label the imperviousness of the external areas on the Post-Development plan for consistency. <u>Crozier Response (January 2024)</u> The Post-development Drainage Plan has been revised to include the imperviousness of the external drainage catchments. <u>GMBP Comment (February 9, 2024)</u> Accepted, no further comment.		Acknowledged.

8. Ochs Street Labels Plans		
GMBP Comment (April 20, 2023) Please label Ochs Street on all plans. Crozier Response (January 2024) Ochs Street has been labelled on all plans. GMBP Comment (February 9, 2024) Accepted, no further comment.		Acknowledged.
9. Infiltration Gallery Detail Grading Plan		
GMBP Comment (April 20, 2023) The function of the 150mm diameter perforated pipe and surface ponding capability of the system is questionable. It appears that the 150mm diameter perforated pipe would convey the drainage prior to the ability of the system to pond on the surface or use the last 150mm of storage in the gallery.Inconsistencies between the FSR and infiltration gallery detail with respect to gallery and overflow pipe dimensions. (i.e. FSR states 1.0m deep gallery with 100mm diameter overflow pipe, detail shows 0.9m deep gallery with 150mm diameter overflow pipe). The notes regarding placing sod on top of geotextile wrapped media need further clarification as the topsoil is not proposed to be wrapped in geotextile. Crozier Response (January 2024) Acknowledged. All infiltration trenches have been removed and replace with storm sewer and an end of pipe stormwater management facility. GMBP Comment (February 9, 2024) Accepted, no further comment.		Acknowledged.

12. Stormwater Model – Visual OTTHYMO FSR – VO Schematics		
GMBP Comment (April 20, 2023) Please replace the wording of the "Post-Development" schematic title to reflect a post-development uncontrolled scenario. Please replace the wording of the "Post-Development w/ Mitigation" to be "Post Development Controlled". This will make it consistent with Table 8 in the report and will make ultimate conditions clear. Crozier Response (January 2024) The Visual OTTHYMO and schematics has been updated to reflected Table 8. GMBP Comment (February 9, 2024) Accepted, no further comment.		Acknowledged.
13. Fire Storage Tank Servicing Plans		
GMBP Comment (April 20, 2023) Please give representation to the location of the fire storage tank on the Servicing Plans. Crozier Response (January 2024) The location of the fire storage tank has been represented on the Site Servicing Plans (Figure 1). GMBP Comment (February 9, 2024) Accepted, no further comment.		Acknowledged.
14. FSR Text FSR		
GMBP Comment (April 20, 2023) Please review the text presented in Section 7.3 paragraph four describing imperviousness.		Acknowledged.

Crozier Response (January 2024) Section 7.3 has been reviewed and revised to account for the removal of the infiltration trenches and the implementation of the end of pipe stormwater management facility. GMBP Comment (February 9, 2024) Accepted, no further comment.		

2. County of Wellington Meagan Ferris Feb 16, 2024		
Comment	**Consultant**	**Response**
General		
1. As part of the 2nd submission for the proposed Zoning By-law amendment, the applicant has also submitted all of the supporting materials for the related Draft Plan of Subdivision to both the Township and the County. For clarification for the Township's records, at this time, the Draft Plan of Subdivision has not been deemed completed (or circulated) by the County of Wellington. Based on a review of the comments from the 2nd submission, it appears there are several comments that may once again impact the Draft Plan of Subdivision design. It is also understood that comments from the County, Township and MTO have not been provided thus far, which may further impact the design. The applicant may wish to further hold off of formal submission to the County for the Draft Plan of Subdivision until these comments are addressed.		Acknowledged.
2. Once the Draft Plan of Subdivision is deemed complete and circulated, additional comments and discussion regarding potential appropriate draft plan conditions will be required. Due to this being a review primarily of the Zoning By-law amendment, these types of comments are pending from planning staff.		Acknowledged.

3. Public Engagement - The applicant is aware that the Planning Act no longer requires Draft Plans of Subdivision to go through the Public Meeting process. However, if the Township wishes that the applicant undertakes another form of Public Engagement, although not required under the Planning Act, such as a developer run open house, this should be communicated at the Township's earliest convenience. The timing of when the Zoning By-law amendment is deemed complete may impact the Township's approach to public engagement.		Acknowledged. The Township has not requested additional public engagement.
4. The submission has indicated that the natural environment block is proposed to be conveyed to the Township. This will need to be considered by the Township and it is recommended that if the Township is willing to accept this block, that they should consult the Township/County consulting Ecologist to determine if there are certain requirements to be met by the applicant prior to taking ownership of said block. Further, the Township may wish to consider if there is an interest in trail development and if there is a need for certain type of fencing between private property and the natural feature block (if municipally owned) to avoid trespassing and encroachment into the feature. If the lands are not intending to be accepted by the Township, this should be communicated to the applicant.	Weston	This will be discussed with the Township following this submission.
Official Plan		
5. Based on the comments from the Township/County consulting Ecologist, conformity with the County Official Plan, with respects to Greenland System, is not yet met. It is anticipated a revised Environmental Impact Study will be required. It is recommended that the lots have specific measure included to avoid encroachment of uses into the natural features. Comments from the Conservation Halton (CH) will also need to be addressed.	Colville	Please refer to the revised Environmental Impact Study and the Planning Justification Report for an assessment of the Official Plan policies.
6. As previously commented, the site is also partially within the Paris Galt Moraine Policy Area and staff well need confirmation that the Township's Hydrogeologist is satisfied that Section 4.9.7 Paris and Galt Moraine Policy Area are addressed.	Weston	Acknowledged. Township's Hydrogeologist to confirm.

7. It is understood that the applicant's comment matrix included comments regarding Section 11.2.3 of the Official Plan, which related to a Servicing Options Assessment. A separate letter from a Hydrogeologist regarding this policy is requested.	Englobe / Weston	Please refer to the letter Hydrogeologist Response Letter which includes a response to this letter.
Zoning By-law Amendment		
8. It is understood that the development proposal has been revised based on technical comments and now indicates that 21 residential lots are proposed with a stormwater management block. Based on the revised design, it appears that the proposed draft Zoning By-law will need to address: a. Further reduced lot sizes b. Exclusion of uses on the proposed stormwater management pond block.	Weston	A revised Zoning By-law is included with the submission, and it accounts for the reduced lot sizes. Township to confirm policies related to a stormwater management block zone.
9. It is unclear if any of the technical assessments submitted have assessed all dwelling types permitted in the Urban Residential (UR) Zone or the permissions for additional residential units. The application has also indicated that the proposed dwelling type if single family dwellings, but requests the full permissions of the UR Zone. This should be flagged for the Township's consultants so that this can be confirmed and considered as part of the ongoing review of the subject application.	Weston	Permissions for single detached dwellings and additional residential units have been included in the revised Zoning By-law Amendment.
10. Based on the above comment, the draft zoning by-law should be revised to clearly address: a. Dwelling types based on the type proposed and supporting studies. b. Remove the following uses such as boarding/lodging/rooming house, semi-detached dwellings, townhouses, long term care facilities, retirement home, and schools. c. Clarify permissions for additional residential units.	Weston	Zoning By-law revised to address this comment.
11. It is recommended that the applicant may wish to complete more detailed assessments of lots 1 and lots 16, 18, and 21 to determine if any reduced setbacks will be required for these lots (i.e. lot 1) and if there is an interest, based on future building designs, to deem lot lines for the corner lots (i.e. 16, 18, and	Weston	No reduced setbacks are required at this point.

21).		
12. It is requested that the applicant clarify if the Natural Environment (NE) Zone and the Environmental Protection Overlay will also include any accepted setback from the natural features.	Weston	The NE zone and EP overlay accounts for a minimum of a 10m setback to the woodland and 15m setback to the wetland.
Studies		
13. Planning Justification Report a. It is acknowledged that a PJR addendum has been provided with respects to Provincial Policy Statement policies specific to Natural Heritage (Section 2.1) and Water (Section 2.2). However, it does not appear that any discussions regarding the refinement to the Greenland System mapping are included. Additional discussion regarding this matter will be required with the Township/County consulting Ecologist.	Weston	The PJR has been revised.
14. Environmental Site Assessment a. The applicant has prepared a Phase 1 Environmental Site Assessment. This study recommends that a Phase 2 assessment be completed. Confirmation is to be provided by the applicant at what stage this assessment will be completed.	NSSL	A revised Phase 1 Environmental Site Assessment was prepared and indicates that a Phase 2 is **not required.**

3. Natural Resource Solution Inc. Jack Richard Feb 06, 2024		
Comment	**Consultant**	**Response**
Environmental Impact Study		
The author states that the “EIS has been prepared to delineate the extent of natural	Colville	Acknowledged.

heritage features on the subject property" and assess the potential impacts of development on natural heritage features on and adjacent to the subject property. Our previous peer review identified that "adjacent lands" had not been defined within the original EIS despite being referenced numerous times, and therefore the actual extent of the study area for this EIS is unclear. The revised EIS has not defined "adjacent lands" and the extent of the study area remains unclear. Adjacent lands and the corresponding extent of the study area should be defined within the EIS in order to confirm that the evaluated study area is consistent with the requirements of the County OP (2023) and relevant natural heritage legislation. Otherwise, relevant natural heritage policies appear to be adequately considered within the EIS and are detailed in Section 2.0, including a review of the County of Wellington OP, PPS, Greenbelt Plan, and Ontario Regulation 162/06. In some cases, conformity to the relevant policy framework has yet to be demonstrated, as is discussed further below. It is understood that the development will include the extension/improvement of Ochs Street, north of the subject property. Trees along this street have been identified both on the Draft Plan and Tree Preservation Plan, however it is unclear if the scope of the EIS has included impacts associated with these works. Clarification should be provided as to whether an evaluation of ecological impacts associated with these works, if any, has been completed and details should be provided. Similar to the previous EIS, the revised EIS states that "some" of the background information reviewed was gathered from the County OP, Conservation Halton, Ministry of Natural Resources and Forestry, and the Natural Heritage Information Centre (NHIC). Within NRSI's 2023 review comments it was recommended that fulsome details of all background information sources that were reviewed as part of the EIS be provided. It was further recommended that common natural heritage information resources such as the Ontario Reptile and Amphibian Atlas (Ontario Nature 2019), Ontario Butterfly Atlas (MacNaughton et al. 2023), Ontario Mammal Atlas (Dobbyn 1994), and Ontario Odonate Atlas (NHIC 2023) be consulted as part of the background review. It is noted that the Ontario Reptile and Amphibian Atlas (Ontario Nature 2019) has been included in the background review, however not all background sources recommended above have been listed within the EIS.		

Recommendations • Identify the extent of the study area, including a definition of "adjacent lands";		Clarified in Section 3.0.
• Complete fulsome screening for Species at Risk (SAR) that may exist within the subject property or adjacent lands;		New screening created and added as an appendix.
• Provide confirmation as to whether ecological impacts associated with the Ochs Street extension/improvement works have been considered. If an assessment has been completed, details should be provided; and,		Assessment of habitat available in area of Ochs Street included in report.
• Provide the results of all background information reviewed as part of the EIS.		Included in section 3.1 and applicable sections of report.
Field Surveys		
The field surveys completed as part of the EIS have been identified in Section 3.2 of the report. NRSI staff identified within the comments made on the previous EIS that spring surveys, specifically spring vegetation and amphibian call surveys, had not been completed. The revised EIS identifies that these surveys were completed in 2023 and it is our opinion that the survey dates of both the vascular plant and amphibian call surveys appear appropriate. The EIS identifies that a single amphibian call survey station (SWT2) was established and that no calling amphibians were recorded, though a single Northern Leopard Frog (Lithobates pipiens) was observed within a pool associated with the regulated watercourse in the southeast of the subject property. Other wetlands within the subject property, including the SWC3-1, MAM3-9, and MAMM1-12 vegetation communities were not assessed for suitable amphibian breeding habitat or potential amphibian movement corridors. Rationalization for this exclusion should be provided. The EIS also referenced a Natural Heritage Evaluation prepared by Beacon Environmental for the property directly south of the subject property (97 Queen Street). It is noted that surveys undertaken for this study recorded numerous calling amphibians. It is recommended that greater detail be provided on the results of these surveys. If regulated natural heritage features overlapping the subject property were found to be providing habitat to calling amphibians, this should be identified within the EIS. If calling amphibians were recorded within the wetland that overlaps the subject property and is	Colville	Acknowledged.

adjacent to the development area, this should be identified.		
Recommendations • Provide a rationalization as to why all wetland vegetation communities within the subject property (SWC3-1, MAM3-9, and MAMM1-12) were not assessed for suitable amphibian breeding habitat and potential amphibian movement corridors; and,		Clarification provided.
• Compare the results of Beacon Environmental's amphibian call surveys to those completed by Colville in 2023. If regulated natural heritage features overlapping the proposed development have been found to provide habitat to calling amphibians, this should be identified.		Comparison added to report.
Habitat for Endangered or Threatened Species		
Section 5.4.2. of the Wellington County OP mandates that development and site alteration may not be permitted if impacts to SAR, considered endangered or threatened, are anticipated. Specifically, the OP states: "Development and site alteration will not be allowed in significant habitat of endangered or threatened species except in accordance with provincial and federal requirements. Development or site alteration adjacent to significant habitat of endangered or threatened species shall require a satisfactory Environmental Impact Assessment that demonstrates there will be no negative impact on the significant habitat of endangered or threatened species or its ecological function." In order to determine whether or not endangered or threatened species occur within the subject property, as well as demonstrate any proposed development will result in "no negative impacts", it is necessary to conduct wildlife and habitat surveys that will effectively detect the presence of existing wildlife communities and habitat. Section 4.2.2. of the EIS provides a description of the acoustic monitoring completed to assess potential habitat for SAR bats. Based on the extent of the proposed tree removal area, it is our opinion that the number of acoustic bat monitoring stations (2) is adequate and the	Colville	Acknowledged.

locations of each station are suitable. While we generally agree with the conclusions drawn from the acoustic survey results, some further analysis is typically required in order to confirm the findings made within the EIS. The EIS should identify the number of acoustic recordings collected that were not able to be auto-classified as "Low Frequency" versus "High Frequency", since all of Ontario's SAR bats fall within the "High Frequency" category and therefore this assessment is dependent on the overall number and timing of High Frequency bat passes. Analysis of Little Brown Myotis detections should also include consideration for the time of night during which they were detected. Based on the data presented in the report, we agree it is unlikely that a maternity roost is present within this area and we agree that no impact to habitat of SAR bats is likely to occur based on the prescribed tree removal area. Section 5 of the EIS discusses Tri-colored Bats under the subheading titled "Myotis species", however this species is a "Perimyotis" rather than "Myotis" bat. The previous EIS identified that suitable bat habitat was found in the woodland, however isolated trees along the northern edge of the property are also identified as having the potential to contain suitable bat roosting habitat. No discussion has been provided within the revised EIS regarding the potential for bat habitat to be present within the FODM11 hedgerow communities that are found north and west of the proposed development area. The EIS indicates that numerous large diameter (50-100cm) Sugar Maple (Acer saccharum) exist within these communities, which are directly adjacent to the proposed "Street A" and "Street B", which will require grading works in proximity to these trees. Should impacts to these trees be likely as a result of the required road grading works, confirmation should be provided that no potential bat habitat will be impacted within this area.		
Recommendations • Identify the number of acoustic recordings collected that were not able to be auto-classified as "Low Frequency" versus "High Frequency"; • Little Brown Myotis detections should also include consideration for the time of night during which they were detected and these details should be provided; and • Discuss whether and/or how individual trees within the FODM11 hedgerow areas, or elsewhere within the subject property, have been assessed for suitable habitat		Further discussion added to section 4.2.2 and applicable sections of report.

for bat SAR. Should suitable habitat be identified, further analysis and consultation with the MECP may be required in order to ensure conformity with the requirements of the ESA (2007).		
Significant Wildlife Habitat		
Section 6.2 of the EIS states that no woodland areas will be removed to facilitate development on the subject property. Despite this, Lot 11 and Block 22 of the proposed development each overlap a small portion of the WODM5 community south of the development area. The EIS identifies that Eastern Wood-pewee (Contopus virens) were heard calling from within the WODM5 community on the eastern portion of the subject property and that survey results indicate that the woodland is being used as breeding habitat. In our experience, the entirety of the contiguous woodland in which Eastern Wood-pewee is determined to be breeding is then considered Significant Wildlife Habitat (SWH), as Habitat for Species of Conservation Concern. Instead, the EIS excludes the portion of the WODM5 community that overlaps the development area from this identified SWH. It is explained that this approach was taken based on this area lacking the canopy cover to be considered woodland or forest, as well as it being dominated by tall shrubs rather than trees and it therefore being considered not representative of typical habitat for this species. During the May 2023 site visit, NRSI staff reviewed this area with Colville staff and confirmed that the portion of the WODM5 community that has been excluded from the identified SWH is consistent with the description provided in the EIS. Specifically, the area proposed for removal was found to be dominated by invasive species and contains few native tree species. Based on our review, it was noted that this community contains very little native tree cover and canopy coverage in the feature is well-below that of the broader WODM5 community, and is more representative of thicket conditions rather than woodland. This is supported by data presented within the TPP, which identifies that the density of trees >10cm in diameter at breast height is quite low within this area. Given that the portion for this community that is proposed for removal is an isolated lobe, we are generally in agreement that the removal of this area is unlikely to impact the identified SWH, as the remainder of this community will be preserved and setback from the	Colville	Acknowledged.

proposed development by 10m. It is anticipated that this approach will effectively achieve "no negative impacts" to the identified SWH as a result of the development. As discussed further below, it is recommended that trees that require removal from within the identified WODM5 feature be compensated for within the subject property in order to offset their removal.		
Recommendations • Provide recommendations for the compensation of trees that require removal from within the WODM feature. This should consist of native species selected in consideration of the natural inventory work completed on site. It is recommended that replacement trees be planted within the subject property.		Recommendations for additional plantings in buffer areas included in various sections of the report.
Significant Woodlands		
Section 5.5.4. of the County of Wellington OP identifies the following with respect to the Greenlands System and Significant Woodlands, which are relevant to this ZBA: "In the Rural System, woodlands over 4 hectares and plantations over 10 hectares are considered to be significant by the County, and are included in the Greenlands system… In the Urban System, woodlands over 1 hectare are considered significant by the County, and are included in the Greenlands system. Detailed studies such as environmental impact assessments may be used to identify, delineate and evaluate the significance of woodlands based on other criteria such as: proximity to watercourses, wetlands, or other woodlands; linkage functions; age of the stand or individual trees; presence of endangered or threatened species; or overall species composition." The EIS has identified White Cedar (Thuja occidentalis) (FOC2-2 and FOC4-1) forest communities as Significant Woodlands throughout the subject property and excluded the contiguous Moist Deciduous Woodland (WODM5) community from this feature. It is stated within the EIS that this has been done to be consistent with the Provincial Policy Statement (PPS) (2020) and for the identified Significant Woodland to coincide with vegetation communities that meet the ELC definition of forest (60% or more canopy cover). The WODM4 community overlapping a portion of the subject property is a large	Colville	Acknowledged.

vegetation community (>20ha) that contains regulated watercourses, wetlands, and a variety of other treed vegetation communities. This includes the White Cedar forest communities (FOC), which the EIS identifies as providing deer wintering habitat as well as seeps, a specialized habitat for wildlife considered SWH. EIS also identifies that trees within this contiguous feature are likely to contain roosting opportunities for SAR bats. While the WODM5 community has been excluded from the identified Significant Woodland, the majority of this community has been identified as SWH, asdescribed above, and will be setback from development by 10m. All portions of the FOC2-2 and FOC4-1 community will be preserved and setback from the proposed development by 10m. The EIS identifies that WODM5 community has been excluded from the identified Significant Woodland based on canopy cover in the that community being than 60% and often dominated by Hawthorn (Crataegus sp.). During the 2023 site visit completed by NRSI and Colville staff, this community was examined with particular attention paid to the portion of the WODM5 feature that has been proposed for removal. Based on our review, we agree that the portion of this community proposed for removal and excluded from the identified Significant Woodland is primarily occupied by invasive species and native shrubs, rather than tree species that dominate elsewhere in the WODM5 community further northeast. Based on this, it is our opinion that the portion of the WODM5 community identified for removal may more accurately be considered thicket than woodland and its exclusion from the identified Significant Woodland area is warranted. The EIS identifies that the proposed stormwater management pond will discharge into the adjacent woodland area, which includes both Significant Woodland and SWH. The author states that “water discharged from the stormwater pond will have the potential to affect hydrology and tree health within a small portion of the woodland” and that individual tree health may decline as a result of road salt and de-icing compounds contaminating water that is discharged into the woodland. Despite this, the author puts forth that the function of the woodland will not be negatively impacted and that individual tree mortality may be offset by the planting of salt-tolerant tree species native to the subject property. While we generally agree that this approach may be suitable to ensuring that the woodland area experiences no negative impact as a result of this development		

component, more detail is required. Specifically, the anticipated volume of water to be discharged into the woodland on an annual basis should be provided and used to better inform the assessment of this impact. The specific area in which tree impacts will occur as a result of the outflow should also be identified. The EIS identifies that 2 years of monitoring will be completed following the completion of the development to evaluate impacts on tree health and soil stability. A specific monitoring plan should be prepared that outlines the frequency of monitoring, assessments that will be completed, and mortality thresholds that will trigger the requirement to plant replacement trees within this area. The EIS provides general recommendations towards the mitigation of impacts to the Significant Woodland area, including directing future residential lighting away from woodlands. It is recommended that additional mitigation measures be provided to more effectively reduce impacts that may arise as a result of residential development. It is recommended that rear-yard fencing be prescribed at the limit of each residential lot, outside of the prescribed 10m setback. Rear-yard fencing will help in limiting the potential for the dumping of yard-waste as well as limit the likelihood of future residents encroaching into the woodland. The EIS identifies that the Significant Woodland identified SWH will be protected through the establishment of a 10m buffer, however no buffer planting or ecological enhancements have currently been proposed. In its currently prescribed format, this area is more accurately considered a setback. It is recommended that restoration and enhancement measures be prescribed for this area to achieve the creation of a suitable buffer area that will effectively protect the woodland from increased edge effects associated with the development. This should include the planting of native trees and shrubs suitable to the subject property. It is recommended that a monitoring plan also be proposed for these plantings to ensure the successful establishment of a vegetative protection buffer.		
Recommendations • Identify the quantity of stormwater proposed for discharge into the woodland;		Final volume of water not known. This will be established at detailed design. This has been stated in Section 6.3.

• Identify the extent of the area in which tree impacts are anticipated to occur as a result of the stormwater management pond discharge;		The area of impact not know. Because the potential impacts are difficult to predict, successful implementation will be reliant on monitoring and adaptive management of the site.
• Provide greater detail regarding the proposed monitoring plan for trees that may be impacted by the stormwater management discharge. Details should include the frequency of monitoring, assessments that will be completed, and mortality thresholds that will trigger the requirement to plant replacement trees within this area;		Detailed monitoring plan to be prepared as part of final design. Preliminary recommendations for monitoring added to Section 7 of the report.
• Provide recommendations to more effectively mitigate woodland edge impacts that may be caused by the proposed development. Consideration should be given to the inclusion of rear-yard fencing; and,		Recommendations for restoration of buffer included in various sections of the report. Recommendation for fencing added to Section 7.
• Identify restoration and/or enhancement measures that will be used to create a suitable woodland buffer within the 10m Significant Woodland setback. This should include the planting of trees and shrubs. It is also recommended that the monitoring plan proposed within the EIS include an evaluation of buffer plantings.		Recommendations added to various sections of report.
Wetlands (Core Greenlands)		
With regards to wetlands, Section 5.4.1. of the County of Wellington OP states: "All wetlands in the County of Wellington are included in the Core Greenlands. Development and site alteration will not be permitted in wetlands which are considered provincially significant. Provincially significant wetlands are shown in Appendix 3 of this Plan. All other wetlands will be protected in large measure and development that would seriously impair their future ecological functions will not be permitted. The appropriate Conservation Authority should be contacted when development is proposed in or adjacent to a wetland." As stated in the County OP, adjacent lands are defined as lands within 30m for Core Greenlands and Greenlands. A considerable portion of the proposed development limit overlaps with the regulated wetland areas in the southwestern portion of the development.	Colville	Acknowledged. New site plan and wetland boundaries are referenced in the report.

Specifically, Lots 1-3 each overlap the 30m regulation limit associated with the Coniferous Swamp wetland identified in Figure 4. While the 30m regulation limit has not been mapped in this area, Lot 7 also appears to be within 30m of the wetland limit. It is noted that the wetland limits were refined through a site visit with Conservation Halton staff. The EIS references Conservation Halton's Policies and Guidelines for the Administration of Ontario Regulation 162/06 and Land Use Planning Policy Document (HRCA, 2020). Specifically, it is noted that Section 2.39.3 of the policy document states that "Except as provided for in Policies 2.39.1 and 2.39.2, no new development is permitted within 30 metres of a Provincially Significant Wetland or a wetland greater than or equal to 2 hectares in size". The size of the wetland overlapping a portion of the subject property has not been identifies within the EIS. The extent of the wetland has also not been identified outside of the subject property. However, based on the extent of the wetland identified in Figure 4 and the extent of the vegetation community the EIS identifies as corresponding with the wetland limits, it is anticipated that this wetland area is greater than 2 hectares in size. The author does not address whether or not the proposed development conforms to this policy requirement. It is anticipated that consultation with Conservation Halton will be required in order to confirm whether or not the proposed development conforms with the Conservation Authority's policy requirements. Specifically, confirmation should be sought from the conservation authority as to whether a reduced setback will be accepted by Conservation Halton. Confirmation of the suitability of the reduced setback from the conservation authority is also a requirement of the Township of Puslinch Zoning By-law (2018). The EIS states that changes in the wetland hydrology as a result of the proposed development are not anticipated to impact this feature. However, no water balance assessment has been completed to support this conclusion. Given that development has been proposed directly adjacent to the wetland and within the regulated area associated with the wetland, a water balance assessment should be completed to confirm that water quality and quantity will not change post-development such that the wetland is not negatively impacted. Despite having proposed reduced wetland setbacks (15m), no additional mitigation		

measures have been provided to reduce the potential impacts of development on these features. Consistent with the discussion provided above, it is recommended that buffer enhancement measures be prescribed within the reduced setback areas to more effectively protect the retained wetland. It is anticipated that, at minimum, this should include the planting of suitable tree and shrub species native to the study area. It is recommended that a monitoring plan also be proposed for these plantings to ensure the successful establishment of a vegetative protection buffer.		
Recommendations • Identify the 30m regulation area limit in relation to Lot 7;		Referenced in report and reflected on Figure 4.
• Complete a water balance assessment for the wetland to confirm that development within the western portion of the subject property will not negatively impact the retained wetland;		Section 6.4 updated to include information from preliminary water balance.
• Consult with Conservation Halton to confirm the suitability of proposed development in relation to Conservation Halton regulated areas. Confirmation should be sought as to whether the proposed development limits in relation to the identified regulated wetland areas conform to the Conservation Authority's policy requirements; and,		Referenced in report and reflected on Figure 4.
• Identify enhancement measures that will support the establishment of a self-sustaining vegetation protection buffer within the proposed 15m wetland setback. It is also recommended that a monitoring plan also be proposed for these plantings to ensure the successful establishment of a vegetative protection buffer.		Response included in Section 6.4
Tree Preservation Plan		
The following comments and recommendations have been provided based on our review of the TPP prepared by Colville:	Colville	

Discussion within the TPP states that the Butternut (Juglans cinerea) directly adjacent to the subject property and development area is presumed to be a hybrid. Based on the site visit completed during May 2023 and the physical attributes observed, we agree with this conclusion. However, the tree appears to be directly adjacent to Lot 1 and the canopy of the tree appears to extend within the development area. The TPP should be revised to visually identify the minimum tree protection zone for this tree in order to adequately confirm that the development will not result in any injury or impact to this tree or its roots. Should impacts be anticipated, a more detailed evaluation of the tree's hybridity status may be required in order to appropriately demonstrate that it is not a pure Butternut;		Further elaboration on hybrid Butternut. Genetic testing if injury anticipated to fully confirm hybridity. Not needed if no impact, standard TPZ.
It is recommended that the combined tree protection area for all trees be visually identified in order to more effectively demonstrate that they may be realistically retained and that the proposed development will not result in their injury or impact. Currently, numerous trees have been prescribed for retention despite their minimum tree protection zone being overlapped by the proposed development area. This includes tree #430 and #455. Neither the tree protection area or limit of grading have been identified in relation to one another. As such, it is unclear whether or not many of these trees will be impacted by the proposed development and associated grading**. At minimum, the tree protection area anticipated to be established to preserve the trees currently prescribed for retention should be mapped and delineated by the proposed tree protection fencing alignment;**		No grading plan. Show that the TPZ will not be impacted through grading. Referenced in report.
Many of the boundary trees currently prescribed for retention appear to have canopies and associated root zones that overlap the development area. This includes the canopy/root zone of tree #544, an off-property tree, which appears to be directly overlapped by "Street B". Similar to the above-comment, the tree protection zone for each of these trees and a combined "tree protection area" should be mapped and delineated with a proposed tree protection fencing alignment;		Referenced in Report. Additional care must be taken during the construction process to ensure this tree is not harmed if the root zone must be encroached.
Consistent with the comments made within the TPP, any injury or removal of boundary tree will require the written permission of each respective landowner prior to its removal. It is recommended that this be obtained prior to any tree removal activity being initiated;		Acknowledged.
Consistent with Colville's comments under "Summary and Recommendations", tree retention and removal prescriptions should be informed by final grading and development details; and,		Acknowledged.

We are in agreement with Colville's comment that compensation for trees removed from the subject property should be considered. In lieu of specific tree replacement requirements within the County or Township, it is recommended that tree compensation of 2:1 replacement, or greater, be considered.		Referenced in Report.
Conclusion		
Based on our review of the EIS, TPP, and additional application materials, it is NRSI's position that recommendations made within the 2023 peer review letter prepared by NRSI have been generally addressed through the revised reports prepared by Colville. Additional comments and recommendations have been made within this letter that should be addressed in order to adequately demonstrate that the proposed development will not result in negative impacts to regulated natural heritage features on and adjacent to the subject property. It is anticipated that each item may be addressed through a revised EIS and TPP.		Acknowledged.

4. Harden Environmental Services Ltd.
Angela M. Mason, Stan Denhoed
Feb 02, 2024

Comment	Consultant	Response
Groundwater flow direction and water table		
Terraprobe indicated that additional groundwater monitoring will be completed for the site, including seasonal high groundwater conditions. The project hydrogeologist must adequately characterize the shallow groundwater flow regime across the site and determine the seasonal high groundwater table across the site. Groundwater level monitoring is recommended monthly for at least one full year, including the spring groundwater high, to demonstrate seasonal fluctuations. The design elevations of building foundations, septic leaching beds, SWM facilities and LIDs (e.g., infiltration facilities) must be evaluated in relation to the high-water table.	Terraprobe / Englobe	Based on available information included as part of the Crozier Functional Servicing Report basements are proposed at depths of approximately 3.0 m with ravine lots proposed as rear walkouts. Infiltration facilities are proposed near the headwall outflow near BH1, measured dry at a depth of 6.6 m below grade (seasonal low groundwater conditions), infiltration facilities and private septic systems are proposed at relatively shallow depths expected up to 1 m below grade.

		Site development is proposed within table lands above the Bronte Creek, associated tributaries and wetlands, for which groundwater discharge and baseflow is expected. Based on groundwater elevations observed during seasonal low conditions (groundwater elevations between 311.8 m to 311.5 m, with Bronte Creek falling at an elevation of approximately 312 m to the west of the site, groundwater baseflow is expected to be seasonal. Given that seasonal low elevations at the site were measured between 6 to 7 m below grade; finished floor elevations and private servicing (i.e. septic, stormwater) are expected to be above the seasonal high groundwater conditions. While seasonal variation is expected within groundwater, variations are not expected to impact servicing including septic leaching beds and infiltration facilities and residential basements are expected to maintain adequate separation from seasonal high groundwater conditions.
Groundwater contribution to Bronte Creek		
Terraprobe indicated that further field investigations will be completed to assess the presence of groundwater seepage during seasonal high groundwater conditions. We recommend the use of shallow piezometers to monitor vertical gradients within Bronte Creek on the site, with monitoring completed at the same frequency to groundwater level monitoring on the site (i.e., monthly for at least one year, including the spring groundwater high).	Terraprobe / Englobe	Comment noted, it is expected that shallow groundwater flow will be influenced by topography and will be directed to surface water features including Bronte Creek and associated wetlands and tributaries. Infiltration features will be proposed to meet pre-development infiltration volumes as assessed as part of the completed water balance, which will maintain of enhance groundwater contribution to Bronte Creek.
Site plan differences		
The revised hydrogeological report must be prepared in accordance with the updated site plans.	Terraprobe/ Englobe	Comment noted, the hydrogeological assessment submitted as part of the detailed design submission will be revised to include the current site plan.

Shallow groundwater quality		
Terraprobe obtained groundwater quality samples three shallow monitoring wells on the site as part of the nitrate impact assessment report, which were analyzed for nitrate, nitrite, phosphorus, ammonia/ammonium, and pH. Additional analysis is requested to characterize the shallow groundwater quality, including general chemistry, metals and nutrients, with comparison to the Ontario Drinking Water Quality Standards.	Terraprobe / Englobe	Shallow groundwater is not proposed as a source of potable water for site servicing. The above noted groundwater quality analysis will be completed for completed test wells expected to be screened within underlying limestone bedrock. It is expected that shallow overburden will have seasonal variation, susceptible to land use practice (i.e. septic disposal) and will not provide adequate yield or quality for potable supply.
Water supply		
Terraprobe indicated that test wells are to be installed as part of further investigations, which will also include a private well survey. The water supply assessment must be completed in accordance with MECP Guideline D-5-5 Private Wells: Water Supply Assessment. The assessment must include installation of Regulation 903 wells onsite in the aquifer targeted for water supply, a pumping test and water quality analyses. Impacts to nearby well users must be evaluated, including existing and approved developments within the area of influence (e.g., 97/107 Queen Street). We are also requesting a fulsome analysis of the aquifer water quality by analyzing all parameters in Tables 1 and 2 of Ontario Regulation 169/03.	Terraprobe / Englobe	Comment noted, the testing and sampling for test wells will be completed to address the above as a minimum.
Supply well construction		
The site is underlain by the Guelph Formation and the Goat Island / Gasport Formation aquifer separated by a regional aquitard. Wells that connect these two aquifers (i.e., multiple aquifer penetrating wells) should not be permitted on any lot as part of the development. Both existing and newly constructed supply wells for the site should be either installed in the upper bedrock aquifer or appropriately cased into the lower bedrock aquifer, in accordance with R.R.O. 1990, Reg. 903: Wells, to minimize potential groundwater movement between the upper and lower bedrock aquifers.	Terraprobe / Englobe	Comment noted, shallow bedrock will form the target aquifer. If adequate yields are not encountered within shallow bedrock well casing will be extended into deep bedrock to maintain separation between shallow and deep bedrock aquifers. Based on a review of well records it is expected that shallow bedrock will provide suitable water quantity for residential demand (i.e., 19 L/min).

Nitrate impact assessment		
The impact of phosphorus and nitrate loading to Bronte Creek must be evaluated by the project hydrogeologist. The assessment should consider whether Bronte Creek is a Policy 2 creek and whether it can accommodate additional phosphorus and nitrate loading. We also recommend collection of at least one surface water sample from the onsite creek for analysis of background surface water chemistry.	Terraprobe / Englobe	The nitrate impact assessment will be revised to incorporate the results of shallow groundwater quality with regards to nitrogen containing species (i.e., nitrate/nitrite, TKN, ammonia) and total phosphorus to surface water. Potential effluent travel times will be assessed based on the current site plan considering Bronte Creek as the primary groundwater receptor, with a nitrate target in accordance with the Canadian Water Quality Guideline (CWQG) limit for nitrate of 2.93 mg/L, and Provincial Water Quality Objectives for total phosphorus.
Groundwater recharge facilities		
The soakaway pits were designed by Crozier (December 2023) based on the hydraulic conductivity estimates determined by Terraprobe (2023). The infiltration estimates should be confirmed with soil infiltration testing at representative locations and appropriate depths based on the proposed septic beds and soakaway pits. Infiltration testing will confirm soil conditions and field saturated hydraulic conductivity/infiltration rates. The proposed depths/elevations of subsurface infiltration structures must also be evaluated alongside the annual high groundwater table elevation across the site.	Terraprobe / Englobe	Comment noted, in-situ infiltration testing will be completed in areas proposed for infiltration facilities (lot level, or site features) once locations of infiltration features have been finalized to confirm infiltration facility design. The results of infiltration testing will be provided as part of the detailed design submission.
Construction dewatering		
The revised hydrogeological report must consider the high groundwater table in the assessment of construction dewatering requirements. If groundwater from dewatering activities must be discharged to surface water sources additional groundwater quality samples should be obtained for comparison to the Provincial Water Quality Objectives.	Terraprobe / Englobe	Comment noted, the dewatering assessment will be completed considering the seasonal high groundwater condition. If dewatering is expected shallow groundwater quality analysis in comparison to the PWQO will be completed to assess suitability of shallow groundwater quality for discharge to overland. Groundwater discharge location, and treatment requirements will be assessed as part of the dewatering discharge plan.

Phase Two ESA		
The Phase One Environmental Site Assessment (ESA) completed by Niagara Soils Solutions Ltd. (March 2022) identified two areas of potential environmental concern (APECs) and recommended a Phase Two ESA be completed. A Phase Two ESA report is required for the site.	Niagara Soils Solutions Ltd.	A revised Phase 1 Environmental Site Assessment was prepared and indicates that a Phase 2 is **not required.**
Excess soil management		
Any import/export of fill/soil from the site must be conducted in accordance with O. Reg. 406/19: On-Site and Excess Soil Management, the Rules for Soil Management and Excess Soil Quality Standards (Soil Rules) and O. Reg. 153/04, as amended.	Owner	Acknowledged.

5. Conservation Halton Heather Dearlove Feb 06, 2024		
Comment	**Consultant**	**Response**
Ontario Regulation 162/06		
CH regulates all watercourses, valleylands, wetlands, Lake Ontario and Hamilton Harbour shoreline and hazardous lands, as well as lands adjacent to these features. The property is regulated by CH as it contains a tributary to Bronte Creek and contains the flooding and erosion hazards associated with that watercourse. The subject property also contains a wetland greater than 2ha in size. In this area, CH regulates a distance of 15 metres from the greater of the flooding and erosion hazardous associated with this watercourse and 30 metres to 120 metres from the limit of wetland. Permission is required and Guidelines for the Administration of Ontario Regulation 162/06, dates April 27, 2006 (Last amended, November 26, 2020) http://www.conservationhalton.ca/policies-and-guidelines/		Acknowledged.

Provincial Policy Statement (Sections 3.1.1 – 3.1.7)		
CH reviews applications based on its delegated responsibility to represent the Province on the natural hazard policies of the PPS (3.1.1 – 3.1.7 inclusive).		Acknowledged.
Key Comments		
The following key comments are provided based on the review of the material submitted by the applicant, CH staff have the following comments:		
1. Based on the updated wetland limits from the survey (provided via email August 29, 2023), the subject wetland was confirmed as being greater than 2ha in size. Please note for any wetlands greater than 2ha, CH regulates 120 metres from the greatest extent of the wetland limits. Development maybe permitted between 30m and 120m if it is determined to not have an impact to the feature. All applicable drawings, figures and reports will need to be updated to ensure that all development is located outside of 30m setback to the wetland limits (including the Environmental Impact Study – Section 6.4 – Wetlands and Figure 4 – Refined Extent of Natural Heritage Features on the Subject Property and Engineering Plans: Figure 2 – Preliminary Site Servicing West).	Weston/ Colville	The EIS and all applicable drawings have been updated to show the extent of the wetland and the minimum 15m buffer. Please refer to the updated Environmental Impact Study for additional information.
2. The Draft Plan of Subdivision will have to be updated to reflect the requirement noted above in Key Comment 1. The lot lines will have to be adjusted to reflect the limits of the wetland.	Weston	The lot lines have been adjusted to account for a minimum 15m buffer to the wetland.
3. An additional wetland has been identified by the consultant through ELC in the EIS (Figure 3) that was not delineated in the field by CH staff as it was not identified at the that time. This portion of the wetland will have to be delineated by CH staff in the field (in the appropriate season) and the 30m regulatory setback applied to this portion of the wetland. Please contact CH staff to coordinate a site visit to stake this portion of the wetland.	Weston/ Colville	Further delineation with CH staff occurred and the appropriate delineation is included in the plans. Please refer to the updated Environmental Impact Study for additional information.
4. At detailed design, an emergency overflow weir should be provided for the pond that can pass the uncontrolled 100-year flow.	Crozier	Acknowledge. Preliminary emergency overflow calculations were completed to confirm the overflow weir can be implemented.

5. There appears to be deficit in surface runoff to the wetland as the front of lots 2 to 4 and the road will be directed to the SWM pond. Please revise drawings and reports to relocate the soak-away pits on Lots 2, 3 and 4 to allow overflow to be directed to the rear yard, not the storm sewer.	Crozier	Surface runoff from Lots 2 to 4 cannot be re-directed to the wetland due to grading constraints. The runoff directed to the stormwater pond ultimately drains to the wetland, therefore, runoff from the front of lots 2 to 4 will still drain to the wetland.
Recommendations		
CH recommend that the Key Comments above are addressed in a revised submission prior to approval of the application. CH would not be able to support the approval of the ZBA or the Draft Plan of Subdivision until the comments above are addressed. To facilitate CH's review, the following should be included in the resubmission:		
1. Consolidated response table (word format preferred) addressing CH's fundamental Key Comments above;	Weston	Contained herein.
2. Cover letter listing all documents submitted;	Weston	Included with submission.
3. A digital copy of all resubmission materials in reduced file size format for fast loading and viewing (digital download preferred). Redlined drawings and reports with tracked changes are also appreciated; and	Weston	Digital copy of all materials is included.
4. Please contact CH at the time of the formal submission to determine the appropriate fee.	Weston	Acknowledged.

6. Salvini Consulting
Julia Salvini
March 07, 2024

Comment	Consultant	Response
I've reviewed the December 2023 TIS prepared by GHD for the proposed residential subdivision in Morriston and provide my comments below:		
• Base traffic data, the background growth assumptions, the traffic generation and	GHD	Noted.

distribution, and the future total traffic volumes are all acceptable. I am in agreement with the capacity analyses at the Badenoch/Ochs and Ochs/Back intersections.		
• The sightline assessment exiting Ochs Street to Badenoch Street was undertaken with the following parameters from the TAC Geometric Design Guide for Canadian Roads: - Driver's eye set back 4.4 metres from the edge of the traveled way - Driver's eye height of 1.08 metres for the passenger vehicle - Driver's eye height of 1.8 metres for the truck/snow plow - Object height of 1.3 metres representing the top of a car • A design speed of 60 kph was chosen for the assessment representing 10 kph beyond the posted speed limit of 50 kph. Given the tight assessment, Township staff would like to see a speed study on Badenoch Street at the crest of the hill to confirm that 60 kph is appropriate. The speed study should provide a speed assessment by direction.	GHD	A speed study was completed with the results of the study indicating that the 85th percentile speed in the eastbound direction travelling towards Ochs Street is 61 km/h and generally consistent with the assumed design speed based on the posted speed limit.
• The sightline assessment indicates that using these parameters, the available sightlines meet the TAC requirements for the passenger vehicle but there is about a 3 metre shortfall in the sightline for the truck (out of a requirement for 158.4 metres). The calculation of available sightlines is based both on the design drawings for reconstructed Badenoch Street and were confirmed in the field to be slightly higher than on the design drawings. Township staff have confirmed that the height of the driver's eye for the snow plow is 2.6 metres. The consultant should revise the drawing to confirm if the appropriate sight distance can be achieved with the additional height to the driver's eye.	GHD	Noted. The sightline assessment was updated using a 2.6 metre driver's eye height for the snow plow assessment.
• The parameters above represent daylight conditions where the top of an approaching vehicle can be seen. At night there are streetlights on Badenoch Street to illuminate oncoming vehicles and given the curve in the road, headlights from westbound traffic will be pointing upward and will be more easily seen from the east.	GHD	Noted.
• The study does not address the reconstruction of Ochs Street. Ochs Street is narrow and requires reconstruction to meet Township standards. It is also my understanding that it will be realigned slightly to the east.	GHD	Noted. Ochs Street is being reconstructed and realigned to meet Township standards.

• Crozier, the Civil Engineer for the project, has prepared a drawing illustrating how the retaining wall at the southwest corner of the Badenoch/Ochs intersection could be reconfigured to meet the sightline requirements at the intersection. This will be reviewed in more detail with GM BluePlan. This drawing illustrates a reconstructed Ochs Street. Township staff confirmed that the distance between the front of a snow plow and the driver's eye can fit in the 4.4 metre setback from the traveled way (see photo below). The design of the shifted retaining wall must consider the sight triangle for the snow plow and include the 4.4 metre setback to ensure proper sight distance for the snow plow driver.	GHD	Noted. The assessment was completed with design of the shifted retaining wall considering the daylighting triangle and to accommodate the sightline assessment for a snow plow design vehicle.
• A proposed cross-section is included in the study for new Streets A and B. The consultant suggests that the cross-section will accommodate a single lane of traffic in each direction plus parking on both sides of the road. This should be reviewed in more detail with GM BluePlan and Township staff. The paved portion of the road is proposed at 6.5 metres with a 1.25 metre shoulder on both sides. If there were cars parked on both sides of the road, there would not be 6 metres of clear width for a firetruck.	GHD	The proposed cross-section for Street A is based on the Township's design standards for a 20-metre right-of-way, however a sidewalk is provided only on the west side of the road due to the small number of units and limited sidewalk connectivity.
• MTO comments on the previous version of the TIS were provided to the consultant on August 2, 2023. MTO will have to provide further comments on this revised TIS. • We have shared these comments with staff from the County and they are in agreement with them.	GHD	Noted. The report has been updated to address all commens from the MTO.

7. Ministry of Transportation
Allan Hodgins
March 27, 2024

Comment	Consultant	Response
Highway 6 in close proximity to the subject property is a Class 2B – Provincial Arterial with a posted speed of 80 km/hr, and designated as a Controlled Access Highway (CAH). As such, all requirements, guidelines and best practices in accordance with this	N/A	

classification and designation shall apply.		
The owner should be aware that the property lies within MTO's Permit Control Area (PCA), and as such, MTO Permits are required before any demolition, grading, construction or alteration to the site commences. In accordance with the Ontario Building Code, municipal permits may not be issued until such time as all other applicable requirements (i.e.: MTO permits/approvals) are satisfied.	Owner	Acknowledged.
The MTO does not oppose the proposed zoning amendments, however the following comments will need to be addressed as conditions of draft plan approval or MTO permit.	N/A	Acknowledged.
Blocks and Land Use:		
It is premature to comment on any block configuration until a municipal road configuration is determined to be acceptable by MTO and supported by an approved Traffic Impact Study (TIS), MTO comments on the TIS detailed below. • The draft plans achieve MTO required 14.0m setback, however future submission should clearly show/label the setback along the Highway 6 frontage.	GHD	Noted.
Stormwater Management:		
• To ensure that stormwater runoff from this property does not adversely affect our highway drainage system or highway corridor, MTO requires the owner to submit a Storm Water Management Report (SWMR) along with the above-noted grading/drainage plans for the proposed development for our review and approval. MTO Stormwater Management Requirements for Land Development Proposals can be obtained from the following website: https://www.ontario.ca/page/resources-transportation-planners#section-5 o The owner's drainage consultant should refer to the ministry website for applicable IDF curves and the ministry's Stormwater Management Requirements for Land Development Proposals. http://www.mto.gov.on.ca/IDF_Curves/terms.shtml o The owner's drainage consultant shall ensure that all return periods are assessed (2yr, 5yr, 10yr, 25yr, 50yr, 100yr and Regional).	Crozier	Stormwater Management Report and associated reports submitted.
• Stormwater Management Blocks are to be assumed and owned by the Township	Crozier	Acknowledged.

of Puslinch.		
Site access & Traffic Impact Review		
All access to the development shall be from the County and Municipal Road network. The MTO preferred access is to be from Ochs St, to meet MTO access spacing requirements (400m minimum and 800m desirable) from the Highway 6 and Badenoch St intersection, as the existing Main St intersection does not meet access spacing requirements.	Weston	The proposed access is from Ochs Street.
MTO would be willing to review a sight line analysis as proposed by Township/County staff to review both locations to further support access, pending the following comments are addressed in a TIS resubmission:		
• MTO will require the MTO/TAC protocol analysis to be completed for all four legs of the intersection of Highway and Badenoch St. ○ Page 18, Section 7.1.1, only provides analysis for SBLT lane, analysis for the NB, WB, EB lanes shall be included in the resubmission.	GHD	The queuing analysis in Section 7.1.1 was completed for left-turn lanes only. Despite the subject site not generating any additional trips to the northbound left-turn movement, the section was revised to also include the NBL lane. The eastbound and westbound approaches do not have exclusive left-turn lanes resulting in no queuing analysis for the respective approaches.
• MTO will require the MTO/TAC protocol to be completed for the right turn lane analysis. ○ Page 19, Section 7.1.2, notes it is not possible, please see section below for information to perform right turn lane analysis.	GHD	Similar to the comment above, only the westbound approach has an exclusive right-turn lane and the queue assessment was only completed for that approach.
• The Synchro files show a PHF= 0.95-96 for future horizon years, MTO policy requires PHF= 0.88 (rural), or 0.92 (urban/suburban). ○ See section below regarding MTO PHF Policy to prepare the resubmission.	GHD	As confirmed through discussion with MTO staff, the existing PHF that is greater than 0.92 can continue to be used.
• In addition to the proposed intersection sightline analysis, MTO suggest alternative measure be reviewed and considered to support access from Ochs St (i.e. posted speed reduction, higher enforcement or photo-radar along this section.	GHD	Noted.

Proposed Conditions of Draft Plan Approval		
The following are MTO's proposed Conditions of Draft Approval:		
1. That prior to final approval, the owner(s) to submit to the Ministry of Transportation for review and approval, a copy of a Traffic Impact Study indicating the anticipated traffic volumes and their impact on Highway 6 and Badenoch St intersection. The Traffic Impact Study will be prepared in accordance with MTO's Traffic Impact Study Guidelines. The owner's transportation consultant shall be RAQS certified.	GHD	Condition of Draft Plan Approval.
2. That prior to final approval, the owner shall submit a stormwater management report along with grading/drainage plans for the proposed development for review and approval.	Crozier	Condition of Draft Plan Approval.
3. That Prior to final approval, the owner shall submit to the Ministry of Transportation for review and approval a draft copy of the M-Plan for this subdivision.	JD Barnes	Condition of Draft Plan Approval.
4. That prior to final approval, the owners shall provide the Ministry of Transportation for review and approval, the Conditions of Draft Plan Approval and Draft Subdivision Agreement to ensure our requirements have been incorporated.	Weston	Condition of Draft Plan Approval.
5. That prior to final approval, 0.3 metre reserve along Highway 6 frontage shall be identified on the final plan, and that the Owner's/Developer's Solicitor provides the Ministry of Transportation with a signed Undertaking to convey this block to the Ministry of Transportation immediately following registration of the plan, to the satisfaction of the Ministry of Transportation.		Condition of Draft Plan Approval.
Notes to Draft Plan Approval - Conditions of MTO Permits:		
The owner should be made aware that under the Public Transportation and Highway Improvement Act (PTHIA), MTO permits are required prior to development of the subject property. The owner shall submit site plans, site-servicing plans, grading plans, and drainage plans for the proposed development to MTO for review and approval.		Acknowledged.
1. MTO Building and Land Use permit(s) will be required prior to any bulk grading, and subdivision servicing.		Acknowledged.

2. MTO Building and Land Use permit(s) for all of the individual residential lots proposed, as all fall within the MTO Permit Control Area.		Acknowledged.

WESTON CONSULTING

Township of Puslinch
Planning and Development
7404 Wellington Road 34,
Puslinch, ON
N0B 2J0

September 5, 2024
File: 10779

County of Wellington
Planning and Development
74 Woolwich Street
Guelph, ON
N1H 3T9

Attn: Lynne Banks, Development and Legislative Coordinator, Township of Puslinch
Meagan Ferris, Manager of Planning and Environment, County of Wellington
Zach Prince, Senior Planner, County of Wellington

Re: Third Submission Zoning By-law Amendment and Draft Plan of Subdivision
11 Main Street, Morriston
Township of Puslinch

Weston Consulting is the planning consultant for WDD Main Street Inc., the registered owner of the lands located at 11 Main Street (Lot 31, Concession 8) in the Township of Puslinch (the "Subject Lands"). We are pleased to submit the following materials in support of a Zoning By-law Amendment and Draft Plan of Subdivision application for a proposed residential subdivision consisting of 20 detached dwelling lots, environmental protection lands, a stormwater management pond and municipal roads.

Description of Subject Property

The Subject Lands are currently vacant and located southeast of the Main Street and Badenoch Street intersection in Morriston. The Subject Lands are surrounded by open spaces to the east and south, and single-detached dwellings to the north and west. The Subject Lands have an approximate area of 23.48 hectares (58.03 acres) and an approximate frontage of 12 metres at the terminus of Main Street and 20 metres at the current terminus of Ochs Street.

The County of Wellington Official Plan designates the northwesterly portion of the Subject Lands as *Residential,* and the easterly and southerly portion of the subject lands as *Greenlands*, and a small portion is designated *Core Greenlands*. The Township of Puslinch Comprehensive Zoning By-law 023-18 zones the majority of the Subject Lands as *Future Development (FD2)* and a minor portion of the north-easterly corner as *Urban Residential (UR),* and a minor southeasterly and southerly portion of the subject lands as *Natural Environment (NE)*. The southwestern, southern and eastern part of the subject lands are overlayed by the Environmental Protection zone.

A portion of the subject lands to the west and south are within the Halton Region Conservation Authority (HRCA) regulated area and are subject to Ontario Regulation 162/06 which requires that all proposed development be reviewed and approved by the HRCA.

Background

A preliminary Concept Plan was submitted to the Township as part of a Pre-Consultation process to receive feedback and a list of required materials for a Complete Application. The Township provided Pre-Consultation comments to the applicant dated February 1st, 2022 which identified comments to be considered as well as materials required for a Complete Application for Zoning By-law Amendment and Draft Plan of Subdivision.

On March 1, 2023, a formal Zoning By-law Amendment and Draft Plan of Subdivision application were submitted to the Township and County. The submission was deemed incomplete on **May 3, 2023** due to comments that needed to be addressed. Detailed comments were provided from the Town on April 13, 2023.

An updated submission of Zoning By-law Amendment and Draft Plan of Subdivision applications was provide to the Township and County on January 10, 2024 addressing the comments from the previous submission. Detailed comments were provided by the Township on February 20, 2024.

The purpose of this submission is to provide the Township and County with the required materials, as requested through the previous submissions. It is our intent to move through the statutory planning process to address any outstanding comments. We ask that a Public Meeting be scheduled at the earliest available date to engage with the Public, and provide them an opportunity to provide comments through the appropriate statutory process.

Submission Materials

The following materials are being provided electronically, and address the requirements for a Complete Zoning By-law Amendment and Draft Plan of Subdivision Application.

No.	Document	Consultant	Date
1.	Draft Plan of Subdivision* (also considered General Arrangement Plan per GM Blue Plans comments)	Weston	September 9, 2024
2.	Draft Zoning By-law Amendment Text		September 2024
3.	Planning Justification Report*		September 2024
4.	Legal Survey	JD Barnes	September 20, 2022
5.	Hydrogeological Assessment* (incl. Nitrate Loading Assessment)	Englobe	August 28, 2024
6.	Hydrogeologist Response Letter		August 28, 2024
7.	Geotechnical Investigation*	Terraprobe	October 3, 2023
8.	Environmental Impact Study*	Colville	August 2024
9.	Tree Preservation Plan		August 23, 2024
10.	Fluvial Geomorphological and Meander Belt Assessment	GeoMorphix	February 17, 2023
11.	Meander Belt Cover Letter		December 21, 2023
12.	Meander Belt Width Report		February 17, 2023
13.	Functional Servicing and Preliminary Stormwater Management Report (Incl. Hydrologic and Hydraulic)*	Crozier	September 2024
14.	Engineering Plans (Grading, Servicing, Erosion & Sediment Control, SWM/Drainage)		August 29, 2024
15.	Traffic Impact Study*	GHD	June 28, 2024
16.	Stage 2 Archaeological Property Assessment	Amick Consultations Limited.	February 12, 2023

17.	Revised Phase 1 Environmental Site Assessment	Niagara Solis Solutions Ltd.	August 14, 2024
18.	Comment-Response Matrix	All	September, 2024

*Materials required by County for Draft Plan of Subdivision Application

Based on the County's Pre-Consultation comments, their preference is for the applications to be submitted concurrently for the review to also occur concurrently. As such, this submission is being provided to both the Township and County and address both their requirements for Complete Application for Zoning By-law Amendment and Draft Plan of Subdivision, respectively.

We trust that the above documents are sufficient for your review and circulation of the Zoning By-law Amendment and Draft Plan of Subdivision applications. Should you have any questions please contact the undersigned at ext. 315 or Michael Pizzimenti at ext. 365.

Yours truly,
Weston Consulting
Per:

Kayly Robbins, MPL, MCIP, RPP
Senior Planner

c. WDD Main Street Inc.