EXTERNAL MEMORANDUM

SUBJECT

Response to:
IAA Letter Dated February 15, 2023
Notification Regarding Potential Designation of the Baldwin East Aerodrome Project as a Designated Project under the *Impact Assessment Act*

TO

Susan Tiege
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COPIES

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FROM (the "Proponent")

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DATE March 1, 2023

Thank you for your letter referenced above. We have prepared this response in accordance with the timelines you have outlined providing us with fourteen (14) days to respond with a deadline of **March 1, 2023**.

To begin, we ask that you consider **Attachment 1** which outlines an executive summary of how we complied with the applicable federal Canadian Aviation Regulations (CARs) 307 related to Aerodrome Consultations. This is also captured in the May 30, 2022, Revision 3, Final Summary Report which you have referenced in your letter and remains available to the public on the project website at https://www.newaerodromeontario2021.ca/. The federal CARs 307 Aerodrome Consultation Process was initiated on November 2021 and was concluded on July 6, 2022.

Furthermore, **Attachment 2** includes a letter received from your department dated **April 28, 2022** which confirmed that the IAA does not apply and offered additional considerations as part future steps. It is our understanding that the IAA Agency was consulted by Transport Canada as part of the CARs 307 review process.

Attachment 3 contains relevant field studies that have been completed and are referenced in the Summary Report. Some of these studies were completed in advance of the CARs 307 process to better inform the Proponent on technical, environmental challenges and mitigations. These studies helped inform the final scope of the project which was presented in the Summary Report. On February 23, 2023 your office requested copies of these studies as part of our response.

On **July 6, 2022,** we were notified by Transport Canada that no further comments would be received and that the May 30, 2022, Revision 3, Summary Report met the requirements of CARs 307. Since that time, we (the "Proponent") have been preparing to implement the recommendations of the Summary Report including conducting supplemental environmental studies, planning construction and site preparation activities.

For the benefit of you and the IAA team, we have extracted **Section 7** from the Summary Report which captures the main areas of concern identified through the CARs 307 consultation process along with proposed actions to be taken by the Proponent to mitigate any significant adverse impacts. We believe this offers a very succinct and clear summary for your consideration and which forms part of the Proponents next steps in carrying out the project.

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7. SUMMARY OF PROPONENT ACTIONS

Based on the foregoing, the Proponent has summarized below the proposed actions to be taken in response to the CAR 307 process.

7.1 ENVIRONMENTAL

The following additional environmental studies and plans will be undertaken by the Proponent:

1. *Complete an Environmental Impact Study (EIS) to confirm the form and function of the existing natural heritage features. A full seasonal survey is expected for flora and wildlife and would include:*
    - *Breeding amphibians (March to May)*
    - *Breeding birds (June)*
    - *Confirmation of PSW Limits with MNRF (June-July)*
    - *ELC & flora (June)*
    - *Aquatic habitat assessment (May)*
2. *Develop compensation plans for:*
    - *Off-site wetland/habitat/Woodlot enhancement*
    - *On-site wetland/habitat/Woodlot enhancement*
3. *Final Stormwater Management Plan including Sediment and Erosion Control*

4. *Final Hydrogeological Study related to Groundwater Impacts including Water Balance*
5. *Final Design and provincial approvals for Septic Tank/Tile Field Sewage Treatment/Disposal.*
6. *Final Design and provincial approvals for drilled wells and distribution system.*
7. *Prepare an Environment Management Plan for the operation of the airport.*
8. *Prepare a Wildlife Management Plan for the operation of the airport using inputs from the EIS to prepare an appropriate risk assessment/mitigation plan for wildlife present on and around the new aerodrome.*
9. *Use low power consumption LED airfield and landside lighting.*
10. *Prepare an aircraft noise study (NEF) to confirm noise compatibility of the airport and surrounding land uses.*
11. *Prepare an air quality/emissions study to assess the change in air quality related to the proposed new aerodrome.*
12. *Obtain permit approvals from federal agencies as required including DFO/MNR or Environment Canada. i.e., species at risk, migratory birds.*

7.2 FILL CONCERNS

The following actions are proposed with respect to the importation of fills for the project:

1. *The Importation of fills must comply with latest soil testing requirements under Provincial Regulation 406/19 of the Environmental Protection Act.*
2. *The Proponent will respect the material testing requirements outlined in the Town of Georgina fill bylaw.*
3. *The Proponent will prepare a Construction and Traffic Management Plan to address the truck related traffic that will come with fill operations. This will include designating routes to limit impacts on residents, respecting time restriction, seasonal load limitations etc.*
4. *The Proponent will design the Site Access Plan to control entry and exit points to enable strict control of truck entering the site.*
5. *The Proponent will implement a Soils Management Plan to be put in place to monitor, control soil importation, placement, testing and tracking of materials. This plan would be prepared and managed by a professional engineering firm qualified in this field.*
6. *The project will include a comprehensive Erosion and Sedimentation Control Plan for the construction phase. This plan will include the latest guidance from the LSRCA and Town of Georgina.*

7.3 AERONAUTICAL PLANNING AND SAFETY

The following actions are proposed with respect to enhancing overall aeronautical safety and compatibility with the surrounding area:

1. *The Proponent will design the new aerodrome to Transport Canada airport design standards TP312 5th Edition.*

2. *The Proponent will publish noise abatement procedures to inform the aeronautical community of noise sensitive areas and to avoid overflights of the provincial parks.*
3. *The Proponent will monitor and advocate for the use of a Mandatory Frequency (MF) designation in the area in the future should air traffic activity dictate. This would be implemented in consultation with Transport Canada and NAV CANADA.*
4. *The Proponent will consider the implementation of a future aerodrome community liaison committee to create an effective means to share updates and to consider community inputs into the operation of the aerodrome.*

7.4 MUNICIPAL AND SERVICING INFRASTRUCTURE

The following actions are proposed with respect to addressing concerns related to municipal infrastructure:

1. *The Proponent will prepare of a traffic study to properly assess the impacts on the provincial and regional road system related to the construction phase and operational phase of the aerodrome.*
2. *The Proponent will also create a construction management plan that would assess and make recommendations related to use of provincial and regional roads to mitigate issues related to: dust, safety, noise, routes to avoid residential areas, seasonal load limitations etc. The proponent currently proposes access only via Provincial Highway No. 48 and Regional Road 79 (Old Homestead).*
3. *As per York Region's long-term plans to enhance Old Homestead Road, the Proponent has accounted for the future conveyance of lands along the southern limits of our site for the purpose of Old Homestead Road upgrades for a 30m right-of-way.*
4. *The Proponent proposes to service the proposed development using septic tanks and tile files in compliance with the Ontario Building Code and Reasonable Use Criteria.*
5. *The Proponent will provide water servicing by way of drilled wells similar to surrounding properties with appropriate treatment.*
6. *Fire water storage is proposed using an inground storage tank and standpipe system with appropriate fittings to match those used by the local fire department.*
7. *Power and communication lines will be extended into the site from Old Homestead Road.*

7.5 AGRICULTURE

The following actions are proposed with respect to addressing concerns related to loss of agricultural land:

1. *The new aerodrome will impact about 3.5 ha of the former agricultural land which will be required for the construction and operation of the new east-west runway. The remaining areas of 8.5 ha could remain available for farming until future aviation demands require the lands for other purposes. However, the Proponent further*

commits to offering up to 18 ha of land west of the new runways for farming activities until such time as the proponent determines that there are aeronautical business development opportunities for these lands.

2. *The Proponent will adopt Transport Canada recommendations to a noise study specifically to assess peak noise levels (per TP1247) should there be any local poultry or fur farms identified in close proximity to the proposed aerodrome.*
3. *Airports are inherently compatible with agricultural land uses. Open space, large flat cultivated fields, livestock has been shown to acclimatize to noise and traffic (Transport Canada). The Town of Georgina Zoning Bylaw recognizes this by permitting aerodromes in rurally zoned areas.*
4. *Some agricultural fields can be classified as posing limited risk as long as they remain inactive. The moment cultivation begins; the degree of risk escalates, since the turning of soil, seeding, etc., increase the attraction to wildlife. However, Transport Canada offers recommendations for remedial actions in the Wildlife Control Procedures Manual (TP 11500) which will be used by the Proponent in future operational risk management.*

7.6 CONSULTATION PROCESS

The following actions are proposed with respect to addressing concerns related to consultation process:

1. *Given the level of interest and concerns expressed through consultation period, the Proponent modified the CAR 307 process by circulating the* ***Draft*** *Summary Report back to the Interested Parties for review and comments.*
    a. *This offered Interested Parties an opportunity to learn more about the project and the actions to be taken by the Proponent.*
    b. *This review period offered an added 14-day review period allocated prior to submission formally to the Minister of Transport.*
    c. *The comments received were considered in the preparation of this Final Summary Report to the Minister.*
2. *To foster effective community communications in the future, the implementation of a community liaison committee could be considered.*

7.7 INDIGENOUS CONSULTATIONS

The following actions are proposed with respect to addressing concerns related to the Indigenous Consultations:

1. *The Proponent will continue to engage and communicate with First Nations and in particular the Georgina Island First Nations. The final Stage 1 Archaeological Assessment Report and the Record of Indigenous Engagement Reports will be circulated as part of future design development subject to the outcome of the CAR 307 process.*
2. *The Proponent will continue to invite the participation of FN in future assessments.*

Further to your request, we have prepared **Table 1** that addresses each of your concerns with references to the May 30, 2022, Revision 3 Summary Report. Page numbers referenced are those printed on the pages (not the PDF Page #s). We have also included key highlights of the analysis, mitigations proposed including references to supplemental studies that should be completed by the Proponent.

TABLE 1 – SUMMARY REPORT REFERENCES TO IAA SPECIFIC POINTS

Requested Information	Reference to Final Summary Report, Revision 3, May 2022	Additional Comments
Potential impacts to fish and fish habitat (e.g., surface water contamination from runoff into Lake Simcoe via the Burnie Creek).	Page 14, row labelled “Watercourses and Fish Habitat” Page 56, Row 3. Page 61, Row 8 “Environmental Impact Studies (EIS)” Page 95, Section 7.1 “Environmental”	The report identifies the need for additional field aquatic surveys and need to ensure federal permitting under the Federal Fisheries Act (1985) An Erosion and Sedimentation management plan will be implemented during construction to ensure no significant impacts on the natural water course downstream of the site. Best practice and guidance from the Lake Simcoe Region Conservations Authority and the Town of Georgina will be used to develop this plan.
Potential impacts to species at risk and/or their habitat (e.g., from changes to, or loss of, critical habitat);	Page 15, row labelled “Habitat of Endangered and/or Threatened Wildlife” Page 54, Row 1 The report clearly indicates that the proponent to “Obtain permit approvals from federal agencies as required including DFO/MNR or Environment Canada. i.e., species at risk, migratory birds.” (See Page 95, point 12) Page 61, Row 8 “Environmental Impact Studies (EIS)”	Identifies that the project must consider federal Species at Risk Act (2004). A major portion of Provincially Sensitive Wetland is preserved at the southern limits of site. A total of 22.7 ha of wetland will be retained and will not be disturbed. Additional field studies are proposed related to species at risk, wetland limits migratory bird nesting and DFO in-water permitting for proposed culvert upgrades for the entrance road are planned. Next steps also include developing additional mitigation strategies through and Environmental

TABLE 1 – SUMMARY REPORT REFERENCES TO IAA SPECIFIC POINTS

Requested Information	Reference to Final Summary Report, Revision 3, May 2022	Additional Comments
	Page 95, Section 7.1 “Environmental”	Impact Study (EIS) along with working with the local conservation authority and environmental groups to develop compensation plans at local parks, conservation areas or onsite and adjacent wetland complexes. Additional field studies are proposed related to species at risk, wetland limits migratory bird nesting and DFO in-water permitting for proposed culvert upgrades for the entrance road are planned.
Potential impacts to migratory birds and/or their habitat (e.g., from changes to, or loss of, habitat);	Page 15, reference is made to appliable regulations need to be adhered to related to Migratory Birds Convention Act (1994). Page 21, reference to Migratory Birds Convention Act (1994) Page 54, R ow 1 The report clearly indicates that the proponent to “Obtain permit approvals from federal agencies as required including DFO/MNR or Environment Canada. i.e., species at risk, migratory birds.” (See Page 95, point 12)	Additional field studies are proposed related to species at risk, wetland limits migratory bird nesting and DFO in-water permitting for proposed culvert upgrades for the entrance road are planned. Next steps also include developing additional mitigation strategies through and Environmental Impact Study (EIS) along with working with the local conservation authority and environmental groups to develop compensation plans at local parks, conservation areas or onsite and adjacent wetland complexes. Additional field studies are proposed related to species at risk, wetland limits migratory bird nesting and DFO in-water permitting for proposed culvert upgrades for the entrance road are planned.

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Requested Information	**Reference to Final Summary Report, Revision 3, May 2022**	**Additional Comments**
	Page 60, Row 7 Page 61, Row 8 "Environmental Impact Studies (EIS)" Page 95, Section 7.1 "Environmental"	If applicable, aeronautical publications will contain advisories to pilots related to bird activity in the vicinity of the aerodrome.
Potential impacts to wetlands and wetland function;	Page 11, Table 2, Row 2 – Wetland protection area and Section 3.3 outlining how majority of site will remain open space or wetland. Page 13, Row labelled "Provincially Significant Wetlands" Page 14, Row labelled "Unevaluated Wetlands" Page 54, Row 1, "Wetland Impacts" Page 54, Row 2 "Groundwater Resource Impact" Page 61, Row 8 "Environmental Impact Studies (EIS)"	A preliminary Natural Heritage Study was completed in the Summer/Fall 2021 to understand site conditions and opportunities and constraints. The findings of this study have been used to optimize the aerodrome layout to minimize impacts. A major portion of Provincially Sensitive Wetland is preserved at the southern limits of site. A total of 22.7 ha of wetland will be retained and will not be disturbed. Additional field studies proposed related to species at risk, wetland limits migratory bird nesting and DFO in-water permitting for proposed culvert upgrades for the entrance road are planned. Next steps also include developing additional mitigation strategies through and Environmental Impact Study (EIS) along with working with the local

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	Page 95, Section 7.1, Point 2, Develop compensation plans for: • Off-site wetland/ habitat/Woodlot enhancement • On-site wetland/ habitat/Woodlot enhancement	conservation authority and environmental groups to develop compensation plans at local parks, conservation areas or onsite and adjacent wetland complexes. Additional field studies are proposed including: • Seasonal field studies to fully establish the existing conditions and determine if regulated species are present (e.g., bats, breeding birds, breeding amphibians and flora); • Assess the subject property for any headwater drainage features and determine ecological and hydrological functions; • Site visit and discussions with LRSCA/MNRF to confirm and stake the driplines and wetland boundaries; and • Determine the applicability of the policy framework relative to the proposed aerodrome which is regulated under the Federal Aeronautics Act.
Potential impacts to Greenbelt Plan Area within the Natural Heritage System of the Protected Countryside	Page 85, Row 45 “York Region – Planning Policy and Natural Heritage Features”	The Proponent recognizes that the proposed aerodrome is located on lands currently designated as “Agricultural Protection Area”, “Environmental Protection Area” and entirely within the “Greenlands

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Requested Information	Reference to Final Summary Report, Revision 3, May 2022	Additional Comments
designation per the Greenbelt Plan, 2017;	Page 86, Row 46 "York Region – Agricultural Area" Page 88, Row 48 "Town of Georgina - Greenbelt Plan" Appendix J Exhibit 14	System" as shown in the Town of Georgina Official Plan, 2016." References are made by the York Region that the new aerodrome is located within the Greenbelt Plan Area and , within Natural Heritage System of the Protected Countryside designation per the Greenbelt Plan, 2017. The site is also within the "Greenbelt Protected Countryside" as shown on Map 1 of the York Region Official Plan, 2010 (YROP). The Proponent has considered these sensitive features in the proposed layout and preliminary design of the new aerodrome by orienting the facility to avoid the most sensitive wetland features to the south and to reduce the number of imperious areas to encourage water balance and pre-post storm water management strategies. A preliminary Natural Heritage Study has been completed and the Proponent anticipates completing additional studies to ensure environmental impacts are fully delineated and addressed and resultant mitigation plans implemented. Additional environmental studies are proposed to better delineate the natural heritage features including the water recharge zones to ensure

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		appropriate mitigations are implemented including minimizing impervious areas, promote infiltration of runoff, restrictions on the use of de-icing fluids, fuel spill containment etc. The proponent will further develop grading plans and landscaping schemes to mitigate as much as possible visual landscape impacts as viewed from Old Homestead and Morning Glory using natural wetland and vegetation buffers. The proponent commits to engaging with the LSRCA in developing reasonable environmental mitigation plans. Refer to Appendix J Exhibit 14 that shows the proposed aerodrome basic outline overlayed on natural heritage features shown on maps from the LSRCA. These maps were provided in the Town of Georgina response letter and now include the aerodrome development outline to demonstrate how the Proponent has respected as much as possible these natural features, recognizing that there will be some impacts that require further study and mitigation plans.

TABLE 1 – SUMMARY REPORT REFERENCES TO IAA SPECIFIC POINTS

Requested Information	Reference to Final Summary Report, Revision 3, May 2022	Additional Comments
Potential impacts to surface water and/or groundwater quality, including drinking water;	Page 18, Section 3.9 "Preliminary Hydrogeological Assessment" Pages 19 and 20 Section 3.10 "Functional Servicing Study And Stormwater Management" Page 54, Row 2 "Groundwater Resource Impact" Page 63, Row 12, "Contaminated Fills and Impact on Surface/ Groundwater" Page 95, Section 7.1, Point 4 "Final Hydrogeological Study related to Groundwater Impacts including Water Balance" Appendix J Exhibit 3.	A preliminary hydrogeological assessment has been prepared with the following findings: The water demands for the site can be accommodated with no significant impacts on surrounding wells. Sewage treatment and disposal using traditional septic system and tile fields can be accommodated on the site while respect the provincial Reasonable Use Criteria. Refer to Section 3.9 and 3.10 of this report for additional details. It is proposed to complete additional hydrogeological studies to ensure that the proposed development does not have a significant impact on the groundwater recharge characteristics of the site. Exhibit 3 shows the proposed aerodrome overlay on existing environmental mapping showing a potential conflict with existing ground water recharge areas. This proposed study will be used to further modify the design to mitigate any impacts. As noted in the preliminary storm water management study completed as outlined in Section 3.9 and 3.10, given the very large open, turf areas and the retention of the wetland along the southern end of the site, a

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		water balance post-construction can be achieved through inline shallow grass swales and infiltration basins. There were several references made by Interested Parties regarding the use of salt on the airfield. Road salt is not used on airfields as it is very corrosive to aircraft metal. As such, airfield "road" salt impacts on ground water will not occur. Aircraft de-icing fluids may be used at the aerodrome but in very low volumes De-icing is typically only used at larger commercial airports. However, should this service be offered, there will be a designated location where aircraft will need to park, and the pavements will slope to drain any de-icing fluids into a holding tank for collection for off-site disposal. Any de-icing fluids that may spray or stray from this collection area, would be travel through grass swales and eventually be collected through a proposed stormwater management system. Routine testing of the water runoff will form part of an overall environmental management plan to ensure water quality continues to meet federal guidelines. The Proponent would also consider restricting any de-icing operations for emergency use only and would be incorporated into their emergency operations and environmental plans.

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		Fuel/oil spills will be managed through oil/grit separators to be installed in line with the stormwater collection system. The proposed aircraft fuel system will be an above ground system built to current regulatory standards and will be installed in a containment system as added protection.
Potential impacts from the use of contaminated soil fill, including on human health;	Page 18, Section 3.8, Point 5 Page 62, Row 11 "Fill concerns/ Town of Georgina Bylaw 2011-0044 (REG1) – Bylaw to Prohibit or Regulate Removal of Topsoil, Placing Fill or Altering Grades" Page 63, Row 12 "Contaminated Fills and Impact on Surface/ Groundwater" Page 63, Row 13 "Truck Traffic on Local Road Networks" Page 63, Row 14 "Volume of Fill" Page 64, Row 15 "Change in Contours/Shape of Land"	If excess excavated soils requiring transportation off-site are generated or if soils are to be imported to the site, a program of sampling and chemical testing will be needed to determine the chemical properties of the soil to evaluate appropriate receiving site options, in accordance with O.Reg. 406/19. The project will not involve removal of topsoil or other material from the site. All existing materials will be re-used within the property and for the project. No material will be taken offsite. Fill will be required and will exceed the limits set out in the bylaw. Preliminary estimates for imported fill volume are over 1.2 million cubic metres consisting of structural fills for building and pavement construction and common fills for the large, landscaped areas. The fill requirements for the

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	Page 64, Row 16, "Stormwater Runoff and Erosion and Sedimentation Control" Page 96, Section 7.2 "Fill Concerns" Appendix J Exhibit 4 and 5.	project are dictated by aeronautical design requirements which ensure the safe operation of aircraft at the facility and may still vary subject to final design and implementation of the CAR 307 mitigation measures. The grading of the site will respect the natural contours to ensure the natural drainage patterns are not altered. The natural water shed divide of the site will not change. The Proponent proposes to also adhere as reasonably required to operational/construction related restrictions as outlined in the Town Bylaw including limits on fill operation hours, traffic studies and impact mitigation, weather consideration i.e., dust/mud. The Schedule C environmental control program requirements in the Bylaw would be incorporated into the project Material/Construction Management Plan. Refer to Exhibit 4 for aerial renderings demonstrating the limits and general change in topography associated with the proposed aerodrome. A Soils Management Plan will be put in place to monitor, control soil importation, placement, testing

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		and tracking of material source, transportation routes and location of placement on the site. The Proponent will complete a traffic study to confirm the proposed project will not negatively impact local and regional road networks during and after construction. The Proponent will create a construction/traffic management plan typical of major construction projects to manage, monitor and control construction equipment movement to and from the site on local road systems. Provincial and Regional roads will be used for this purpose as shown in Exhibit 5. Some public comments suggest that the runways will be 20m in the air. This will not be the case. To comply with Transport Canada airport design standards, grading constraints extend well beyond the physical runway pavement. The site will be graded to an average of 2-3m above the existing ground levels to meet the aeronautical requirements. This is based on preliminary design analysis and may vary subject to final design and the

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		CAR 307 process. Some fill areas will be more, and some will be lower. The project will be guided by a Storm Water Management Study and Recommendations. The SWM study will reflect all current best practices of the LSRCA and other provincial authorities. The project will be guided by a comprehensive Erosion and Sedimentation Control Plan including requirements of the LSRCA and Town of Georgina.
Potential adverse effects on air quality, including on human health; and	Page 58, Row 5 “Emissions” Page 95, Section 7.1, Point 11	The impact on regional emissions should be neutral as this airport is proposed to offset the closure of the Buttonville Municipal Airport. The Proponent will prepare an air quality and emissions study to demonstrate the impacts on local air quality will not be significant. Similar studies have been completed for other municipal airports in Southern Ontario and found that general aviation contributes imperceptible levels of contaminants to the local areas.

TABLE 1 – SUMMARY REPORT REFERENCES TO IAA SPECIFIC POINTS

Requested Information	Reference to Final Summary Report, Revision 3, May 2022	Additional Comments
Potential impacts on Indigenous peoples on the following: **- health, social or economic conditions.** **- current use of lands and resources for traditional purposes (e.g. hunting, fishing, trapping, gathering); and** **- any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.**	Page 15, Section 3.7 “Stage 1 Archaeological Assessment and Indigenous Engagement” Page 32, Section 5.7 “Indigenous Engagement” Page 93, Row 52 “Indigenous Consultation/Lack of Engagement” Page 94, Row 53, “Interests in Land/Hunting/Trapping Rights” Page 98, Section 7.7 “Indigenous Consultations” Appendix D – “Indigenous Engagement”	The proponent initiated a Stage 1 Archaeological Assessment in September 2021. This involved formally contacting eight (8) FN. A formal Record of Indigenous Engagement has been maintained and was formally submitted along the findings of the Stage 1 Assessment to the MHSTCI – Ministry of Heritage, Sport, Tourism and Culture Industries The Stage 1 report has also be made available to all FN that requested copies through the engagement process. The Stage 1 report and the Record of Indigenous Engagement Report have been entered into the ***Ontario Public Register of Archaeological Reports, as of September 15, 2022.*** In response to statement made by the Town of Georgina, the local MP and Georgina Island First Nation (GIFN) that the GIFN was not contacted, the proponent issued a formal communication to the Town of Georgina on December 17, 2021, advising that they indeed were contacted and that they were invited to participate in the site review in September 2021. GIFN originally accepted the invitation but was unable to attend. GIFN requested to be remain

TABLE 1 – SUMMARY REPORT REFERENCES TO IAA SPECIFIC POINTS

Requested Information	Reference to Final Summary Report, Revision 3, May 2022	Additional Comments
		informed and has received a copy of the original site assessment. A copy of the correspondence related to the GIFN engagements is included in Appendix D along with the draft Record of Indigenous Engagement Report being prepared for this project. The Proponent will continue to engage and communicate with First Nations and in particular the Georgina Island First Nations. The final Stage 1 Archaeological Assessment Report and the Record of Indigenous Engagement Reports will be circulated as part of future design development subject to the outcome of the CAR 307 process.

In addition to the above, the following offers supplemental inputs are provided in response to your requests:

IAA Request #1:

1. Information about key project activities, maps and layouts of the location of project components, land tenure, zoning, and estimated timelines for planning, construction, operation, decommissioning and abandonment.

   Proponent Response to #1

   The Summary Report provides a significant level of project detail and descriptions to address your requests related to overview of project activities, maps and layouts of the location of project components, land tenure, zoning. For ease of reference, please consider the following all of which has not been repeated in this letter.

   - *Page 3, Section 2.2 – General Project Description*
   - *Page 7, Figure 2 - Proposed Project and Regional Location*
   - *Page 10, Section 3 - Proposed New Aerodrome Technical Studies and Details*
   - *Page 85, Table 9, Row 44 through to Page 92 Row 51*
   - *Appendix J – All Exhibits Demonstrate Maps, Layouts,Land Tenure, Zoning etc. along with rationale for project design and mitigation strategies.*

   The following represents the estimated project implementation timeline. Some of these dates have been modified from those shown in the Summary Report.

   It should be noted that the CARs307 Summary Report is valid for a period of five (5) years after which the process must be completed again if the project has not been completed. In this case the Summary Report validity period is up to July 2027.

   - *Planning, Environmental Studies and Design – 2022-2023*
   - *Construction – 2024-2025*
   - *Operation – 2026+*
   - *Decommissioning – Not Applicable*
   - *Abandonment – Not Applicable*
   - ***CARs307 Summary Report Valid Until – July 2027***

For additional detail, during construction of the airport the following activities are anticipated:

- *Tree trimming and clearing*
- *Grubbing*
- *Topsoil stripping*
- *Earth excavation*
- *Subgrade preparation*
- *Placement and compaction of granular materials and asphalt*
- *Installation of grassed ditches/swales, catchbasins and subdrain*
- *Pavement markings*
- *Placement of topsoil*
- *Installation of culverts*
- *Installation of fencing*
- *Preparation of landside roads/carpark and entrance*
- *Installation of visual aids for the airfield*
- *Conduits and cabling*
- *Club house and utility buildings*

During construction, there will be temporary facilities to accommodate construction including site trailers, and material and equipment storage yards. Temporary access roads to accommodate construction delivery of materials and worker access will also be constructed utilizing existing local and onsite roads. All construction activities, locations of stockpiles, equipment and material yards would need to meet the site management plans and material management plans including any mitigations outlined in a traffic study.

Once operational, the following typical activities would occur to support the aerodrome:

- *Sweeping*
- *Grass cutting*
- *Pavement marking repainting*
- *Pavement repairs*
- *Crack sealing*
- *Foreign Object Debris inspections*
- *Wildlife inspections*
- *Maintenance of visual aids*
- *Aircraft operations*

IAA Request #2-#4

2. A list of all regulatory approvals (federal, provincial, municipal, other) and any federal financial assistance that would be required for the Project and the associated project components or activities.

   a) For each regulatory approval that would be required, please provide the following information:

      i. Name of the licence, permit, authorization or approval, the associated legislative framework, and the responsible jurisdiction.

      ii. Whether it would involve an assessment of any of the effects outlined in the paragraphs above, and if so, a general description of the assessment that you intend to undertake. Would conditions be set and if yes, what effects would those conditions address?

      iii. Whether public and/or Indigenous consultation would be required and if yes, provide information on the approach you intend to take (if any steps have been taken, please provide a summary, including issues raised as well as your responses).

   b) Identify whether any licence, permit, authorization or approval listed above would address any of the issues indicated by the requestor.

      i. If yes, discuss, in general, the benchmarks or standards that you intend to meet (or would be expected to meet).

      ii. If the Project is anticipated to result in permanent changes or cumulative effects, how you intend to manage those impacts.

4. For all federal licences, permits, authorizations, approvals, and/or financial assistance that may be provided for the Project, describe any anticipated adverse direct or incidental effects (including changes to health, social and economic conditions) that may occur as a result.

Proponent Response to #2-#4

No federal financial assistance is proposed for this project.

*See **Table 2** below that captures or response related to the above.*

TABLE 2 – SUMMARY OF REGULATORY APPROVALS ANTICIPATED TO BE REQUIRED				
Regulatory Approval Considered	**Authority/ Jurisdiction**	**Assessment of Impacts of Concern , Benchmarks and Address Requestor Issues**	**Public/ Indigenous Consultations**	**Permanent Changes/ Adverse Impacts and Managing Them (including changes to health, social and economic conditions)**
Canadian Aviation Regulations 307 – Aerodrome Consultations	Federal (Aeronautics)	Benchmark is the Regulation itself that outlines the requirements. Refer to Summary Report Page 22, Section 4 that outlines compliance with the Regulation. The Summary Report and process addresses the requestor's issues which are cross-referenced in Table 1 above and addressed in Table 9 on Page 54. The Summary Report sets out all conditions required which are also summarized in Page 95 Section 7. The Summary Report considered all of the Requestors and other public inputs.	Both the public and Indigenous consultations were completed and mandated as part of the CARs307 process. Refer to Summary Report Section 4, 5 and 6 that documents the consultation process. The report Appendices captures all consultation communications.	Sections 6 and 7 of the Summary report capture how the changes will be managed and actions to be taken to mitigate impacts. The authorization under CARs 307 will permit the site to operate as an aerodrome. Refer to Page 3, Section 2.2 that outline the benefits of General Aviation in Canada. Page 54, Table 9 further identifies issues, mitigations and resulting impacts. Refer also to Appendix J for Exhibits that describe various mitigations graphically as described in the Summary Report. Page 82, Rows 37 through 39 document social and

TABLE 2 – SUMMARY OF REGULATORY APPROVALS ANTICIPATED TO BE REQUIRED

Regulatory Approval Considered	Authority/ Jurisdiction	Assessment of Impacts of Concern , Benchmarks and Address Requestor Issues	Public/ Indigenous Consultations	Permanent Changes/ Adverse Impacts and Managing Them (including changes to health, social and economic conditions)
				economic benefits associated with the project. There is the potential adverse social impact related to reduce land values. Page 84, Row 39 addresses this in the Summary Report and demonstrates how the proposed project mitigates and offers the potential for increased land values.
Canadian Aviation Regulations 301 – Aerodromes	Federal (Aeronautics)	Benchmark is the Regulation itself that outlines the requirements. Refer to Summary Report Page 22 Section 3.11 confirms that the project will be designed to comply Transport Canada recommendations for airport which would meet Regulation 301.	The new aerodrome triggered the requirement for Regulation 307 outlined above. Both the public and Indigenous consultations were completed and mandated as part of the CARs307 process.	Sections 6 and 7 of the Summary report capture how the changes will be managed and actions to be taken to mitigate impacts. The authorization under CARs 307 will permit the site to operate as an aerodrome. Refer to Page 3, Section 2.2 that outline the benefits of General Aviation in Canada.

TABLE 2 – SUMMARY OF REGULATORY APPROVALS ANTICIPATED TO BE REQUIRED

Regulatory Approval Considered	Authority/ Jurisdiction	Assessment of Impacts of Concern , Benchmarks and Address Requestor Issues	Public/ Indigenous Consultations	Permanent Changes/ Adverse Impacts and Managing Them (including changes to health, social and economic conditions)
			Refer to Summary Report Section 4, 5 and 6 that documents the consultation process. The report Appendices captures all consultation communications.	Page 54, Table 9 further identifies issues, mitigations and resulting impacts. Refer also to Appendix J for Exhibits that describe various mitigations graphically as described in the Summary Report. Page 82, Rows 37 through 39 document social and economic benefits associated with the project. There is the potential adverse social impact related to reduce land values. Page 84, Row 39 addresses this in the Summary Report and demonstrates how the proposed project mitigates and offers the potential for increased land values.

TABLE 2 – SUMMARY OF REGULATORY APPROVALS ANTICIPATED TO BE REQUIRED

Regulatory Approval Considered	Authority/ Jurisdiction	Assessment of Impacts of Concern , Benchmarks and Address Requestor Issues	Public/ Indigenous Consultations	Permanent Changes/ Adverse Impacts and Managing Them (including changes to health, social and economic conditions)
NAV CANADA Land Use Approval	Federal (Aeronautics)	The project must meet the test of No Objection from this authority. NAV CANADA confirmed no objection in their response. Refer to Page 32, Section 5.6 of Summary Report.	NAV CANADA consults with and advises adjacent and regional airport and airspace operators. The Proponent is not responsible for these consultations.	Page 32, Section 5.6 and Appendix C contains the NAV CANADA no objection. The proposed aerodrome as a result will not negatively impact the air transportation networks in the area and can operate safely. No impacts to major air transportation networks for Greater Toronto Area. No impacts are anticipated to health, social and economic conditions as a result of this approval. A potential adverse impact on air traffic conflicts with other small general airports in the vicinity are mitigated

TABLE 2 – SUMMARY OF REGULATORY APPROVALS ANTICIPATED TO BE REQUIRED

Regulatory Approval Considered	Authority/ Jurisdiction	Assessment of Impacts of Concern , Benchmarks and Address Requestor Issues	Public/ Indigenous Consultations	Permanent Changes/ Adverse Impacts and Managing Them (including changes to health, social and economic conditions)
				through the proposed alignment of the runways and recommendations to consider future Mandatory Frequencies as outlined on Page 96, Section 7.3 Aeronautical Planning and Safety point No. 3.
Department of Fisheries and Oceans (DFO) **Federal Fisheries Act (1985)**	Federal	Any potential in-water/stream work proposed onsite would be subject to this approval under the Department of Fisheries and Oceans (DFO). This would trigger a potential HADD (Harmful Alteration, Disruption, or Destruction) of Fish Habitat. DFO permits will involve additional aquatic field studies which are recommended in the Summary Report, Page 95, Section 7.1. DFO requirements including	DFO typically does not involve public consultations. Not Anticipated but may be requested based on past experience subject to complexity of the application.	The Project has been currently designed to avoid any in water activities protecting the natural waterway and wetland at the southern limits of the site. Based on the current use of only one stream crossing where an existing culvert already exists combined with DFO permitting, any adverse impacts are mitigated and will not be significant. Refer to Summary Report

TABLE 2 – SUMMARY OF REGULATORY APPROVALS ANTICIPATED TO BE REQUIRED

Regulatory Approval Considered	Authority/ Jurisdiction	Assessment of Impacts of Concern , Benchmarks and Address Requestor Issues	Public/ Indigenous Consultations	Permanent Changes/ Adverse Impacts and Managing Them (including changes to health, social and economic conditions)
		approve by appointed DFO biologist is required. The project affects only one existing culvert crossing within an existing watercourse. The existing culvert location will be re-used to avoid significant changes to existing conditions. Any upgrade to the culvert will include provisions to protect the existing aquatic habitat.		Page 54-57,Rows 1 through 4. Appendix J – Exhibits 4, 14 and 15
Migratory Birds Convention Act (1994)	Federal	Any potential impacts during construction and operations would be subject to any approvals or compliance with this Act. Additional field studies are recommended in the Summary Report, Page 95, Section 7.1. The outcome of this study and recommendations would be	Not Anticipated.	It is anticipated that during construction of the project, there will be restrictions when certain operations will be permitted to avoid nesting birds. These restrictions will be met to mitigate impacts. During operation of the airport reference is made in the Summary report to Transport Canada

TABLE 2 – SUMMARY OF REGULATORY APPROVALS ANTICIPATED TO BE REQUIRED

Regulatory Approval Considered	Authority/ Jurisdiction	Assessment of Impacts of Concern , Benchmarks and Address Requestor Issues	Public/ Indigenous Consultations	Permanent Changes/ Adverse Impacts and Managing Them (including changes to health, social and economic conditions)
		incorporated into the project design, construction and future operations.		recommended Wildlife Control Procedures Manual (TP 11500) which would be used as a guideline to manage airport operations and bird activity. As a result no signifant adverse impacts are anticipated to health, social and economic conditions.
Species at Risk Act (2004)	Federal	Any potential impacts during construction and operations would be subject to any approvals or compliance with this Act. Additional field studies are recommended in the Summary Report, Page 95, Section 7.1. The outcome of this study and recommendations would be incorporated into the project	Not Anticipated.	It is anticipated that during construction of the project, there will be restrictions when certain operations will be permitted to avoid nesting birds. These restrictions will be met to mitigate impacts. During operation of the airport reference is made in the Summary report to Transport Canada recommended Wildlife

TABLE 2 – SUMMARY OF REGULATORY APPROVALS ANTICIPATED TO BE REQUIRED				
Regulatory Approval Considered	Authority/ Jurisdiction	Assessment of Impacts of Concern , Benchmarks and Address Requestor Issues	Public/ Indigenous Consultations	Permanent Changes/ Adverse Impacts and Managing Them (including changes to health, social and economic conditions)
		design, construction and future operations.		Control Procedures Manual (TP 11500) which would be used as a guideline to manage airport operations and bird activity. As a result no signifant adverse impacts are anticipated to health, social and economic conditions.
Stage 2 and 3 Archaeological Assessments (Ministry of Tourism, Culture and Sport (MTCS)	Provincial	Stage 2 and 3 Archaeological Assessments were recommended in the Stage 1 Report. These were recommended based on the findings and consultations that occurred as part of the Summary Report preparations. These reports will be completed in accordance with accepted practices of the Province of Ontario and the	Indigenous engagement will be undertaken similar to that completed for the Stage 1 studies completed as part of the CARs307 process.	The findings of these studies will guide any pre-construction preparations or mitigations. The objective is to work closely with affected indigenous groups as outlined in the Summary Report. Refer to Page 32, Section 5.7,

TABLE 2 – SUMMARY OF REGULATORY APPROVALS ANTICIPATED TO BE REQUIRED				
Regulatory Approval Considered	Authority/ Jurisdiction	Assessment of Impacts of Concern , Benchmarks and Address Requestor Issues	Public/ Indigenous Consultations	Permanent Changes/ Adverse Impacts and Managing Them (including changes to health, social and economic conditions)
		License Archaeologist.		Page 98, Section 7.7 Appendix D – Indigenous Engagement. Impacts to Indigenous communities will be mitigated the work completed under the Stage 2 and 3 studies and continued consultations. .
Provincial Regulation 406/19 of the Environmental Protection Act & Town of Georgina Schedule C Soil Quality Testing	Provincial/ Municipal	Fill material testing and compliance will be based on the Provincial Regulation 406/19 and will include the preparation of a material management plan and traffic studies compliant with those typically approved by municipal and provincial authorities. As a result, any fill material that is imported or exported	Not Anticipated	Impacts of permanent changes to the site have been mitigated through design of grading to match closely the existing contours of the site. No change in drainage boundaries on the site due to filling operations. Any fill material placed will meet the applicable

TABLE 2 – SUMMARY OF REGULATORY APPROVALS ANTICIPATED TO BE REQUIRED

Regulatory Approval Considered	Authority/ Jurisdiction	Assessment of Impacts of Concern , Benchmarks and Address Requestor Issues	Public/ Indigenous Consultations	Permanent Changes/ Adverse Impacts and Managing Them (including changes to health, social and economic conditions)
		will meet the requirements of these regulations. Page 18, Section 3.8, Point 5 Page 62, Row 11 "Fill concerns/ Town of Georgina Bylaw 2011-0044 (REG1) – Bylaw to Prohibit or Regulate Removal of Topsoil, Placing Fill or Altering Grades" Page 63, Row 12 "Contaminated Fills and Impact on Surface/ Groundwater" Page 63, Row 13 "Truck Traffic on Local Road Networks" Page 63, Row 14 "Volume of Fill" Page 64, Row 15 "Change in Contours/Shape of Land"		regulations and not have a significant impact on groundwater and surface water resources. No significant adverse impacts are anticipated by applying the soil management regulations as proposed.

TABLE 2 – SUMMARY OF REGULATORY APPROVALS ANTICIPATED TO BE REQUIRED

Regulatory Approval Considered	Authority/ Jurisdiction	Assessment of Impacts of Concern , Benchmarks and Address Requestor Issues	Public/ Indigenous Consultations	Permanent Changes/ Adverse Impacts and Managing Them (including changes to health, social and economic conditions)
		Page 64, Row 16, "Stormwater Runoff and Erosion and Sedimentation Control" Page 96, Section 7.2 "Fill Concerns" Appendix J – Exhibit 4.		
Town of Georgina and York Region Engineering Design Standards,	Municipal (In Consultation based on "good neighbour" approach)	Utilize local design standards where practical i.e. entrance roads, sediment control, lighting, roads etc. Using local design standards ensures consistent application of engineering standards for design and construction which consider local environment and expectations.	No	No significant adverse impacts anticipated by following local design and construction practices.
Conservation Authority Act (- Lake Simcoe	Provincial (In Consultation	SWM Quality and Quantity & Erosion, Sedimentation Control and Water Balance to	Not Anticipated	Potential adverse impacts will be mitigated through vegetated filter strips and

TABLE 2 – SUMMARY OF REGULATORY APPROVALS ANTICIPATED TO BE REQUIRED

Regulatory Approval Considered	Authority/ Jurisdiction	Assessment of Impacts of Concern , Benchmarks and Address Requestor Issues	Public/ Indigenous Consultations	Permanent Changes/ Adverse Impacts and Managing Them (including changes to health, social and economic conditions)
Region Conservation Authority)	based on “good neighbour” approach)	LSRCA requirements. 'Enhanced'Level of Protection, as defined in the MOE's Stormwater Management Planning &Design Manual Page 11, Table 2, row 1 – Wetland protection area and Section 3.3 outlining how majority of site will remain open space or wetland. Page 13, row labelled “Provincially Significant Wetlands” Page 14, row labelled “Unevaluated Wetlands” Page 54, Row 1, “Wetland Impacts” Page 54, Row 2 “Groundwater Resource Impact"		enhanced grass swales prior to entering the dry pond. Each of the above noted features will provide TSS removal efficiency benefits. The vegetated filter strips, enhanced grass swales, storm sewer complete with deep sumps, oil/grit separator and dry pond will also inherently provide water balance and phosphorus reduction benefits. Each of the buildings are proposed to have soak-away pits to infiltrate 25mm of clean roof runoff to aid in providing sufficient water.

TABLE 2 – SUMMARY OF REGULATORY APPROVALS ANTICIPATED TO BE REQUIRED

Regulatory Approval Considered	Authority/ Jurisdiction	Assessment of Impacts of Concern , Benchmarks and Address Requestor Issues	Public/ Indigenous Consultations	Permanent Changes/ Adverse Impacts and Managing Them (including changes to health, social and economic conditions)
		Page 61, Row 8 “Environmental Impact Studies (EIS)” Page 95, Section 7.1, Point 2, Develop compensation plans for: • Off-site wetland/ habitat/Woodlot enhancement • On-site wetland/ habitat/Woodlot enhancement		
Ministry of Environment, Conservation & Parks (MECP) **Reasonable Use Criteria/ Building Code**	Provincial (Based on “good neighbour” approach)	Sewage system designed in compliance with Building Code and MECP criteria. Page 18, Section 3.9 “Preliminary Hydrogeological Assessment” Pages 19 and 20 Section 3.10 “Functional Servicing Study And Stormwater Management”	Not Anticipated	No significant adverse impacted predicted by using provincial design standards. Sanitary servicing for the site will be provided by one (1) proposed septic tank and pump chamber at each phase and one (1) distribution box and six (6) filter beds to be located in the landscaped area on the

TABLE 2 – SUMMARY OF REGULATORY APPROVALS ANTICIPATED TO BE REQUIRED				
Regulatory Approval Considered	**Authority/ Jurisdiction**	**Assessment of Impacts of Concern , Benchmarks and Address Requestor Issues**	**Public/ Indigenous Consultations**	**Permanent Changes/ Adverse Impacts and Managing Them (including changes to health, social and economic conditions)**
		Page 54, Row 2 "Groundwater Resource Impact" Page 63, Row 12, "Contaminated Fills and Impact on Surface/ Groundwater" Page 95, Section 7.1, Point 4 "Final Hydrogeological Study related to Groundwater Impacts including Water Balance"		western limits of the site MECP Reasonable Use Concept (RUC) for treatment of nitrate concentrations greater than 2.5mg/L in groundwater at the property limits for developments generating more than 10,000 L/day of sewage should not be required based on Sections 22.5.11 and 22.5.14 of the RUC
Ministry of Environment, Conservation & Parks (MECP) **(Permit to Take Water PTTW/ECA Permits)**	Provincial (Based on "good neighbour" approach)	Wells subject to hydrogeological assessments to demonstrate capacity and no impacts to surrounding wells and aquifers. Page 18, Section 3.9 "Preliminary Hydrogeological Assessment"	Not Anticipated	No significant adverse impacts predicted using provincial design standards and permitting practices.

TABLE 2 – SUMMARY OF REGULATORY APPROVALS ANTICIPATED TO BE REQUIRED

Regulatory Approval Considered	Authority/ Jurisdiction	Assessment of Impacts of Concern , Benchmarks and Address Requestor Issues	Public/ Indigenous Consultations	Permanent Changes/ Adverse Impacts and Managing Them (including changes to health, social and economic conditions)
		Pages 19 and 20 Section 3.10 “Functional Servicing Study And Stormwater Management” Page 54, Row 2 “Groundwater Resource Impact” Page 63, Row 12, “Contaminated Fills and Impact on Surface/ Groundwater” Page 95, Section 7.1, Point 4 “Final Hydrogeological Study related to Groundwater Impacts including Water Balance”		

IAA Request #5

5. What steps have you taken to consult with the public? What steps do you plan to undertake during each phases of the Project? Are you aware of any public concerns in relation to this project? If yes, provide an overview of the key issues and the way in which (in general terms) you intend to address these matters?

   Proponent Response:

   Significant public consultation has occurred.

   Refer to Summary Report Sections 4, 5 and 6. These sections of the report document the entire consultation process used to comply with the Federal CARs 307 Aerodrome Consultation Process.

   All report Appendices document the public/agency responses and communications.

   Public concerns were received and addressed in Sections 6 and Table 9 of the Summary Report.

   Page 95, Section 7 "Summary of Proponent Actions" acts as a summary of the key issues identified through the consultation process and the proposed actions to be taken by the Proponent as part of carrying out the project.

   Refer also to ***Attachment 1*** *where the Proponent engaged in consultations beyond the minimum requirements of the CARs307.*

IAA Request #6

6. What steps have you taken to consult with Indigenous communities? What steps do you plan to undertake during all phases of the Project? Are you aware of any Indigenous community concerns in relation to this Project? If yes, provide an overview of the key issues and the way in which (in general terms) you plan to address these matters?

   Proponent Response:

   Page 32, Section 5.7 specifically address Indigenous Engagement

   An official Record of Indigenous Engagement and a Stage 1 Archeaological Report were completed and FN engaged. These reports have been entered into the Ontario Public Register of Archaeological Reports, as of September 15, 2022.

Upon initiation of the Stage 1 asssessment the following FN were invited to participate:

- *Alderville First Nation, Contact: D. Simpson*
- *Beausoleil First Nation, Contact: D. Monague*
- *Chippewas of Rama First Nation, Contact: S. James*
- *Curve Lake First Nation, Contact: J. MacArthur*
- *Georgina Island First Nation, Contact: N. Charles*
- *Hiawatha First Nation, Contact: T. Cowie*
- *Huron-Wendat Nation, Contact: M.-S. Gendron*
- *Mississaugas of Scugog Island First Nation, Contact: D. Mowat*

Appendix D of the Summary report also captures key communications/actions take with respect to Indigenous Consultations.

Page 98, Section 7.7 "Indigenous Consultations" commits the proponent to continue engaging engaging with Indigenous communities.

IAA Request #7

7. Do you have any other comments in relation to environmental effects or impacts to the public or Indigenous peoples and how you intend to address and manage those?

Proponent Response:

The IAA requests did not fully capture all of the issues addressed in the Summary Report. Below we have highlight additional issues that were identified to the Proponent during the CARs307 process along with the proposed actions proposed to ensure adverse impacts are mitigated.

Aeronautical Noise and Safety:

In particular, aircraft noise and aeronautical safety were raised as an issue through public consultation. The Summary Report specifically address these comments through a preliminary noise exposure forecast review and discussion related to the *optimization of the airport layout to mitigate noise, emissions and safety concerns.*

Page 96, Section 7.3 outlines the issues and mitigations proposed and are also summarized here including a commitment to implementing a future aerodrome community liaison committee that would include the public and Indigenous peoples:

1. *The Proponent will design the new aerodrome to Transport Canada airport design standards TP312 5th Edition.*
2. *The Proponent will publish noise abatement procedures to inform the aeronautical community of noise sensitive areas and to avoid overflights of the provincial parks.*
3. *The Proponent will monitor and advocate for the use of a Mandatory Frequency (MF) designation in the area in the future should air traffic activity dictate. This would be implemented in consultation with Transport Canada and NAV CANADA.*
4. *The Proponent will consider the implementation of a future aerodrome community liaison committee to create an effective means to share updates and to consider community inputs into the operation of the aerodrome.*

Addition references within the Summary Report include:

- *Page 65, Rows 17 through 27*
- *Appendix J – Exhibits 1, 6, 8, 9, 10*

Agriculture Impacts:

Page 97, Section 7.5 outlines the issues and mitigations proposed related to reducing impacts on agricultural uses of the land which are also summarized below:

1. The new aerodrome will impact about 3.5 ha of the former agricultural land which will be required for the construction and operation of the new east-west runway. The remaining areas of 8.5 ha could remain available for farming until future aviation demands require the lands for other purposes. However, the Proponent further commits to offering up to 18 ha of land west of the new runways for farming activities until such time as the proponent determines that there are aeronautical business development opportunities for these lands.
2. The Proponent will adopt Transport Canada recommendations to a noise study specifically to assess peak noise levels (per TP1247) should there be any local poultry or fur farms identified in close proximity to the proposed aerodrome.
3. Airports are inherently compatible with agricultural land uses. Open space, large flat cultivated fields, livestock has been shown to acclimatize to noise and traffic (Transport

Canada). The Town of Georgina Zoning Bylaw recognizes this by permitting aerodromes in rurally zoned areas.

4. Some agricultural fields can be classified as posing limited risk as long as they remain inactive. The moment cultivation begins; the degree of risk escalates, since the turning of soil, seeding, etc., increase the attraction to wildlife. However, Transport Canada offers recommendations for remedial actions in the Wildlife Control Procedures Manual (TP 11500) which will be used by the Proponent in future operational risk management.

Addition references within the Summary Report include:

- *Page 75, Row 28*
- *Page 85, Row 44*
- *Page 86, Row 46*
- *Page 87, Row 47*
- *Page 90, Row 50*
- *Appendix J – Exhibits 9, 11*

Benefits to the Community:

Page 83, Row 38 outlines the anticipated community benefits which are also summarized below:

1. Alternative to Buttonville Airport – Imminent Closure of this Airport Displacing Aircraft/Pilots
2. Long-term Potential to Contribute $5-10+ Million to local economy and approx. 50-100 Jobs
3. Contribute to Municipal Taxes
4. General Aviation Generates Significant Economic Benefits - $2.2 Billion (Canada Wide, COPA)

5. Each Airport Based Aircraft has potential to contribute $68,500/year in GDP and 0.57 FTE to communities (COPA)

IAA Request #8

8. Explain your views on whether the Project should be designated under IAA.

Proponent Response:

The Project has followed all applicable regulatory requirements under the federal Aeronautics Act which enables the Canadian Aviation Regulations (CARs) including CARs 307. CARs 307 Aerodrome Consultation was met and exceeded which resulted in the final Summary Report dated May 30, 2022, Revision 3 which was accepted without further comments by the Minister (Transport Canada) on July 6, 2022.

The Summary Report documents the entire consultation process that involved public and Indigenous engagement in accordance with the regulation. All significant issues identified through this process were addressed through completion of preliminary field studies, identification of future studies and mitigation plans through design and operations. The proposed mitigations are documented in the report which must be followed by the Proponent to comply with CARs307 (the regulation).

Furthermore, on April 28, 2022, a letter was issued to the Proponent by the IAA which confirmed that the airport did not trigger the IAA. Additional information was provided in the letter for future consideration by the Proponent.

The Summary Report along with our response to your request of February 15, 2023 demonstrates that the project has met all required regulatory requirements and has proposed an appropriate level of environmental mitigations to ensure that the aerodrome can be constructed and operated in an environmentally responsible manner. The Proponent has proceeded to date on the basis of fully complying with applicable regulations and the approved Summary Report.

Based on the above, we do not believe the project should designated under IAA.

Please consider the above in our review of this project. We trust that the final Summary Report, May 30 2022, Revison 3 presents a comprehensive database of the responsible environmental actions and consultations completed to date for this project.

Should you require any further clarifications please advise.

>>> END OF MEMO

ATTACHMENT 1

SUMMARY OF COMPLIANCE WITH FEDERAL CANADIAN AVIATION REGULATION 307 – AERODROME CONSULTATION

ATTACHMENT 1 - SUMMARY OF COMPLIANCE WITH REGULATION CAR 307
Aerodrome Work Consultation Summary Report
New Aerodrome Proposal (Baldwin East)
February 27, 2023

1. Purpose:

This document summarizes how the Proponent has met, and in some cases exceeded the requirements outlined in Canada Aviation Regulation (CAR) 307, Sub Part 7, Aerodromes - Consultation.

2. General Actions taken that Exceed the Requirements of Canada Aviation Regulation (CAR) 307, Sub Part 7, Aerodromes - Consultation.

The following actions/studies have been undertaken by the Proponent that are not explicitly described as requirements within the regulation or actions that have demonstrated where the Proponent has exceeded the requirements of the regulation.

Consultations with Town of Georgina:

Additional consultations were held with the Town of Georgina as follows:

- December 2, 2021 – Proponent met virtually with Town of Georgina Staff to offer a presentation of the proposed project.
- December 15, 2021 – Proponent met with the Town of Georgina Council at a Special Public Council Meeting that was broadcast to the Public.

During these sessions the Proponent and their technical advisor participated in a question-and-answer period.

Technical Studies (Summer-Fall 2021)

The following technical studies were undertaken by the Proponent to better understand the feasibility of developing the proposed aerodrome and to better respond to potential comments from all interested parties:

1. Preliminary Natural Heritage Study
2. Geotechnical Investigation (Soils and Groundwater Conditions)
3. Preliminary Hydrogeological Assessment
4. Stage 1 Archeological Assessment and Indigenous Engagement
5. Preliminary Site Servicing Study

6. Preliminary Stormwater Management Study

Public Consultation on Draft Final Summary Report (March 2022)

The Proponent modified the CAR 307 process by adding an additional ***Draft*** Summary Report review period for all Interested Parties that submitted comments during the 45-day initial comment period. This additional 2-week consultation period was offered to share additional project information which was specifically developed to address the objections and information requests received during the consultation period between ***November 5, 2021, to December 22, 2021***. Given the wide range of issues raised it was considered appropriate to share the ***Draft*** Summary Report before it is submitted formally to the Minster.

This ***Draft*** Summary Report was also offered to the Minister (Transport Canada).

The Draft Summary Report was made available from March 1, 2022, to March 15, 2022 for an additional 14 days of public consultation.

Transport Canada Comments Beyond 30 Days from Summary Report Submission

The Proponent further modified the CAR 307 process by receiving and addressing comments received from Transport Canada beyond the 30-day period outlined in the regulation under Section 307.10 (1) Start of Aerodrome Work which states *"….The proponent shall not start the proposed aerodrome work before the end of 30 days after the date on which the summary report is provided to the Minister…."*.

The Proponent has indicated that no aerodrome work on the site will take place until Transport Canada has been satisfied with the final Summary Report. As such comments received from Transport Canada on May 3, 2022, which was 35-days after the final Summary Report was originally submitted to the Minister, were received, replied to and incorporated into this updated Final Summary Report.

Revision 3 of the Final Summary Report was submitted on May 30, 2022 following which another comment was received from Transport Canada dated May 31, 2022 reflecting a total of 63 days since the original Final Summary Report was submitted. The regulation outlines 30-days for review and comment by the Minister.

The May 31, 2022 comments from Transport Canada requested that the Proponent complete a full title search/inventory of all land parcels and ownership within the 4000m study area. On June 2, 2022, the Proponent responded to the Transport Canada request outlining how the existing Final Summary Report has met the requirements of the regulation.

On June 15, 2022, Transport Canada advised that the Proponent response remains under review by Transport Canada.

As of June 17, 2022, the Final Summary Report was submitted 80 days ago. The regulation offers the Minister 30 days to review the Final Summary Report.

On July 6, 2022, Transport Canada Notified the Proponent that no further comments would be forthcoming and that the project should be implemented based on the Summary Report.

3. Summary of Compliance with Regulation 307, Sub Part 7 – Aerodromes - Consultation

The following Table 1 outlines each clause of Regulation 307 and how the Proponent met or exceeded the requirements of the regulation.

TABLE 1 - Regulation Compliance Matrix and Actions Taken by Proponent

Regulation Requirement	Actions Taken by the Proponent to Comply	Actions Taken the Exceed Regulatory Requirements
Subpart 7 — Aerodromes — Consultations **Interpretation** ***307.01*** *The following definitions apply in this Subpart.*	The Proponent confirmed and accepted that this Regulation applies to the proposed work. The proposed work involves the building of a new aerodrome meeting Section 307.01 (a).	

TABLE 1 - Regulation Compliance Matrix and Actions Taken by Proponent

Regulation Requirement	Actions Taken by the Proponent to Comply	Actions Taken the Exceed Regulatory Requirements
aerodrome work *means work, other than work necessary to comply with a new requirement imposed by or under the Act, carried out for any of the following purposes:* ***(a)*** *building a new aerodrome; or* ***(b)*** *at an existing aerodrome,* ○ ***(i)*** *building a new runway for aeroplanes, or* ○ ***(ii)*** *increasing the length of an existing runway for aeroplanes by 100 m or by 10%, whichever is greater. (travaux d'aérodrome)* ***proponent*** *means a person who proposes to carry out aerodrome work. (promoteur)*	The Proponent recognized the definition of *"protected areas"* as those covered under federal jurisdiction and has circulated a notice to those affected by the regulation. The Proponent confirmed this definition with Transport Cannada.	

TABLE 1 - Regulation Compliance Matrix and Actions Taken by Proponent		
Regulation Requirement	**Actions Taken by the Proponent to Comply**	**Actions Taken the Exceed Regulatory Requirements**
protected area *means a natural area or habitat that is protected by or under federal legislation. (aire protégée)*		
Application ***307.02*** *This Subpart applies to existing and proposed aerodromes that are not* ***(a)*** *military aerodromes;* ***(b)*** *water aerodromes;* ***(c)*** *aerodromes that are used primarily for agricultural operations;* ***(d)*** *aerodromes, including heliports, that are used primarily for helicopter operations; and* ***(e)*** *aerodromes that are used as temporary installations for the purpose of providing emergency services, such as forest fire suppression, law enforcement activities, and search and rescue operations, and responding to a medical emergency.*	The Proponent acknowledges that this section did not apply and that their project was not exempt from this regulation.	

TABLE 1 - Regulation Compliance Matrix and Actions Taken by Proponent

Regulation Requirement	Actions Taken by the Proponent to Comply	Actions Taken the Exceed Regulatory Requirements
Requirement — Consultations ***307.03*** *The proponent shall consult with the interested parties in accordance with the requirements of this Subpart.* **Interested Parties** ***307.04 (1)*** *For the purposes of this Subpart, the interested parties are the following:* ○ ***(a)*** *if a built-up area of a city or town is located within a radius of 4 000 m from the location of the proposed aerodrome work,* ▪ ***(i)*** *the Minister,* ▪ ***(ii)*** *the providers of air navigation services,* ▪ ***(iii)*** *the operator of a certified or registered aerodrome located within a radius of 30 nautical miles from the location of the proposed aerodrome work,* ▪ ***(iv)*** *the authority responsible for a protected area located within the*	The Proponent proceeded based on consulting with interested parties as defined by this regulation under this section 307.04(1) (a) – Built Up Area Criteria	While the proposed aerodrome is located primarily in a rural area, the Proponent proceeded with the more comprehensive consultation process outlined in section 307.04(1) (a). This considered that the aerodrome would be located in a built-up area. This approach obligated the Proponent to conduct a broader consultation of interested parties under the regulation.

TABLE 1 - Regulation Compliance Matrix and Actions Taken by Proponent

Regulation Requirement	Actions Taken by the Proponent to Comply	Actions Taken the Exceed Regulatory Requirements
radius of 4 000 m from the location of the proposed aerodrome work, ▪ ***(v)*** *any local land use authority where the proposed aerodrome work is to be carried out, and* ▪ ***(vi)*** *members of the public who are within the radius of 4 000 m from the location of the proposed aerodrome work; or*		
○ ***(b)*** *in any other case,* ▪ ***(i)*** *the Minister,* ▪ ***(ii)*** *the providers of air navigation services,* ▪ ***(iii)*** *the operator of a certified or registered aerodrome located within a radius of 30 nautical miles from the location of the proposed aerodrome work,* ▪ ***(iv)*** *the authority responsible for a protected area located within a radius of 4 000 m from the location of the proposed aerodrome work,*	Section (b) was not considered applicable in this case.	

TABLE 1 - Regulation Compliance Matrix and Actions Taken by Proponent		
Regulation Requirement	**Actions Taken by the Proponent to Comply**	**Actions Taken the Exceed Regulatory Requirements**
▪ ***(v)*** *any local land use authority where the proposed aerodrome work is to be carried out, and* ▪ ***(vi)*** *the owner of any land bordering the land on which the proposed aerodrome work is to be carried out.*		
(2) *For the purposes of subsection (1), the radius of 4 000 m from the location of the proposed aerodrome work shall be measured from the outer perimeter of the site of that location.*	The Proponent met this requirement and clearly demonstrated how the 4000-metre offset from the existing boundary was established and used to establish the regulatory boundary.	
Notice and Sign ***307.05*** *The proponent shall, at least 75 days before the expected start date of the proposed aerodrome work,* ***(a)*** *provide a notice of the proposed aerodrome work to the interested parties referred to in subparagraphs 307.04(1)(a)(i) to (v) or paragraph 307.04(1)(b), as applicable; and*	The Proponent developed a notification program to comply with the requirement outlined in 307.04(1)(a)(i) to (v). All of the Interested parties listed below received a project notice and were asked to offer their objections or support of the proposed aerodrome: ▪ ***(i) the Minister:***	Additional consultations were held with the Town of Georgina as follows: *December 2, 2021 – Proponent met virtually with Town of Georgina Staff to offer a presentation of the proposed project.* *December 15, 2021 – Proponent met with the Town of Georgina Council at a*

TABLE 1 - Regulation Compliance Matrix and Actions Taken by Proponent

Regulation Requirement	Actions Taken by the Proponent to Comply	Actions Taken the Exceed Regulatory Requirements
	September 23, 2021 - Pre-consultation with Transport Canada. *November 5, 2021 – Transport Canada (Minister) given Notice and Advised Consultation Period has been Initiated.* *November 29, 2021 – Transport Canada advised receipt of notice and requested specific requirements be addressed in the Summary Report which have been completed.* *March 5, 2022 - Transport Canada advised of Draft Summary Report available for comment.* *March 10, 2022 – Transport Canada responded and advised that the Draft Summary Report would not be commented on.* *March 29, 2022 – Transport Canada (Minister) was advised*	*Special Public Council Meeting that was broadcast to the Public.*

TABLE 1 - Regulation Compliance Matrix and Actions Taken by Proponent		
Regulation Requirement	**Actions Taken by the Proponent to Comply**	**Actions Taken the Exceed Regulatory Requirements**
	that the Final Summary Report was officially submitted. *April 19, 2022 – Transport Canada provided comments and request for clarifications #1.* *April 20, 2022 – Proponent Responded to Transport Canada Request for Clarification. #1.* *May 3, 2022 – Transport Canada provided comments and request for clarifications #2* *May 10, 2022 – Proponent Responded to Transport Canada Request for Clarification. #2* *May 17, 2022 – Proponent requested Virtual Meeting to review Status of Transport Canada Review and Next Steps.* *May 30, 2022 – Proponent Submitted Updated Revision 3 Final Summary Report to Transport Canada (Minister)*	

TABLE 1 - Regulation Compliance Matrix and Actions Taken by Proponent		
Regulation Requirement	**Actions Taken by the Proponent to Comply**	**Actions Taken the Exceed Regulatory Requirements**
	May 31, 2022 – Transport Canada provided comments and request for clarifications #3 *June 2, 2022 – Proponent Responded to Transport Canada Request for Clarification. #3* *June 15, 2022 – Transport Canada advises that the Final Summary Report remains under review in response to request by Proponent on status of review on June 15, 2022.* ▪ ***(ii) the providers of air navigation services,*** *September 17, 2021 – NAV CANADA Land Use Submission submitted for review and confirmation of no objection.* *January 19, 2022 – NAV CANADA response confirming no objection to proposed aerodrome.*	

TABLE 1 - Regulation Compliance Matrix and Actions Taken by Proponent		
Regulation Requirement	**Actions Taken by the Proponent to Comply**	**Actions Taken the Exceed Regulatory Requirements**
	▪ ***(iii) the operator of a certified or registered aerodrome located within a radius of 30 nautical miles from the location of the proposed aerodrome work,*** *November 5, 2021 – Notices were sent to all registered and certified aerodromes.* *November – December 2021 – Two responses were received and recorded as supporting the new aerodrome.* ▪ ***(iv) the authority responsible for a protected area located within the radius of 4 000 m from the location of the proposed aerodrome work,*** *November 5, 2021 – Notices were sent to all authorities responsible for protected areas including:*	

TABLE 1 - Regulation Compliance Matrix and Actions Taken by Proponent		
Regulation Requirement	**Actions Taken by the Proponent to Comply**	**Actions Taken the Exceed Regulatory Requirements**
	Sibbald Point Provincial Park, Ontario Parks *Duclos Point Provincial Park, Ontario Parks* *December 20, 2021 – Responses were received and incorporated into the Final Summary Report* ▪ ***(v)*** *any local land use authority where the proposed aerodrome work is to be carried out, and* *September 2021 – The following Indigenous/First Nations were contacted and requested to engage in Stage 1 Archaeological Assessment:* • *Chippewas of Georgina Island First Nations* • *Alderville First Nation* • *Beausoleil First Nation* • *Chippewas of Rama First Nation*	

TABLE 1 - Regulation Compliance Matrix and Actions Taken by Proponent		
Regulation Requirement	**Actions Taken by the Proponent to Comply**	**Actions Taken the Exceed Regulatory Requirements**
	• *Curve Lake First Nation* • *Georgina Island First Nation* • *Hiawatha First Nation* • *Huron-Wendat Nation* • *Mississaugas of Scugog Island First Nation* *November - December , 2021 – Responses were received and incorporated into the Final Summary Report* *November 5, 2021 – Notices were sent to the following Land Use Authorities:* • *Town of Georgina* • *Department of Fisheries and Oceans Canada (Central and Arctic Regions)* • *Environment and Climate Change Canada's Canadian Wildlife Service (Ontario Region)*	

TABLE 1 - Regulation Compliance Matrix and Actions Taken by Proponent		
Regulation Requirement	**Actions Taken by the Proponent to Comply**	**Actions Taken the Exceed Regulatory Requirements**
	• *Ministry of Natural Resources and Forestry (Peterborough District)* • *Lake Simcoe Region Conservation Authority* *November - December, 2021 – Responses were received and incorporated into the Final Summary Report*	
***(b)** in the case referred to in paragraph 307.04(1)(a), place a sign, in plain view of the public, at the location where the proposed aerodrome work is to be carried out.*	The Proponent installed two (2) signs at both existing entrances to the project stie on November 5, 2021 and these have been left in place since. (Note: the signs have been vandalized since originally being installed)	The Proponent believed that the provision of a sign was not considered sufficient to properly inform all Interested Parties as defined under 307.04(1) (vi). As such the proponent enhanced the consultation process through the following activities that exceeded the requirements of the Regulation: 1. Published a Project Website to better enable all interested parties to submit comments, receive reports and follow the status of the project. The website remains active at www.newaerodromeontario2021.ca

TABLE 1 - Regulation Compliance Matrix and Actions Taken by Proponent

Regulation Requirement	Actions Taken by the Proponent to Comply	Actions Taken the Exceed Regulatory Requirements
		2. Informed the community of the consultation period, Draft Report review period and Final Summary Report publication using the two local newspapers: Georgina Advocate and Georgina Post. Publications were made on three (3) occasions. 3. Special meetings with Town of Georgina Staff and Council in December 2021.
Content of Notice and Sign ***307.06*** *The proponent shall include the following information on the notice and the sign:* ***(a)*** *a drawing showing the location of the proposed aerodrome work;* ***(b)*** *a description of the proposed aerodrome work and its purpose;*	The Notice and Sign included all of the regulatory requirements listed under 307.01 (a) through (e). A period exceeding 45 days was provided by the Proponent to enable Interested Parties to comment.	The consultation period exceeded the regulatory period of 45 days. The consultation period covered was 47 days. Draft Final Summary Report was also made available to Interested Parties to comments between March 1 – 15th, 2022. This represents an additional 14 days of consultation. The Public was offered a total of 47+14 = 61 days to comment on the proposed aerodrome.

TABLE 1 - Regulation Compliance Matrix and Actions Taken by Proponent		
Regulation Requirement	**Actions Taken by the Proponent to Comply**	**Actions Taken the Exceed Regulatory Requirements**
(c) *the expected start date and completion date of the proposed aerodrome work;* ***(d)*** *a statement that the interested parties may provide their comments or objections to the proponent with respect to the proposed aerodrome work;* ***(e)*** *contact information, including the mailing address, phone number and email address, for the contact persons to whom the interested parties may provide their comments or objections; and* ***(f)*** *the period, which shall be at least 45 days, during which the interested parties may provide their comments or objections.*		The exceeds the regulatory requirement of 45 days by 16 days.
Summary Report ***307.07*** *At the end of the period referred to in paragraph 307.06(f), the proponent shall prepare a summary report that includes the following:*	The Proponent prepared a comprehensive Summary Report that addressed all of the requirements outlined in 307.07 including comments received by Transport Canada dated	A Draft Summary Report was also made available the Public/Interested Parties and Transport Canada (the Minister) between March 1 – 15, 2022. The Proponent has received and responded to additional Transport Canada comments

TABLE 1 - Regulation Compliance Matrix and Actions Taken by Proponent

Regulation Requirement	Actions Taken by the Proponent to Comply	Actions Taken the Exceed Regulatory Requirements
(a) *a description of the proposed aerodrome work;* ***(b)*** *a description of the measures taken by the proponent to comply with the requirements of this Subpart;* ***(c)*** *the interested parties who were notified of the proposed aerodrome work; and* ***(d)*** *a summary of the comments and objections received, the actions that the proponent proposes to take to address those comments and objections, and any objections that were not addressed, if applicable.*	April 19, 2022 (within the 30-day regulatory review period) The Final Summary Report Revision 2 was Submitted on March 19, 2022.	received beyond the regulatory 30-day review period and has subsequently issued an updated Summary Report dated May 30, 2022, Revision 3.
Communication of Summary Report ***307.08*** *The proponent shall, as soon as practicable after the end of the period referred to in paragraph 307.06(f), provide the summary report to the Minister and make it available to the interested parties.*	On March 29, 2022, the Proponent posted the Final Summary Report on the project website which is available to the public and all interested parties. All interested parties as identified in Section 307.04(1)(a)(i) to (vi) who submitted comments throughout the	May 30, 2022 – The Proponent updated and responded to additional Transport Canada comments received beyond the regulatory 30-day comment report. The updated report was submitted as Revision 3 on May 30, 2022.

TABLE 1 - Regulation Compliance Matrix and Actions Taken by Proponent

Regulation Requirement	Actions Taken by the Proponent to Comply	Actions Taken the Exceed Regulatory Requirements
	consultation periods were advised of the Final Report. The Final Summary Report is available to all Interested Parties via the Proponents Website.	
Availability of Summary Report ***307.09*** *The proponent shall ensure that the summary report is available to the interested parties for at least five years after the date on which it is made available to them.*	The Proponent posted the final Summary Report on the project website which is available to the public and all interested parties. The Proponent will also make a copy of the final Summary Report available for viewing at the new aerodrome administrative office or via an online request through the Proponent's email as shown at the beginning of this document.	
Start of Aerodrome Work ***307.10 (1)*** *The proponent shall not start the proposed aerodrome work before the end of 30 days after the date on which the summary report is provided to the Minister.*	The Proponent has complied with this requirement and has not start construction although by regulation, the 30 days has expired from the	As of June 17, 2022, a total of 80 days have elapsed and no work has started on the aerodrome.

TABLE 1 - Regulation Compliance Matrix and Actions Taken by Proponent		
Regulation Requirement	**Actions Taken by the Proponent to Comply**	**Actions Taken the Exceed Regulatory Requirements**
(2) *If the proponent does not start the proposed aerodrome work within five years after the date on which the summary report is provided to the Minister, the proponent shall once again comply with the requirements of this Subpart.*	submission of the original Final Summary Report on March 29, 2022.	This exceeds the regulatory requirement by 50 days.

>>> END OF ATTACHMENT 1

ATTACHMENT 2

IMPACT ASSESSMENT AGENCY LETTER DATED APRIL 28, 2022

Impact Assessment Agency of Canada
Ontario Region
600-55 York Street
Toronto ON M5J 1R7

Agence d'évaluation d'impact du Canada
Région de l'Ontario
600-55 rue York
Toronto ON M5J 1R7

April 28, 2022

Sent by email

Maurizio Marchioni
Sutton Airport Development Inc.
March Law Barristers and Solicitors
300-9100 Jane Street, Building A
Vaughn ON L4K 0A4
mmarch@marchlaw.ca

Dear Maurizio Marchioni:

Subject: Information on the *Impact Assessment Act* and its applicability to the New Aerodrome Proposal (Baldwin East)

The Impact Assessment Agency of Canada has become aware of the New Aerodrome Proposal (Baldwin East), proposed by Sutton Airport Development Inc.

The *Impact Assessment Act* (IAA) outlines a process for assessing the impacts of certain major projects, including the assessment of positive and negative environmental, economic, health and social effects that are within the legislative authority of the Parliament of Canada. The *Physical Activities Regulations* (also known as the Project List) describe those projects that have the greatest potential to cause adverse effects in those areas and are subject to the requirements of IAA. Proponents of those projects are required to submit an Initial Project Description to the Impact Assessment Agency of Canada (the Agency).

Please note that your project pertains to a class of project considered on the Project List:

46(a) The construction, operation, decommissioning and abandonment of a new aerodrome with a runway length of 1 000 m or more.

.../2

Based on the information available to the Agency, the Agency understands that the proposed activity involves the construction of two runways of up to 991 metres in length; as such the proposed project does not appear to be described on the Project List; however, the Agency notes that the proposed runway length close to the threshold in the Project List. **If the project changes from what is presented on the project website,[1] please contact the Agency.** In the event that the Project is described in the Project List you will be required to submit an Initial Project Description to the Agency. **Kindly review the requirements of IAA, including the Project List.**

Please note that subsection 9(1) of the IAA provides the Minister of Environment and Climate Change with the option to designate a physical activity that is not described on the Project List, provided that it has not substantially begun and that no federal authority has exercised a power or performed a duty or function that could allow the activity to be carried out. A physical activity may be designated if the Minister is of the opinion that the carrying out of that activity may cause adverse effects within federal jurisdiction or adverse direct or incidental effects (resulting from federal decisions), or if public concerns related to those effects warrant the designation. Should the Minister designate a physical activity an Initial Project Description would be required.

If you have any questions, please contact us at *ontarioregion-regiondontario@iaac-aeic.gc.ca*.

The attachment that follows provides links to useful legislation, regulation, and guidance documents.

Sincerely,

Anjala Puvananathan
Director, Ontario Region

Enclosure: Useful Legislation, Regulation, and Guidance Documents

c.c.: David Zeit, Transport Canada

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[1] *https://www.newaerodromeontario2021.ca*

Enclosure – Useful Legislation, Regulation, and Guidance Documents

For more information on the *Impact Assessment Act*, please refer to the following links:

Legislation and Regulations:
https://www.canada.ca/en/impact-assessment-agency/corporate/acts-regulations/legislation-regulations.html

Impact Assessment Process Overview:
https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/impact-assessment-process-overview.html

Practitioner's Guide to Federal Impact Assessments under the *Impact Assessment Act*:
https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act.html

Compendium of Policies and Guidance Documents:
https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance.html

ATTACHMENT 3

RELEVANT FIELD STUDIES COMPLETED TO DATE

- Geotechnical Investigation
- Preliminary Function Servicing Study including Preliminary Hydrogeological Assessment
- Stage 1 Archaeological Study
- Record of Indigenous Engagement
- Preliminary Natural Heritage Study

Peto MacCallum Ltd.
CONSULTING ENGINEERS

PRELIMINARY GEOTECHNICAL INVESTIGATION
PROPOSED SUTTON AERODROME DEVELOPMENT
SUTTON, ONTARIO

for

AVIA NG INC.

PETO MacCALLUM LTD.
19 CHURCHILL DRIVE
BARRIE, ONTARIO
L4N 8Z5
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EMAIL: barrie@petomaccallum.com

Distribution:
1 cc: Avia NG Inc. (email only)
1 cc: PML Barrie

PML Ref.: 21BF043
Report: 1
November 2021

Peto MacCallum Ltd.
CONSULTING ENGINEERS

November 11, 2021

PML Ref.: 21BF043
Report: 1

Mr. Bernhard Schropp, P.Eng.
Avia NG Inc.
23 Albert Street North
Southampton, Ontario
N0H 2L0

Dear Mr. Schropp

Preliminary Geotechnical Investigation
Proposed Sutton Aerodrome Development
Sutton, Ontario

Peto MacCallum Ltd (PML) is pleased to present the results of the preliminary geotechnical investigation recently completed at the above noted project site. Authorization for the work was provided by Mr. B. Schropp in an email dated August 24, 2021.

An aerodrome development is proposed for an existing rural property on Old Homestead Road, near Sutton, in the Town of Georgina. The concept is still being developed however, currently two runways are proposed up to 991 m, including taxiways and support buildings. Both airside and groundside pavements are also proposed.

A preliminary geotechnical investigation has been requested to assess the subsurface conditions at the site, and based on this information, provide comments and preliminary geotechnical engineering recommendations for pavements, along with recommendations for building foundations and parameters for septic tile bed design.

The comments and recommendations provided in this report are based on the subsurface conditions as revealed in a limited number of boreholes. Development plans for the site have not been finalized. Accordingly, the comments and recommendations provided in this report are general in nature, and suitable only for preliminary planning purposes. When final design details are available, they should be submitted to PML for review, and may require additional analyses and supplementary investigation in order to finalize the geotechnical recommendations.

This report is subject to the Statement of Limitations that is included in Appendix A and must be read in conjunction with the report.

Geoenvironmental services (observations, recording, chemical testing or assessment of the environmental conditions of the soil and ground water) were not within the terms of reference for this assignment, and no work has been carried out in this regard. If excess excavated soils requiring transportation off-site are generated, a program of sampling and chemical testing will be needed to determine the chemical properties of the soil to evaluate appropriate receiving site options, in accordance with O.Reg. 406/19.

INVESTIGATION PROCEDURES

The field work for the assignment was carried out on October 5, 8 and 12, 2021 and comprised a total of 20 boreholes. Boreholes 1 to 4 were drilled adjacent to proposed buildings and advanced to 4.7 to 5.0 m depth and Boreholes 5 to 20 were advanced to 3.5 m across the remaining areas of the site. The boreholes were drilled at the locations shown on the appended Borehole Location Plan, Drawing 1.

Borehole locations were laid out in the field by PML based on a plan provided by the Client. Co-ordination for clearances of underground utilities was provided by PML. The boreholes were drilled cognizant of the underground utilities.

The ground surface elevation at the borehole locations was obtained with a Sokkia SHC5000 GPS System equipped with a GCX3 (network RTK rover) Global Navigation Satellite System (GNSS) Receiver. Vertical and horizontal accuracy of this unit are 0.1 m and 0.5 m, respectively. All elevations in this report are geodetic and expressed in metres.

The boreholes were advanced with a D-50 track mounted drill rig equipped with continuous flight solid/hollow stem augers, supplied and operated by a specialist drilling contractor. All of the boreholes were backfilled in accordance with O.Reg. 903.

Representative samples of the overburden were recovered at frequent depth intervals for identification purposes using a conventional 51 mm OD split spoon sampler. The sampler excludes particles larger than 38 mm. Standard penetration tests were carried out simultaneously with the sampling operations to assess the strength characteristics of the subsoil. The ground water conditions in the boreholes were assessed during drilling by visual examination of the soil samples, the sampler, and drill rods as the samples were retrieved, and measurement of the water level in the open boreholes, if any.

The field work was supervised throughout by a member of PML's engineering staff who directed the drilling and sampling process, prepared the stratigraphic logs, monitored ground water conditions and cared for the recovered samples.

All samples secured in the field were returned to our laboratory for detailed visual examination as well as natural moisture content determination tests. The laboratory testing programme included five particle size distribution analyses on subgrade soils and two Atterberg limits tests. One Modified Proctor moisture density relationship and one California Bearing Ratio (CBR) test were also carried out on a bulk sample of the subgrade soil. Results are presented on Figures 1 to 6 and Table I, appended.

SUMMARIZED SUBSURFACE CONDITIONS

Reference is made to the appended Log of Borehole sheets for details of the subsurface conditions, including topsoil thicknesses, soil classifications, inferred stratigraphy and thicknesses, Standard Penetration N values (N values, blows per 300 mm of penetration of the split spoon sampler), ground water observations, and the results of laboratory moisture content determinations and Atterberg Limits Tests.

Due to the soil sampling procedures and limited sample size, depth demarcations on the borehole logs must be viewed as "transitional" zones between layers and cannot be construed as exact geologic boundaries between layers. PML should be retained to assist in defining the geologic boundaries in the field during construction, if required.

Soil

Topsoil was at the surface of all boreholes and was 100 to 200 mm thick, locally 70 mm thick.

A sand to silty sand unit was underlying the topsoil in Boreholes 4, 8 to 12 and 16 to 18, extending to 0.7 to 2.4 m depth (elevation 231.4 to 239.05). The unit varied from sand trace silt and trace gravel to a silty sand with some gravel and trace clay. A sample of the silty sand was submitted for laboratory testing and the results are provided on Figure 1, appended. The soil was very loose to dense with N values of 3 to 46 and moist to wet with moisture contents of 4 to 24%.

A thin layer of sandy silt was below the topsoil in Boreholes 5, 14, 15 and 20, being penetrated at 0.7 to 1.4 m depth (elevation 234.0 to 242.45). The layer comprised sandy silt with trace to some gravel and trace clay. The soil was very loose to loose (N values of 3 to 6), locally compact with an N value of 12. The material was moist to wet with moisture contents of 10 to 26%.

Local layers of clayey silt were noted in Boreholes 3, 14 and 17. In Borehole 3 the material was present below the topsoil to 1.4 m depth (elevation 234.2). In Borehole 14 the layer occurred from 1.4 to 2.4 m depth (elevation 233.0 to 234.0), and in Borehole 17 the unit was below the sand and extended to the 3.5 m depth of exploration. The layers contained trace sand and gravel. N values were 5 to 14 (firm to stiff). Moisture contents were 5 to 22%.

A silty clay unit was present in Boreholes 7 and 12. In Borehole 7 the unit occurred from 1.4 to 3.1 m depth (elevation 235.0 to 236.7) and in Borehole 12 from 0.7 to 2.1 m depth (elevation 236.4 to 237.8). The unit contained some sand and trace gravel. A sample of the material was submitted for grain size analysis and the results are provided on Figure 2, attached. Atterberg limit tests are provided on Figure 3, attached. The soil was firm to stiff with N values of 7 to 12. Moisture contents were 10 to 25%.

A sand and silt deposit was revealed in Boreholes 9 and 11, below the sand/silty sand. In Borehole 9 the deposit extended to the 3.5 m depth of exploration. In Borehole 11 the unit was penetrated at 2.4 m depth (elevation 233.7). A sample of the deposit was submitted for laboratory testing and the results are presented on Figure 4, attached. The N values were 2 to 5 in Borehole 11 (very loose to loose) and 19 to greater than 50 in Borehole 9 (compact to very dense). Moisture contents were 10 to 21% (moist to wet).

A major silt till deposit was below the upper soil layers in all boreholes, except Boreholes 9 and 17. The deposit extended to the 3.5 to 5.0 m depth of exploration. The till typically comprised a sandy silt, some clay and trace to some gravel, varying to a clayey silt, trace to some gravel. Cobbles and boulders were noted during drilling. Two samples of the material were submitted for grain size analysis and the results are provided in Figure 5, attached. Atterberg Limits test results are provided on Figure 6, appended. A large bulk sample was also submitted for Modified Proctor moisture density relationship (2.215 t/m³ at 7.5% moisture content) and California Bearing Ratio (CBR) tests (soaked and unsoaked values of 10) with results are summarized on Table I. N values in the till ranged from 4 to greater than 50 (loose to very dense). Moisture contents ranged from 5 to 23%, typically moist with wet seams noted.

Ground Water

The first ground water strike (during drilling) and the water level/ wet cave measured in the boreholes upon completion are summarized below.

BOREHOLE	FIRST GROUND WATER STRIKE (DEPTH (m) / ELEVATION)	WATER LEVEL UPON COMPLETION (DEPTH (m) / ELEVATION)
1	No Water	No Water
2	No Water	No Water
3	1.8 / 233.8	4.6 / 231.0
4	0.9 / 235.3	4.7 / 231.5
5	No Water	No Water
6	2.4 / 236.4	3.4 / 235.4
7	No Water	No Water
8	1.8 / 237.9	0.6 / 239.1
9	3.3 / 236.3	3.3 / 236.3
10	1.8 / 231.9	3.3 / 230.4
11	0.9 / 235.2	3.3 / 232.8
12	No Water	No Water

BOREHOLE	FIRST GROUND WATER STRIKE (DEPTH (m) / ELEVATION)	WATER LEVEL UPON COMPLETION (DEPTH (m) / ELEVATION)
13	No Water	No Water
14	1.8 / 233.6	3.4 / 232.0
15	3.4 / 234.6	3.3 / 234.7
16	1.8 / 232.6	1.8 / 232.6
17	1.3 / 232.2	1.3 / 232.2
18	No Water	No Water
19	2.4 / 235.7	3.3 / 234.8
20	No Water	No Water

The ground water levels noted in the boreholes appear to reflect local perched water in the soil above the till, and local wet seams in the till.

Ground water levels are subject to fluctuations due to precipitation and seasonal variation.

GEOTECHNICAL ENGINEERING CONSIDERATIONS

Foundations

A main terminal building and a skydiving hanger building are currently proposed. It is assumed that the buildings will be slab-on-grade, although it is understood that the floor slab elevations were not established at the time of this report.

Boreholes 1 and 2 were drilled in the area of the skydiving hanger building and Boreholes 3 and 4 were advanced in the main terminal building area. The following table provides the bearing resistance values on a borehole by borehole basis for the top 2 to 3 m of stratigraphy.

BOREHOLE	MINIMUM DEPTH (m) / ELEVATION	ANTICIPATED SUBGRADE SOIL TYPE	GEOTECHNICAL BEARING RESISTANCE AT SLS (kPa)	FACTORED BEARING RESISTANCE AT ULS (kPa)
1	0.7 / 239.1	Silt Till	75	110
	1.5 / 238.3	Silt Till	150	225
	2.2 / 237.6	Silt Till	250	375
2	0.7 / 239.1	Silt Till	200	300
3	0.7 / 234.9	Clayey Silt / Silt Till	150	225
	2.2 / 233.4	Silt Till	250	375
4	0.7 / 235.5	Sand	150	225
	1.5 / 234.7	Silt Till	200	300

SLS – Serviceability Limit State
ULS – Ultimate Limit State

The geotechnical bearing resistance at SLS is based on 25 mm or settlement in the bearing stratum with differential settlement not exceeding 75% of the value.

Footings subject to frost action should be provided with a minimum 1.2 m of earth cover or equivalent insulation.

Prior to placement of structural concrete, all founding surfaces must be examined by PML to check the design bearing capacity is available, and/or to reassess the available soil capacity.

Seismic Design

Based on the soil profile revealed in the boreholes (N Values), Site Classification D is applicable for Seismic Site Response as set out in Table 4.1.8.4.A of the Ontario Building Code (2012). Based on the type and relative density of the soil cover at the site, the soils have a low potential for liquefaction.

Site Grading and Engineered Fill

Finalized grades were not provided at the time of this report, however it is assumed that some cut and fill will be required based on the ground surface elevation at the borehole locations.

The existing topsoil and typically the upper very loose to loose native soil in the upper 0.7 m of the site are unsuitable to support footings and floor slab-on-grade or pavements due to potential for excessive gross and differential settlement. In this regard, it is recommended that existing topsoil and upper unsuitable native soil be removed and replaced. Where grades are to be raised under structures (building, paved areas and site servicing) the fill should be constructed as engineered fill.

In general, engineered fill construction requires, removal of unsuitable soil, compaction/ proofrolling of exposed soil, placement and compaction of suitable material in 200 mm thick loose lifts, compacted to minimum 100% Standard Proctor maximum dry density (SPMDD) in building areas and 95% SPMDD in groundside pavement areas. Airside pavement subgrade preparation is discussed later in the report.

More detailed recommendations can be provided when site grading plans are developed.

Floor Slab-on-Grade

Floor slab-on-grade construction is considered feasible on native soil or engineered fill, constructed as described earlier in the report.

A minimum 200 mm thick base layer of crushed stone (nominal 20 mm size) is recommended directly beneath the floor slab. Where a vapour sensitive floor finish is to be used then the use of polyethylene sheeting or similar means should be incorporation as a vapour barrier. Underfloor drains are not considered necessary, provided the floor is at least 150 mm above exterior grade.

Exterior grades should be established to promote surface drainage away from the building.

Excavation and Ground Water Control

Excavation for the building foundations and pavements is expected to extend as much as about 1.5 to 2.0 m depth. Excavation will encounter topsoil, and sand/silty sand, sandy silt, clayey silt, silty clay, sand and silt and the upper portion of the till. Harder digging and cobbles and boulders should be expected in the till deposit.

Subject to ground water control, the site soils should be considered as Type 3 soil requiring excavation sidewalls to be constructed at no steeper than one horizontal to one vertical (1H:1V) from the base of the excavation in accordance with the Occupational Health and Safety Act.

In general, perched water was encountered at the site, and it is anticipated that seepage from the perched water can be handled by conventional sump pumping, for excavation to about 2.0 m depth.

Excavation during the dry summer months is also recommended to aid in reducing ground water control requirements.

Water taking in Ontario is governed by the Ontario Water Resources Act (OWRA) and the Water Taking and Transfer Regulation O.Reg. 387/040, Section 34 of the OWRA requires any one taking more than 50,000 L/d to obtain a Permit-to-Take-Water (PTTW). This requirement applies to all withdrawals, whether for consumption, temporary construction dewatering or permanent drainage improvements. Projects assessed to be taking more than 50,000 L/d but less than 400,000 L/d of ground water can obtain a permit/permission online via the Environmental Activity and Sector Registry (EASR) system. If it is assessed that more than 400,000 L/d is required then a Category 3 PTTW will be required.

Based on the discussion above, a PTTW or registry on the EASR system is not anticipated. However, this should be reviewed when grading and servicing are established to review ground water/control requirements.

Preliminary Septic System Parameters

Septic systems will be required for both the skydiving building and the main terminal building however, design details are not available at this time. Preliminary values for a percolation rate T–time for septic tile bed design have been requested.

Boreholes 1 and 2 were drilled at the skydiving hanger and revealed silt till soil below the topsoil. Based on the grain size curves of the till soil in Figure 5 an estimated coefficient of permeability, K, of the tested site soils is less than 1 x 10^{-6} cm/sec with a corresponding T-time greater than 50 min/cm.

Boreholes 3 and 4 were drilled at the main terminal building and revealed either clayey silt or wet sand over the till deposit. An estimated coefficient of permeability, K, of the clayey silt is less than 1 x 10^{-6} cm/sec with a corresponding T-time greater than 50 min/cm. The sand may have an estimated coefficient of permeability, K, of about 1 x 10^{-4} cm/sec with a corresponding T-time of 12 min/cm, however the ground water table lies at about 0.9 m depth.

The K value derived from the particle size distribution curve does not take into consideration site specific details such as compaction, soil structure, organic content and/or the degree of saturation.

The site soils are generally unacceptable for conventional inground septic systems and this is complicated further by the typically high perched ground water table. In general, the requirement for raised septic beds is likely.

Pavement Construction and Design

Airside Pavements

Two runways are proposed for the development, Runway 04-22 and Runway 08-26. PML understands that the airside pavements for the aerodrome will support a mix of aircraft. The design aircraft will be the Cessna Stationair, the Cessna Citation Jet, the Cessna Caravan, Pilatus PC12 and future consideration for the ATR 42. The Air Craft Load Rating (ALR) for these planes will be less than 5.0.

The pavement design methods used in our analysis are in general accordance with Transport Canada guidelines as outlined in ASG-19 *Manual of Pavement Structural Design*.

The CBR test conducted on the anticipated silt till revealed a soaked CBR value of 10, which correlates to a Spring Reduced Subgrade Bearing Strength of about 80 kN.

It is noted that since the subgrade soil for the pavements generally comprises frost susceptible silty soils, design procedures recommend the total pavement thickness be based on frost protection requirements to minimize differential frost heaving. For an air freezing Index of about 700 Degree Days (C) for the location, the total pavement structure depth required would be 730 mm.

Prior to pavement construction, all surficial topsoil should be removed and the exposed subgrade must be allowed to dry and be proofrolled with a heavy vibrating compactor under the full-time supervision of qualified geotechnical personnel. The subgrade preparations should occur in dry weather. Any soft, organic or otherwise deleterious soils encountered during the proofrolling process should be subexcavated to the level of competent soil. Any subgrade fill requirement should be constructed as engineered fill (placement in 200 mm thick lifts) and compacted to 95% MPMDD, with the upper 150 mm of the pavement subgrade compacted to 98% MPMDD.

The airside pavement embankments should extend at least 5 m past the asphalt edge, and down to the native subgrade level at a slope of 45 degrees to the horizontal. Beyond the 5 m embankment the site should be level graded with on-site soil placed as engineered fill compacted to minimum 90% MPMDD.

Once the preparation of the subgrade is complete, the following pavement structure should be placed. As noted above, frost requirements will govern the design and will achieve a Pavement Load Rating (PLR) of 9, exceeding design requirement of 5, with a tire pressure restriction of 1.0 MPa:

LAYER	THICKNESS (mm)
Asphalt Surface HL 4	40
Asphalt Binder HL 4	40
Granular A Base	230
Granular B Subbase	420
Total	730

The above pavement designs consider that construction will be carried out on a stable subgrade as determined by proofrolling operations inspected by geotechnical personnel. If the subgrade is wet or unstable during construction activities, additional aggregate subbase material or geogrid might be required. The need for additional items will be best determined during construction.

The Granular A base course should be placed in maximum 150 mm lifts and be compacted to a minimum 100% Modified Proctor Maximum Dry Density (MPMDD). The Granular A base should meet OPS specifications.

The granular subbase course should meet OPS specifications for Granular B and should be placed in maximum 150 mm thick lifts and be compacted to a minimum of 98% MPMDD.

Asphalt courses should comprise HL 4 and be modified to contain a minimum 5.5% asphalt cement with a PGAC of 64-28. The asphalt should be placed in maximum 50 mm loose lifts and compacted to at least 97% Marshal (75 blows). A tack coat should be placed between all asphalt lifts.

The pavement recommendations provided above consider that construction will be carried out during the drier time of the year and that the base is stable and uniform, as determined by proofrolling inspected by PML personnel.

Frequent inspection, sampling and testing by PML personnel is recommended to approve the granular compaction and the design properties and placement of the asphalt.

Subdrains should be constructed in new airside pavement areas. Subdrains should comprise 150 mm diameter perforated pipe surrounded with a filter sleeve and bedded and covered with concrete sand up top the underside of the granular subbase. The pipe should be set at least 0.3 m below the pavement subgrade and set at sufficient slope to flow to frost free discharge points.

All construction materials proposed for this airport project should conform to Transport Canada Specifications. Inspection and testing of all pavement construction operations and subgrade preparation should be carried out on a continuous basis by experienced specialist geotechnical/materials quality assurance testing staff to ensure that appropriate materials, procedures and equipment are used to construct the work.

Groundside Pavements

Similar to the airside pavements, grading has not been established and it is assumed the subgrade will comprise near surface soils at the site. The following designs must be reviewed when the subgrade soil has been confirmed.

MATERIAL	PARKING LOTS (MEDIUM DUTY) (mm)	PRIMARY ROADS (HEAVY DUTY) (mm)
Asphalt (two lifts)	80	110
Granular A Base Course	150	150
Granular B Subbase Course	350	500

It is recommended that following rough grading to the subgrade level, subgrade preparation should include proof-rolling and compacting the exposed subgrade with a heavy compactor to 95% SPMDD under geotechnical review. Any unstable zones identified during this process should be sub-excavated and replaced with compacted select site material, subject to geotechnical field review. Any grade raises required should be constructed as engineered fill as described earlier in the report.

Imported material for the granular base and subbase should conform to OPSS gradation specifications for Granular A and Granular B, and should be compacted to 100% SPMDD. Asphalt should be compacted in accordance with OPSS 310.

The pavement design considers the construction will be carried out during the dry time of the year and the subgrade is stable and not heaving under construction traffic. If wet or unstable subgrade conditions are encountered, addition sub-excavation, additional granular subbase, the use of Granular B Type II and/or the use of geogrid may be required, subject to geotechnical review during construction.

For the pavement to function properly, it is essential that provisions be made for water to drain out of and not collect in the base material. The incorporation of side ditches or subdrains should be considered in conjunction with crowning of the final subgrade to promote drainage towards the pavement edge. Subdrains should be installed similar to airside pavements. Maintenance hole/catchbasins should be backfilled with free draining Granular B. The above measures will help drain the pavement structure as well as alleviate the problems of differential frost movement between the catchbasins and pavement.

Geotechnical Review and Construction Inspection and Testing

It is recommended that the final design drawings be submitted to PML for geotechnical review for compatibility with site conditions and recommendations of this report.

The comments and recommendations provided in the report are based on the information revealed in the previous boreholes. Conditions away from and between boreholes may vary, considering previous activity at the site. Geotechnical review during construction should be on going to confirm the subsurface conditions are substantially similar to those encountered in the previous boreholes, which may otherwise require modification to the original recommendations.

CLOSURE

We trust this report is complete within our terms of reference, and the information presented is sufficient for your present purposes. If you have any questions, or when we may be of further assistance, please do not hesitate to call our office.

Sincerely

Peto MacCallum Ltd.

<Original signed by>

G. R. WHITE
Nov. 11/2021

Geoffrey R. White, P.Eng.
Director
Manager, Geotechnical Services

<Original signed by>

G.P. MITCHELL
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Nov 11/21

G. Mitchell, MEng, P.Eng.
Senior Consultant

GRW/GM:tc

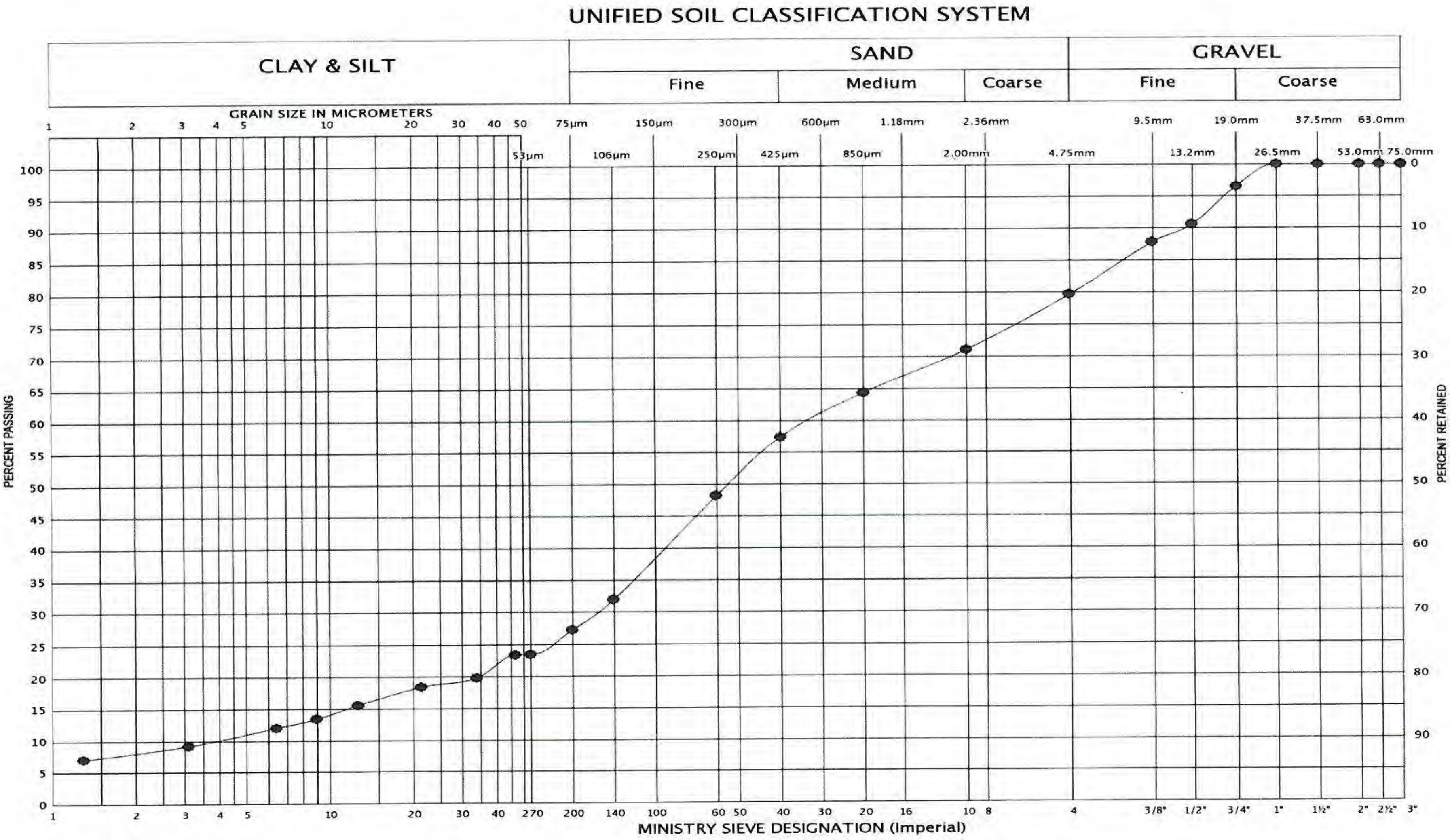
Enclosure(s):
Table I – Compaction and CBR Test Results
Figures 1 to 6 – Grain Size Analysis and Atterberg Limits Tests
List of Abbreviations
Log of Boreholes Nos. 1 to 20
Drawing No. 1 – Borehole Location Plan
Appendix A – Statement of Limitations

TABLE I

COMPACTION AND CBR TEST RESULTS

SOIL DESCRIPTION	SAMPLE NO.	MODIFIED PROCTOR COMPACTION		CALIFORNIA BEARING RATIO						
				UNSOAKED				SOAKED CONDITION		
		MAXIMUM DRY DENSITY (t/m^3)	OPTIMUM WATER CONTENT (%)	DRY DENSITY (t/m^3)	PERCENT COMPACTION	WATER CONTENT (%)	CBR[1]	WATER CONTENT (%)	CBR[1]	SWELL (%)
Silt Till	Bulk sample	2.216	7.5	2.150	99	7.6	10	8.7	10	0

NOTE: 1. CBR Values recorded at 0.1" (2.5 mm) penetration



LEGEND	BH	8
	SAMPLE	2
	SYMBOL	●

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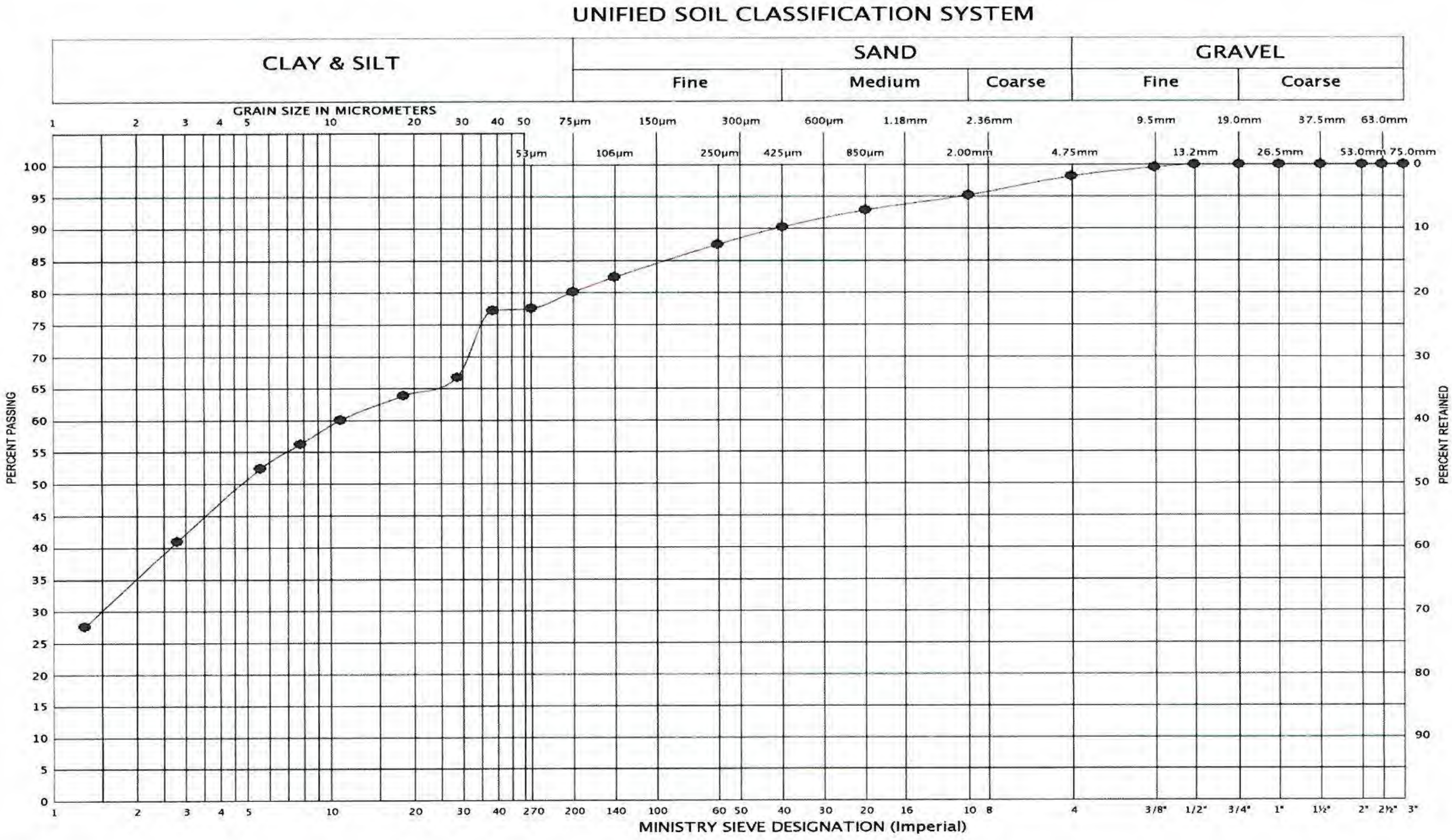
GRAIN SIZE DISTRIBUTION

SILTY SAND, Some gravel, Trace clay

FIG No.: 1

Project No.: 21BF043



LEGEND		
	BH	12
	SAMPLE	3
	SYMBOL	●

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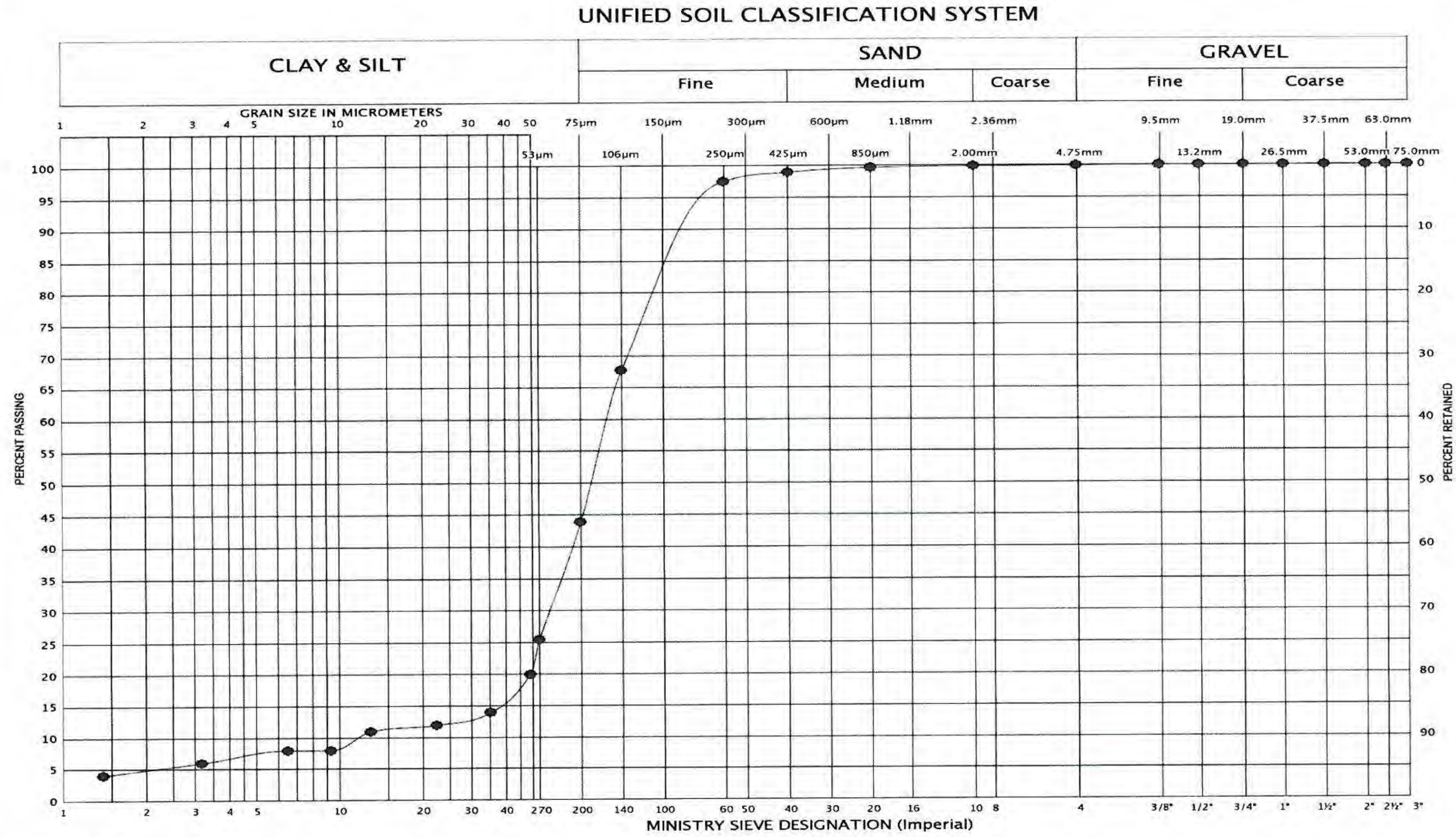
GRAIN SIZE DISTRIBUTION

SILTY CLAY, Some Sand, Trace Gravel

FIG No.: 2

Project No.: 21BF043



LEGEND	BH	11
	SAMPLE	2
	SYMBOL	●

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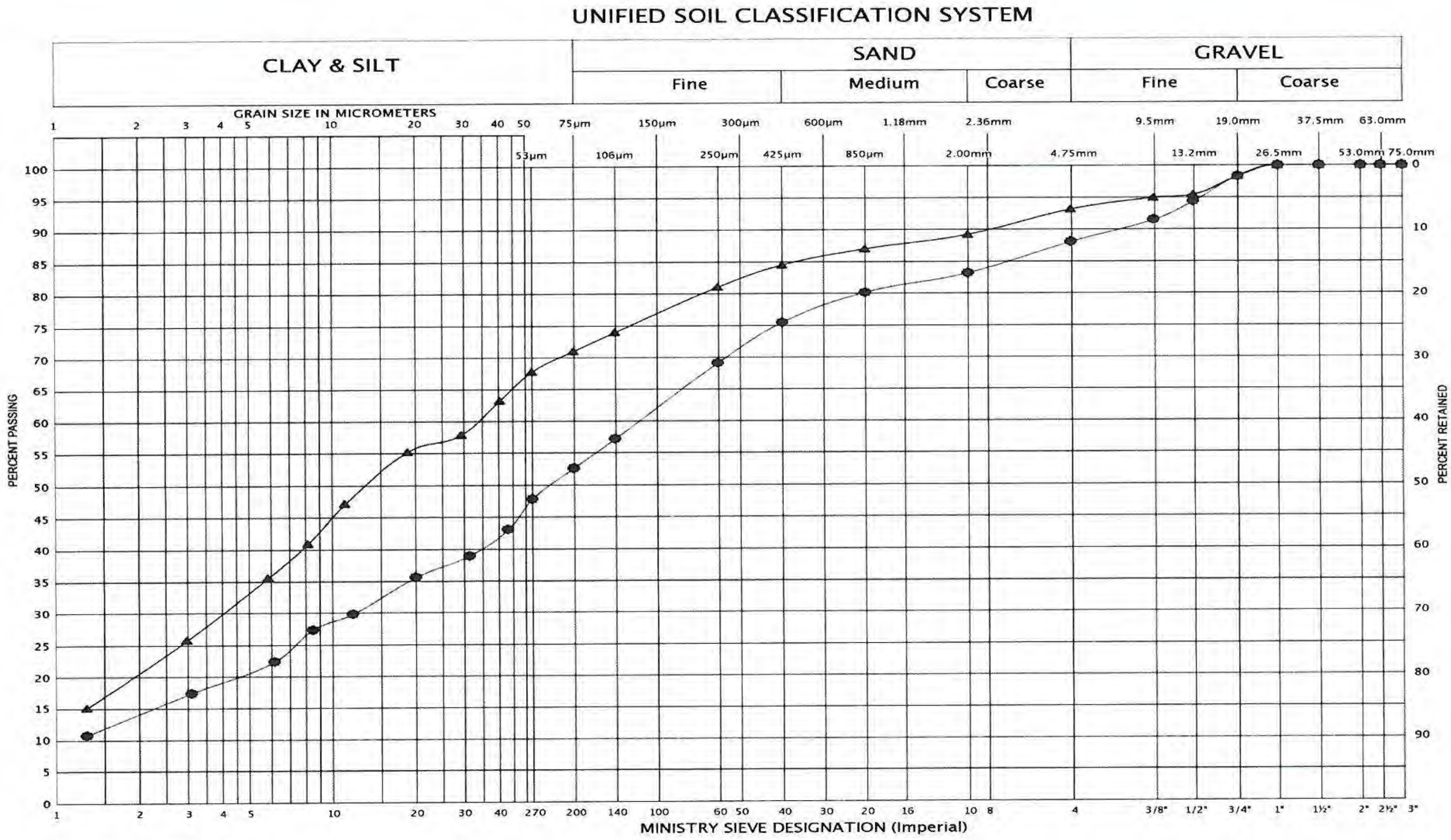
GRAIN SIZE DISTRIBUTION

SAND AND SILT, Trace Clay, Trace Gravel

FIG No.: 4

Project No.: 21BF043



LEGEND	BH	1	5
	SAMPLE	3	3
	SYMBOL	●	▲

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GRAIN SIZE DISTRIBUTION

SILT TILL; Sandy Silt, Some Clay, Trace to Some Gravel

FIG No.: 5

Project No.: 21BF043

LIST OF ABBREVIATIONS

PENETRATION RESISTANCE

Standard Penetration Resistance N: - The number of blows required to advance a standard split spoon sampler 0.3 m into the subsoil. Driven by means of a 63.5 kg hammer falling freely a distance of 0.76 m.

Dynamic Penetration Resistance: - The number of blows required to advance a 51 mm, 60 degree cone, fitted to the end of drill rods, 0.3 m into the subsoil. The driving energy being 475 J per blow.

DESCRIPTION OF SOIL

The consistency of cohesive soils and the relative density or denseness of cohesionless soils are described in the following terms:

CONSISTENCY	N (blows/0.3 m)	c (kPa)	DENSENESS	N (blows/0.3 m)
Very Soft	0 - 2	0 - 12	Very Loose	0 - 4
Soft	2 - 4	12 - 25	Loose	4 - 10
Firm	4 - 8	25 - 50	Compact	10 - 30
Stiff	8 - 15	50 - 100	Dense	30 - 50
Very Stiff	15 - 30	100 - 200	Very Dense	> 50
Hard	> 30	> 200		

WTLL	Wetter Than Liquid Limit
WTPL	Wetter Than Plastic Limit
APL	About Plastic Limit
DTPL	Drier Than Plastic Limit

TYPE OF SAMPLE

SS	Split Spoon	ST	Slotted Tube Sample
WS	Washed Sample	TW	Thinwall Open
SB	Scraper Bucket Sample	TP	Thinwall Piston
AS	Auger Sample	OS	Oesterberg Sample
CS	Chunk Sample	FS	Foil Sample
GS	Grab Sample	RC	Rock Core

PH	Sample Advanced Hydraulically
PM	Sample Advanced Manually

SOIL TESTS

Qu	Unconfined Compression	LV	Laboratory Vane
Q	Undrained Triaxial	FV	Field Vane
Qcu	Consolidated Undrained Triaxial	C	Consolidation
Qd	Drained Triaxial		

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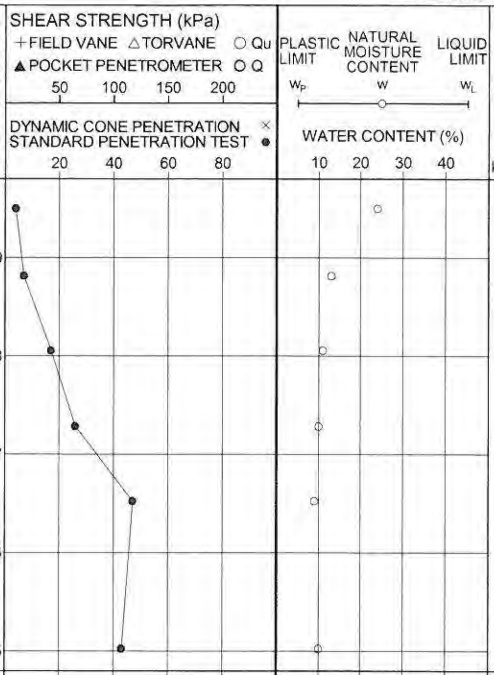
LOG OF BOREHOLE NO. 1

17T 636693E 4905893N

1 of 1

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 08, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

DEPTH ELEV (metres)	SOIL PROFILE DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	TYPE	"N" VALUES	ELEVATION SCALE	UNIT WEIGHT kN/m³	GROUND WATER OBSERVATIONS AND REMARKS GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL
	SURFACE ELEVATION 239.80							
	TOPSOIL: Dark brown, sandy silt, some organics, trace gravel, moist		1	SS	4			
0.10 239.70	SILT TILL: Loose to dense, brown, sandy silt some clay to clayey silt, trace to some gravel, cobbles and boulders, moist		2	SS	7	239		
			3	SS	17	238		
			4	SS	26	237		
			5	SS	47			
	Becoming grey					236		
			6	SS	43	235		
5.0 234.8	BOREHOLE TERMINATED AT 5.0 m							Upon completion of augering No water No cave



Depth scale: 0.0, 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, 13.0, 14.0, 15.0

NOTES

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LOG OF BOREHOLE NO. 2

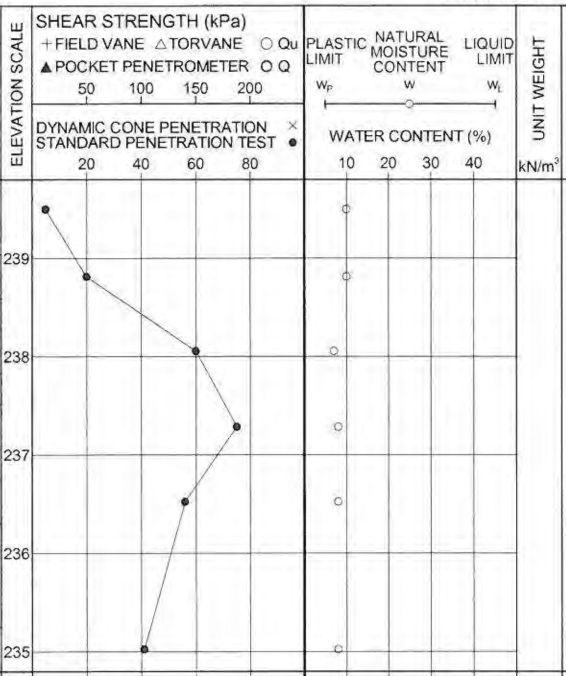
1 of 1

17T 636713E 4905853N

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 08, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

SURFACE ELEVATION 239.80

DEPTH ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
0.20 239.60	TOPSOIL: Dark brown, silty sand, some organics, trace gravel, moist	1	SS	5	
	SILT TILL: Loose to very dense, brown, sandy silt some clay to clayey silt, trace to some gravel, cobbles and boulders, moist	2	SS	20	
		3	SS	60	
		4	SS	75	
	Becoming grey	5	SS	56	
		6	SS	41	
5.0 234.8	BOREHOLE TERMINATED AT 5.0 m				Upon completion of augering No water No cave



GRAIN SIZE DISTRIBUTION (%)
GR SA SI&CL

NOTES

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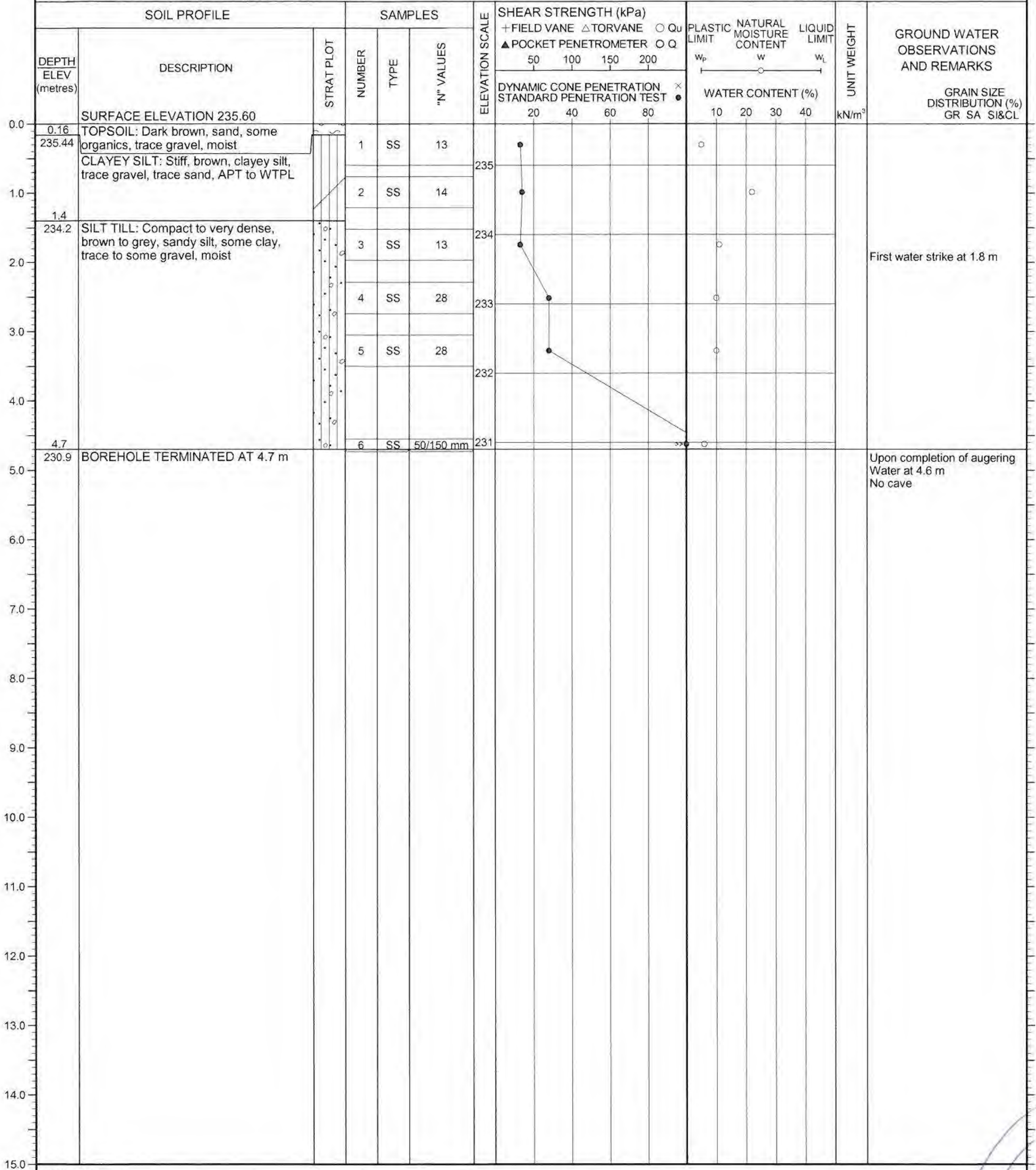
LOG OF BOREHOLE NO. 3

17T 637317E 4905949N

1 of 1

PROJECT Proposed Sutton Aerodrome Development
PML REF. 21BF043
LOCATION Sutton, Ontario
BORING DATE October 05, 2021
ENGINEER GW
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN FF

DEPTH / ELEV (metres)	SOIL PROFILE DESCRIPTION	SAMPLE NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
	SURFACE ELEVATION 235.60				
0.16 235.44	TOPSOIL: Dark brown, sand, some organics, trace gravel, moist	1	SS	13	
	CLAYEY SILT: Stiff, brown, clayey silt, trace gravel, trace sand, APT to WTPL	2	SS	14	
1.4 234.2	SILT TILL: Compact to very dense, brown to grey, sandy silt, some clay, trace to some gravel, moist	3	SS	13	First water strike at 1.8 m
		4	SS	28	
		5	SS	28	
4.7		6	SS	50/150 mm	
230.9	BOREHOLE TERMINATED AT 4.7 m				Upon completion of augering Water at 4.6 m No cave



NOTES

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LOG OF BOREHOLE NO. 4

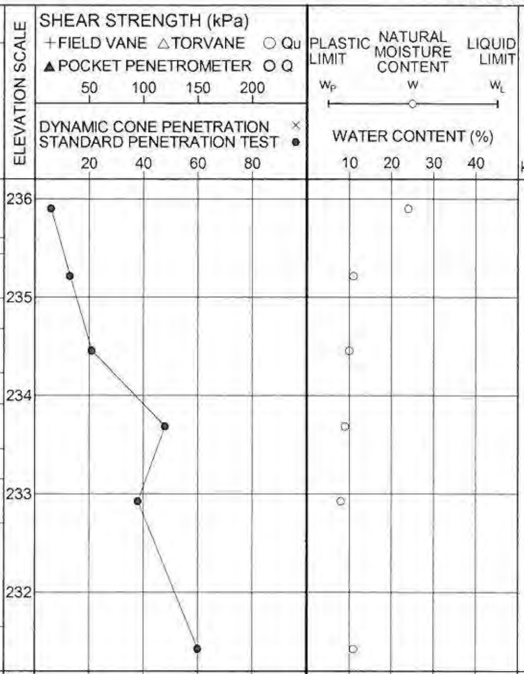
1 of 1

17T 637340E 4906003N

PROJECT Proposed Sutton Aerodrome Development
PML REF. 21BF043
LOCATION Sutton, Ontario
BORING DATE October 05, 2021
ENGINEER GW
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN FF

SURFACE ELEVATION 236.20

DEPTH / ELEV (metres)	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER	TYPE	"N" VALUES	UNIT WEIGHT kN/m³	GROUND WATER OBSERVATIONS AND REMARKS / GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL
0.17 236.03	TOPSOIL: Dark brown, sand, some organics, trace gravel, moist					
	SAND: Loose to compact, dark brown, sand, trace silt, trace gravel, moist to wet	1	SS	6		
		2	SS	13		First water strike at 0.9 m
1.4 234.8	SILT TILL: Compact to very dense, brown, sandy silt, some clay, trace to some gravel, cobbles and boulders, moist	3	SS	21		
		4	SS	48		
		5	SS	38		
		6	SS	60		
5.0 231.2	BOREHOLE TERMINATED AT 5.0 m					Upon completion of augering Water at 4.7 m No cave



NOTES

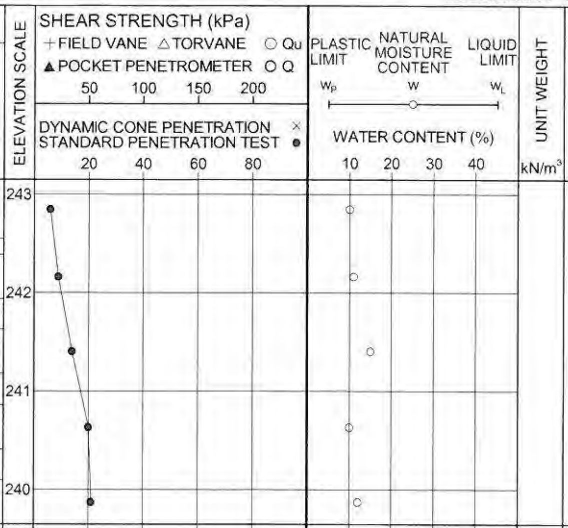
LOG OF BOREHOLE NO. 5

17T 636650E 4906173N

1 of 1

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 8, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

DEPTH ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
	SURFACE ELEVATION 243.15				
0.16 242.99	TOPSOIL: Dark brown, sandy silt, some organics, trace gravel, moist	1	SS	6	
0.70 242.45	SANDY SILT: Loose, brown, sandy silt, some gravel, moist				
	SILT TILL: Loose to compact, brown, sandy silt some clay to clayey silt, trace to some gravel, cobbles and boulders, moist	2	SS	9	
		3	SS	14	
		4	SS	20	
		5	SS	21	
3.5 239.7	BOREHOLE TERMINATED AT 3.5 m				Upon completion of augering No water No cave



GRAIN SIZE DISTRIBUTION (%)
GR SA SI&CL

Depth scale (m): 0.0, 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, 13.0, 14.0, 15.0

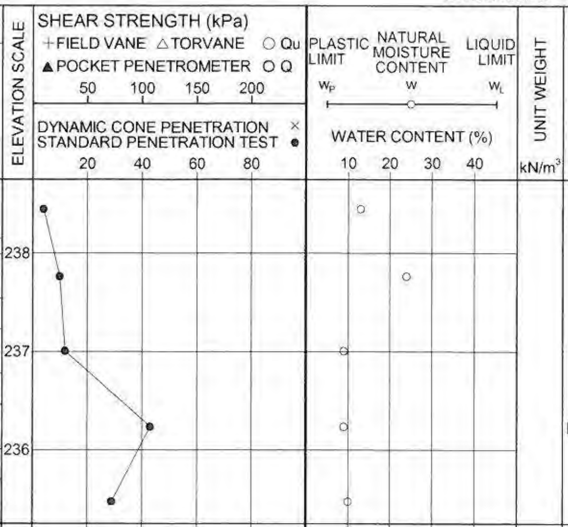
NOTES

LOG OF BOREHOLE NO. 6

17T 636869E 4906250N

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 8, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

DEPTH ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
	SURFACE ELEVATION 238.75				
0.16 238.59	TOPSOIL: Dark brown, clayey silt, some organics, trace gravel, moist	1	SS	4	
	SILT TILL: Loose to dense, brown, sandy silt some clay to clayey silt, trace to some gravel, cobbles and boulders, moist, wet seams	2	SS	10	
		3	SS	12	
		4	SS	43	First water strike at 2.4 m
	Becoming grey	5	SS	29	
3.5 235.3	BOREHOLE TERMINATED AT 3.5 m				Upon completion of augering Water at 3.4 m No cave



GRAIN SIZE DISTRIBUTION (%)
GR SA SI&CL

NOTES

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LOG OF BOREHOLE NO. 7

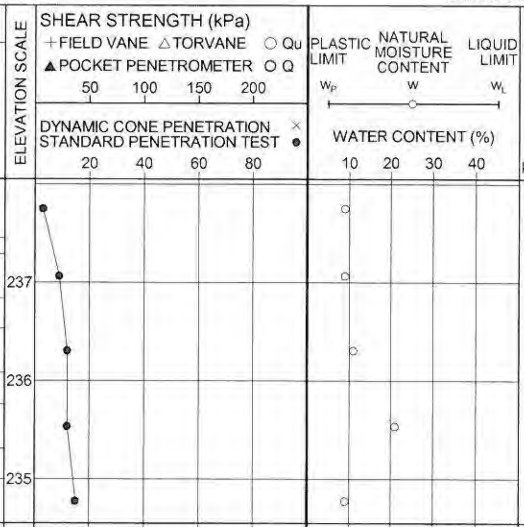
17T 637102E 4906352N

1 of 1

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 08, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

SURFACE ELEVATION 238.05

DEPTH / ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	UNIT WEIGHT kN/m³	GROUND WATER OBSERVATIONS AND REMARKS / GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL
0.13 237.92	TOPSOIL: Dark brown, sandy silt, some organics, trace gravel, moist	1	SS	3		
	SILT TILL: Very loose to loose, grey, sandy silt some clay to clayey silt, trace to some gravel, cobbles and boulders, moist	2	SS	9		
1.4 236.7	SILTY CLAY: Stiff, brown, silty clay, some sand, trace gravel, APL to WTPL	3	SS	12		
		4	SS	12		
3.1 235.0	SILT TILL: Compact, grey, sandy silt some clay to clayey silt, trace to some gravel, cobbles and boulders, moist	5	SS	15		
3.5 234.6	BOREHOLE TERMINATED AT 3.5 m					Upon completion of augering No water No cave



NOTES

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LOG OF BOREHOLE NO. 8

17T 637263E 4906396N

1 of 1

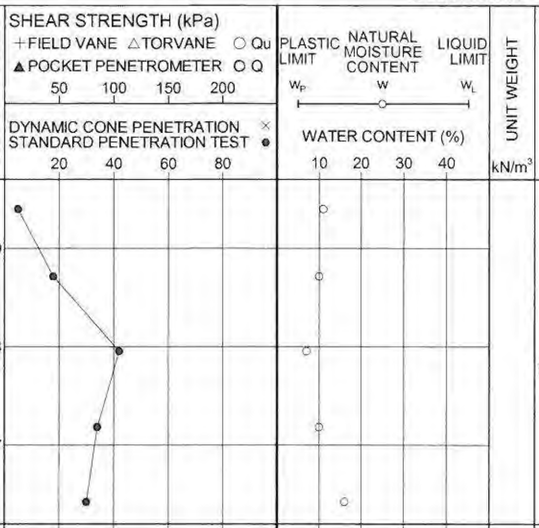
PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers

BORING DATE October 12, 2021

PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

SURFACE ELEVATION 239.70

DEPTH ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	ELEVATION SCALE	GROUND WATER OBSERVATIONS AND REMARKS
0.16 239.54	TOPSOIL: Dark brown, silty sand, some organics, trace gravel, moist	1	SS	5		
	SILTY SAND: Loose to dense, brown, silty sand, some gravel, trace clay, moist to wet				239	
		2	SS	18		
		3	SS	42	238	
						First water strike at 1.8 m
2.4 237.3	SILT TILL: Dense, brown, sandy silt some clay to clayey silt, trace to some gravel, cobbles and boulders, moist	4	SS	34		
					237	
		5	SS	30		
3.5 236.2	BOREHOLE TERMINATED AT 3.5 m					Upon completion of augering Wet cave at 0.6 m



GRAIN SIZE DISTRIBUTION (%)
GR SA SI&CL

Depth scale: 0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0

NOTES

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 9

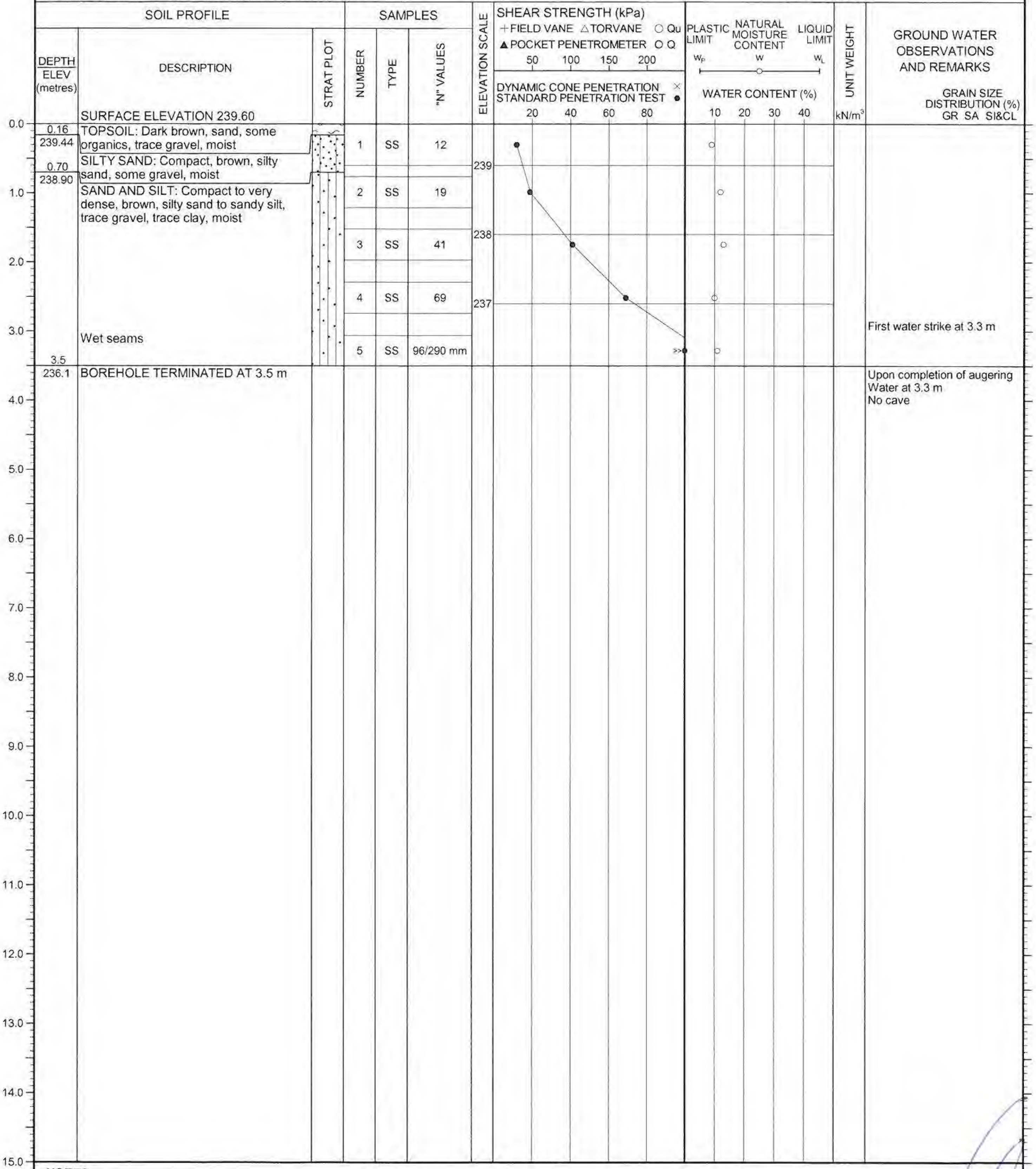
17T 637360E 4906527N

1 of 1

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 12, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

SURFACE ELEVATION 239.60

DEPTH / ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
0.16 239.44	TOPSOIL: Dark brown, sand, some organics, trace gravel, moist	1	SS	12	
0.70 238.90	SILTY SAND: Compact, brown, silty sand, some gravel, moist				
	SAND AND SILT: Compact to very dense, brown, silty sand to sandy silt, trace gravel, trace clay, moist	2	SS	19	
		3	SS	41	
		4	SS	69	
	Wet seams	5	SS	96/290 mm	First water strike at 3.3 m
3.5 236.1	BOREHOLE TERMINATED AT 3.5 m				Upon completion of augering Water at 3.3 m No cave



NOTES

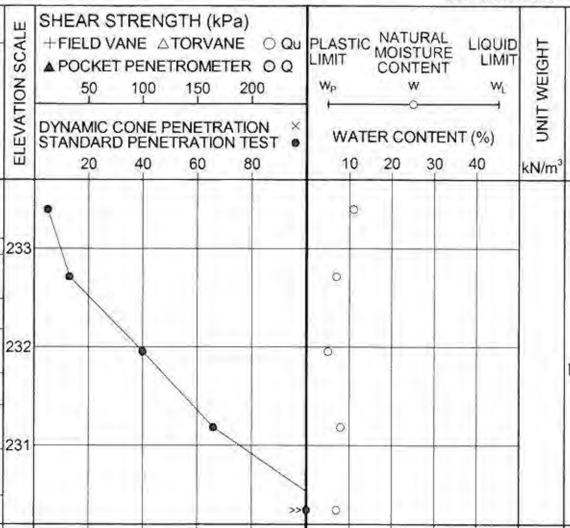
LOG OF BOREHOLE NO. 10

17T 636996E 4905719N

1 of 1

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 05, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

DEPTH ELEV (metres)	SOIL PROFILE – DESCRIPTION	SAMPLES – NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
	SURFACE ELEVATION 233.70				
0.12 233.58	TOPSOIL: Dark brown, silty sand, some organics, moist	1	SS	5	
	SILTY SAND: Loose to compact, brown, silty sand, some gravel, trace clay, moist to wet	2	SS	13	
1.4 232.3	SILT TILL: Dense to very dense, brown, sandy silt, some clay, trace to some gravel, cobbles and boulders, moist	3	SS	40	First water strike at 1.8 m
		4	SS	66	
		5	SS	50/140mm	
3.5 230.2	BOREHOLE TERMINATED AT 3.5 m				Upon completion of augering Water at 3.3 m Cave at 3.4 m



NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

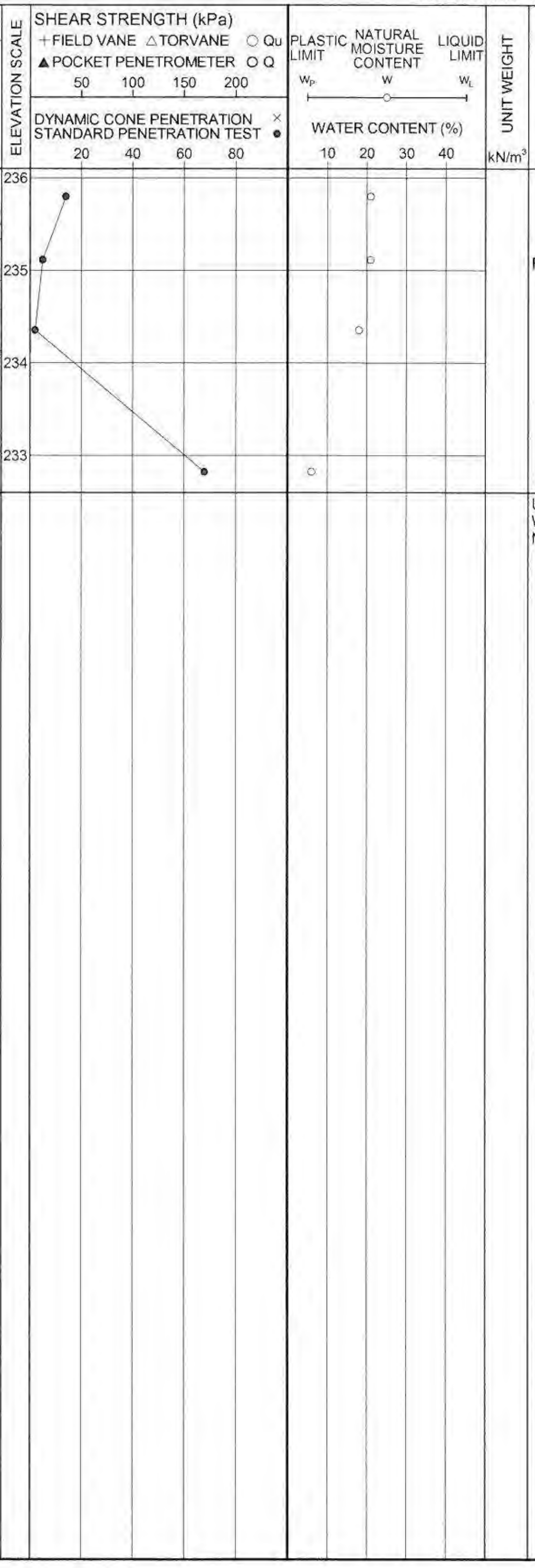
LOG OF BOREHOLE NO. 11

17T 637048E 4905975N

1 of 1

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 05, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

DEPTH / ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
	SURFACE ELEVATION 236.10				
0.13 235.97	TOPSOIL: Dark brown, sand, some organics, trace gravel, moist	1	SS	14	
0.70 235.40	SAND: Compact, brown, sand, trace gravel, trace silt, moist				
	SAND AND SILT: Loose to very loose, grey, silty sand to sandy silt, trace gravel, trace clay, wet to moist	2	SS	5	First water strike at 0.9 m
		3	SS	2	
2.4 233.7	SILT TILL: Very dense, grey, sandy silt some clay to clayey silt, trace to some gravel, cobbles and boulders, moist	5	SS	68	
3.5 232.6	BOREHOLE TERMINATED AT 3.5 m				Upon completion of augering Water at 3.3 m No cave



NOTES

PML - BH/TP LOG GEO/ENV WITH MWS 21BF043 BH LOGS 2021-10-13.GPJ ON_MOT.GDT 2021-11-02 10:48:53 AM

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

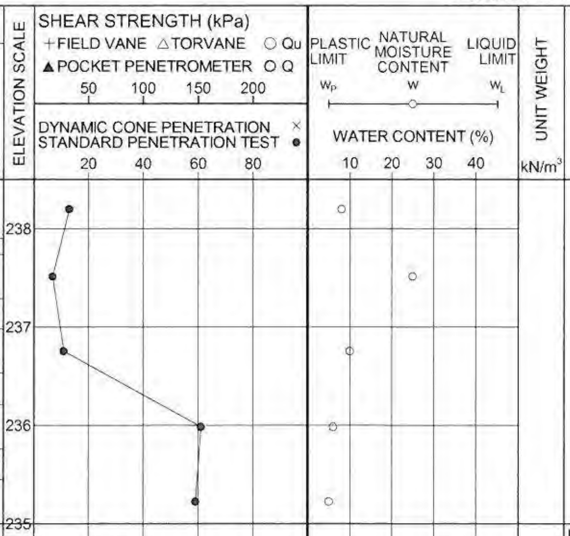
LOG OF BOREHOLE NO. 12

17T 637213E 4906220N

1 of 1

PROJECT Proposed Sutton Aerodrome Development
PML REF. 21BF043
LOCATION Sutton, Ontario
BORING DATE October 08, 2021
ENGINEER GW
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN FF

DEPTH ELEV (metres)	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
	SURFACE ELEVATION 238.50				
0.13 238.37	TOPSOILL: Dark brown, sand, some gravel, trace orgaics, moist	1	SS	13	
0.70 237.80	SAND : Compact, brown, sand, trace gravel, trace silt, moist				
	SILTY CLAY: Firm to stiff, brown, silty clay, some sand, trace gravel, WTPL to APL	2	SS	7	
		3	SS	11	
2.1 236.4	SILT TILL: Very dense, brown, sandy silt some clay to clayey silt, trace to some gravel, cobbles and boulders, moist	4	SS	61	
		5	SS	59	
3.5 235.0	BOREHOLE TERMINATED AT 3.5 m				Upon completion of augering No water No cave



NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

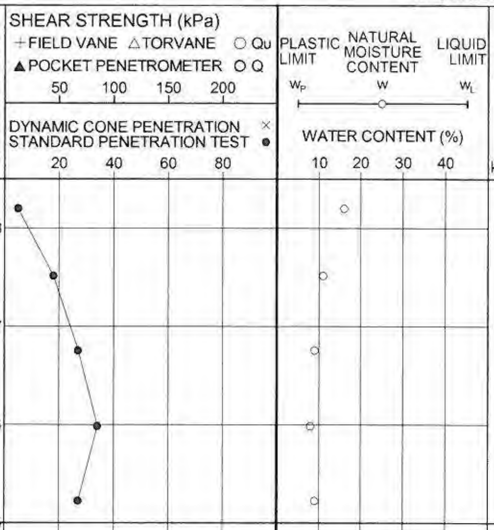
LOG OF BOREHOLE NO. 13

17T 636788E 4905913N

1 of 1

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 08, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

DEPTH / ELEV (metres)	SOIL PROFILE DESCRIPTION	SAMPLE NUMBER	TYPE	"N" VALUES	UNIT WEIGHT kN/m³	GROUND WATER OBSERVATIONS AND REMARKS / GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL
	SURFACE ELEVATION 238.50					
0.10 238.41	TOPSOIL: Dark brown, sand, some silt, trace organics, moist	1	SS	5		
	SILT TILL: Loose to dense, brown to grey, sandy silt some clay to clayey silt, trace to some gravel, cobbles and boulders, moist	2	SS	18		
		3	SS	27		
		4	SS	34		
		5	SS	27		
3.5 235.0	BOREHOLE TERMINATED AT 3.5 m					Upon completion of augering No water No cave



Depth scale (m): 0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0

NOTES

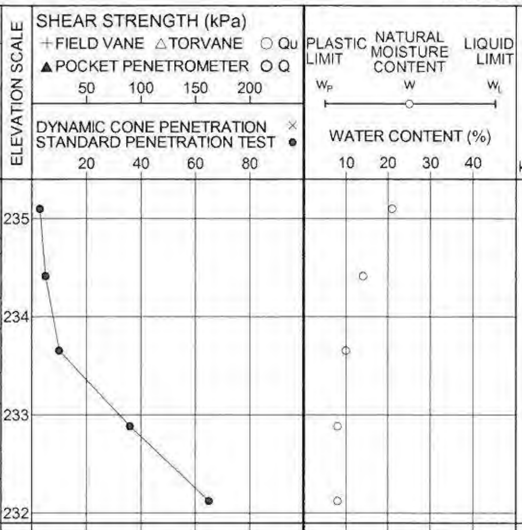
LOG OF BOREHOLE NO. 14

1 of 1

17T 637198E 4906055N

PROJECT Proposed Sutton Aerodrome Development
PML REF. 21BF043
LOCATION Sutton, Ontario
BORING DATE October 05, 2021
ENGINEER GW
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN FF

DEPTH / ELEV (metres)	SOIL PROFILE: DESCRIPTION	SAMPLES: NUMBER	TYPE	"N" VALUES	UNIT WEIGHT kN/m³	GROUND WATER OBSERVATIONS AND REMARKS / GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL
0.0	SURFACE ELEVATION 235.40					
235.28	TOPSOIL: Dark brown, sand, some silt, some organics, trace gravel, moist	1	SS	3		
	SANDY SILT: Very loose to loose, brown, sandy silt, trace gravel, very moist	2	SS	5		
1.4 234.0	CLAYEY SILT: Stiff, grey, clayey silt, trace gravel, trace sand, APL	3	SS	10		First water strike at 1.8 m
2.4 233.0	SILT TILL: Dense to very dense, grey, sandy silt, some clay, trace to some gravel, cobbles and boulders, moist	4	SS	36		
		5	SS	65		
3.5 231.9	BOREHOLE TERMINATED AT 3.5 m					Upon completion of augering Water at 3.4 No cave



0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0

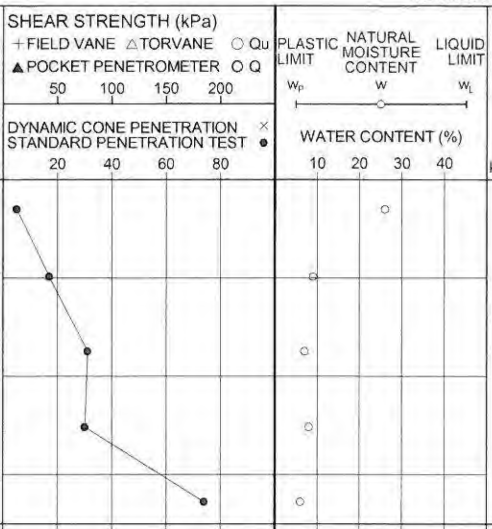
NOTES

LOG OF BOREHOLE NO. 15

1 of 1

17T 637451E 4906213N

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 12, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF



DEPTH / ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	ELEVATION SCALE	UNIT WEIGHT kN/m³	GROUND WATER OBSERVATIONS AND REMARKS GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL
	SURFACE ELEVATION 238.00						
0.16 237.84	TOPSOIL: Dark brown, sand, trace gravel, trace organics, moist	1	SS	5			
	SANDY SILT: Loose to compact, brown, sandy silt, trace gravel, wet to moist	2	SS	17	237		
1.1 236.9	SILT TILL: Dense to very dense, grey, sandy silt, some clay, trace to some gravel, cobbles and boulders, moist	3	SS	31	236		
		4	SS	30			
	Wet seams	5	SS	74	235		First water strike at 3.4 m
3.5 234.5	BOREHOLE TERMINATED AT 3.5 m						Upon completion of augering Water at 3.3 m No cave

NOTES

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LOG OF BOREHOLE NO. 16

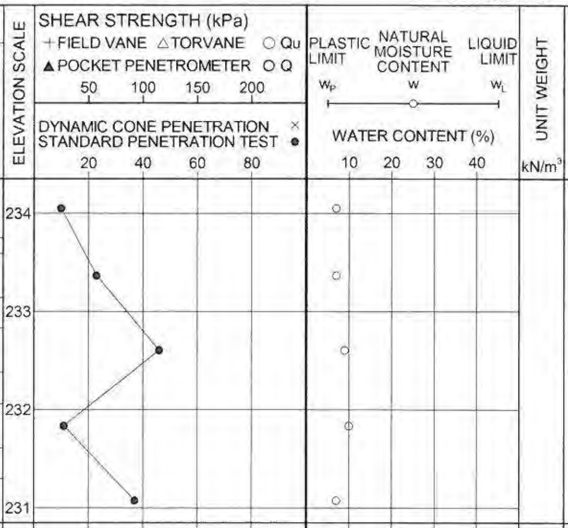
17T 637254E 4905813N

1 of 1

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 05, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

SURFACE ELEVATION 234.35

DEPTH ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
0.18 234.17	TOPSOIL: Dark brown, sand, some organics, trace gravel, moist	1	SS	10	
	SAND: Compact to dense, brown, sand, trace gravel, trace silt, moist to wet	2	SS	23	
		3	SS	46	First water strike at 1.8 m
2.1 232.3	SILT TILL: Compact to dense, grey, sandy silt, some clay, trace to some gravel, cobbles and boulders, moist	4	SS	11	
		5	SS	37	
3.5 230.9	BOREHOLE TERMINATED AT 3.5 m				Upon completion of augering Wet cave at 1.8 m



GRAIN SIZE DISTRIBUTION (%)
GR SA SI&CL

NOTES

LOG OF BOREHOLE NO. 18

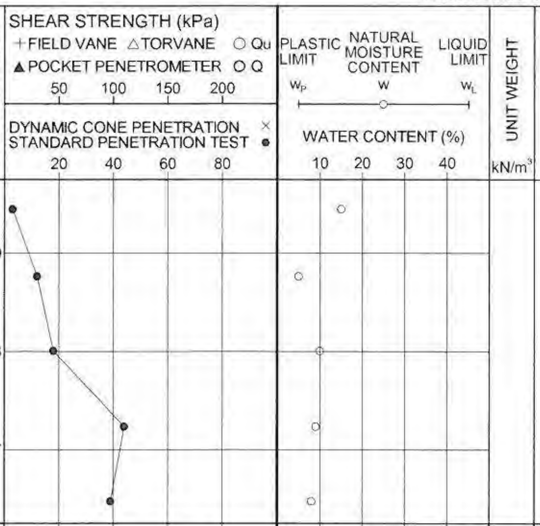
17T 636866E 4906332N

1 of 1

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 08, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

SURFACE ELEVATION 239.75

DEPTH ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	ELEVATION SCALE	GROUND WATER OBSERVATIONS AND REMARKS
0.14 239.61	TOPSOIL: Dark brown, silty sand, some organics, moist	1	SS	3		
0.70 239.05	SILTY SAND: Very loose, brown, silty sand, trace gravel, moist				239	
	SILT TILL: Compact to dense, brown, sandy silt, some clay, trace to some gravel, cobbles and boulders, moist	2	SS	12		
		3	SS	18	238	
		4	SS	44	237	
		5	SS	39		
3.5 236.3	BOREHOLE TERMINATED AT 3.5 m					Upon completion of augering No water No cave



GRAIN SIZE DISTRIBUTION (%)
GR SA SI&CL

Depth scale (m): 0.0, 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, 13.0, 14.0, 15.0

NOTES

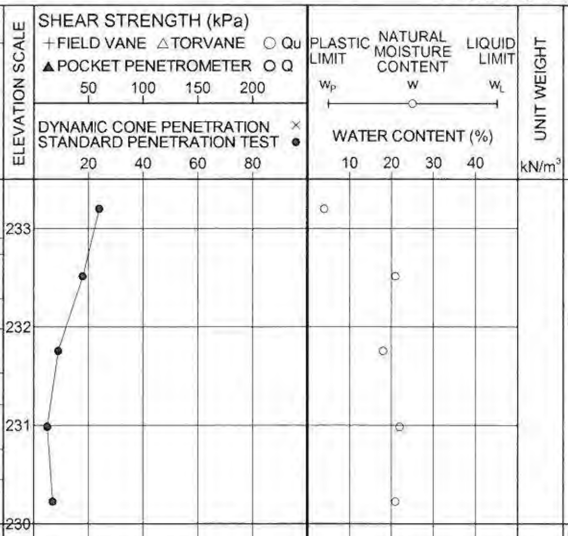
PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 17

17T 637517E 4905856N

PROJECT Proposed Sutton Aerodrome Development
PML REF. 21BF043
LOCATION Sutton, Ontario
BORING DATE October 12, 2021
ENGINEER GW
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN FF

DEPTH ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	UNIT WEIGHT kN/m³	GROUND WATER OBSERVATIONS AND REMARKS
	SURFACE ELEVATION 233.50					
0.07 233.43	TOPSOIL: Dark brown, sand, some silt, some organics, trace gravel, moist SAND: Compact to loose, brown to grey, sand, some gravel, some silt, wet	1	SS	24		
		2	SS	18		
						First water strike at 1.3 m
		3	SS	9		
2.1 231.4	CLAYEY SILT: Firm, grey, clayey silt, trace sand, trace gravel, APL to WTPL	4	SS	5		
		5	SS	7		
3.5 230.0	BOREHOLE TERMINATED AT 3.5 m					Upon completion of augering Water at 1.3 m Cave at 1.5 m



GRAIN SIZE DISTRIBUTION (%)
GR SA SI&CL

NOTES

LOG OF BOREHOLE NO. 19

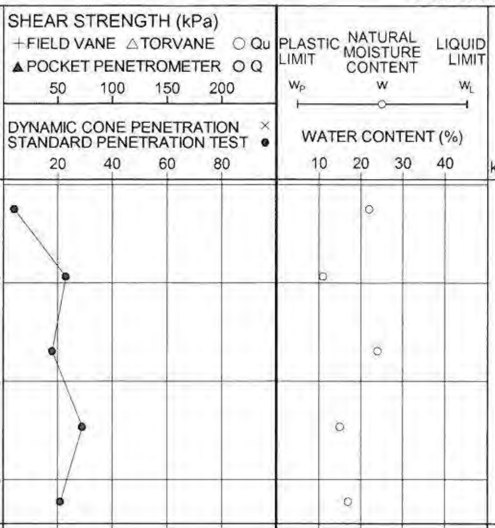
17T 637073E 4906593N

1 of 1

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 12, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

SURFACE ELEVATION 238.05

DEPTH ELEV (metres)	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" VALUES	ELEVATION SCALE	GROUND WATER OBSERVATIONS AND REMARKS
0.17 237.88	TOPSOIL: Dark brown, sand, some organics, trace gravel, moist	1	SS	4		
	SILT TILL: Loose to compact, brown, sandy silt, some clay, trace to some gravel, cobbles and boulders, moist, wet seams	2	SS	23	237	
		3	SS	18	236	
		4	SS	29		First water strike at 2.4 m
		5	SS	21	235	
3.5 234.6	BOREHOLE TERMINATED AT 3.5 m					Upon completion of augering Water at 3.3 m No cave



UNIT WEIGHT kN/m³

GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL

Depth scale: 0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0

NOTES

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

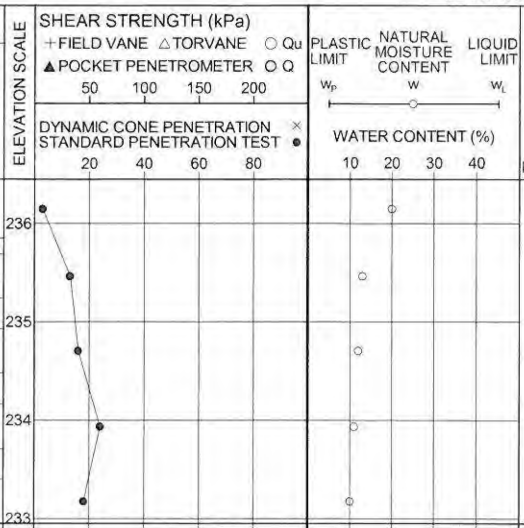
LOG OF BOREHOLE NO. 20

17T 637273E 4906665N

1 of 1

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 12, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

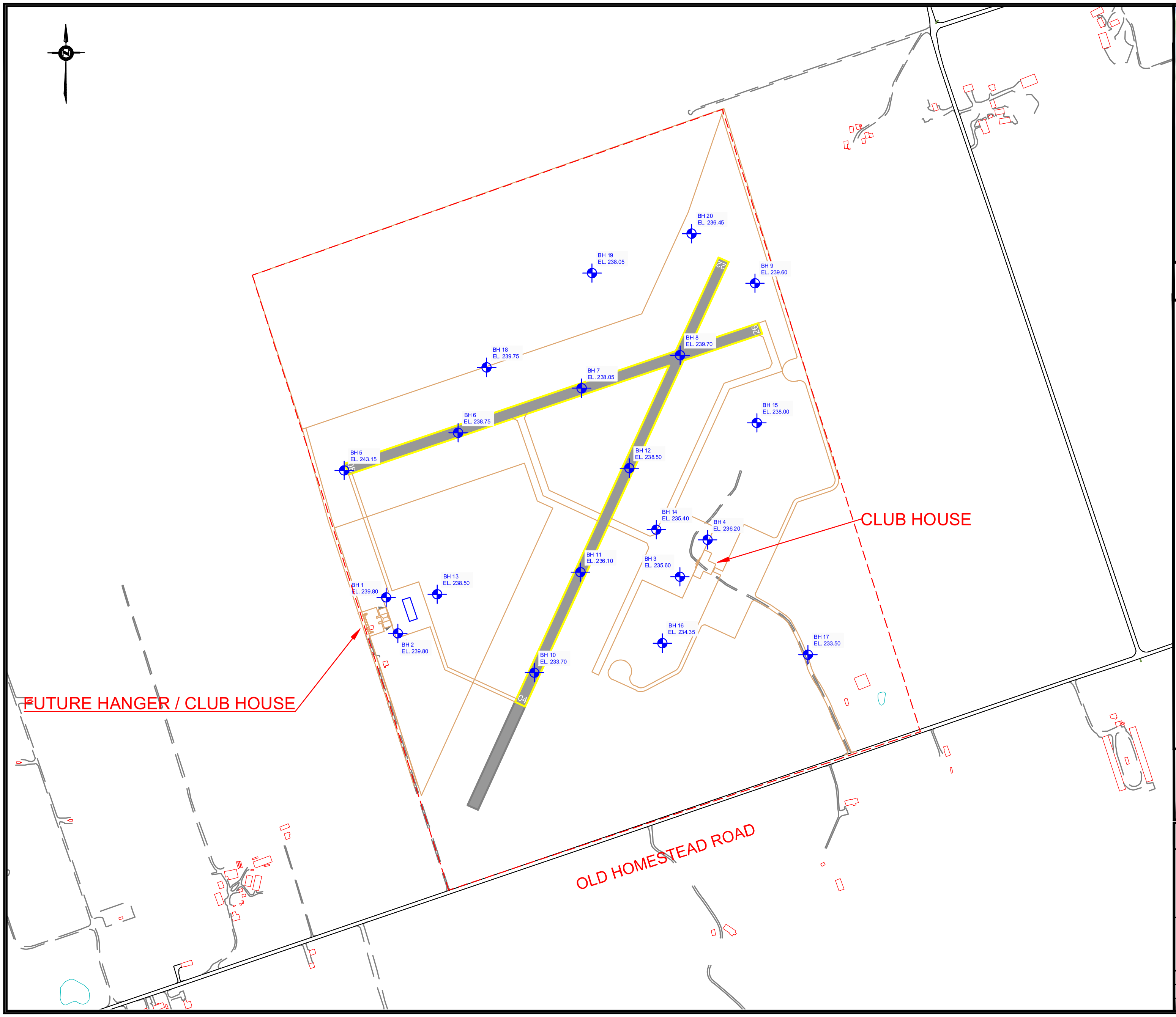
DEPTH / ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
	SURFACE ELEVATION 236.45				
0.17 236.28	TOPSOIL: Dark brown, sandy silt, some organics, trace gravel, moist	1	SS	3	
0.70 235.75	SANDY SILT: Very loose, brown, sandy silt, some gravel, trace clay, very moist				
	SILT TILL: Compact, brown to grey, sandy silt, some clay, trace to some gravel, cobbles and boulders, moist	2	SS	13	
		3	SS	16	
		4	SS	24	
		5	SS	18	
3.5 233.0	BOREHOLE TERMINATED AT 3.5 m				Upon completion of augering No water No cave

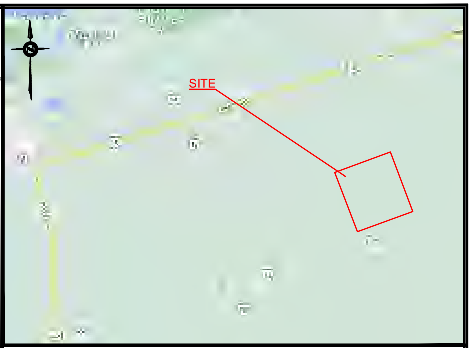


UNIT WEIGHT kN/m³

GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL

NOTES





KEY PLAN
SUTTON, ONTARIO

LEGEND:

⊕	BH 1 EL. 239.80	BOREHOLE 1 SURFACE ELEVATION
– – – – – –		APPROXIMATE SITE LIMIT

REFERENCE:
BASE PLAN PRODUCED BY THE CLIENT

0m 60 120 180 240 300

BOREHOLE LOCATION PLAN

PROPOSED SUTTON AERODOME DEVELOPMENT
SUTTON, ONTARIO

Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	FF	DATE	SCALE	PML REF.	DRAWING NO.
CHECKED	GW	NOV. 2021	AS SHOWN	21BF043	1
APPROVED	GW				

APPENDIX A

Statement of Limitations

STATEMENT OF LIMITATIONS

This report is prepared for and made available for the sole use of the client named. Peto MacCallum Ltd. (PML) hereby disclaims any liability or responsibility to any person or entity, other than those for whom this report is specifically issued, for any loss, damage, expenses, or penalties that may arise or result from the use of any information or recommendations contained in this report. The contents of this report may not be used or relied upon by any other person without the express written consent and authorization of PML.

This report shall not be relied upon for any purpose other than as agreed with the client named without the written consent of PML. It shall not be used to express or imply warranty as to the fitness of the property for a particular purpose. A portion of this report may not be used as a separate entity: that is to say the report is to be read in its entirety at all times.

The report is based solely on the scope of services which are specifically referred to in this report. No physical or intrusive testing has been performed, except as specifically referenced in this report. This report is not a certification of compliance with past or present regulations, codes, guidelines and policies.

The scope of services carried out by PML is based on details of the proposed development and land use to address certain issues, purposes and objectives with respect to the specific site as identified by the client. Services not expressly set forth in writing are expressly excluded from the services provided by PML. In other words, PML has not performed any observations, investigations, study analysis, engineering evaluation or testing that is not specifically listed in the scope of services in this report. PML assumes no responsibility or duty to the client for any such services and shall not be liable for failing to discover any condition, whose discovery would require the performance of services not specifically referred to in this report.

STATEMENT OF LIMITATIONS
(continued)

The findings and comments made by PML in this report are based on the conditions observed at the time of PML's site reconnaissance. No assurances can be made and no assurances are given with respect to any potential changes in site conditions following the time of completion of PML's field work. Furthermore, regulations, codes and guidelines may change at any time subsequent to the date of this report and these changes may affect the validity of the findings and recommendations given in this report.

The results and conclusions with respect to site conditions are therefore in no way intended to be taken as a guarantee or representation, expressed or implied, that the site is free from any contaminants from past or current land use activities or that the conditions in all areas of the site and beneath or within structures are the same as those areas specifically sampled.

Any investigation, examination, measurements or sampling explorations at a particular location may not be representative of conditions between sampled locations. Soil, ground water, surface water, or building material conditions between and beyond the sampled locations may differ from those encountered at the sampling locations and conditions may become apparent during construction which could not be detected or anticipated at the time of the intrusive sampling investigation.

Budget estimates contained in this report are to be viewed as an engineering estimate of probable costs and provided solely for the purposes of assisting the client in its budgeting process. It is understood and agreed that PML will not in any way be held liable as a result of any budget figures provided by it.

The Client expressly waives its right to withhold PML's fees, either in whole or in part, or to make any claim or commence an action or bring any other proceedings, whether in contract, tort, or otherwise against PML in anyway connected with advice or information given by PML relating to the cost estimate or Environmental Remediation/Cleanup and Restoration or Soil and Ground Water Management Plan Cost Estimate.

Functional Servicing Report
Sutton Aerodrome
Sutton, Town of Georgina, ON
Regional Municipality of York

File 21-692
November 2021

Prepared by

WMI & Associates Limited
119 Collier Street, Barrie Ontario L4M 1H5

Table of Contents

Appendices

1.0 Introduction

1.1 General

WMI & Associates Limited was retained by Avia NG to prepare a Functional Servicing and Stormwater Management Report for the proposed Sutton Aerodrome development located at 7486 and 7818 Old Homestead Road, in the Town of Georgina.

1.2 Background

The site is located south and west of Highway 48 and between the communities of Sutton, 12 kilometres to the northwest and Pefferlaw, 5 kilometers to the east on the north side of Old Homestead Road. The general location of this property is illustrated on **FIG 1** in **Appendix A** (**Site Location Plan**) and will be referred to as the "site" within the context of this report. The Concept Plan for this project has been prepared by Avia NG. (October 4, 2021) and can be found in **Appendix A.**

The lands are legally described in the Plan of Survey as Lot 11, Part of Lot 12, Concession 5, Town of Georgina, County of York, as per Land Registry Office York Region (LRO 65).

The proposed development is to be located on the 137.4ha mixed use property (residential / agricultural / forested / wetland) that lies between Park Road (County Road 18) 1560m to the west and Stony Batter Road 470m to the east, with the unopened road allowance for Morning Glory Road north of the subject property and fronting Old Homestead Road to the south.

It is proposed to construct a small airport (aerodrome) facility including two runways, taxiways, hangars, maintenance facilities and administrative buildings, and associated parking lots. There are three (3) phases planned for this development with Phase 1A and 1B being the subject of review at this time. These two (2) phases encompass the southern two-thirds of the subject lands with Phase 1A including the terminal, hangars and runways for the central to eastern portion of the property and Phase 1B including skydive facility, hangars and apron to the west. No development will occur in the southeastern portion of the site with the exception of the access road. The remaining developed site area will consist of paved and turf surface cover, landscaped lawns and a Stormwater Management Dry Pond. There are two site entrances planned from the Old Homestead Road right-of way (ROW) in the south at the locations of the existing residential driveways to access the skydive facilities and for the aerodrome terminal. A future extension to Morning Glory Road in the northeast is planned for public access in Phase 2, which encompasses the northern third of the subject property.

The stormwater management features that have been designed for this site consist of vegetated filter strips, enhanced grass swales, soak-away pits, storm sewer complete with deep sumps, oil/grit separator, and a dry pond for quantity and quality control. The stormwater management features will be designed to achieve an Enhanced Level of stormwater quality control which corresponds to a removal of 80% of suspended solids.

Phase 1A and 1B of the aerodrome facility will be serviced by one proposed on-site sewage treatment system and two proposed drilled wells.

2.0 Stormwater Management

2.1 Development Design Criteria

The stormwater management design for the site will incorporate the policies and criteria of a number of agencies, including the Ministry of the Environment, Conservation and Parks (MECP), Lake Simcoe Region Conservation Authority (LSRCA), Town of Georgina (Town). Considering the desire to provide stormwater quality control for the site runoff, additional design guidance has been provided based on the Low Impact Development Stormwater Management Planning & Design Guide (LID Manual) prepared by the Credit Valley Conservation (CVC) and the Toronto and Region Conservation Authority (TRCA), Version 1.0, dated 2010. The above noted agencies stormwater design criteria for the site are summarized below:

- Stormwater quality controls will be provided based on the guidelines described in the Ministry of the Environment, Stormwater Management Planning and Design Manual dated March 2003 and the LID Manual. Following the MECP and LID Manual Guidelines noted above, the stormwater management design utilized for the site will provide water quality control at an Enhanced Level of Protection (minimum of 80% Total Suspended Solids removal efficiency).
- The Town of Georgina and Lake Simcoe Region Conservation Authority (LSRCA) Engineering Design Criteria and Standards.
- South Georgian Bay Lake Simcoe Region Source Protection Plan.
- The proposed development area is partially located within a significant groundwater recharge area, highly vulnerable aquifer and Intake Protection Zone 3.
- Stormwater quantity control will be provided to ensure post-development peak flows do not exceed pre-development target rates for each of the 2-100 year design storm events.
- The rainfall data (IDF curves) from the Ministry of Transportation (MTO) IDF Curve Look-Up for Pefferlaw/Sutton were used to derive peak flows and runoff volumes for the site.
- Erosion and Sediment Control measures will be implemented prior to and during the construction of the development and maintained until the site is stabilized.

2.2 Pre-Development Condition

Currently the site is mostly undeveloped with each parcel consisting on an existing (abandoned) residential dwellings complete with outbuildings, agricultural fields, forests and wetlands. Each parcel of the property is bound to the south by Old Homestead Road, the unopened road allowance for Morning Glory Road to the north and residential properties to the east and west (25382 Stoney Batter Road and 7376 Old Homestead Road, respectively). The site currently receives minor external drainage from west of the subject site which is cut-off by the existing driveway along the western property line which conveys runoff south to Old Homestead Road.

Digital Terrain Modelling (DTM) reveals that the high point is located a third of the way south of the north property boundary with the site gradually sloping to the north / northeast (PRE1 = 44.3ha) and towards the south / southeast (PRE2 = 93.1ha) towards an existing watercourse which flows in a northeast direction. The existing topographic relief on-site is approximately 7m.

The pre-development drainage patterns have been confirmed through the digital terrain modelling. Refer to **FIG 2**in **Appendix A** for the **Pre-Development Drainage Plan**.

2.3 Soil Conditions

According to the Soils Map of York County, Ontario, Soil Survey Report No. 19, prepared for the Department of Agriculture, the site consists of many soil types including Sargent Sandy Loam (belonging to Hydrologic Soil Group ‘A’) and exhibits good drainage characteristics, Tecumseth Sandy Loam (belonging to Hydrologic Soil Group ‘AB’) which exhibits imperfect drainage characteristics and Otonabee Loam, Emily Loam, Granby Sandy Loam, and Muck (belonging to Hydrologic Soil Group ‘B’) which exhibit drainage characteristics ranging from good to very poor.

The Runoff Coefficients and Curve Numbers associated with the site were computed by calculating weighted values based on corresponding land uses and soil types. The Hydrologic Soil Groups were determined in accordance with the Ontario Ministry of Transportation (MTO) Soil Classification System.

Refer to **Appendix C** for the Soils Map, **Appendix D** for the **Hydrogeologic Study**and **Appendix E** for the **Preliminary Geotechnical Investigation**.

2.4 Post-Development Condition

Post-development drainage patterns on-site will be generally consistent with that of the existing condition, with the intention of improving the overall stormwater management on-site through both quantity and quality control features. The post-development condition consists of two (2) drainage areas (POST1 = 47.3ha, POST2 = 90.1ha) with the POST2 drainage area being divided into two (2) subcatchments (POST2A = 65.1ha, POST2B = 25.0ha) as the southeastern portion of the site will not be developed and is to remain in its natural state as a wooded wetland area.

This development consists of three (3) phases with Phase 1A and 1B proposed to construct an aerodrome facility with two runways, aprons, taxiways, hangars, maintenance facilities and administrative buildings. This site will be accessed by two entrances from the Old Homestead Road right-of-way and will consist of an asphalt parking area at the airport terminal and the skydiving facility. The residual lands will consist of landscaped lawns and the stormwater management dry pond. Phase 2 will be for future expansion of aviation commercial and industrial development that will have separate water and sanitary services and stormwater management facilities.

A treatment train approach to stormwater quality control is proposed via the use of vegetated filter strips and enhanced grass swales located along the perimeter of the runways and taxiways, storm sewer complete with deep sumps and an oil/grit separator prior to outletting to the stormwater management dry pond located at the southeastern portion of Phase 1A. Soak-away pits will be utilized at each of the proposed buildings to promote infiltration of the 25mm runoff from the building roofs (clean runoff). The enhanced grass swales have been designed such that they will intercept the runoff generated by the majority of the proposed development. The enhanced grass swales will consist of the typical vegetative cover and will be graded such that they inherently provide additional stormwater quality control (pre-treatment) while also providing conveyance of the stormwater runoff generated on-site to the proposed stormwater management dry pond. The storm sewer with deep sumps and oil and grit separator will provide pre-treatment and conveyance of the stormwater from the Phase 1A impervious areas to the SWM dry pond. The proposed treatment train will be designed to provide an Enhanced Level of Protection (80% TSS removal efficiency).

Stormwater quantity control is proposed on-site via the use of the stormwater management dry pond complete with a control structure which will discharge to the site outlet (existing watercourse at the southeast part of the property). The stormwater management dry pond will be sized with extended detention and total storage volume to provide the required volume for stormwater quality control. The 2-100 year design storm events post-development peak flows will be controlled to the corresponding pre-development target rates or less.

The majority of the site runoff will be in the form of overland sheet flow which will be pre-treated via vegetated filter strips prior to being intercepted and conveyed through the site via the proposed enhanced grass swales and discharging into the stormwater management dry pond. Stormwater runoff from the parking lot and hangar development areas in Phase 1A will be pre-treated by the proposed storm sewer with deep sumps and an oil/grit separator prior to discharging to the stormwater management dry pond.

Phase 2 of the development will be situated in northern portion of the subject lands (PRE1 and POST1 drainage areas) and will consist of commercial / industrial related development. This future development was assumed to have land cover that is impervious covering 33% of the area with the remainder as landscaped area. This assumption is similar to the level of imperviousness of POST2A.

Refer to **FIG 3**(**Post-Development Drainage Plan**) in **Appendix A**.

2.5 Hydrologic Analysis

Using the drainage area as illustrated on **FIG2** and the Rational Method, the total flows were determined for the 2, 5, 10, 25, 50 & 100-year design storm events. These flows are summarized in **Table 1** below. The stormwater management design calculations includingthe Rational Method peak flow values can be found in **Appendix C**.

Table 1: Pre-Development Peak Flows

Catchment	Area (ha)	Pre-Development Peak Flows					
		2 yr. m^3/s	5 yr. m^3/s	10 yr. m^3/s	25 yr. m^3/s	50 yr. m^3/s	100 yr. m^3/s
PRE1	44.3	0.561	0.743	0.864	1.118	1.355	1.550
PRE2	93.1	0.682	0.904	1.051	1.360	1.648	1.885

The post-development (**FIG 3**) peak flows are summarized in **Table 2** below.

Table 2: Post-Development Uncontrolled Peak Flows

Catchment	Area (ha)	Post-Development Uncontrolled Peak Flows					
		2 yr. m^3/s	5 yr. m^3/s	10 yr. m^3/s	25 yr. m^3/s	50 yr. m^3/s	100 yr. m^3/s
POST1	47.3	1.812	2.402	2.792	3.611	4.378	5.007
POST2A	65.1	2.835	3.758	4.369	5.650	6.850	7.835
POST2B	25.0	0.214	0.284	0.330	0.427	0.518	0.593
POST2 (Total)	90.1	3.049	4.042	4.699	6.077	7.368	8.428

By comparing **Tables 1**and **2** for the site's drainage areas, it is evident that the post-development peak flows exceed the pre-development levels and thus require peak flow attenuation before being released to the existing outlets. As POST1 pertains to the future development of Phase 2, no attenuation would be required until at that time. The POST2 drainage area has two distinct regions consisting of POST2A and POST2B. POST2A will be developed whereas POST2B will remain in its natural state of wooded wetland. To determine the peak flows allowed to be released for POST2A (controlled sub-catchment), the peak flows of POST2B were subtracted from PRE2 (PRE2-POST2B = POST2A Controlled). POST2B peak flows exceed the pre-development levels and thus peak flow attenuation is required before releasing the site's runoff to the existing site outlet (existing watercourse at the southeast corner of the property).

2.6 Stormwater Quantity Control

The table below (**Table 3)** summarizes the storage volume requirements for the stormwater management facility (dry pond) for Phase 1A and 1B and the corresponding post-development and pre-development peak flow rates. The SWM pond for Phase 2 (POST1) is shown in **Table 4**. The storage volumes were determined using the Modified Rational Method and the calculations can be found in **Appendix C**.

Table 3: Phase 1A and 1B Dry Pond Characteristics

Storm Event (Year)	Phase 1A and 1B Dry Pond Post-Development Controlled Peak Flows (m^3/s) & Storage Volumes (m^3)			
	Drainage Area (ha)	Inflow (m^3/s) (Table 2, POST2A)	Outflow (m^3/s) (PRE2-POST2B)	Storage Provided (m^3)
100	65.1	7.835	1.293	17376

Table 4: Phase 2 Dry Pond Characteristics

Storm Event (Year)	Phase 2 Dry Pond Post-Development Controlled Peak Flows (m^3/s) & Storage Volumes (m^3)			
	Drainage Area (ha)	Inflow (m^3/s) (Table 2, POST1)	Outflow (m^3/s) (PRE1)	Storage Provided (m^3)
100	47.3	5.007	1.550	7785

Refer to drawing **FIG 4**(**Conceptual Site Servicing Plan**) located in **Appendix A** and to the supporting calculations provided in **Appendix C** for additional details.

2.7 Stormwater Quality Control

In determining the best approach to provide quality control for the proposed development, various factors were considered, as follows:

- Existing land characteristics and uses (soils, topography, treatment area, location, etc.);
- Local requirements and maintenance considerations with regard to quality control;
- Facility feasibility & proximity to a suitable stormwater outlet and receiving watercourse.
- Utilizing an 'integrated treatment train' approach to treat stormwater runoff;
- Ability to utilize landscaped areas and providing water balance and nutrient uptake benefits;

Based on the above noted factors, the application of vegetated filter strips, enhanced grass swales, storm sewer complete with deep sumps and an oil/grit separator, in conjunction with a downstream dry pond, have been chosen as the preferred means of providing a complete treatment train approach for the treatment of stormwater runoff generated on-site.

Vegetated filter strips along the edge of the runways will provide pre-treatment of the stormwater runoff before flowing into long shallow sloped enhanced grass swales which will convey all stormwater runoff to the Stormwater Management Dry Pond. Enhanced grass swales are considered advantageous as they can be integrated into the various landscape features proposed throughout the site. From a performance perspective they are beneficial in that they can function adequately when graded into areas of varying slope and will provide exceptional capture due to the longitudinal dimension and location of the swales with respect to the overland runoff's perpendicular direction of flow. The design of the enhanced grass swales is highly conducive to providing optimal capture of the site's stormwater runoff while facilitating a reduction in flow velocity as the runoff is conveyed downstream towards the proposed dry pond, and ultimately the site outlet. The enhanced grass swales will serve as a means of further pre-treatment of the stormwater by means of vegetative filtration, nutrient uptake and evapotranspiration. The enhanced grass swales will also provide opportunity for infiltration as they promote shallow low velocity conveyance. The runoff generated from the Phase 1A car parking lot and north and south hangar development areas will be conveyed by gravity to the stormwater management dry pond by means of a storm sewer system. Each catchbasin will have minimum 0.60m deep sumps to provide pre-treatment. The stormwater runoff from the storm sewer will pass through an oil/grit separator for further removal of total suspended solids and other pollutants prior to the treatment provided within the dry pond.

The proposed rural road cross-section used for access to the skydiving facility located along the western property line will intercept and collect any external drainage from the west and will convey it to the existing north ditch within the Old Homestead Road ROW. A by-pass swale is proposed along the northwestern property line to convey the external drainage to the north to the Morning Glory Road ROW. The sizing and design of the enhanced grass swales will be uniform, with the exception of the longitudinal slopes. Based upon guidance from the LID Manual, the grass swales will consist of a 0.75 bottom width, 3:1 (H:V) side slopes, longitudinal slopes 1.0% or less (where possible)

Considering the above, a minimum of 80% Total Suspended Solids (TSS) removal efficiency is considered to be achievable on-site via the use of the proposed treatment train.

Refer to drawing **FIG 4** (**Conceptual Site Servicing Plan**) located in **Appendix A**for additional details.

2.8 Total Phosphorus Removal Initiatives

Each of the on-site stormwater management features noted above will retain pollutants and nutrients (such as phosphorus), as they have been designed to capture and convey all of the runoff generated from within the proposed development. The proposed Best Management Practices (BMPs) have been designed as a treatment train to provide filtration, evapotranspiration, infiltration, and nutrient uptake.

This development constitutes a major development as defined by the Lake Simcoe Protection Plan (LSPP) and the Lake Simcoe Phosphorus Offsetting Policy (LSPOP) and the aforementioned stormwater management features will meet these requirements and achieve a minimum of 80% removal of phosphorus for this development.

2.9 Water Balance and Runoff Volume Control Initiatives

Assuming the predominant native sandy loam and loam soils exhibit good infiltration capabilities, the implementation of infiltration-based stormwater management BMPs are proposed to provide water balance and runoff volume control on-site.

The implementation of vegetated filter strips along the runways, gently sloped enhanced grass swales, and landscaped areas will each allow for infiltration to occur into the native soils as well as facilitate evapotranspiration. Soak-away pits at each of the buildings will permit the clean roof runoff to be infiltrated into the subsurface as well as to promote evapotranspiration.

A water balance budget for this site will be provided as per the LSRCA Water Balance Recharge Policy.

2.10 Sediment and Erosion Controls

In accordance with Town policy, effective erosion and sediment controls must be established prior to construction commencement and maintained until the site has been fully stabilized. Exposure of the soil during construction should be minimized to avoid erosion and sedimentation. The site’s erosion potential may be mitigated through the use of sound erosion and sedimentation control measures. The following measures shall be carried out prior to construction and maintained until disturbed areas have regained a significant grass cover:

Topsoil Stripping: Topsoil stripping will be reduced as much as possible on-site. Where grading is necessary, the exposed soil will be stabilized by seeding immediately upon being set to grade. Should topsoil stockpiling be required, the stockpiles will be kept at manageable levels for grass/weed cutting purposes.

Silt Fence: Silt fence will be placed along the down slope of all excavated material and along the downstream perimeter of the site (where necessary) to prevent sediment transport. Periodic inspections and repairs to the silt fence should be performed regularly, as well as after every rainfall event.

Vegetated Buffers: Existing grassland vegetation/wooded areas along the development limits are to be maintained wherever possible. These areas will provide a natural barrier to filter potentially sediment-laden overland flow before it is released from the site.

Conveyance Protection: Straw bale / rock check dams will be placed within all swales immediately after being constructed, and should be removed only after the area has been fully stabilized. Single Net Straw Blankets (S75 or approved equivalent) will be placed on the upstream banks and bottom of all enhanced grass swales to prevent erosion while vegetation establishment takes place. The blankets will remain in place from 45 days to up to 12 months and will eventually biodegrade, allowing a seamless transition from construction to operational conditions.

Mud Mat: Mud tracking from construction traffic must be controlled through the use of mud mats consisting of large diameter stone. The mud mat will be placed at the property entrance/exit where the construction traffic is proposed to access the property from Old Homestead Road in order to prevent tracking of sediment off site (if required).

Finally, the Site Engineer will be responsible for completing routine inspections of the sediment and erosion control structures throughout the construction phase of the development, particularly after rainfall events. All damaged or clogged stormwater features or fencing must be repaired immediately.

3.0 Water Servicing & Fire Protection

Water servicing for the site will be provided by a proposed drilled well to be located within the development for each Phase 1A and 1B as determined by the hydrogeologist and ensuring buffers are maintained from the proposed stormwater management features and sewage treatment system.

The daily domestic water supply flow calculations for Phase 1A were provided by Avia NG and based on existing aerodrome data with actual flow data per the number of employees and passengers per day for the airport terminal, number of seats for a restaurant not opened 24 hours, number of hangars and gross floor area of the proposed medium sized hangars and the Ontario Building Code (OBC), 2012, Table 8.2.1.3.B. The Average Day Demand (ADD), Maximum Day Demand (MDD) and Peak Hourly Demand (PHD) for Phase 1A was determined to be 0.13L/s, 0.20 L/s and 0.40 L/s, respectively.

The daily domestic water supply flow calculations for Phase 1B were provided by Avia NG and based on existing aerodrome data with actual flow data per the number of employees and passengers per day for the skydiving facility, restaurant with paper service, number of proposed medium sized hangars and the Ontario Building Code (OBC), 2012, Table 8.2.1.3.B. The Average Day Demand (ADD), Maximum Day Demand (MDD) and Peak Hourly Demand (PHD) for Phase 1B was determined to be 0.03L/s, 0.05 L/s and 0.10 L/s, respectively.

Based on the hydrogeological desktop review prepared by Wilson Associates dated November 23, 2021, found in **Appendix D**, well records for the area were reviewed and it was determined that the bedrock is the primary source of potable groundwater. The average expected yields from these wells is 37L/min which is greater than the highest anticipated Peak Hourly Demand (PHD) for Phase 1A (0.40L/s x 60s/min=24L/min). Actual well yields will need to be confirmed during construction and if found to be insufficient could necessitate an additional well or use of in-line storage to meet the required water demand.

A drilled well is proposed for each Phase 1A and Phase 1B based on the hydrogeological recommendations and for ease of construction. The Phase 1A well is proposed to be located east of the central carpark which will connect to a water treatment building that will provide for the numerous anticipated buildings and hangars. The water treatment will provide both primary and secondary treatment. As the exact configuration of buildings and hangars for Phase 1A is unknown, a dual-looped watermain is proposed with a loop in the north and south hangar development areas connected together by a single run of watermain through the proposed carpark area south of the terminal.

The water demand for Phase 1B at the skydive facility is expected to be much less than Phase 1A and providing for fewer buildings so the drilled well is proposed to connect directly to the skydive building and then being distributed to the hangar buildings from there. Primary and secondary point-of-entry treatment to be provided internal to the buildings.

Fire protection services, if required, are proposed onsite by means of underground storage tanks. An onsite underground storage tank is proposed to be located by the water treatment building east of the Phase 1A carpark to provide coverage for Phase 1A. For Phase 1B fire protection, an onsite underground storage tank is proposed to be located east of the proposed well, south of the skydive apron. Further fire protection service details and calculations will be provided during detailed design.

Water service calculations are provided in **Appendix B**. Refer to **FIG 4**(**Conceptual Site Servicing Plan**) for additional details.

4.0 Sanitary Servicing

The proposed sanitary system for the subject site has been designed in accordance with Ontario Building Code (OBC) standards and as per the Ministry of Environment, Conservation and Parks (MECP) Guidelines. The sewage flows for the proposed development were determined via the use of the OBC's total daily sewage flow data as well as actual data usage from similar airport facilities as provided by Avia NG. To determine the total daily sewage flow rate for the proposed development Table 8.2.1.3.B. of the 2012 OBC was also referenced. Using the aforementioned table, the total (maximum) daily sewage flow rate for Phase 1A and 1B was determined to be 14351 L/d. As the total daily sewage flow is greater than 10,000 L/day an Environmental Compliance Approval (ECA) is required through the MECP.

From the the hydrogeological desktop review prepared by Wilson Associates dated November 23, 2021, found in **Appendix D**, for properties with total sewage design flow greater than 10,000L/d, MECP Reasonable Use Concept (RUC) applies which is the case for this property as the total design flow for two of the three phases is greater than the 10,000L/day threshold. It is anticipated that the Phase 2 total sewage flows will be much greater than Phase 1A and 1B although this phase will have its own separate sewage treatment system. The MECP RUC assessment requires that the nitrate content not exceed 2.5mg/L in the groundwater at the property line. Based on the existing topography and location of the proposed septic system for Phase 1A and 1B, the groundwater is reasonably assumed to flow in a south-easterly direction, similar to the existing topographic relief onsite and is over 650m from the existing watercourse at the southeastern corner of the property.

Section 22.5.11 of the MECP RUC provides allowances to reduce / waive the groundwater quality limits where the potential sewage plume would reach a surface waterbody, and more than 300m of separation exists between the waterbody and sewage treatment system (>650m) the groundwater quality limits imposed by the RUC should not apply. As a result of the location of the proposed sewage treatment system relative to the existing water body, the sewage plume would be intercepted prior to reaching the property line, and therefore the aforementioned Section 22.5.11 of the RUC should be applicable and no tertiary treatment system is proposed for these two phases of the project. Prior to construction, the directional flow of groundwater will need to be confirmed to ensure the assumptions used herein match the existing site conditions.

The MECP RUC also provides allowances under Section 22.5.14 whereby the infiltration locations of sewage treatment systems with underlying soil conditions having hydraulic conductivities of 10^{-5}cm/s or less, thickness of 10m or greater and extending 100m downgradient of the infiltration area may not require groundwater quality limits be imposed. With the proposed location of the sewage treatment system for Phase 1A and 1B situated between the Phase 1B apron and north-south runway, the existing soil conditions have thick subsurface layers of low hydraulic conductivity materials (clay, silt) that extends greater than 100m in the dispersal area of the treatment system, no tertiary treatments are proposed for this development to meet the groundwater quality limits. Further determination of the subsurface conditions will be required to confirm that the existing conditions meet the assumptions used to qualify for this section of the RUC.

A private sewage treatment system (STS), consisting of a septic tank and pump chamber for each Phase 1A and 1B, and a distribution box and six (6) filter beds are proposed within the development to service these two phases. As the building and hangar layouts are currently unknown for Phase 1A, a general gravity sanitary sewer with manholes spaced a maximum of 110m apart will bring the sewage along the southeastern side of north and south hangar development areas (northwest of the Phase 1A carpark) to the septic tank adjacent to the western-most turnaround area. From the Phase 1A septic tank the effluent will go into the pump chamber to be pumped through a forcemain to the distribution box northwest of the filter beds located between the north-south runway and the Phase 1B apron. The distribution box will evenly divide the effluent between the filter beds. For Phase 1B the proposed sanitary system will drain via gravity from the skydive building and hangars, north to the proposed sanitary sewer where it will flow east to a proposed septic tank, into a pump chamber, through a forcemain and ultimately into the distribution box. Refer to the **Conceptual Site Servicing Plan**, **FIG 4,** for illustration (contained in **Appendix A**). Also refer to **Appendix B**for supporting calculations.

The proposed septic tank for Phase 1A has been sized based on three times (x3) the total daily design flow as per the Ontario Building Code (OBC) Section 8.2.2.3. The total daily design flow was determined to be 11551 L/d and the required septic tank working volume to be approximately 34653 L, which requires an 8085 imperial gallon septic tank.

The proposed septic tank for Phase 1B has been sized based on three times (x3) the total daily design flow as per the Ontario Building Code (OBC) Section 8.2.2.3. The total daily design flow was determined to be 2800 L/d and the required septic tank working volume to be approximately 8400 L, which requires a 2040 imperial gallon septic tank.

5.0 Summary and Conclusions

This Functional Servicing Report demonstrates how the Phase 1A and 1B portions of the proposed aerodrome development can be integrated into the existing community, with sufficient means to provide both stormwater management and servicing on-site. Specifically, we note the following:

- Stormwater quantity control on-site will be provided to attenuate the 2-100 year design storm peak flows to or below their corresponding pre-development target rates via the use of a dry pond. The dry pond will feature a control structure sized to attenuate post-development flows and will also utilize the infiltration capacity of the in-situ soils to provide quality control, phosphorus reduction and water balance.
- Stormwater quality control on-site will be provided via the use of an integrated treatment train approach which will help mitigate any negative impacts the proposed development may have on the existing quality of stormwater runoff. An 'Enhanced' Level of Protection, as defined in the MOE's Stormwater Management Planning & Design Manual, will be provided through the use of vegetated filter strips and enhanced grass swales prior to entering the dry pond. Each of the above noted features will provide TSS removal efficiency benefits. The vegetated filter strips, enhanced grass swales, storm sewer complete with deep sumps, oil/grit separator and dry pond will also inherently provide water balance and phosphorus reduction benefits. Each of the buildings are proposed to have soak-away pits to infiltrate 25mm of clean roof runoff to aid in providing sufficient water balance and run-off volume control onsite.
- The use of silt fence, existing vegetated buffers, straw bale / rock check dams, and a construction mud mat, will provide erosion and sediment control during construction until the site is stabilized.
- Water servicing for the site will be provided by a proposed drilled well for each Phase of the development. The Phase 1A portion will require a minimum flow of 0.40 L/s to accommodate the Peak Hourly Demand (PHD) with Phase 1B requiring a minimum flow of 0.1 L/s PHD. Local well records show that these flow requirements are achievable from the bedrock aquifer. A proposed watermain in a dual-looped configuration will allow for water service connections in Phase 1A and the water service for Phase 1B will connect directly to the skydive building to be distributed from there to the proposed hangars in this phase.
- Onsite fire protection services to be provided by underground storage tanks, as required.

- Sanitary servicing for the site will be provided by one (1) proposed septic tank and pump chamber at each phase and one (1) distribution box and six (6) filter beds to be located in the landscaped area between Phase 1B and the north-south runway.
- MECP Reasonable Use Concept (RUC) for treatment of nitrate concentrations greater than 2.5mg/L in groundwater at the property limits for developments generating more than 10,000 L/day of sewage should not be required based on Sections 22.5.11 and 22.5.14 of the RUC.

The functional servicing and stormwater management design as described above, can be constructed and maintained as a feasible method of servicing the site and treating all stormwater run-off generated by the proposed development. This Functional Servicing Report and the associated engineering design drawings are based on information provided at the time of their preparation and are considered only applicable to the proposed works as described in this brief.

Any changes subsequent to the report and drawings date of issuance should be reviewed by WMI & Associates Ltd. to ensure applicability of the design contained within the documents.

Respectively submitted,

WMI & Associates Limited

<Original signed by>

<Original signed by>

Chris Jungkunz, E.I.T.

Jeremy W. Lightheart, P. Eng.

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APPENDIX A

FIGURES / DRAWINGS

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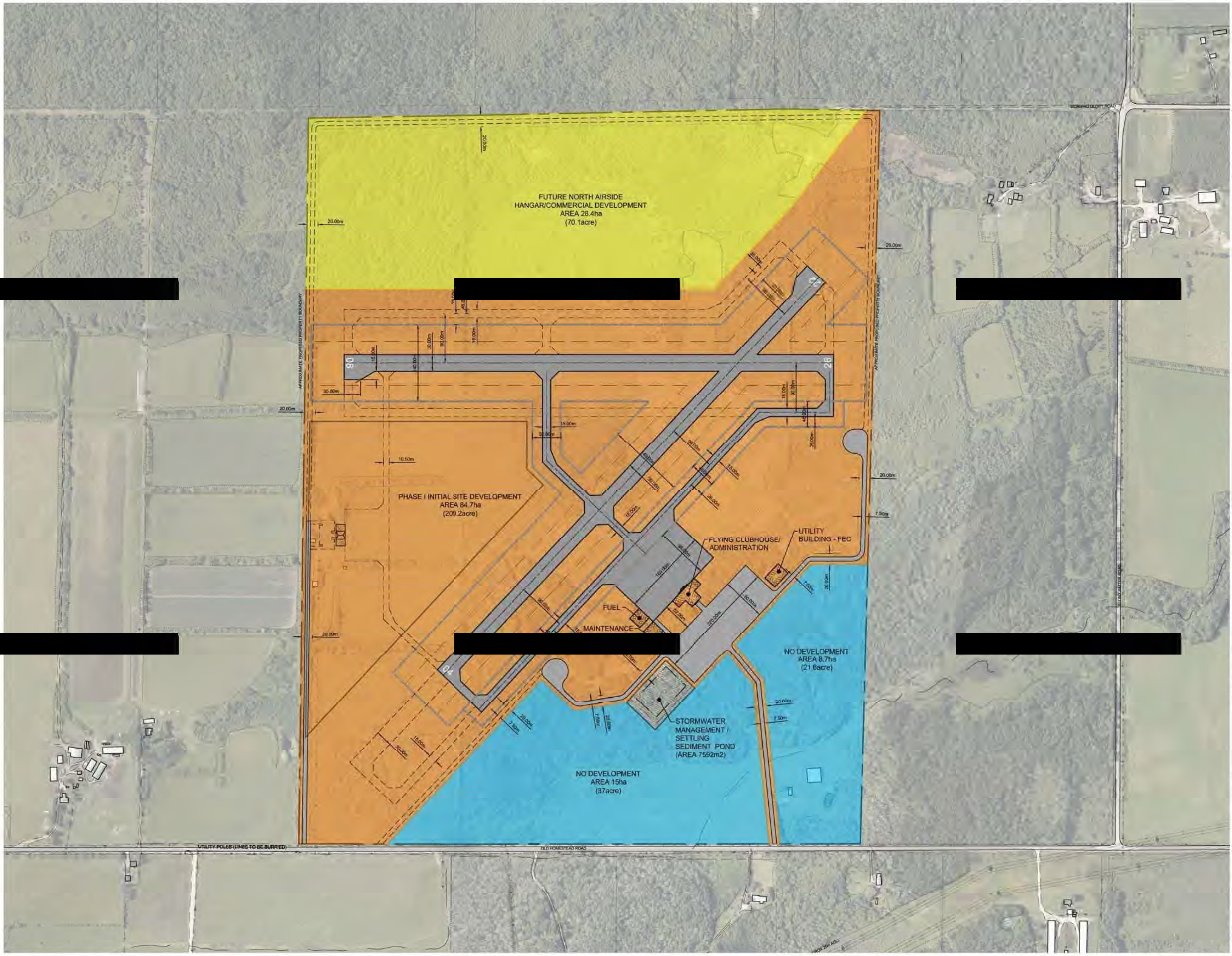

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3. BASE INFORMATION DERIVED FROM FILES RECEIVED FROM THE CLIENT MAY 2020
4. TOPOGRAPHICAL INFORMATION DERIVED FROM SURVEY FILES RECEIVED FROM THE CLIENT MAY 2020

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Key Plan

Seals

PRELIMINARY

0	2021.10.04	BASE PLAN	NHH	BGS
No.	DATE	DESCRIPTION	BY	APPD

REVISION / ISSUE

AVIA · NG
AIRPORT CONSULTANTS

Client:
SUTTON AIRPORT DEVELOPMENT INC.

Project:
AERODROME FEASIBILITY STUDY

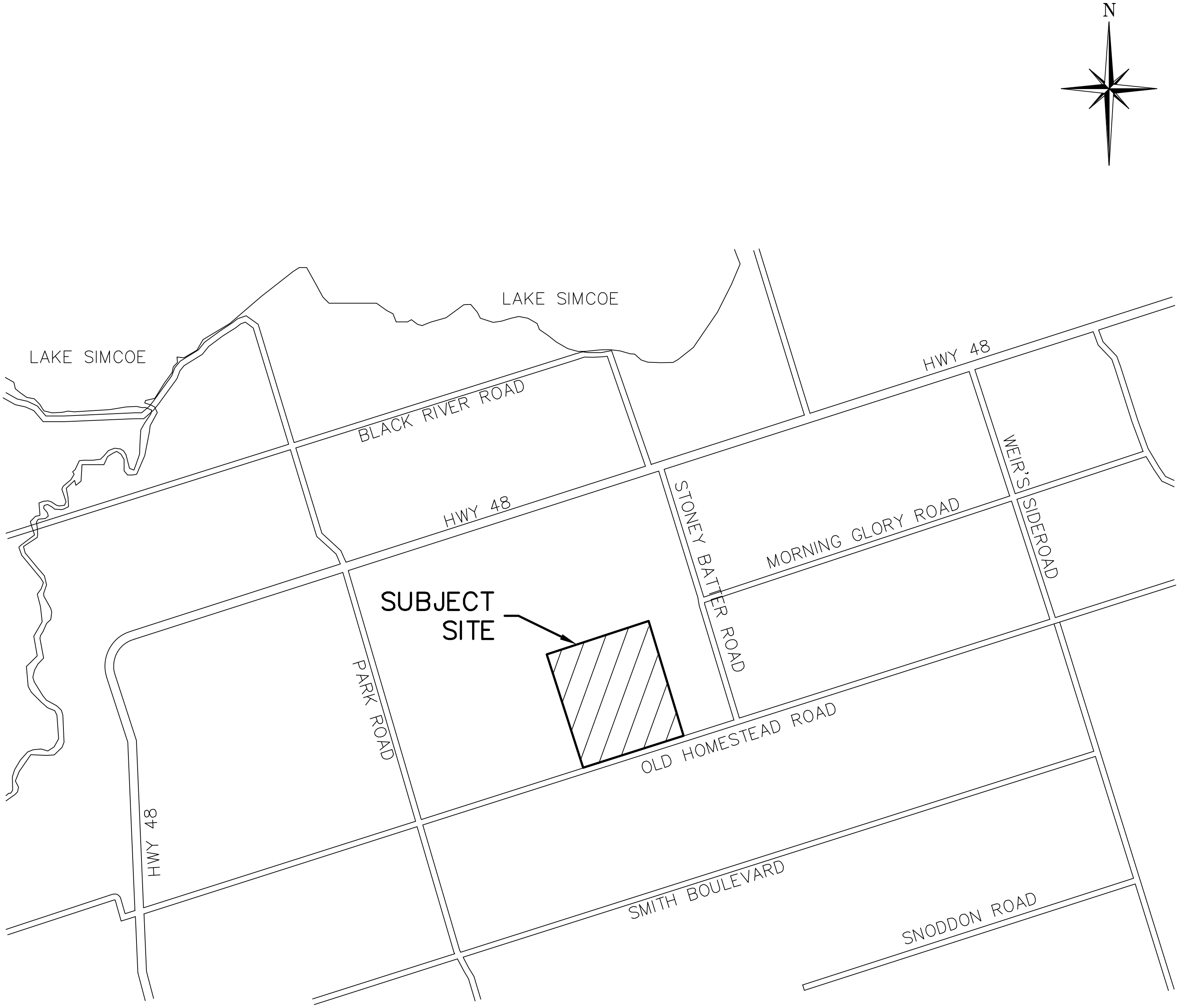
Title:
AIRPORT LAYOUT

Scale 1:3000

25 0 25 50 100 150 250 METRES

100 0 100 250 750 FEET

Checked:	BGS	Avia NG Project No.	21-0076
Design:	IFW	Contract No.	N/A
Drawn:	NHH	DRAWING No.	SP1



Drawing Title

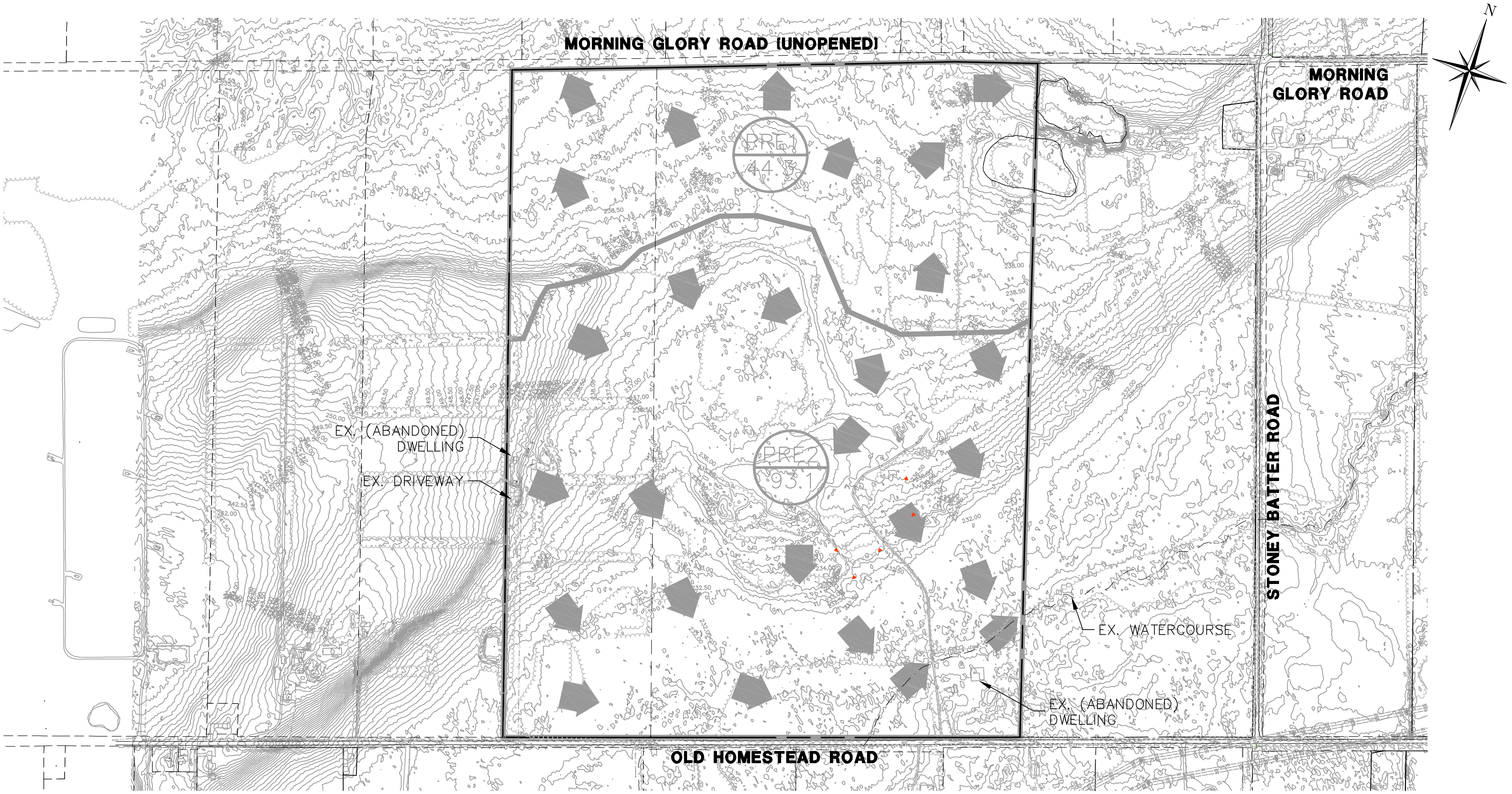
SITE LOCATION PLAN

Project Title

SUTTON AERODROME

WMI & Associates Limited
119 Collier Street
Barrie, Ontario
L4M 1H5
705-797-2027
www.wmiengineering.ca

Drawn By AW	Checked By JWL	Figure No. FIG1
Scale N.T.S.	Project No. 21-692	



Legend:

0	CATCHMENT IDENTIFICATION
0.00	CATCHMENT AREA (HA)
⬅	OVERLAND FLOW DIRECTION
▬	LIMITS OF CATCHMENT AREA

Drawing Title

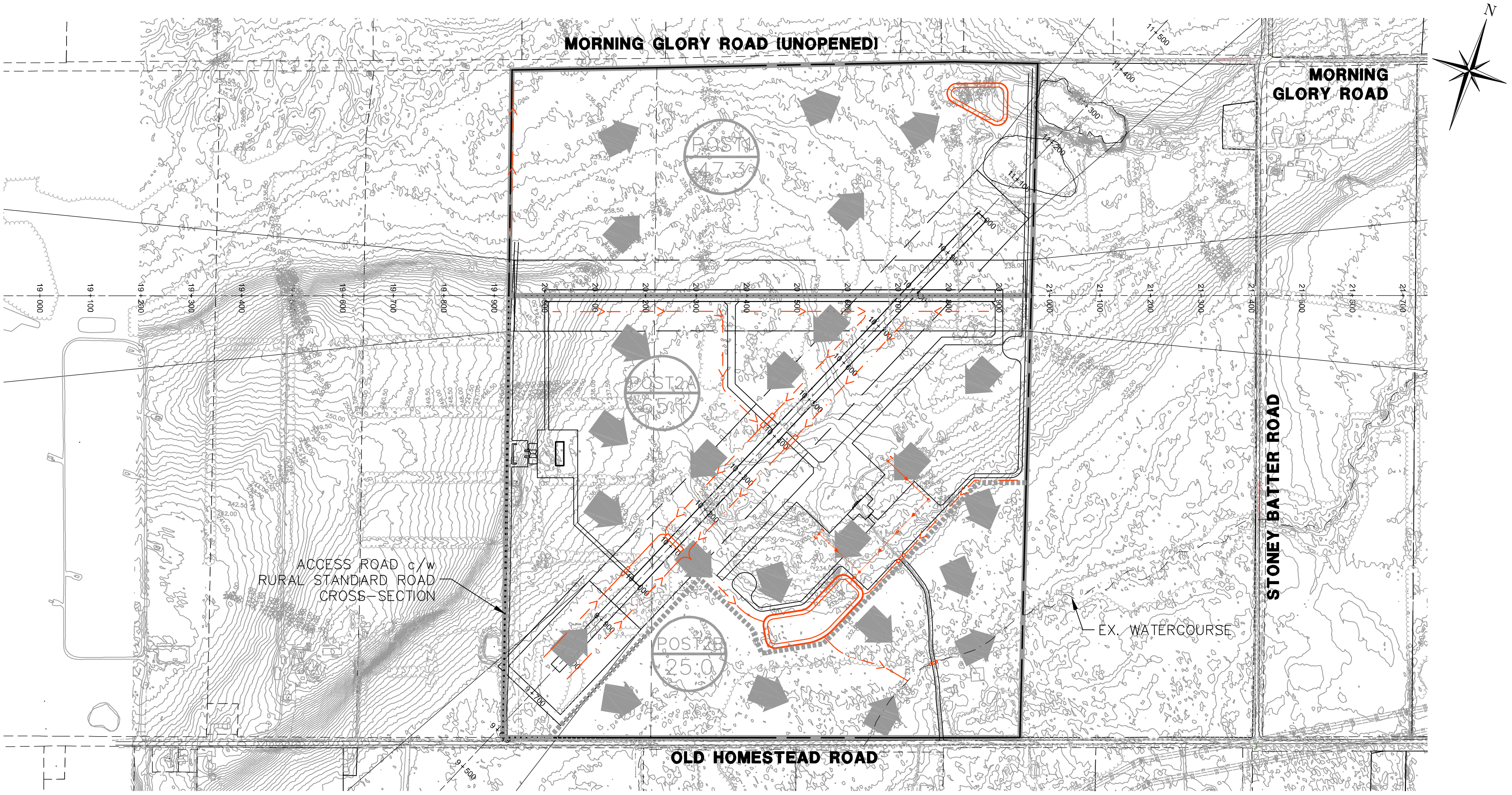
PRE–DEVELOPMENT
DRAINAGE PLAN

Project Title

SUTTON AERODROME

WMI & Associates Limited
119 Collier Street
Barrie, Ontario
L4M 1H5
705-797-2027
www.wmiengineering.ca

Drawn By AW	Checked By JWL	Figure No.
Scale 1: 7500	Project No. 21–692	FIG 2



Legend:

0 / 0.00	CATCHMENT IDENTIFICATION
	CATCHMENT AREA (HA)
━━	LIMITS OF CATCHMENT AREA
▪▪▪▪	LIMITS OF SUB-CATCHMENT AREA
⬅	OVERLAND FLOW DIRECTION

Drawing Title

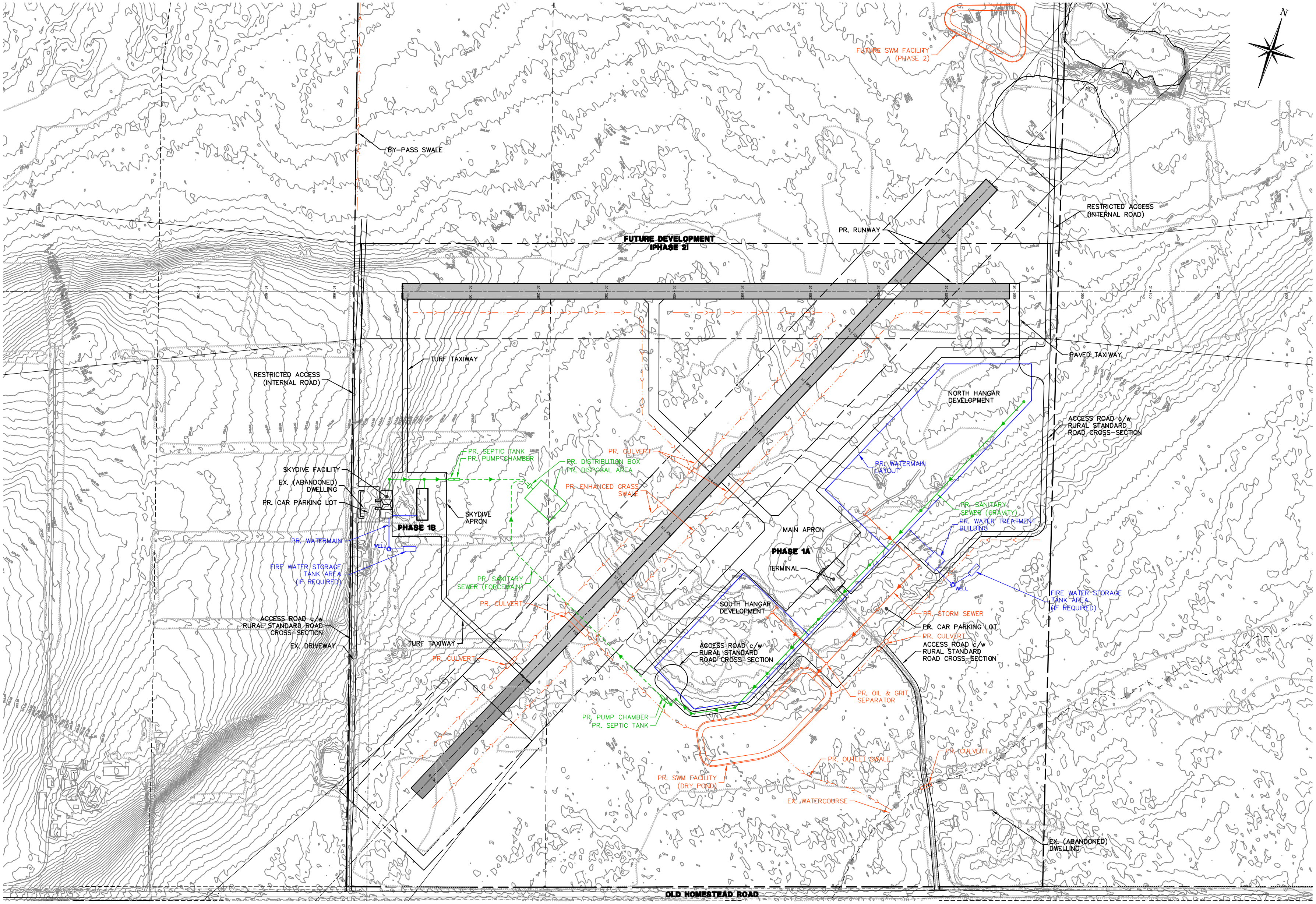
POST-DEVELOPMENT
DRAINAGE PLAN

Project Title

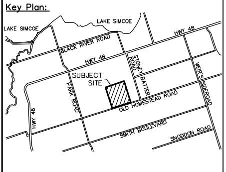
SUTTON AERODROME

WMI & Associates Limited
119 Collier Street
Barrie, Ontario
L4M 1H5
705-797-2027
www.wmiengineering.ca

Drawn By AW	Checked By JWL	Figure No.
Scale 1:7500	Project No. 21-692	FIG 3



Key Plan:



Legend:

───	PR WATERMAIN
◎ WELL	PR WELL
───◀	PR SANITARY SEWER
●	PR SANITARY MANHOLE
▭	PR SEPTIC TANK
— · · — > — · · — >	PR SWALE
▭	PR CULVERT
○	PR STORM MANHOLE
───◀	PR STORM SEWER

CAUTION
CONTRACTOR TO DETERMINE
LOCATION OF EXISTING UTILITIES
PRIOR TO CONSTRUCTION.

Notes:

1. Unless noted otherwise, the measurements and distances shown on this drawing are shown in meters.
2. Do not scale drawings.
3. It is the contractor's responsibility to verify all dimensions, levels and datums on site and report any discrepancies or omissions to WMI & Associates Ltd. prior to construction.
4. This drawing is to be read and understood in conjunction with all other relevant documents applicable to this project.
5. This drawing is the exclusive property of WMI & Associates Ltd. and the reproduction of any part of this document without prior written consent is strictly prohibited.

Benchmark: XXX.XXm

No.	Issue / Revision	Date
1	FSR FIRST SUBMISSION	NOV. 25, 2021

SUTTON AERODROME

CONCEPTUAL SITE
SERVICING PLAN

Client:

AviaNG

23 Albert Street N,
Southamption, Ontario
N0H 2L0

WMI & Associates Limited
119 Collier Street
Barrie, Ontario
L4M 1H5
Ph 705-797-2027
www.wmiengineering.ca

Drawn By AW
Checked By JWL
Drawing No. FIG4
Scale 1:2500
Project No. 21-692

APPENDIX B

WATER & SANITARY SEWER CALCULATIONS

WMI & Associates Limited
119 Collier Street, Barrie, Ontario L4M 1H5
p (705) 797-2027 f (705) 797-2028

TOTAL DAILY DOMESTIC WATER SUPPLY FLOW CALCULATIONS
Sutton Aerodrome - Phase 1A

Date: 18-Nov-21

Project No.: 21-692

Project: Sutton Aerodrome

Prepared By: CJ

▨ <<< **Elements Requiring Input Information**

Total Daily Design Flow Calculations

References:
- Ontario Building Code (OBC), 2012, Division B, Part 8, Table 8.2.1.3.A. Residential Occupancy & Table 8.2.1.3.B. Other Occupancies
- Ministry of the Environment (MOE), Design Guidelines for Drinking-Water Systems (2008), Chapter 3

Proposed Condition:

Establishment:		**# of people**	**# of water closets**	**# of Hangars**	**# of seats**	**Gross Floor Area (m^2)**	**Land Area (ha)**	**Total Daily Design Volume**		**Avg Day Demand ADD (L/s)**	**Max Day Demand MDD (L/s)**	**Peak Hourly Demand PHD (L/s)**
Commercial/Institutional & Industrial Uses:												
Phase 1A: ATB Terminal												
ATB Terminal												
	Employee (per 8hr shift)	**10**						**40**	L/day	0.00	0.01	0.01
	Passengers	**25**						**20**	L/day	0.01	0.01	0.02
Restaurant not 24hr					**25**			**125**	L/seat	0.04	0.05	0.11
North	Simple Hangars	**2**		**48**				**40**	L/ day	0.04	0.07	0.13
	Medium Hangars*					**14025**		**0.086**	L/m^2/day	0.01	0.02	0.04
South	Simple Hangars	**2**		**31**				**40**	L/ day	0.03	0.04	0.09
	Subtotal =	**39**		**79**	**25**	**14025**				**0.13**	**0.20**	**0.40**
										Peaking Factor =	**1.5**	**3**

Notes: Measured airport data was provided by Avia NG.
* - Information based on actual data from medium sized hangars at other airports as provided

\\WMI-SERVER\wmi-server\Data\Projects\2021\21-692\Design\Water\[211117_Total_Daily_Domestic_Water_Supply_Flow_Calcs_Ph1A.xlsx]Water_Supply_Flows

WMI & Associates Limited
119 Collier Street, Barrie, Ontario L4M 1H5
p (705) 797-2027 f (705) 797-2028

TOTAL DAILY DOMESTIC WATER SUPPLY FLOW CALCULATIONS
Sutton Aerodrome - Phase 1B

Date: 18-Nov-21
Project No.: 21-692
Project: Sutton Aerodrome
Prepared By: CJ

▨ <<< **Elements Requiring Input Information**

Total Daily Design Flow Calculations

References:
- Ontario Building Code (OBC), 2012, Division B, Part 8, Table 8.2.1.3.A. Residential Occupancy & Table 8.2.1.3.B. Other Occupancies
- Ministry of the Environment (MOE), Design Guidelines for Drinking-Water Systems (2008), Chapter 3

Proposed Condition:

Establishment:	**# of people**	**# of water closets**	**# of Hangars**	**# of seats**	**Gross Floor Area (m^2)**	**Land Area (ha)**	**Total Daily Design Volume**		**Avg Day Demand ADD (L/s)**	**Max Day Demand MDD (L/s)**	**Peak Hourly Demand PHD (L/s)**
Commercial/Institutional & Industrial Uses:											
Phase 1B: Skydive											
ATB - Skydive											
Employee (per 8hr shift)	**5**						**40**	L/day	0.00	0.00	0.01
Passengers	**25**						**20**	L/day	0.01	0.01	0.02
Restaurant, paper service				**25**			**60**	L/seat	0.02	0.03	0.05
Medium Hangars*	**15**						**40**	L/day	0.01	0.01	0.02
Subtotal =	**45**			**25**					**0.03**	**0.05**	**0.10**
									Peaking Factor =	**1.5**	**3**

Notes: Measured airport data was provided by Avia NG.
* - Information based on actual data from medium sized hangars at other airports

\\\\WMI-SERVER\wmi-server\Data\Projects\2021\21-692\Design\Water\[211117_Total_Daily_Domestic_Water_Supply_Flow_Calcs_Ph1B.xlsx]Water_Supply_Flows

WMI & Associates Limited
119 Collier Street, Barrie, Ontario L4M 1H5
p (705) 797-2027 f (705) 797-2028

MAXIMUM DAILY DESIGN SEWAGE FLOW CALCULATIONS
Sutton Aerodrome

Date: 25-Nov-21
Project No.: 21-692

Project: Sutton Aerodrome
Prepared By: CJ

▨ <<< **Elements Requiring Input Information**

Total Daily Design Flow Calculations

References: - Ontario Building Code (OBC), 2012, Division B, Part 8, Table 8.2.1.3.A. Residential Occupancy & Table 8.2.1.3.B. Other Occupancies
- Ministry of the Environment (MOE), Design Guidelines for Sewage Works (2008), Chapter 5

Proposed Condition:

Establishment:		**# of people**	**# of water closets**	**# of hangars**	**# of seats**	**Gross Floor Area (m^2)**	**Land Area (ha)**	**Maximum Daily Design Sewage Volume**		**Maximum Daily Design Sewage Flow (L/day)**
Commercial/Institutional & Industrial Uses:										
Phase 1A: ATB Terminal										
ATB Terminal										
	Employee (per 8hr shift)	10						40	L/day	400
	Passengers	25						20	L/day	500
Restaurant not 24hr					25			125	L/seat	3125
North Development	Simple Hangars	2		48				40	L/ day	3840
	Medium Hangars*					14025		0.086	L/m^2/day	1206
South Development	Simple Hangars	2		31				40	L/ day	2480
Phase 1B: Skydive										
ATB - Skydive										
	Employee (per 8hr shift)	5						40	L/day	200
	Passengers	25						20	L/day	500
Restaurant, paper service					25			60	L/seat	1500
Medium Hangars*		15						40	L/day	600
									L/m^2/day	
	Subtotal =	84		79	50	14025				14351

Notes: Measured airport data was provided by Avia NG.
* - Information based on actual data from medium sized hangars at other airports

\\WMI-SERVER\wmi-server\Data\Projects\2021\21-692\Design\Sanitary\[211125_Max_Daily_Design_Sewage_Flow_Calcs.xlsx]Sani_Design_Flows

Sutton Aerodrome **Date: November 25, 2021**

Filter Bed Design

Daily Design Flow (DDF)	Typical Airport Uses (See Max Daily Design Sewage Flow Calcs)		
	Phase 1A	11551	L / Day
	Phase 1B	2800	L / Day
	Total (L)	14351	L / Day

Filter Bed (m^2) (Section 8.7.5.2)	DDF / 50 L / m^2 / day		
(Stone & Sand)			
DDF / 50 L / m^2 / day (>3000L/day)			
DDF / 75 L / m^2 / day (<3000L/day)			
DDF / 100 L / m^2 / day (treatment unit)		14351	L
	10 m^2≤ Filter Bed ≤ 50 m^2	287	m^2
	6 Filter Beds @ 48m^2 ea	288	m^2

Filter Bed Contact Area (Section 8.7.5.3)	A = QT/850		
(Bottom 250mm of sand)			
A = Contact Area			
Q = DDF		14351	L
T = Soil T-Time		35	min/cm
	Contact Area	591	m^2

Loading Area (Section 8.7.5.2.(2) & 8.7.5.3.(1)	DDF / Loading Rate	West Site (Skydive)	
(Leaching Bed Fill)			
DDF		14343	L
Loading Rate (Table 8.7.4.1)		8	L / m^2 / day
	Expanded Area	1793	m^2

Summary

Filter Bed	287	m^2
Contact Area	591	m^2
Loading Area	1793	m^2

Sutton Aerodrome **Date: November 25, 2021**

Septic Tank Design

Daily Design Flow (DDF)	Typical Airport Uses		
	(See Max Daily Design Sewage Flow Calcs)		
	Phase 1A	11551	L / Day
	Total (L)	11551	L / Day
Tank size (litres)	3 x DDF (L)	34653	L
	Imperial Gallons	7633	Imp. Gallon
Proposed Tank Size	Model 36000 2 Piece Tank	8085	Imp. Gallon

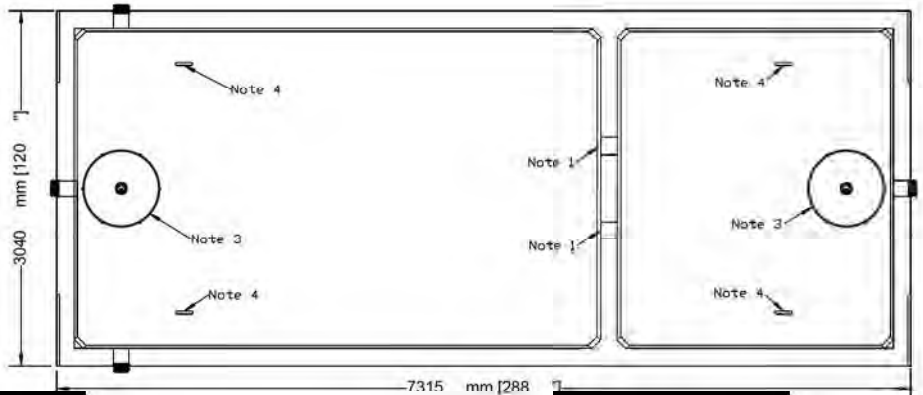
Daily Design Flow (DDF)	Typical Airport Uses		
	(See Max Daily Design Sewage Flow Calcs)		
	Phase 1B	2800	L / Day
	Total (L)	2800	L / Day
Tank size (litres)	3 x DDF (L)	8400	L
	Imperial Gallons	1850	Imp. Gallon
Proposed Tank Size	Model 9000 1 Piece Tank	2040	Imp. Gallon

NEWMARKET PRE-CAST CONCRETE PRODUCTS LTD.

Telephone: 905-852-6111 ; Toll Free 1-800-263-1297

Model 36,000 (8000 GAL) Septic - 2 Piece Unit

Working Capacity 36,759 Litres (8085 Gal)



[redacted]

[redacted]

Top Section

- This tank design is installed in multiple units
- Each unit is tongue and groove design and is sealed with fibrous mastic sealant
- tanks are cast with 35 MPA strength concrete at 7 days with 5-7% air
- Steel reinforced with 20m rebar, spaced at 300mm in each direction at 50mm cover, CAN/CSA-G30.18.
- Tanks conform to National Standards of Canada CAN/CSA B66-16
- Non-sulphate resistant concrete
- Standard (three) 100mm Inlets and one 100mm outlet fitted with flexible rubber connections
- Chamber divider monolithically cast with structure

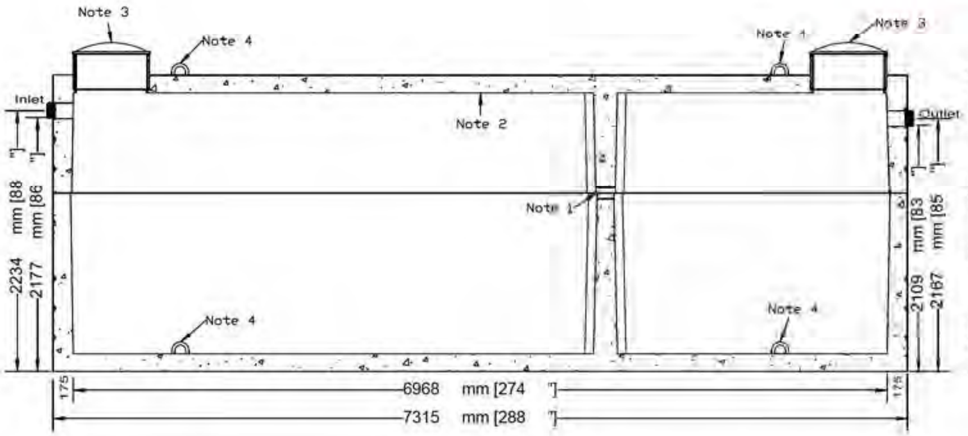
Top Half Weight.......................14,515Kg (32,000Lbs)
Bottom Half Weight..................19,960Kg (44,003Lbs)
Total Tank Weight....................34,475Kg (76,003Lbs)

Notes

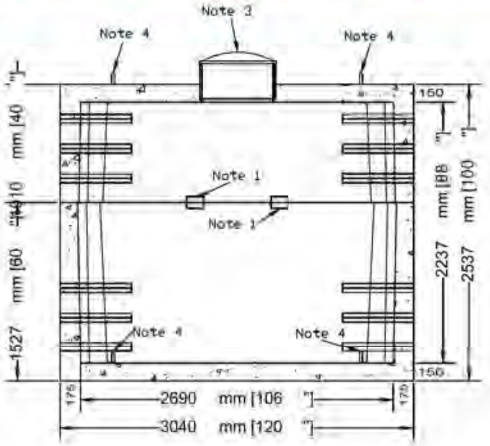
1. Two 100mm x 150mm prtitio flow through holes
2. Outlet contains one 100mm flexible rubber conection - accommodates effluent filter - filter installed by contractor
3. Cast in place 610mm ID plastic riser with plastic lid secured with stainless steel fasteners extending 178mm above top
4. Lifting Hooks - 4 Points eac [redacted]

Designed for up to two metre burial over top of tank - vehicle traffic tanks are available upon request. Specialty conformations may be possible

*Watertight seal cannot be guaranteed if Coseal Installation Guidelines are not followed.Please read and follow Insallation Guidelines from http://conseal.com/Installation/ButylSealingTapes.pdf



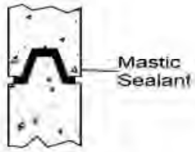
Side Elevation Section



End Elevation Section

Tank Markings Observed:
Inlet & Outlet is Marked,
Tank is marked on tank lid - Inlet End

NPCP
2019 SEPTIC 36000
B.D. 2 METRE
1200 LIQUID DEPTH
WC 36750
NON-SULPHATE
AGINP



Tongue and Groove Joint

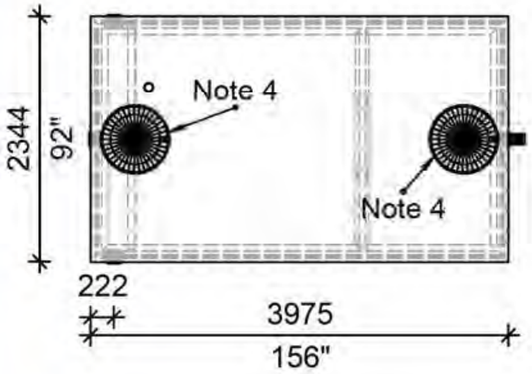
www.newmarketprecast.com

08 - 2019

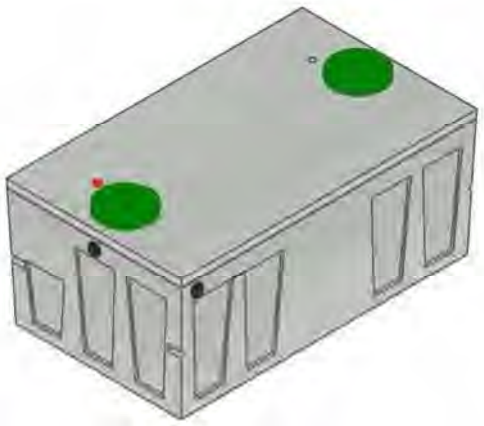
[redacted]

[redacted]

[redacted]



Top View



Isometric View

WORKING CAPACITY: 9272L (2040 IG)

Bare Base Weight.....................6005 Kg (13,239 Lbs)
Lid Weight...............................2295 Kg (5059 Lbs)
Total Tank Weight...................8300 Kg (18,298 Lbs)

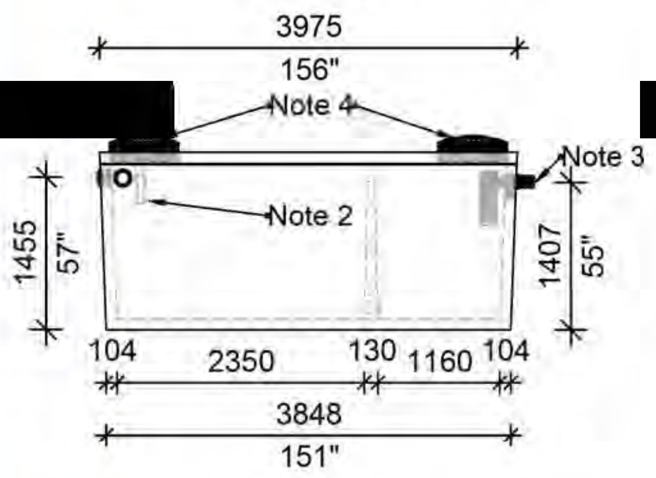
Notes

1. Two 100mm x 130mm partition flow through
2. Concrete inlet baffle is pre-fitted to accommodate three 100mm flexible rubber connections
3. Outlet contains one 100mm flexible rubber connection fitted with Tuf-tite EF-6 Effluent Filter
4. Cast in place 610mm ID Tuf-tite riser with Dome lid secured with stainless steel fasteners extending 70mm above top

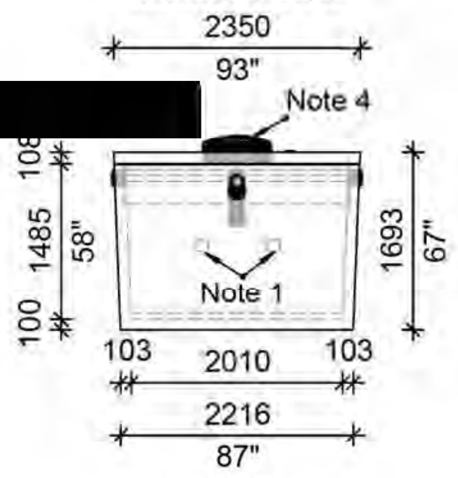
[redacted]

[redacted]

[redacted]



Side View



End View

Tank Markings Observed:
Inlet & Outlet are Marked
Tank is Marked on Tank Lid - Inlet End

NPCP
SEPTIC 9000 L
B.D. 1 METRE
1200 LIQUID DEPTH
WC 9283
NON SULPHATE
AGINP
PML

NEWMARKET
PRE-CAST
[redacted]

20 Victoria St
Uxbridge, ON L9P 1N4
Tel: 905-852-6111
Toll Free: 1-800-263-1297
Fax: 905-852-4340
Info@Newmarketprecast.com
Newmarketprecast.com

Model 9000 Septic

2000 Imperial Gallon

Designed for up to one metre burial over top of tank - Deep burial and vehicle traffic tanks are available upon request. Specialty conformations may be possible

- This tank design is a one piece unit. Top is sealed with a fibrous mastic sealant
- Tanks are cast with 45 MPA strength concrete at 7 days with 5-7% air steel reinforced with 10m rebar, spaced at 500mm long axis, 700mm short axis. CAN/CSA-G30 18.
- 1.5 Kg. structural fibre added to concrete. ASTM C 1116
- Lid has 10m Pre-manufactured welded wire. Rebar Cover 25mm
- Tanks conform to National Standards of Canada CAN/CSA B66-16
- Non-sulphate resistant concrete
- Standard Three 100mm Inlets and one 100mm Outlet, measured O/C
- [redacted]lithically cast with structure.

[redacted]

[redacted]

APPENDIX C

STORMWATER MANAGEMENT CALCULATIONS

Ontario IDF CURVE LOOKUP

Active coordinate

44° 17' 45" N, 79° 14' 45" W (44.295833,-79.245833)

Retrieved: Fri, 12 Nov 2021 19:10:44 GMT

Map data ©2021 Google

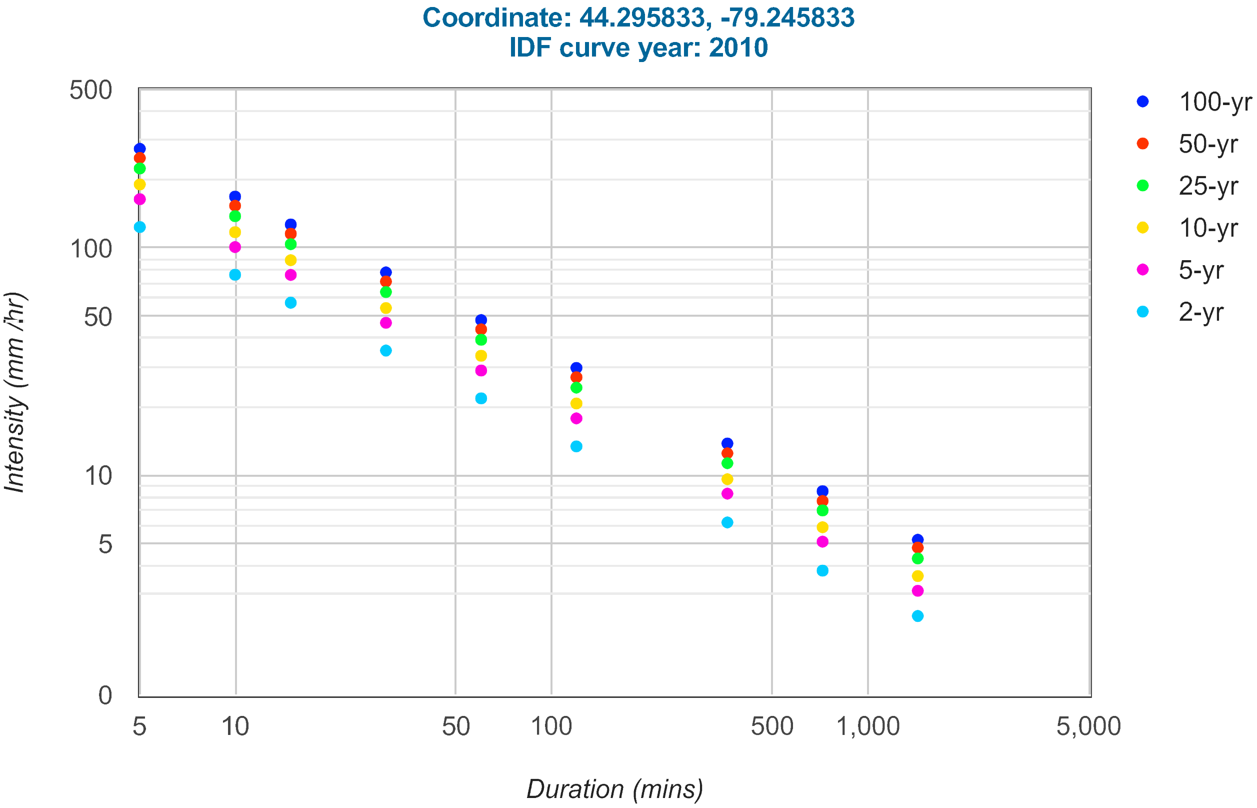
Location summary

These are the locations in the selection.

IDF Curve: 44° 17' 45" N, 79° 14' 45" W (44.295833,-79.245833)

Results

An IDF curve was found.



Coefficient summary

IDF Curve: 44° 17' 45" N, 79° 14' 45" W (44.295833, -79.245833)

Retrieved: Fri, 12 Nov 2021 19:10:44 GMT

Data year: 2010
IDF curve year: 2010

Return period	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
A	21.8	28.9	33.6	39.5	43.9	48.2
B	-0.699	-0.699	-0.699	-0.699	-0.699	-0.699

Statistics

Rainfall intensity (mm hr^{-1})

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	123.8	76.3	57.5	35.4	21.8	13.4	6.2	3.8	2.4
5-yr	164.2	101.1	76.2	46.9	28.9	17.8	8.3	5.1	3.1
10-yr	190.8	117.6	88.5	54.5	33.6	20.7	9.6	5.9	3.6
25-yr	224.4	138.2	104.1	64.1	39.5	24.3	11.3	7.0	4.3
50-yr	249.4	153.6	115.7	71.3	43.9	27.0	12.5	7.7	4.8
100-yr	273.8	168.6	127.0	78.2	48.2	29.7	13.8	8.5	5.2

Rainfall depth (mm)

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	10.3	12.7	14.4	17.7	21.8	26.9	37.4	46.1	56.7
5-yr	13.7	16.9	19.0	23.5	28.9	35.6	49.6	61.1	75.2
10-yr	15.9	19.6	22.1	27.3	33.6	41.4	57.6	71.0	87.5
25-yr	18.7	23.0	26.0	32.1	39.5	48.7	67.7	83.5	102.8
50-yr	20.8	25.6	28.9	35.6	43.9	54.1	75.3	92.7	114.3
100-yr	22.8	28.1	31.8	39.1	48.2	59.4	82.7	101.8	125.5

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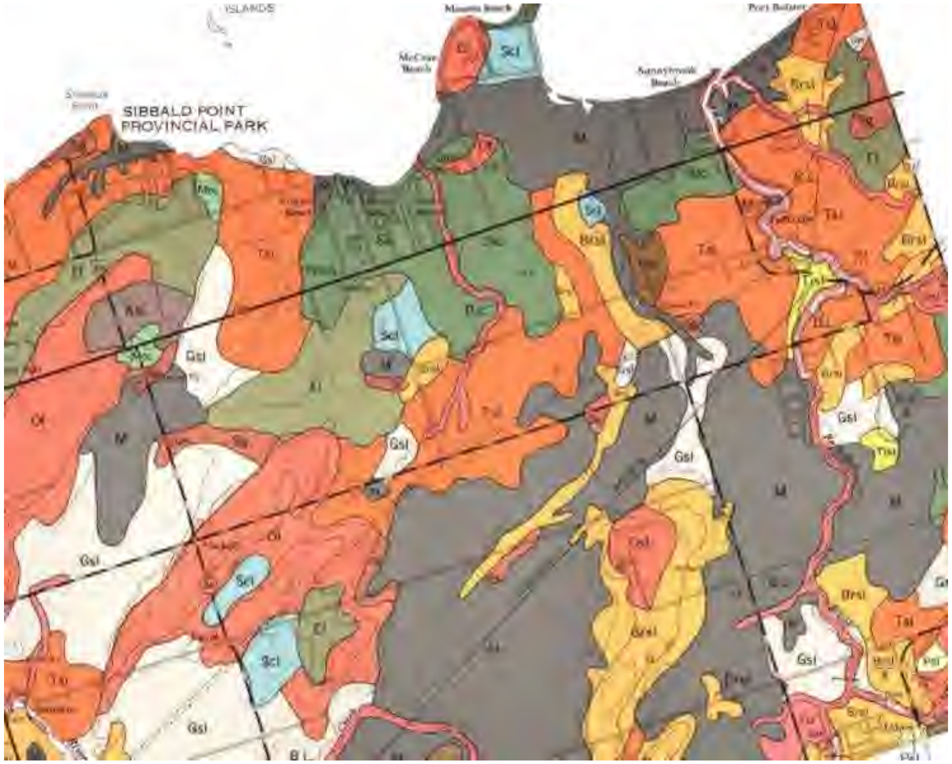
Last Modified: September 2016



El	EMILY	loam	Brown Forest	Imperfect	Smooth gently sloping. Few stones	Slightly alkaline to medium alkaline	Medium textured grey stony, strongly calcareous till
						utral to ghtly alkaline	Well sorted slightly cal-careous sandy outwash
Ol	OTONABEE	loam	Brown Forest	Good	Smooth very gently sloping. Few stones	Slightly alkaline to medium	Medium textured grey stony, strongly
Sg	SARGENT	sandy loam	Brown Forest	Good	Smooth gently sloping. Few to moderate stones	Slightly to moderately alkaline	Well sorted strongly calcareous, stratified sand and gravel
M	MUCK	variable	Bog	Very poor	Depressional. Stonefree	Neutral to alkaline	Well decomposed organic deposits (18" +) over mineral materials
Tsl	TECUMSETH	sandy loam	Grey-Brown Podzolic	Imperfect	Smooth very gently sloping. Stonefree	Neutral to slightly alkaline	Well sorted grey, calcareous sand, or stratified sand and gravel
Tsl		sandy loam over					

CHART H2-6A
(Cont'd)

CHART H2-6A - continued

Soils Series	Soil Texture	Hyd. Soil Grp.	Soils Series	Soil Texture	Hyd. Soil Grp.	Soils Series	Soil Texture	Hyd. Soil Grp.
Darlington	s	B	"	c 1	C	Heidelburg	f s 1	B
"	1	C	Ferndale	si 1	BC	Hendrie	s /g	AB
Dawson	s 1	A	"	c 1	C	Henwood	s /g	A
"	1	B	Flamboro	s	B	Hespeler	s 1	B
Deloro	1	B	"	s 1	B	Hillier	c &c 1	C
Devlin	si c /	C	Floradale	1	B	Hillsburgh	s 1	A
	c 1		Fonthill	g	A	Himsworth	si 1	BC
Dinorwic	c	BC	"	1	B	Hinchinbr.	s 1	B
Dobie	c /1	BC	Font	g s 1	A	"	1	BC
Doe	s 1	B	Forbes	c	D	"	si 1	BC
"	si 1	BC	Fox	s	A	Honeywood	s 1	AB
Donald	1	B	"	s 1	AB	"	si 1	BC
Donnybrook	s g	A	"	gr 1	AB	"	s	A
"	s 1	AB	Foxboro	s	A	Howland	s 1	B
"	1	B	Franktown	1	B	"	1	BC
Dorion	c /1	C	Freeport	s 1	B	Huron	s 1	B
Dorking	si c 1	BC	Galesburg	s 1	A	"	1	BC
Dumfries	s 1	A	"	1	AB	"	si 1	BC
"	1	AB	Gameland	s /g	AB	"	c 1	CorD
Dummer	s 1	A	Gananoque	c	C	"	c	D
"	1	B	Gerow	c 1	C	Innisville	s 1	B
Dundonald	s 1	AB	Gilford	s 1	B	Jeddo	1	BC
Dunedin	c	D	"	1	B	"	c 1	C
Dymond	s 1	AB	Gordon	si c	C	"	c	D
"	1	B	Granby	s	B	Kagawong	si 1	BC
Eagle Lake	s /g	AB	"	s 1	B	Kars	s /g	A
Eamer	1	BC	Grand	1	B	"	s 1	B
Earlton	si 1	B	Grenville	s 1	A	Kemble	si 1	BC
"	c 1	C	"	1	BC	"	si c 1	C
Eastport	s	A	Grimsby	s 1	A	"	si c	C
Edenvale	s	AB	Guelph	s 1	A	"	c 1	D
"	s 1	B	"	1	BC	Kenabeek	s	B
Eganville	1	B	"	si 1	BC	"	s 1	B
Elderslie	si 1	BC	Guerin	s 1	AB	Killean	1 /s 1	AB
"	si c 1	C	"	1	B	King	si 1	BC
"	c 1	C	Gwillimb.	g	AB	"	c 1	C
Eldorado	s 1	A	Haileybury	si c 1	C	Kirkland	s 1	A
"	1	B	"	si c	C	Kossuth	s 1	B
Elk Pit	s g	A	"	c	CD	L'Achigan	s	AB
Ellwood	c 1	C	Haldimand	si 1	BC	Lambton	1	BC
Elmbrook	si 1	BC	"	si c 1	C	"	si 1	BC
"	c 1	C	"	c	CorD	Lanark	c	C
"	c	C	"	c 1	C	Lansdowne	c /si 1	C
Elmira	1	B	Hanbury	si c 1	C	Leech	si c 1	C
Elmsley	s 1	B	"	si c	C	"	c 1	D
Embro	s 1	BC	"	c	D	Leitrim	g	B
"	si 1	C	Harkaway	1	B	Leith	si 1	BC
Emily	1	B	"	si 1	BC	Lily	1 /s 1	B
Emo	c & p	C	Harriston	1	BC	Lincoln	si c	C
Englehart	s 1	B	"	si 1	BC	"	c	C
Evanturel	si 1	BC	Harrow	s	A	Lindsay	c 1	C
"	si c 1	C	"	s 1	AB	"	c	C
Falardeau	si 1	BC	"	1	B	Lisbon	s 1	A
"	si c 1	C	Havelock	s /g	A	Listowel	1	B/BC
Farmington	s 1	A	Hawkesvi.	1	B	"	si 1	BC
"	1	B	Haysville	s 1	AB	Little Cur.	c	C

CHART H2 - 6A (Cont'd)

CHART H2-6A - continued

Soils Series	Soil Texture	Hyd. Soil Grp.	Soils Series	Soil Texture	Hyd. Soil Grp.	Soils Series	Soil Texture	Hyd. Soil Grp.
Lockport	c	D	Mountain	s l	AB	"	l	C
London	l	BC	Muck	m	B	"	si l	C
"	si l	BC	Murray	si l /f		"	si c l	CD
Lovering	si c l	C		s	B	"	c l	CD
"	c	D	Napanee	c /si l	C	"	c	CD
"	c l	CD	Neebing	s /si	B	Petherwick	si l	BC
Lyons	l	B	Nepean	s	AB	Phipps	si c l	C
Macton	l	B	Newburgh	s l	A	"	c l	C
Magnetawan	si l	BC	"	si l	BC	Piccadilly	s l	B
Mallard	s	AB	Newcastle	l	BC	"	l	BC
"	s l	AB	"	c l	C	"	si l	BC
Malton	c	C	"	si l	BC	Pike	c	D
Mannheim	l	B	Newton	s l	B	Pike Lake	l	B
Manotick	s	AB	Nelson	c	D	Plainfield	s	A
Maplewood	si l	BC	New lisk.	si c	C	Pontypool	s	A
Marionville	s	B	"	c	C	"	s l	AB
"	s l	B	Niagara	c	D	Powassan	si l	BC
Martin	s /g	AB	Nipissing	s /si	B	Preston	s l	B
Maryhill	l	BC	Norham	si l	BC	Raglan	s /g	A
Matilda	l	BC	North Gow.	c l	C	Rainy Riv.	p	B
Matson	si l	BC	"	c	C	Renfrew	c l	C
Medonte	si l	BC	O'Connor	c	D	"	l	BC
"	si c l	C	Oliver	l /si l	B-BC	Rideau	c l	D
McCool	c	C	Oneida	l	BC	"	c	D
McInnis Cr	c l/l		"	si l	BC	Rosslyn	s /g	A
	&P	BC	"	si c l	C	Rubicon	s	AB
McIntyre	s	AB	"	c l	D	"	s l	AB
Miami	l	BC	Ontario	l	BC	Sandford	c	D
"	si l	BC	Osgoode	l	BC	Sargent	s /g	A
"	c l	D	"	si l	BC	"	s l	AB
"	g l	AB	"	si c l	C	Saugeen	si l	BC
Milberta	c /si		Oshtemo	s	A	"	si c l	C
	c l	C	Osnabruck	c l	C	"	c l	D
Mill	s	B	Osprey	s l	A	Schomberg	si l	BC
	s l	B	"	l	B	"	si c l	C
Milliken	s l	AB	Otonabee	s l	A	"	c l	C
"	l	BC	"	l	B	Scoble	si c	C
Minesing	ma si		Otterskin	s l	B	Seely's Bay	si c l	C
	c l	BC	Oxdrift	c	D	Shashawan	l	B
"	ma c	C	Paipoonge	c	C	Shenston	c l &p	BC
Mississauga	c	C	Parkhill	l	BC	Sidney	c	C
Monaghan	l	BC	"	si l	BC	Sifton	si c /c	
"	si l	BC	Peat	p	B		l	C
"	c l	C	Peel	c	D	Simcoe	si l	BC
Monteagle	s l	A	Pelham	s l	A	"	si c l	C
"	sl + r	B	Pense	si l	BC	"	c l	C
Moose	s l	B	Pense	si c l	C	Slate River	s /l	B
"	l	BC	Perch	c	C	Smithfield	si l	C
Morley	c si		Percy	s	A	"	si l	C
	c l	C	"	f s l	B	"	c l	CD
Morrisburg	c	C	"	s l	B	Smithville	l	BC
Moscow	si c	C	Perth	s l	AB	"	si c l	C

CHART H2-6A - continued

Soils Series	Soil Texture	Hyd. Soil Grp.	Soils Series	Soil Texture	Hyd. Soil Grp.	Soils Series	Soil Texture	Hyd. Soil Grp.
"	si l	BC	Uplands	s	A			
Snedden	si c l	C	"	s l	A			
Solmesville	c l	C	Upsala	f s	AB			
South Bay	c l	D	Vars	l	B			
"	c	D	Vasey	s l	AB			
Spohn	s /g /		"	l	B			
	c	BC	Vergennes	si l	BC			
Springvale	s l	A	"	l	BC			
Stafford	l	B	"	c	C			
Stockdale	si l/f		Vincent	si l	BC			
	s	B	"	si c l	C			
St. Clem.	s l	A	"	c l	D			
"	si c l	C	Vineland	s l	AB			
St. Jacobs	l	B	Wabi	s l	A			
St. Peter	s /g	A	"	l	B			
St. Rosalie	c	C	Wabigoon	c	C			
St. Samuel	s	B	Waterloo	s	A			
"	s l	B	"	s l	A			
St. Thomas	s	A	Watrin	s	B			
Sullivan	s	A	Waupoos	c l	D			
"	s l	A	"	c	D			
Sutton Bay	s	B	Wauseon	s l	B			
"	s l	B	Wayside	s	AB			
Tansley	c	D	Welland	c	C			
Tavistock	s l	AB	Wellesley	s l	AB			
"	si l	BC	"	si c l	C			
Tecumseth	s	AB	Wemyss	s l	AB			
			Wendigo	s	A			
Teeswater	si l	B	"	s l + r	AB			
Temisk'g	r &c	C	"	s l	AB			
Tennyson	s l	A	Wendover	c l	D			
Thames	c l	D	"	c	D			
Thorah	s	B	Westmeath	s	A			
Thornloe	c	C	Whitby	l	BC			
Thwaites	si l	BC	White Lake	s /g	A			
Tioga	s	A	Whitfield	si l	B			
"	s l	A	Wiarton	l	B			
Toledo	si l	BC	"	si l	BC			
"	si c l	C	Wilmot	s l	B			
"	c l	C	"	si c l	C			
"	c	C	Winona	s l	AB			
Trafalgar	c	D	Woburn	s l	A			
Trent	s	AB	"	l	B*			
Tuscola	s l	AB	Wolford	c l	D			
"	si l	BC	Wolsey	si c	C			
Tweed	s l	A	Wooler	si l/f				
"	s l + r	AB		s	AB			
"	r	AB	Woolwich	l	BC			
Undiffer'd	s l + r	AB or B(dep. on depth)	Worthing.	s /g /c	BC			
			Wyevale	s /g	A			

RUNOFF COEFFICIENT CALCULATIONS
"C" SPREADSHEET

Date: 18-Nov-21
Project No.: 21-692

Project: Sutton Aerodrome
Prepared By: CJ

RUNOFF COEFFICIENT NUMBERS

Land Cover		Hydrologic Soil Groups		
		A-AB	B-BC	C-D
Cultivated Land	0 - 5% grade	0.22	0.35	0.55
	5 - 10% grade	0.3	0.45	0.6
	10 - 30% grade	0.4	0.65	0.7
Pasture Land	0 - 5% grade	0.1	0.28	0.4
	5 - 10% grade	0.15	0.35	0.45
	10 - 30% grade	0.22	0.4	0.55
Woodlot or Cutover	0 - 5% grade	0.08	0.25	0.35
	5 - 10% grade	0.12	0.3	0.42
	10 - 30% grade	0.18	0.35	0.52
Lakes and Wetlands		0.05	0.05	0.05
Impervious Area	(i.e. buildings, roads, parking lot, etc.)	0.95	0.95	0.95
Gravel	(not used for proposed parking or storage areas)	0.4	0.5	0.6
Residential	Single Family	0.3	0.4	0.5
	Multiple (i.e. semi, townhouse, apartment, etc.)	0.5	0.6	0.7
Industrial	Light	0.55	0.65	0.75
	Heavy	0.65	0.75	0.85
Commercial		0.6	0.7	0.8
Unimproved Areas		0.1	0.2	0.3
Lawn	< 2% grade	0.05	0.11	0.17
	2 - 7% grade	0.1	0.16	0.22
	> 7% grade	0.15	0.25	0.35

Ref: Runoff Coefficient Numbers - Adapted from Design Chart 1.07, Ontario Ministry of Transportation, "MTO Drainage Management Manual", MTO. (1997)

▨ <<< **Elements Requiring Input Information**

PRE-DEVELOPMENT CONDITION PRE1

Land Cover		Hydrologic Soil Groups		
		A-AB	**B-BC**	**C-D**
Cultivated Land	0 - 5% grade			
	5 - 10% grade			
	10 - 30% grade			
Pasture Land	0 - 5% grade			
	5 - 10% grade			
	10 - 30% grade			
Woodlot or Cutover	0 - 5% grade	1.4	35.7	
	5 - 10% grade		0.2	
	10 - 30% grade		0.6	
Lakes and Wetlands		0.1	0.8	
Impervious Area	(i.e. buildings, roads, parking lot, etc.)			
Gravel	(not used for proposed parking or storage areas)			
Residential	Single Family			
	Multiple (i.e. semi, townhouse, apartment, etc.)			
Industrial	Light			
	Heavy			
Commercial				
Unimproved Areas		1.5	4.0	
Lawn	< 2% grade			
	2 - 7% grade			
	> 7% grade			

Total Area (ha) = 44.3 **Runoff Coefficient, C =** **0.23**

PRE-DEVELOPMENT CONDITION PRE2

Land Cover		Hydrologic Soil Groups		
		A-AB	**B-BC**	**C-D**
Cultivated Land	0 - 5% grade			
	5 - 10% grade			
	10 - 30% grade			
Pasture Land	0 - 5% grade			
	5 - 10% grade			
	10 - 30% grade			
Woodlot or Cutover	0 - 5% grade	19.3	19.3	
	5 - 10% grade		2.3	
	10 - 30% grade			
Lakes and Wetlands			0.0	
Impervious Area	(i.e. buildings, roads, parking lot, etc.)	0.2	0.4	
Gravel	(not used for proposed parking or storage areas)			
Residential	Single Family			
	Multiple (i.e. semi, townhouse, apartment, etc.)			
Industrial	Light			
	Heavy			
Commercial				
Unimproved Areas		17.4	34.3	
Lawn	< 2% grade			
	2 - 7% grade			
	> 7% grade			

Total Area (ha) = 93.1 **Runoff Coefficient, C =** **0.17**

POST-DEVELOPMENT CONDITION - POST1

Land Cover		Hydrologic Soil Groups		
		A-AB	B-BC	C-D
Cultivated Land	0 - 5% grade			
	5 - 10% grade			
	10 - 30% grade			
Pasture Land	0 - 5% grade			
	5 - 10% grade			
	10 - 30% grade			
Woodlot or Cutover	0 - 5% grade			
	5 - 10% grade			
	10 - 30% grade			
Lakes and Wetlands				
Impervious Area	(i.e. buildings, roads, parking lot, etc.)	1.0	14.6	
Gravel	(not used for proposed parking or storage areas)			
Residential	Single Family			
	Multiple (i.e. semi, townhouse, apartment, etc.)			
Industrial	Light			
	Heavy			
Commercial				
Unimproved Areas				
Lawn	< 2% grade			
	2 - 7% grade	2.0	29.7	
	> 7% grade			

Total Area (ha) = 47.3 **Runoff Coefficient, C =** **0.42**

POST-DEVELOPMENT CONDITION POST2A

Land Cover		Hydrologic Soil Groups		
		A-AB	B-BC	C-D
Cultivated Land	0 - 5% grade			
	5 - 10% grade			
	10 - 30% grade			
Pasture Land	0 - 5% grade			
	5 - 10% grade			
	10 - 30% grade			
Woodlot or Cutover	0 - 5% grade			
	5 - 10% grade			
	10 - 30% grade			
Lakes and Wetlands				
Impervious Area	(i.e. buildings, roads, parking lot, etc.)	10.2	12.8	
Gravel	(not used for proposed parking or storage areas)			
Residential	Single Family			
	Multiple (i.e. semi, townhouse, apartment, etc.)			
Industrial	Light			
	Heavy			
Commercial				
Unimproved Areas				
Lawn	< 2% grade			
	2 - 7% grade	17.9	24.2	
	> 7% grade			

Total Area (ha) = 65.1 **Runoff Coefficient, C =** **0.42**

POST-DEVELOPMENT CONDITION **POST2B**

Land Cover		**Hydrologic Soil Groups**		
		A-AB	**B-BC**	**C-D**
Cultivated Land	0 - 5% grade			
	5 - 10% grade			
	10 - 30% grade			
Pasture Land	0 - 5% grade			
	5 - 10% grade			
	10 - 30% grade			
Woodlot or Cutover	0 - 5% grade	7.5	8.3	
	5 - 10% grade			
	10 - 30% grade			
Lakes and Wetlands				
Impervious Area	(i.e. buildings, roads, parking lot, etc.)		0.7	
Gravel	(not used for proposed parking or storage areas)			
Residential	Single Family			
	Multiple (i.e. semi, townhouse, apartment, etc.)			
Industrial	Light			
	Heavy			
Commercial				
Unimproved Areas			7.4	
Lawn	< 2% grade			
	2 - 7% grade	1.1		
	> 7% grade			

Total Area (ha) = 25.0 **Runoff Coefficient, C =** **0.2**

\\WMI-SERVER\wmi-server\Data\Projects\2021\21-692\Design\Storm\[211118_C_CALCS.xlsx]C CALCS

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TIME OF CONCENTRATION & TIME TO PEAK CALCULATIONS
T_C & T_P SPREADSHEET

Date: 18-Nov-21
Project No.: 21-692

Project: Sutton Aerodrome
Prepared By: CJ

OVERLAND SHEET FLOW TIME OF CONCENTRATION (T_C) CALCULATION, $T_{C,\ OVER}$

The Runoff Coefficient 'C' governs which Time of Concentration Formula is used:
C > 0.40   Bransby Williams Formula
C <= 0.40   Airport Formula (FAA Equation)
Ref: MTO, Drainage Management Manual, pg 28, Ch. 8, 1997

▨ <<< **Elements Requiring Input Information**

Catchment I.D.	**Area (ha)**	**h_1 (m)**	**h_2 (m)**	**Length (m)**	**Runoff Coefficient**	**h_{DELTA} (m)**	**Slope (%)**
PRE1	44.3	239.5	232.5	630.4	0.23	7.0	1.1
PRE2	93.1	244.5	231.25	1143.3	0.17	13.3	1.2
POST1	47.3	246	235	896.5	0.42	11.0	1.2
POST2A	65.1	246	232.5	817.65	0.42	13.5	1.7
POST2B	25	232.5	231	504.4	0.2	1.5	0.3

$T_{C,\ OVER}$ (min.)	
Airport Formula	**Bransby Williams Formula**
68.8	
97.6	
	33.4
	27.8
98.3	

Airport Formula (FAA Equation)

$$T_{C,\ OVER} = \frac{3.26\ (1.1-C)\ (L)^{0.5}}{(S)^{0.33}} \quad \text{(min.)}$$

where, C = Runoff Coefficient
L = Length of Overland Flow Path, (m)
S = Avg. Slope of Overland Flow Path, (%)

Bransby Williams Formula

$$T_{C,\ OVER} = \frac{0.057\ (L)}{(S)^{0.2}\ (A)^{0.1}} \quad \text{(min.)}$$

where, L = Length of Overland Flow Path, (m)
S = Avg. Slope of Overland Flow Path, (%)
A = Catchment Area, (ha)

CHANNELIZED FLOW TIME OF CONCENTRATION (T_C) CALCULATION, $T_{C,\ CHAN}$

Refer to separate sheet attached for the calculation of the Velocity values (i.e. Flow Master Output, Manning's Channel Spreadsheet, etc.).

Catchment I.D.	**Length (m)**	**Velocity (m/s)**

$T_{C,\ CHAN}$ (min.)

$$T_{C,\ CHAN} = \frac{L}{V} \quad \text{(min.)}$$

where, L = Length of Channel, (m)
V = Flow Velocity in Channel, (m/s)

PIPED FLOW TIME OF CONCENTRATION (T_C) CALCULATION, $T_{C,\ PIPE}$

Refer to separate sheet attached for the calculation of the Velocity values (i.e. Culvert Master Output, Manning's Pipe Spreadsheet, etc.).

Catchment I.D.	**Length (m)**	**Velocity (m/s)**

$T_{C,\ PIPE}$ (min.)

$$T_{C,\ PIPE} = \frac{L}{V} \quad \text{(min.)}$$

where, L = Length of Pipe, (m)
V = Flow Velocity in Pipe, (m/s)

TOTAL TIME OF CONCENTRATION (T_C) AND TIME TO PEAK (T_P) CALCULATION, $T_{C,\ TOTAL}$, $T_{P,\ TOTAL}$

The Total Time of Concentration and Time to Peak values consist of a combination of the Overland, Channel and/or Pipe travel times.

Catchment I.D.	**$T_{C,\ OVER}$ (min.)**	**$T_{C,\ CHAN}$ (min.)**	**$T_{C,\ PIPE}$ (min.)**
PRE1	68.8		
PRE2	97.6		
POST1	33.4		
POST2A	27.8		
POST2B	98.3		

$T_{C,\ TOTAL}$ (min.)	**$T_{P,\ TOTAL}$ (min.)**
68.8	**46.1**
97.6	**65.4**
33.4	**22.4**
27.8	**18.6**
98.3	**65.9**

$$T_{C,\ TOTAL} = T_{C,\ OVER} + T_{C,\ CHAN} + T_{C,\ PIPE} \quad \text{(min.)}$$

$$T_{P,\ TOTAL} = 0.67 \times T_{C,\ TOTAL} \quad \text{(min.)}$$

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RATIONAL METHOD CALCULATIONS

Date: 19-Nov-21 **Project No.:** 21-692

Project: Sutton Aerodrome **Prepared By:** CJ

▨ <<< **Elements Requiring Input Information**

Rainfall Intensity-Duration-Frequency Coefficients from: http://www.mto.gov.on.ca/IDF_Curves/terms.shtml

2-year		**5-year**		**10-year**		**25-year**		**50-year**		**100-year**	
A =	21.8	A =	28.9	A =	33.6	A =	39.5	A =	43.9	A =	48.2
B =	-0.699	B =	-0.699	B =	-0.699	B =	-0.699	B =	-0.699	B =	-0.699

Rational Method Formula

$$Q = \frac{C \times I \times A}{360} \quad (m^3/s)$$

where, C = Runoff Coefficient
I = Rainfall Intensity, (mm/hr)
A = Drainage Area, (ha)

Rainfall Intensity Equation (2-100 year storm events)

$$I_{2\text{-}100} = A \times (T_C / 60)^B \quad (mm/hr)$$

where, A = Rainfall IDF Coefficient
B = Rainfall IDF Coefficient
T_C = Time of Concentration, (min)

Runoff Coefficient Equations
Based on MTO Drainage Manual (1984), page BD-4

2-year C_2 = C
5-year C_5 = C
10-year C_{10} = C
25-year C_{25} = 1.10 x C
50-year C_{50} = 1.20 x C
100-year C_{100} = 1.25 x C

For storms having a return period of more than 10 years, the Runoff Coefficient, C, will be increased as indicated above, up to a maximum value of 1.

Rainfall Intensity Equation (25mm storm event)
Based on the MOE SWMP Manual (2003), Eq'n 4.9

$$I_{25mm} = (43 \times C) + 5.9 \quad (mm/hr)$$

where, C = Runoff Coefficient

Catchment I.D.	**A (ha)**	**T_C (min.)**	**C**	**Q_{25mm} (m^3/s)**	**Q_2 (m^3/s)**	**Q_5 (m^3/s)**	**Q_{10} (m^3/s)**	**Q_{25} (m^3/s)**	**Q_{50} (m^3/s)**	**Q_{100} (m^3/s)**
PRE1	44.30	68.8	0.23	0.447	0.561	0.743	0.864	1.118	1.355	1.550
PRE2	93.10	97.6	0.17	0.581	0.682	0.904	1.051	1.360	1.648	1.885
POST1	47.30	33.4	0.42	1.322	1.812	2.402	2.792	3.611	4.378	5.007
POST2A	65.10	27.8	0.42	1.820	2.835	3.758	4.369	5.650	6.850	7.835
POST2B	25.00	98.3	0.20	0.201	0.214	0.284	0.330	0.427	0.518	0.593
POST2A (Controlled)				0.379	0.468	0.620	0.721	0.932	1.130	1.293

Note: *POST2A (Controlled) is calculated by the following: PRE2-POST2B, as the stormwater for POST2B is uncontrolled.

\\WMI-SERVER\wmi-server\Data\Projects\2021\21-692\Design\Storm\[211119_Rational_Method_Calcs(A,B).xlsx]Rational Method

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MODIFIED RATIONAL METHOD CALCULATIONS
100-year Design Storm Event
(Phase 2)

Date: 25-Nov-21
Project No.: 21-692

Project: Sutton Aerodrome
Prepared By: CJ

▭ <<< **Elements Requiring Input Information**

Rainfall Intensity-Duration-Frequency Coefficients from: http://www.mto.gov.on.ca/IDF_Curves/terms.shtml

2-year		**5-year**		**10-year**		**25-year**		**50-year**		**100-year**	
A =	21.8	A =	28.9	A =	33.6	A =	39.5	A =	43.9	A =	48.2
B =	-0.699	B =	-0.699	B =	-0.699	B =	-0.699	B =	-0.699	B =	-0.699

Rational Method Formula

$$Q = \frac{C \times I \times A}{360} \quad (m^3/s)$$

where, C = Runoff Coefficient
I = Rainfall Intensity, (mm/hr)
A = Drainage Area, (ha)

Runoff Coefficient Equations
Based on MTO Drainage Manual (1984), page BD-4

2-year	C_2 =	C
5-year	C_5 =	C
10-year	C_{10} =	C
25-year	C_{25} =	1.10 x C
50-year	C_{50} =	1.20 x C
100-year	C_{100} =	1.25 x C

For storms having a return period of more than 10 years, the Runoff Coefficient, C, will be increased as indicated above, up to a maximum value of 1.

Rainfall Intensity Equation (2-100 year storm events)

$$I_{2\text{-}100} = A \times (t_d/60)^B \quad (mm/hr)$$

where, A = Rainfall IDF Coefficient
B = Rainfall IDF Coefficient
t_d = Storm Duration, (min)

Runoff Volume

$$V_{Runoff} = Q_{Runoff} \times t_d \quad (m^3)$$

where, Q_{Runoff} = Runoff Peak Flow Rate, (m^3/sec)
t_d = Storm Duration, (sec)

Released Volume

$$V_{Released} = Q_{Released} \times (t_d + T_C)/2 \quad (m^3)$$

where, $Q_{Released}$ = Max. Release Rate, (m^3/sec)
t_d = Storm Duration, (sec)
T_C = Time of Concentration, (sec)

Max. Storage Required

$$V_{Storage} = V_{Runoff} - V_{Released} \quad (m^3)$$

V_{Runoff} = Runoff Volume, (m^3)
$V_{Released}$ = Released Volume, (m^3)

\\WMI-SERVER\wmi-server\Data\Projects\2021\21-692\Design\Storm\[211125_(21-692)_Modified_Rational_Method_Calcs(A,B).xlsx]Mod. Rational Method

Catchment I.D.	**Storm Event**	**Area A (ha)**	**Runoff Coeff. C**	**Runoff Coeff. C_{MOD}**	**Time of Conc. T_C (min.)**	**Storm Time Step (min.)**	**Release Rate (m^3/s)**
POST1	100-year	47.30	0.42	0.53	33.4	10	1.550

NOTES: 100-year pre-development target is 1.55 m^3/s PRE1

Storm Duration t_d (min.)	**Rainfall Intensity (mm/hr)**	**Runoff Peak Flow Rate (m^3/s)**	**Runoff Volume (m^3)**	**Released Volume (m^3)**	**Storage Volume (m^3)**	**Max. Storage Required (m^3)**
33.4	72.6	5.007	10034.41	3106.20	6928.21	
43.4	60.4	4.170	10857.46	3571.20	7286.26	
53.4	52.3	3.607	11556.70	4036.20	7520.50	
63.4	46.4	3.199	12169.50	4501.20	7668.30	
73.4	41.9	2.888	12717.99	4966.20	7751.79	
83.4	38.3	2.641	13216.45	5431.20	7785.25	**7785**
93.4	35.4	2.440	13674.72	5896.20	7778.52	
103.4	32.9	2.273	14099.85	6361.20	7738.65	
113.4	30.9	2.131	14497.15	6826.20	7670.95	
123.4	29.1	2.008	14870.65	7291.20	7579.45	
133.4	27.6	1.902	15223.55	7756.20	7467.35	
143.4	26.2	1.808	15558.41	8221.20	7337.21	
153.4	25.0	1.725	15877.33	8686.20	7191.13	
163.4	23.9	1.651	16182.02	9151.20	7030.82	
173.4	23.0	1.583	16473.95	9616.20	6857.75	
183.4	22.1	1.523	16754.33	10081.20	6673.13	
193.4	21.3	1.467	17024.23	10546.20	6478.03	
203.4	20.5	1.416	17284.53	11011.20	6273.33	
213.4	19.9	1.370	17536.04	11476.20	6059.84	
223.4	19.2	1.326	17779.44	11941.20	5838.24	
233.4	18.6	1.286	18015.33	12406.20	5609.13	
243.4	18.1	1.249	18244.27	12871.20	5373.07	
253.4	17.6	1.215	18466.72	13336.20	5130.52	
263.4	17.1	1.182	18683.12	13801.20	4881.92	
273.4	16.7	1.152	18893.84	14266.20	4627.64	
283.4	16.3	1.123	19099.25	14731.20	4368.05	
293.4	15.9	1.096	19299.65	15196.20	4103.45	
303.4	15.5	1.071	19495.33	15661.20	3834.13	
313.4	15.2	1.047	19686.56	16126.20	3560.36	
323.4	14.8	1.024	19873.56	16591.20	3282.36	
333.4	14.5	1.003	20056.57	17056.20	3000.37	

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MODIFIED RATIONAL METHOD CALCULATIONS
100-year Design Storm Event
(Phase 1A&1B)

Date: 25-Nov-21 **Project No.:** 21-692

Project: Sutton Aerodrome **Prepared By:** CJ

▨ <<< **Elements Requiring Input Information**

Rainfall Intensity-Duration-Frequency Coefficients from: http://www.mto.gov.on.ca/IDF_Curves/terms.shtml

2-year		**5-year**		**10-year**		**25-year**		**50-year**		**100-year**	
A =	21.8	A =	28.9	A =	33.6	A =	39.5	A =	43.9	A =	48.2
B =	-0.699	B =	-0.699	B =	-0.699	B =	-0.699	B =	-0.699	B =	-0.699

Rational Method Formula

$$Q = \frac{C \times I \times A}{360} \quad (m^3/s)$$

where, C = Runoff Coefficient
I = Rainfall Intensity, (mm/hr)
A = Drainage Area, (ha)

Runoff Coefficient Equations
Based on MTO Drainage Manual (1984), page BD-4

2-year C_2 = C
5-year C_5 = C
10-year C_{10} = C
25-year C_{25} = 1.10 x C
50-year C_{50} = 1.20 x C
100-year C_{100} = 1.25 x C

For storms having a return period of more than 10 years, the Runoff Coefficient, C, will be increased as indicated above, up to a maximum value of 1.

Rainfall Intensity Equation (2-100 year storm events)

$$I_{2\text{-}100} = A \times (t_d/60)^B \quad (mm/hr)$$

where, A = Rainfall IDF Coefficient
B = Rainfall IDF Coefficient
t_d = Storm Duration, (min)

Runoff Volume

$$V_{Runoff} = Q_{Runoff} \times t_d \quad (m^3)$$

where, Q_{Runoff} = Runoff Peak Flow Rate, (m^3/sec)
t_d = Storm Duration, (sec)

Released Volume

$$V_{Released} = Q_{Released} \times (t_d + T_C)/2 \quad (m^3)$$

where, $Q_{Released}$ = Max. Release Rate, (m^3/sec)
t_d = Storm Duration, (sec)
T_C = Time of Concentration, (sec)

Max. Storage Required

$$V_{Storage} = V_{Runoff} - V_{Released} \quad (m^3)$$

V_{Runoff} = Runoff Volume, (m^3)
$V_{Released}$ = Released Volume, (m^3)

\\WMI-SERVER\wmi-server\Data\Projects\2021\21-692\Design\Storm\[211125_(21-692)_Modified_Rational_Method_Calcs(A,B).xlsx]Mod. Rational Method

Catchment I.D.	**Storm Event**	**Area A (ha)**	**Runoff Coeff. C**	**Runoff Coeff. C_{MOD}**	**Time of Conc. T_C (min.)**	**Storm Time Step (min.)**	**Release Rate (m^3/s)**
POST2A	100-year	65.10	0.42	0.53	27.8	10	1.293

NOTES: 100-year pre-development target is 1.293 m^3/s (POST2A Controlled)

Storm Duration t_d (min.)	**Rainfall Intensity (mm/hr)**	**Runoff Peak Flow Rate (m^3/s)**	**Runoff Volume (m^3)**	**Released Volume (m^3)**	**Storage Volume (m^3)**	**Max. Storage Required (m^3)**
27.8	82.5	7.835	13068.37	2156.72	10911.64	
37.8	66.6	6.320	14334.71	2544.62	11790.08	
47.8	56.5	5.364	15384.08	2932.52	12451.56	
57.8	49.5	4.697	16289.36	3320.42	12968.94	
67.8	44.3	4.201	17090.86	3708.32	13382.54	
77.8	40.2	3.816	17813.48	4096.22	13717.25	
87.8	36.9	3.507	18473.78	4484.12	13989.65	
97.8	34.3	3.252	19083.40	4872.02	14211.38	
107.8	32.0	3.038	19650.88	5259.92	14390.96	
117.8	30.1	2.855	20182.67	5647.82	14534.84	
127.8	28.4	2.697	20683.76	6035.72	14648.04	
137.8	27.0	2.559	21158.16	6423.62	14734.53	
147.8	25.7	2.437	21609.06	6811.52	14797.53	
157.8	24.5	2.328	22039.11	7199.42	14839.68	
167.8	23.5	2.230	22450.51	7587.32	14863.18	
177.8	22.6	2.141	22845.11	7975.22	14869.89	**14870**
187.8	21.7	2.061	23224.49	8363.12	14861.37	
197.8	20.9	1.988	23590.00	8751.02	14838.97	
207.8	20.2	1.920	23942.81	9138.92	14803.89	
217.8	19.6	1.858	24283.94	9526.82	14757.12	
227.8	19.0	1.801	24614.30	9914.72	14699.58	
237.8	18.4	1.748	24934.67	10302.62	14632.04	
247.8	17.9	1.698	25245.75	10690.52	14555.23	
257.8	17.4	1.652	25548.18	11078.42	14469.76	
267.8	16.9	1.608	25842.52	11466.32	14376.19	
277.8	16.5	1.568	26129.27	11854.22	14275.04	
287.8	16.1	1.529	26408.89	12242.12	14166.77	
297.8	15.7	1.493	26681.80	12630.02	14051.78	
307.8	15.4	1.459	26948.38	13017.92	13930.46	
317.8	15.0	1.427	27208.97	13405.82	13803.15	
327.8	14.7	1.396	27463.89	13793.72	13670.17	

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QUALITY CONTROL STORAGE CALCULATIONS
SWM FACILITY DESIGN SPREADSHEET - PH1A+1B

Date: 25-Nov-21
Project No.: 21-692

Project: Sutton Aerodrome
Prepared By: CJ

▨ <<< **Elements Requiring Input Information**

Catchment I.D.'s	**Drainage Area (ha)**	**Imperviousness (%)**
POST2 (controlled)	65.10	35

Total Drainage Area (ha) = **65.10**

Total Imperviousness (%) = **35**

NOTE: For catchment areas consisting of a Total Imperviousness value less than 35% and greater than 85%, the corresponding Water Quality Storage Volume Requirement based on Table 3.2 of the 2003 MOE SWMP manual has been extrapolated from the values provided in Table 3.2.

SWM Facility Characteristics (based on 2003 MOE Guidelines, Table 3.2):

Protection Level = **Basic** (Options are Enhanced, Normal or Basic)
SWMP Type = **Dry Pond** (Options are Infiltration, Wetland, Hybrid, Wet Pond or Dry Pond **BUT** the Dry Pond Facility is only capable of providing a **Basic** Level of Protection)

2003 MOE Table 3.2 Water Quality Storage Requirements based on Receiving Waters:

Total Storage Volume = 90 m^3/ha
= **5859 m^3**

Permanent Pool Volume = 0 m^3/ha (for wet facilities only, i.e. Wetland, Hybrid OR Wet Pond)
= **0 m^3**

Extended Detention Volume = 90 m^3/ha (Water Quality Control Volume (40m^3/ha), MOE Guidelines)
= 5859 m^3
OR
= SWMHYMO m^3 (Erosion Control Volume (25mm 4-hr Chicago Storm runoff volume), MOE Guidelines)

Extended Detention Volume = **5859 m^3** (greater of the Water Quality & Erosion Control Volume)

NOTE: - The Extended Detention Volume is to be the greater of the Water Quality Control Volume and the Erosion Control Volume.

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QUALITY CONTROL STORAGE CALCULATIONS
SWM FACILITY DESIGN SPREADSHEET - PH2

Date: 25-Nov-21 **Project No.:** 21-692

Project: Sutton Aerodrome **Prepared By:** CJ

▨ <<< **Elements Requiring Input Information**

Catchment I.D.'s	**Drainage Area (ha)**	**Imperviousness (%)**
POST1	47.30	33

Total Drainage Area (ha) = **47.30**

Total Imperviousness (%) = **33**

NOTE: For catchment areas consisting of a Total Imperviousness value less than 35% and greater than 85%, the corresponding Water Quality Storage Volume Requirement based on Table 3.2 of the 2003 MOE SWMP manual has been extrapolated from the values provided in Table 3.2.

SWM Facility Characteristics (based on 2003 MOE Guidelines, Table 3.2):

Protection Level = **Basic** (Options are Enhanced, Normal or Basic)
SWMP Type = **Dry Pond** (Options are Infiltration, Wetland, Hybrid, Wet Pond or Dry Pond **BUT** the Dry Pond Facility is only capable of providing a **Basic** Level of Protection)

2003 MOE Table 3.2 Water Quality Storage Requirements based on Receiving Waters:

Total Storage Volume = 84 m^3/ha
= **3973 m^3**

Permanent Pool Volume = 0 m^3/ha (for wet facilities only, i.e. Wetland, Hybrid <u>OR</u> Wet Pond)
= **0 m^3**

Extended Detention Volume = 84 m^3/ha (Water Quality Control Volume (40m^3/ha), MOE Guidelines)
= 3973 m^3
<u>OR</u>
= SWMHYMO m^3 (Erosion Control Volume (25mm 4-hr Chicago Storm runoff volume), MOE Guidelines)

Extended Detention Volume = **3973 m^3** (greater of the Water Quality & Erosion Control Volume)

NOTE: - The Extended Detention Volume is to be the greater of the Water Quality Control Volume and the Erosion Control Volume.

APPENDIX D

Hydrogeological Report

Ian D. Wilson Associates Ltd.
since 1974

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Wilson
Associates
Consulting Hydrogeologists

November 23, 2021

Mr. Bernhard Schropp, P. Eng.
Senior Project Director, President
Avia NG Airport Consultants
23 Albert St. N
Southampton, ON
N0H 2L0

Dear Mr. Schropp:

Re: Desktop Hydrogeological Review - Water Supply and Sewage Disposal Implications
Proposed Aerodrome - Sutton Airport Development Inc.
7486 and 7818 Old Homestead Road, Pefferlaw, ON

Sutton Airport Development Inc. proposes to develop an aerodrome and skydive facility on a ±137ha parcel of land at the municipal address of 7486 and 7818 Old Homestead Road, Town of Georgina (the site). The supplied Conceptual Aerodrome Master Plan sketch is attached for reference.

It is understood that Phase 1 of the proposed aerodrome facility will include two runways, taxiways, hangars, maintenance facilities and administrative buildings, and associated parking lots, in the southeast portion of the site. Phase 2 is the proposed skydive facility in the western portion of the site. A future extension to Morning Glory Road in the northeast is planned for public access in Phase 3, which will include the northern third of the subject property.

It is understood from WMI & Associates Limited that water demand/sewage flows for the three phases of the project are:

Phase 1:	11,543L/day
Phase 2:	2,800L/day
Phase 3:	68,780L/day

As requested, we have conducted a desktop hydrogeological review of the setting of the site to provide an opinion of probable potable groundwater availability and of probable sewage impact implications of the Ministry of the Environment, Conservation and Parks (MECP) Reasonable Use Guideline (per Chapter 22 of the 2008 MECP Design Guidelines for Sewage Works) and/or Procedure D-5-4 "Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment", whichever is applicable.

SITE SETTING

The site is a rectangularly-shaped parcel situated on the north side of Old Homestead Road, extending northwards from Old Homestead Road to the unopened road allowance of Morning Glory Road. Frontage is about 1,025m along Old Homestead Road, beginning approximately 470m west of Stoney Batter Road, and the depth is about 1,100m.

The site is currently mostly undeveloped, and contains a small number of scattered rural buildings. On-site land use is a mixture of agricultural fields, lands in fallow, forest, wetland and stream. Lands surrounding the site are mainly in agricultural use, with forested lands to the north and southeast, and several rural residential properties to the south and east. The site exhibits moderate slopes to the north, northeast and southeast from a central upland area, with overall relief of about 7m. A minor tributary of Lake Simcoe is mapped to flow northeastwards through the southeastern periphery of the site.

The site is located within the Lake Simcoe basin of the Simcoe Lowlands physiographic region of southern Ontario. According to the Ontario Geological Survey Map 2560 "Quaternary Geology of the Beaverton Area", surficial soils across the site are some what complex, as follows:

- Soils over most of the western half of the site are mapped as silty sand to sandy silt glacial till.
- Soils in the east half of the site consist of glaciolacustrine deposits of sand in the southeast, glaciolacustrine deposits of gravel and sand in the mid-east and northeast, and some glacial till in the mid-northeast.

Because of the relatively remote setting of most of the site (apart from homes to the south along Old Homestead Road and to the east along Stoney Batter Road), the MECP water well record database contains very few records for water wells in the close vicinity of most of the site. The majority of available local well records indicate a mainly fine-grained overburden (i.e. clay or clay with stones, or hardpan), with a discontinuous basal granular deposit atop the bedrock surface. A small number of local well records indicate the presence of the mapped upper sands and gravels, however these mapped upper deposits are mainly distributed in undeveloped portions of the area where few well records exist. The overburden locally ranges in depth between 14.0m and 36.5m, the depth varying due to ground surface and bedrock surface topography.

The bedrock beneath the site consists of limestone, dolostone or shale of the Simcoe Group of rock.

Due to the mostly fine-grained overburden, the bedrock is the primary viable groundwater supply in the area. A small number of local wells have historically been completed in shallow or basal granular deposits, where present and viable. The bedrock aquifer is well known in the region to yield aesthetically-poorer quality groundwater (i.e. sulphur, salt water, etc...), particularly with increasing drilling depth into the bedrock, so most wells completed in the bedrock are completed only a short distance into the bedrock.

As shallow groundwater most often follows surface drainage patterns, shallow groundwater can be expected to flow from the upland divide roughly in the middle of the site to the north towards Lake Simcoe or to the southeast towards the small tributary.

GROUNDWATER SUPPLY

To establish well yield and basic water quality probabilities, up-to-date MECP records for water wells located within approximately 700 metres of the site boundaries were reviewed. The MECP water well record database contains the records for 19 water wells within the review area. Photo-reduced copies of the water well records used in the preparation of the review are attached.

The following summarizes the reported well record information within the review area.

Number of wells:	19
Drilled Construction:	16 (84%)
Dug/Bored Construction:	3 (16%)
Sandpoint Construction:	0
Unknown Construction:	0
Completed in Overburden:	5 (26%)
Completed in Bedrock:	14 (74%)

The following summarizes the reported well performance data.

	Maximum	Minimum	Average
Well Depth (m)	43.3	8.5	25.0
Test Rate (L/min)	114	2	37
Test Period (Hours)	8	1	2.9

Reported Water Quality:

Fresh:	18 or 95% (no objectionable tastes or odours)
Sulphurous:	1 or 5%
Mineralized/Saline:	none
Quality Not Reported:	none

Number of wells reported as “dry”: none
Number of wells reported as limited yield (i.e. ≤13.7L/min) : 2 or 11%

The average well within about 700 metres of the site is of drilled construction, completed in the upper bedrock aquifer to a depth of 25.0 metres and yields 37 litres of fresh-quality water per minute over an average period of 2.9 hours. It is expected that the future well(s) on the site will be completed in the bedrock aquifer, in a manner similar to most other local wells.

As detailed above, projected water demand for Phases 1 and 2 is expected to be in the range of 14,343L/day. Projected water demand of future Phase 3 is higher, at 68,780L/day. The above average well yield should be considered sufficient for Phases 1 and 2, requiring about 6.5 hours of supply from an average well. In-line storage can be used to balance peak demand periods. With the distance between the proposed skydive facility in the west and the proposed terminal and hangars in the southeast, serving the entire aerodrome with one water supply well may not be realistic or feasible.

For the higher demand of proposed future commercial Phase 3 (i.e. periodic or continuous higher demand), based on the above analysis, multiple wells are likely to be required to supply the needs of Phase 3. If actual (vs. design) water use exceeds 50,000L/day for the entire site (if it remains under one ownership entity), a Permit to Take Water (PTTW) will be required from the MECP, and will require the construction of supply wells and formal testing of the wells under MECP PTTW guidelines.

As is common in a bedrock aquifer setting, a small number of local wells are reported to have a marginal yield (i.e. ≤13.7L/min yield), which can occur in bedrock aquifers where yields can vary substantially over short distances due to the heterogeneity of the bedrock aquifer. Additional well attempts can be required.

SEWAGE IMPACT IMPLICATIONS

Preliminary Design:

Under the Ontario Building Code, for a Class 4 sewage disposal system to operate effectively, the leaching bed must be located in soil with a percolation rate (T-time) of between 1 and 50 minutes per centimetre and the base of the absorption trenches must be situated at least 0.9m above the high ground water table, bedrock or a soil with a permeability of greater than 50 minutes per centimetre. To achieve a normal, in-ground installation, the high groundwater table, rock or soil with a permeability of greater than 50 min/cm must be situated at least 1.5 to 1.8 metres below grade.

Based on mapped soils conditions, a sewage system(s) serving the proposed Phase 2 skydiving facility in the west part of the site, and the future Phase 3 commercial development in the northern third of the site, will likely be completed in glacial till soils. For preliminary design purposes, it is recommended that shallow seasonal watertable conditions be assumed, which requires a raised tile bed, and that a percolation rate (T-time) of 35min/cm be assumed. The design daily sewage volume will need to be established under Ontario Building Code criteria to establish an approximate sewage system envelope.

Based on mapped soils conditions, a sewage system(s) serving the proposed Phase 1 terminal facility and hangars in the southeast part of the site will likely be completed in sandy soils. For preliminary design purposes, it is recommended that shallow seasonal watertable conditions be assumed, which requires a raised tile bed, and that a percolation rate (T-time) of 10min/cm be assumed. The design daily sewage volume will need to be established under Ontario Building Code criteria to establish an approximate sewage system envelope.

Site-specific test pits will be required at sewage system approval stage to confirm soils and shallow groundwater conditions.

Preliminary Sewage Impact:

The MECP Reasonable Use Concept (RUC) is applicable to the assessment of impact of large sewage disposal systems (i.e. ≥10,000 litres per day total site design capacity), and is detailed in the 2008 MECP "Design Guidelines for Sewage Works". The critical groundwater contaminant in the context of the RUC is nitrate.

As above, the MECP RUC will apply to the aerodrome as the Phase 1 + Phase 2 sewage flow of 14,343L/day exceeds 10,000L/day. Sewage flow for future Phase 3, at 68,780L/day, will also require application of the MECP RUC, unless the Phase 3 lands can be subdivided into separately owned parcels.

Under the RUC, the effect is to require the nitrate content of groundwater at the downgradient property line, directly downgradient of each sewage disposal system, not to exceed 2.5mg/L under a mass-balance calculation specified by the guideline. The RUC assessment requires a determination of actual groundwater flow direction at each sewage disposal system, and as indicated above, shallow groundwater is anticipated to flow either to the north in the northern part of the site or to the southeast in the southern part of the site. While the site area is relatively very large, depending on the locations of sewage disposal systems and design sewage flows to each tile bed, some degree of sewage treatment (nitrate reduction) may be required.

The MECP RUC provides for some circumstances where treatment requirements can be reduced or be waived:

- Under Section 22.5.11 of the RUC, where there is a high likelihood that the potential sewage plume(s) will not cross a property line before reaching a surface water body, and where there is a separation distance of more than 300m between the area of sewage infiltration and the surface water body, the groundwater quality limits imposed by the RUC do not apply. Based on the probable southeasterly direction of shallow groundwater flow in the southern portion of the site, a sewage system serving the Phase 1 terminal plus hangars may be able to be situated such that Section 22.5.11 of the RUC can be implemented.

- Under Section 22.5.14 of the RUC, where it can be shown that the uppermost subsurface unit(s) have a vertical hydraulic conductivity of 10^{-5}cm/sec or less, is at least 10m thick, and extends at least 100m downgradient of the infiltration area, the groundwater quality limits imposed by the RUC do not apply. Based on the mapped glacial till in the western part of the site, a relatively small sewage system (i.e. 2,800L/day design flow) serving the proposed skydiving facility may be able to be situated such that Section 22.5.14 of the RUC can be implemented. Depending on site conditions, consideration to directing Phase 2 sewage effluent from the terminal plus hangars to the lower permeability soils of the western part of the site may also be considered, however design flows from Phase 2 (11,543L/day) may limit this possibility by requiring a larger sewage disposal area.

Due to uncertainty regarding subsurface information for Phase 3 of the northern third of the site (due to the isolated character of the area) and higher sewage flows, it should be assumed that the sewage impact limits of the RUC will apply to Phase 3 (if the Phase remains un-subdivided). Based on a probable northwards direction of flow, dilution area downgradient (north) of future sewage systems in Phase 3 are likely to be limited, and some level of tertiary treatment (i.e. nitrate reduction) should be expected for sewage systems in the Phase 3 area. The actual level of treatment will depend on the possibility of subdivision, design sewage flows to each specific Phase 3 sewage system, the size and orientation of each specific Phase 3 sewage system, and confirmed groundwater flow direction.

Site-specific subsurface studies will be required to demonstrate groundwater flow direction, sewage system function and impact prior to sewage system approval stage(s).

SUMMARY

1. Surficial soils across the site are some what complex, with soils over most of the western half of the site are mapped as silty sand to sandy silt glacial till, and soils over the east half of the site consisting of glaciolacustrine deposits of sand in the southeast, glaciolacustrine deposits of gravel and sand in the mid-east and northeast, and some glacial till in the mid-northeast.

2. The bedrock beneath the site is the primary water supply aquifer in the area, and should be the expected source of potable groundwater for the aerodrome. Expected well yield from the bedrock aquifer should be considered likely sufficient for Phases 1 and 2 from one well, or two separate wells at Phases 1 and 2. Potential commercial demands for future Phase 3 will likely require multiple wells in the northern third of the site.

3. Shallow groundwater can be expected to flow from a divide roughly in the middle of the site to the north towards Lake Simcoe or to the southeast towards the small on-site tributary.

4. A sewage system(s) serving the proposed Phase 2 skydiving facility in the west part of the site, and most of the Phase 3 in the northern third of the site, will likely be completed in glacial till soils. For preliminary design purposes, it is recommended that shallow seasonal watertable conditions be assumed, which requires a raised tile bed, and that a percolation rate (T-time) of 35min/cm be assumed.

5. A sewage system(s) serving the proposed Phase 1 terminal facility and hangars in the southeast part of the site will likely be completed in sandy soils. For preliminary design purposes, it is recommended that shallow seasonal watertable conditions be assumed, which requires a raised tile bed, and that a percolation rate (T-time) of 10min/cm be assumed.

6. As the total design sewage flow for the entire property will exceed 10,000L/day, the MECP Reasonable Use Concept will apply to the assessment of sewage system impact. Under the RUC, depending on the locations of sewage disposal systems and design sewage flows to each tile bed, some degree of sewage treatment (nitrate

reduction) may be required. However, based on the large site area, the sewage system(s) for Phases 1 and 2 may be able to be situated such that treatment requirements can be reduced or be waived. Due to the proximity of the Phase 3 lands to the probable downgradient (north) property line, some degree of sewage treatment (nitrate reduction) should be anticipated. Additional subsurface study will be required to determine the implications of the RUC, if applicable.

Should there be any questions regarding this desktop assessment, please feel free to contact this office.

Yours sincerely,
IAN D. WILSON ASSOCIATES LIMITED

<Original signed by>

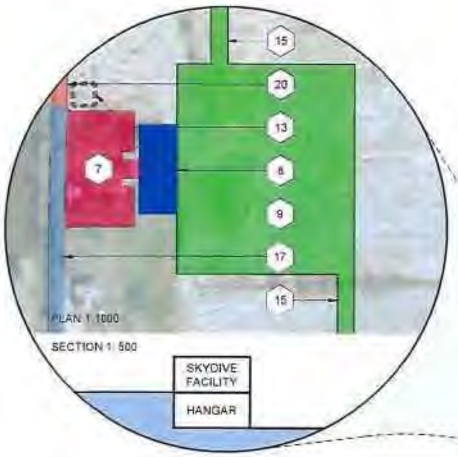
Geoffrey Rether, P.Geo.

PROFESSIONAL GEOSCIENTISTS ONTARIO
GEOFFREY B. RETHER
PRACTISING MEMBER
0426

DEVELOPMENT BOUNDARIES

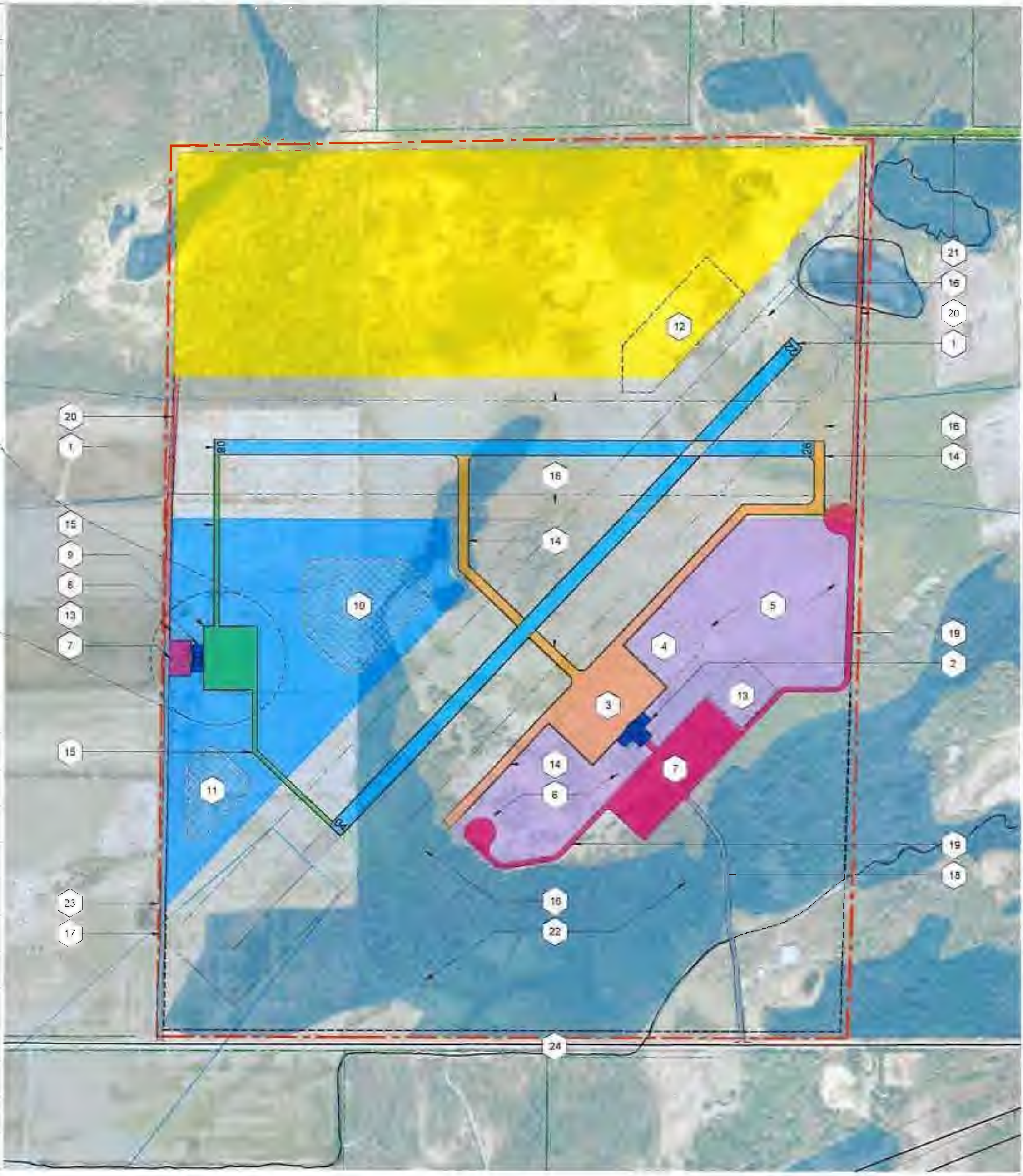
🟪	GENERAL AVIATION AREA (FBO / TERMINAL / TIE-DOWNS / HANGAR)
🟦	SKYDIVING DEVELOPMENT AREA
🟨	FUTURE COMMERCIAL AVIATION / RELATED INDUSTRIAL USE DEVELOPMENT

SKYDIVING CLUB FACILITY / HANGAR



KEY PLAN

1	PROPOSED RUNWAY	13	AIRFIELD MAINTENANCE FACILITY
2	FBO / TERMINAL	14	PAVED TAXIWAY
3	MAIN APRON	15	TURF TAXIWAY
4	TIE DOWN	16	FUTURE TAXIWAY
5	GA HANGAR DEVELOPMENT - NORTH	17	SKYDIVE ACCESS ROAD (EXISTING DRIVEWAY)
6	GA HANGAR DEVELOPMENT - SOUTH	18	FBO / AIR TERMINAL ACCESS ROAD (EXISTING DRIVEWAY)
7	CARPARK	19	INTERNAL ACCESS ROADS
8	SKYDIVING CLUB HOUSE / FACILITY	20	RESTRICTED ACCESS INTERNAL ROADS
9	SKYDIVE APRON	21	FUTURE PUBLIC ACCESS RIGHT OF WAY (MORNING GLORY ROAD EXTENSION)
10	SKYDIVE LANDING AREA - NORTH	22	PROVINCIALLY SIGNIFICANT WETLAND AREAS
11	SKYDIVE LANDING AREA - SOUTH	23	APPROXIMATE PROPERTY BOUNDARY
12	HELICOPTER PARKING POSITIONS	24	OLD HOMESTEAD ROAD



Notes

1. FOR CONCEPTUAL PLANNING PURPOSES ONLY.
2. THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS STAMPED ISSUED FOR CONSTRUCTION
3. BASE INFORMATION DERIVED FROM FILES RECEIVED FROM THE CLIENT MAY 2020
4. TOPOGRAPHICAL INFORMATION DERIVED FROM SURVEY FILES RECEIVED FROM THE CLIENT MAY 2020

N
E

Key Plan

PRELIMINARY

No.	DATE	DESCRIPTION	BY	APPD
2	2020.08.27	ISSUED FOR FINAL REPORT	PT	DCS
1	2020.07.27	PRELIMINARY FOR CLIENT REVIEW	PT	DCS
0	2020.07.22	PRELIMINARY FOR CLIENT REVIEW	PT	DCS

REVISION / ISSUE

AVIA NG
AIRPORT CONSULTANTS

SCOTT
ASSOCIATES

Client
SUTTON AIRPORT DEVELOPMENT INC.

Project
AERODROME FEASIBILITY STUDY

Title
CONCEPTUAL AERODROME MASTER PLAN

Scale 1:3000

Checked	DCS	AVIA NG Project No	20-0047
Design	DCS / BGS	Contract No	N/A
Drawn	PT	DRAWING No	A1

UTM 17 Z 636120 E

Con 5 R ~~10~~ 4904722 N

Elev Lot 5 R 9 00800

Basin 22 York

C 31D6~~440~~

GROUND WATER BRANCH
69 No 1086
OCT 21 1963
ONTARIO WATER RESOURCES COMMISSION

The Ontario Water Resources Commission Act

WATER WELL RECORD

County or District York

Township, Village, Town or City Georgina

Con 4 Lot 9

Date completed 17 (day) Sept. (month) 63 (year)

[redacted]

ress RR#1 Pefferlaw

Casing and Screen Record

Inside diameter of casing 34"

Total length of casing 47'

Type of screen

Length of screen

Depth to top of screen

Diameter of finished hole 34"

Pumping Test

Static level 18'

Test-pumping rate 5 G.P.M.

Pumping level

Duration of test pumping

Water clear or cloudy at end of test clear

Recommended pumping rate 3 G.P.M.

with pump setting of 45' HS feet below ground surface

Well Log

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
Dark topsoil	0	1		
yellow clay	1	10		
blue clay	10	46		
sand	46	47	47	fresh

For what purpose(s) is the water to be used? house

Is well on upland, in valley, or on hillside? uplands

Drilling or Boring Firm Wilsons' Well Digging

Address RR#2 Gormley Ont

Licence Number 1002

Name of Driller or Borer same

Address

Date Oct. 14/63

<Original signed by>

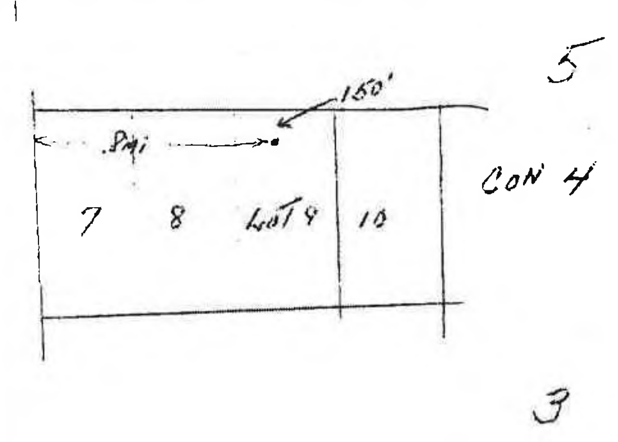
(Signature of Licensed Drilling or Boring Contractor)

Form 7 15M-60-4138

OWRC COPY

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



3

UTM 17 638163 E
5 4905269 N

31D ~~6~~ C

69 № 1987 B

The Ontario Water Resources Commission Act

WATER WELL RECORD

Elev. 5 R 07115

Basin 22 ~~County or District~~ YORK .... Township, Village, Town or City GEORGINA

Con. IV Lot R. 11 Date completed 2 (day) MAR month 1967 year)

[redacted] ress VACHELL

Casing and Screen Record	
Inside diameter of casing	4"
Total length of casing	50 ft
Type of screen	— —
Length of screen	— —
Depth to top of screen	— —
Diameter of finished hole	4"

Pumping Test	
Static level	4'
Test-pumping rate	25' G.P.M.
Pumping level	7'
Duration of test pumping	1 hr
Water clear or cloudy at end of test	clear
Recommended pumping rate	12 G.P.M.
with pump setting of	20' feet below ground surface

Well Log			Water Record	
Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
top soil	0	3	48	fresh
sandy clay	3	10		
blue clay	10	48		
lime stone	48	50		

For what purpose(s) is the water to be used? chicken farm

Is well on upland, in valley, or on hillside? valley

Drilling or Boring Firm W-F. Gartshore

Address Sharon

Licence Number 2526

Name of Driller or Borer J Diceman

Address Sharon

Date March 18 - 67

<Original signed by>

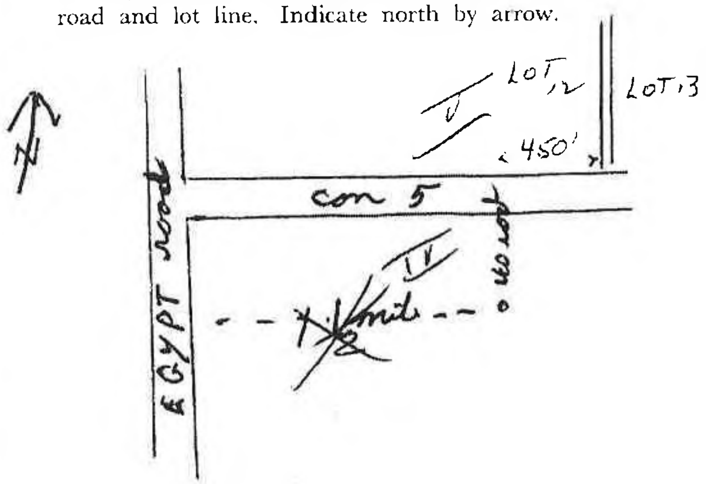
(Signature of Licensed Drilling or Boring Contractor)

Form 7 15M-60-4138

OWRC COPY

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



UTM 1 7 z 6 3 6 6 6 0 E

1 9 R 4 9 0 5 1 7 0 N

Elev 93 0 7 2 5

Basin 22 6

GROUND WATER BRANCH
3106 DEC 10 1958
ONTARIO WATER RESOURCES COMMISSION

69 №. 1995

ONTARIO

The Water-well Drillers Act, ~~1954~~

Department of Mines

Water-Well Record

County or Territorial District YORK
Township, Village, Town or City GEORGINA TWP.

[redacted]

Village, Town or City)

Address VIRGINA

Date completed
(day) (month) (year)

Pipe and Casing Record		Pumping Test	
Casing diameter(s)	36"	Static level	12 FT
Length(s)	36" x 28 ft.	Pumping rate	5 gal min.
Type of screen		Pumping level	
Length of screen		Duration of test	

Well Log / Water Record

Overburden and Bedrock Record	From ft.	To ft.	Depth (s) at which water (s) found	No. of feet water rises	Kind of water (fresh, salty, or sulphur)
Blue Clay & BOLDERS	0	28	22	16	fresh

For what purpose(s) is the water to be used? farm & house

Is water clear or cloudy? clear

Is well on upland, in valley, or on hillside? upland

Drilling firm Ontario Well Digging Co.

Address Newmarket

Name of Driller S. J. Moore

Address

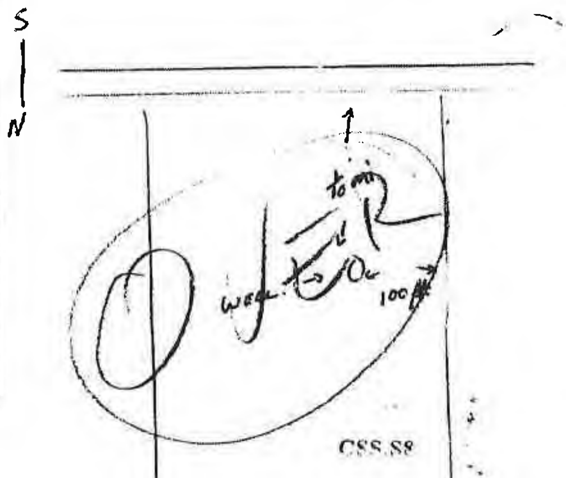
Licence Number

I certify that the foregoing statements of fact are true.

Date Dec 5 Roy Weddel
Signature of Licensee

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



CSS.S8

Form 5

UTM 17 Z 637908 E
6 R 4906674 N
Elev. 5 R 0115
Basin [illegible]

LOT 13

31D6

GROUND WATER BRANCH
69
DEC 10 1958
ONTARIO WATER
RESOURCES COMMISSION

№ 1096

ONTARIO

The Water-well Drillers Act, 1954
Department of Mines

Water-Well Record

County or Territorial District York Township, Village, Town or City Georgina
Con. 5 Lot 13 Street and Number (if in Village, Town or City)
Owner [redacted] Address Virginia
Date completed 3 (day) Dec (month) 1958 (year)

Pipe and Casing Record [redacted] **Pumping Test**

Casing diameter(s) 3½"
Length(s) 23 ft to 30 ft
Type of screen
Length of screen

Static level 12 ft.
Pumping rate 4 gal per minute
Pumping level
Duration of test

Well Log **Water Record**

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	No. of feet water rises	Kind of water (fresh, salty, or sulphur)
yellow clay.	0	20			
hard clay and rock.	10	25	30	18	fresh.
sand & gravel	25	30			

For what purpose(s) is the water to be used? livestock on farm.
Is water clear or cloudy? clear.
Is well on upland, in valley, or on hillside? upland

Drilling firm Ontario Well Digging Co.
Address 445 Ontario Street, Newmarket.
Name of Driller L. J. Moore
Address Newmarket.

Licence Number

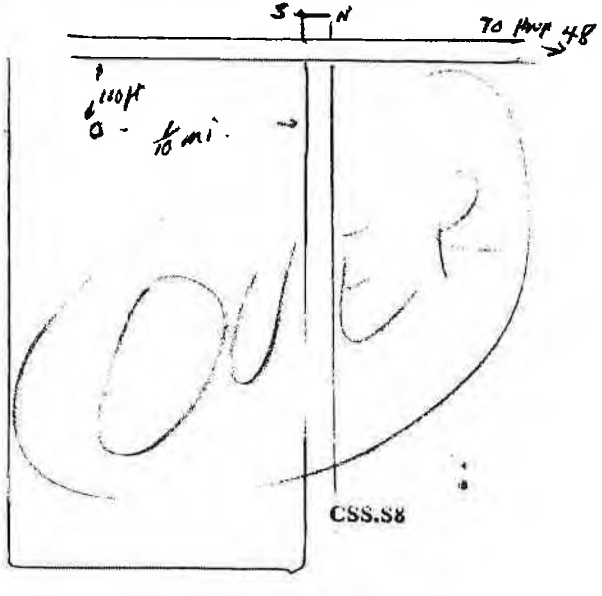
I certify that the foregoing statements of fact are true.

Date Dec 3 Roy Kiddell
Signature of Licensee

Form 5

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



CSS.S8

6909411
3 9

J.B.

UTM 17 Z 637850

4 R 49057330

Elev. 5 R 0760

Basin 22

Con IV
Lot 12
CODED

DIVISION OF WATER RESOURCES
SEP 30 1969
ONTARIO WATER RESOURCES COMMISSION

31D bc

The Ontario Water Resources Commission Act

WATER WELL RECORD

County or District YORK
Township, Village, Town or City GEORGINA
Con. ~~3~~ 4 Lot 12
Date completed 21 (day) JUNE (month) 69 (year)

[redacted]

dress RR2 Pefferlaw Ont

Casing and Screen Record

Inside diameter of casing 5"
Total length of casing 47
Type of screen –
Length of screen –
Depth to top of screen –
Diameter of finished hole 5"

Pumping Test

Static level 4'
Test-pumping rate 2½ G.P.M.
Pumping level 21'
Duration of test pumping 2 hrs
Water clear or cloudy at end of test clear
Recommended pumping rate 3½ G.P.M.
with pump setting of ...... feet below ground surface

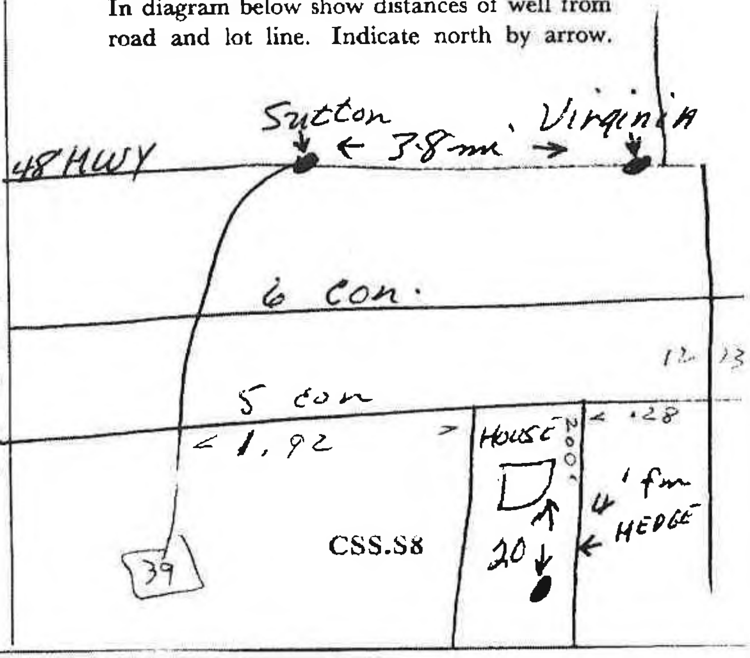
Well Log

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
SANDY LOAM	0	1		
Dry yellow SAND	1	11		
stoney clay	11	18		
HARDPAN	18	46		
LIMESTONE	46	63	60	fresh

For what purpose(s) is the water to be used? D
Is well on upland, in valley, or on hillside? upland
Drilling or Boring Firm Shannon Well Drilling
Address Box 371 Sutton
Licence Number 3252
Name of Driller or Borer HARVEY SEDORE
Address CEDARE BRAE ONT.
Date June 21/69
<Original signed by>
(Signature of Licensed Drilling or Boring Contractor)

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



CSS.S8

Form 7
OWRC COPY

The Ontario Water Resources Commission Act

31D/6W

WATER WELL RECORD

Water management in Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11

6910856

MUNICIP 69002 CON. CON 05

COUNTY OR ~~DISTRICT~~: YORK

TOWNSHIP, ~~BOROUGH, CITY, TOWN,~~ VILLAGE: GEORGINA

CON., ~~BLOCK, TRACT, SURVEY,~~ ETC.: V

LOT 25-27: 009

OWNER (SURNAME FIRST) [redacted] R 1 PEFFERLAW Ontario

DATE COMPLETED 48-53: DAY 12 MO. ~~April~~ 04 YR. 72

05050 | 4 | ELEVATION 0800 | RC 5 | BASIN CODE 22

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH – FEET FROM	DEPTH – FEET TO
DUG	WELL			0	47
GREY	CLAY	BOULDERS	HARD	47	93
GREY	SAND	GRAVEL	POROUS	93	95
GREY	LIMESTONE		HARD	95	98

31 | 0047 23 | 0093 2 45 13 | 0095 2 28 11 | 0098 2 15 1

32

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0093 ~~93 98~~	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH – FEET FROM	DEPTH – FEET TO
~~5¼~~ 05	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	~~92~~ 0092
05 ~~5¼~~	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		92	~~98~~ 0098
	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	DEPTH SET AT – FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER

PUMPING RATE: 0004 GPM.

DURATION OF PUMPING: 03 HOURS 00 MINS.

WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
047 FEET	080 FEET	068 FEET	076 FEET	077 FEET	077 FEET

IF FLOWING, GIVE RATE: GPM

PUMP INTAKE SET AT: 85 FEET

WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

RECOMMENDED PUMP SETTING: 085 FEET

RECOMMENDED PUMPING RATE: 0004 GPM.

000.1 GPM./FT. SPECIFIC CAPACITY

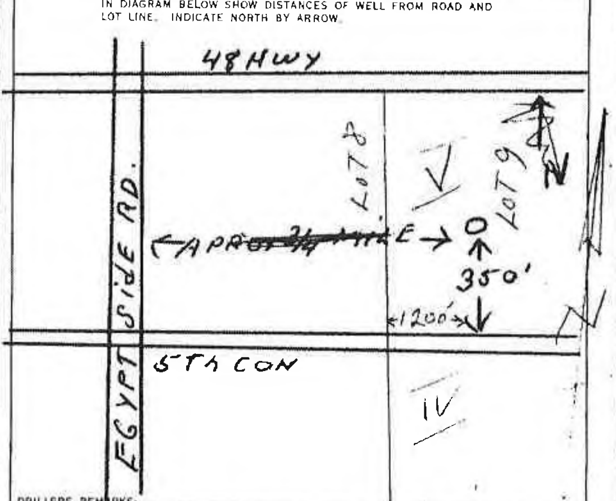
FINAL STATUS OF WELL
- 1 ☒ WATER SUPPLY
- 2 ☐ OBSERVATION WELL
- 3 ☐ TEST HOLE
- 4 ☐ RECHARGE WELL
- 5 ☐ ABANDONED, INSUFFICIENT SUPPLY
- 6 ☐ ABANDONED, POOR QUALITY
- 7 ☐ UNFINISHED

WATER USE 02
- 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 DRILLING
- 1 ☒ CABLE TOOL
- 2 ☐ ROTARY (CONVENTIONAL)
- 3 ☐ ROTARY (REVERSE)
- 4 ☐ ROTARY (AIR)
- 5 ☐ AIR PERCUSSION
- 6 ☐ BORING
- 7 ☐ DIAMOND
- 8 ☐ JETTING
- 9 ☐ DRIVING

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

CONTRACTOR

NAME OF WELL CONTRACTOR: R.E. BOADWAY | LICENCE NUMBER: 1413

ADDRESS: Box 397 SUTTON WEST ONT.

NAME OF DRILLER OR BORER: NORM POWELL | LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: <Original signed by>

SUBMISSION DATE: DAY 12 MO. April YR. 72

OFFICE USE ONLY

DATA SOURCE: 1 | CONTRACTOR: 1413 | DATE RECEIVED: 090572

DATE OF INSPECTION: Feb. 6/73 | INSPECTOR: J.B.

REMARKS: CSS.S8

P/J.B

WI

OWRC COPY

31D/6W

ONTARIO

MINISTRY OF THE ENVIRONMENT

The Ontario Water Resources Act

WATER WELL RECORD

6911080

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11

MUNICIP. 69002 CON. CON 05

COUNTY OR DISTRICT: York

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: GEORGINA

CON., ~~BLOCK, TRACT, SURVEY~~, ETC.: ~~5~~ V

LOT: ~~9~~ 009

[redacted] RRI PEFFERLAW ONT.

DATE COMPLETED: DAY 02 MO. ~~90~~ 10 YR. 72

05000 RC 4 ELEVATION 0800 RC 5 BASIN CODE 22

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	STONE	HARD	0	18
GREY	CLAY	STONE BOULDERS	HARD	18	78
GREY	GRAVEL	SILT	CEMENTED	78	83
GREY	CLAY		DENSE	83	94
GREY	CLAY	GRAVEL BOULDERS	HARD	94	105
BROWN	LIMESTONE		SHELLY	105	110
BROWN	LIMESTONE		HARd	110	118

31 0018605 12 | 0078205 1213 | 0083 21 06 | 0094205 | 0105205 1113 | 0118015

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0105 ~~105 118~~	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
0118	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
~~5¼~~ 05	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	~~105~~ 0105
~~5⅛~~ 06	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		105	0118 ~~118~~
	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	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER

PUMPING RATE: 0008 GPM

DURATION OF PUMPING: 02 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
047 FEET	060 FEET	060 FEET	060 FEET	060 FEET	060 FEET

WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY

IF FLOWING GIVE RATE: GPM

PUMP INTAKE SET AT: 75 FEET

WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

RECOMMENDED PUMP SETTING: 090 FEET

RECOMMENDED PUMPING RATE: 0006 GPM

800.6 GPM./FT. SPECIFIC CAPACITY

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 02

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 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: R.F. BOADWAY

LICENCE NUMBER: 1413

ADDRESS: Box 397 SUTTON WEST ONT

NAME OF DRILLER OR BORER: R.F. BOADWAY

LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: <Original signed by>

SUBMISSION DATE: DAY 2 MO. Oct YR. 72

OFFICE USE ONLY

DATA SOURCE: 1

CONTRACTOR: 1413

DATE RECEIVED: 17 10 72

DATE OF INSPECTION: Feb 6/73

INSPECTOR: J.B.

REMARKS:

CSS.S8

P/J.B.

WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 07-091

MINISTRY OF THE ENVIRONMENT

The Ontario Water Resources Act

WATER WELL RECORD

31D/6W

Ontario ✓

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 6912765 | MUNICIP. 6900 | CON. CON | 04

COUNTY OR DISTRICT: YORK

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: GEORGINA

CON., BLOCK, TRACT, ~~SURVEY~~, ETC.: IV

LOT: 009

[redacted] 37 CHLEDONIA

DATE COMPLETED: DAY 10 MO. 05 YR. 75

HING 904779 | RC. 4 | ELEVATION 0797 | RC. 5 | BASIN CODE 22

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BRN	CLAY	–	–	0	16
GREY	CLAY	STONE	HARD	16	75
GREY	CLAY	LIMESTONE LAYERS	HARD	75	98

31 | 0016605 | 00752051 2 | 0098205 15

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0080	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
04	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	~~98~~ 0098
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	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	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER

PUMPING RATE: 0005 GPM.

DURATION OF PUMPING: 06 HOURS 00 MINS

STATIC LEVEL: 016 FEET

WATER LEVEL END OF PUMPING: 025 FEET

WATER LEVELS DURING: 1 ☐ PUMPING 2 ☒ RECOVERY

15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
016 FEET	016 FEET	016 FEET	016 FEET

IF FLOWING GIVE RATE: GPM

PUMP INTAKE SET AT: 30 FEET

WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☒ SHALLOW ☐ DEEP

RECOMMENDED PUMP SETTING: 030 FEET

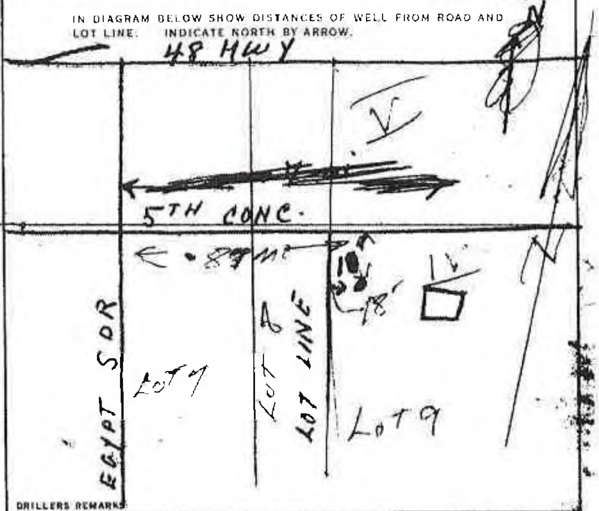
RECOMMENDED PUMPING RATE: 0004 GPM

0006 GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL

3604

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS

FINAL STATUS OF WELL 1

1 ☒ WATER SUPPLY
2 ☐ OBSERVATION WELL
3 ☐ TEST HOLE
4 ☐ RECHARGE WELL
5 ☐ ABANDONED, INSUFFICIENT SUPPLY
6 ☐ ABANDONED, POOR QUALITY
7 ☐ UNFINISHED

WATER USE 01

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 DRILLING 2

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: Shannon Well Drilling

LICENCE NUMBER: 4760

ADDRESS: Box 37 Sutton

NAME OF DRILLER OR BORER: R Shannon

LICENCE NUMBER: 4760

SIGNATURE OF CONTRACTOR: <Original signed by>

SUBMISSION DATE: DAY 30 MO. 5 YR. 75

OFFICE USE ONLY

DATA SOURCE: 1

CONTRACTOR: 4760

DATE RECEIVED: 270875

DATE OF INSPECTION: Jan. 13/76

INSPECTOR: J.B

REMARKS:

P/J.B.

WI

FORM 7 07-091

MINISTRY OF THE ENVIRONMENT COPY

ENA4 31 D/6

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 6916788 MUNICIP 69002 CON. CON 05

COUNTY OR DISTRICT [redacted]

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE GINA

CON., BLOCK, TRACT, SURVEY, ETC 5 N

LOT 011

CHELL RR PEFFERLAW

DATE COMPLETED DAY 20 MO ~~SEPT~~ 09 YR 83

905300 RC 5 ELEVATION 0750 RC 5 BASIN CODE 221

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BROWN	SAND		PACKED	0	5
GREY	SAND		PACKED	5	9
BLUE	CLAY		DENSE	9	22
GREY	CLAY	GRAVEL SILT	LAYERED	22	50
GREY	LIMESTONE		HARD	50	64

31 0005 28 79 | 0009 22 8 79 | 0022 30 5 66 | 0050 20 5 1106 | 0064 21 5 73

32

WATER RECORD (41)

WATER FOUND AT - FEET	KIND OF WATER
0050	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
0058 ~~58 62~~	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

CASING & OPEN HOLE RECORD (51)

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
~~6 1/4~~ 06	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	0052
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	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

PLUGGING & SEALING RECORD (61)

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

PUMPING TEST (71)

PUMPING TEST METHOD 1 ☒ PUMP 2 ☐ BAILER

PUMPING RATE 00/0 GPM

DURATION OF PUMPING 02 HOURS 30 MINS

WATER LEVELS DURING 1 ☒ PUMPING 2 ☐ RECOVERY

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
005 FEET	020 FEET	016 FEET	020 FEET	020 FEET	020 FEET

IF FLOWING, GIVE RATE GPM

PUMP INTAKE SET AT 35 FEET

WATER AT END OF TEST 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE ☐ SHALLOW ☒ DEEP

RECOMMENDED PUMP SETTING 035 FEET

RECOMMENDED PUMPING RATE 0008 GPM

FINAL STATUS OF WELL 1

1 ☒ WATER SUPPLY
2 ☐ OBSERVATION WELL
3 ☐ TEST HOLE
4 ☐ RECHARGE WELL
5 ☐ ABANDONED, INSUFFICIENT SUPPLY
6 ☐ ABANDONED, POOR QUALITY
7 ☐ UNFINISHED

WATER USE 01

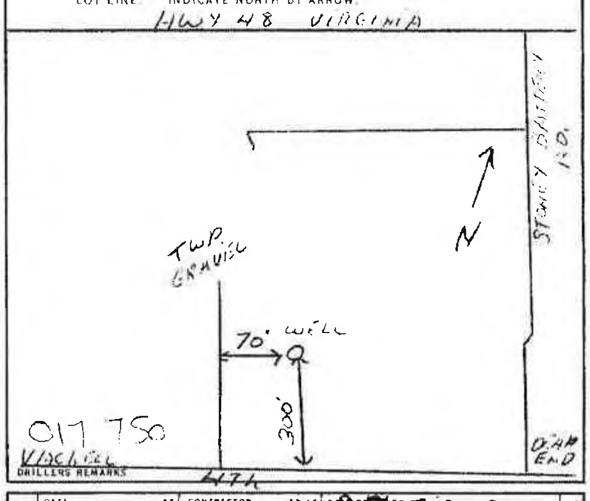
1 ☒ DOMESTIC
2 ☐ STOCK
3 ☐ IRRIGATION
4 ☐ INDUSTRIAL
☐ OTHER
5 ☐ COMMERCIAL
6 ☐ MUNICIPAL
7 ☐ PUBLIC SUPPLY
8 ☐ COOLING OR AIR CONDITIONING
9 ☐ NOT USED

METHOD OF DRILLING 2

1 ☐ CABLE TOOL
2 ☒ ROTARY (CONVENTIONAL)
3 ☐ ROTARY (REVERSE)
4 ☐ ROTARY (AIR)
5 ☐ AIR PERCUSSION
6 ☐ BORING
7 ☐ DIAMOND
8 ☐ JETTING
9 ☐ DRIVING

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



017 750
VACHELL

DRILLERS REMARKS

CONTRACTOR

NAME OF WELL CONTRACTOR ROGER BOADWAY ENT LTD

LICENCE NUMBER 1413

ADDRESS P.O. BOX 397 SUTTON WEST ONT

NAME OF DRILLER OR BORER ROGER BOADWAY

LICENCE NUMBER

<Original signed by>

SUBMISSION DATE DAY 20 MO SEPT YR 83

OFFICE USE ONLY

DATA SOURCE 1

CONTRACTOR 1413

DATE RECEIVED 07 10 83

DATE OF INSPECTION

INSPECTOR

REMARKS loc only 08/85 KD

FORM NO. 0506-4-77 FORM 7

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ENL 4 - 31 D/6

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

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(11) 6917092 MUNICIP 69002 CON CON 04

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON, BLOCK, TRACT, SURVEY, ETC.	LOT
York	Georgina	4 IV	009 ~~109~~

[redacted]

ADDRESS R.R.1 Pefferlaw, ON

DATE COMPLETED DAY 24 MO 05 YR 84

(21) ZONE 17 EASTING 636400 NORTHING 4904800 RC 5 ELEVATION 0775 RC 5 BASIN CODE 22

[redacted]

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
Brown	Clay		Dense	0	20
Grey	Clay	Stone	Hard	20	100
Grey	Gravel	Stone, Silt	Cemented	100	120
Grey	Limestone		Hard	120	142
Cummins					
		~~Plan~~ 389	sub 9		

(31) 002060566 | 0100205 1273 | 01 2021 1206 | 0142215 73

(32)

(41) WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0142	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

(51) CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
05 ~~5 1/8~~	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	0120
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	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 0003 GPM

DURATION OF PUMPING 01 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
030 FEET	120 FEET	060 FEET	085 FEET	105 FEET	120 FEET

IF FLOWING, GIVE RATE GPM

PUMP INTAKE SET AT 110 FEET

WATER AT END OF TEST 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE ☐ SHALLOW ☒ DEEP

RECOMMENDED PUMP SETTING 110 FEET

RECOMMENDED PUMPING RATE 0003 GPM

FINAL STATUS OF WELL 1

1 ☒ WATER SUPPLY
2 ☐ OBSERVATION WELL
3 ☐ TEST HOLE
4 ☐ RECHARGE WELL
5 ☐ ABANDONED, INSUFFICIENT SUPPLY
6 ☐ ABANDONED, POOR QUALITY
7 ☐ UNFINISHED

WATER USE 01

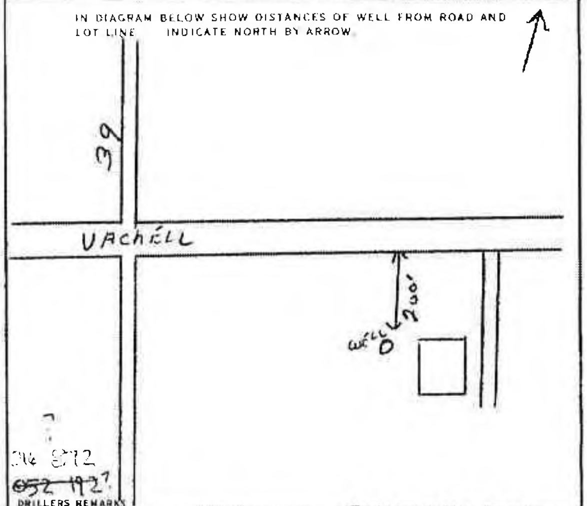
1 ☒ DOMESTIC
2 ☐ STOCK
3 ☐ IRRIGATION
4 ☐ INDUSTRIAL
☐ OTHER
5 ☐ COMMERCIAL
6 ☐ MUNICIPAL
7 ☐ PUBLIC SUPPLY
8 ☐ COOLING OR AIR CONDITIONING
9 ☐ NOT USED

METHOD OF DRILLING 2

1 ☐ CABLE TOOL
2 ☒ ROTARY (CONVENTIONAL)
3 ☐ ROTARY (REVERSE)
4 ☐ ROTARY (AIR)
5 ☐ AIR PERCUSSION
6 ☐ BORING
7 ☐ DIAMOND
8 ☐ JETTING
9 ☐ DRIVING

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



34 872
~~052 1927~~

DRILLERS REMARKS

CONTRACTOR

NAME OF WELL CONTRACTOR Roger Roadway Ent., Ltd. LICENCE NUMBER 1413

ADDRESS Box 397 Sutton West, ON L0E 1R0

NAME OF DRILLER OR BORER Barry Ingham LICENCE NUMBER

<Original signed by>

SUBMISSION DATE DAY 24 MO 05 YR 84

OFFICE USE ONLY

DATA SOURCE 1 CONTRACTOR 1413 DATE RECEIVED 20 06 84

DATE OF INSPECTION INSPECTOR

REMARKS lic only 08/85 KD

FORM NO. 0506-4-77 FORM 7

MINISTRY OF THE ENVIRONMENT COPY

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 6921424 - MUNICIP 69002 CON. CON 104

COUNTY OR DISTRICT: YORK
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: GEORGINA
CON., BLOCK, TRACT, SURVEY, ETC.: CON 4
LOT: PART #9

[redacted]

D HOMESTEAD RD

DATE COMPLETED: DAY 22 MO 8 YR 90

RC. ELEVATION RC. BASIN CODE

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	BOULDERS	HARD	0	16
BLUE	CLAY	BOUDERS	HARD	16	58
GRAY	SILT		SOFT	58	59
GRAY	CLAY	BOULDERS	HARD	59	72
BLACK	CLAY	/	DENSE	72	87
GRAY	CLAY	SAND	CEMENTED	87	90
BROWN	SHALE		FRACTURED	90	92
GRAY	LIMESTONE		HARD	92	102

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
	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	DEPTH - FEET TO
5"	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	88'	+2	90
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			
	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	DEPTH SET AT - FEET 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: 8 HOURS MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING 1 ☑ PUMPING 2 ☐ RECOVERY: 15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
30 FEET	80 FEET	48 FEET	60 FEET	71 FEET	80 FEET

IF FLOWING, GIVE RATE: GPM
PUMP INTAKE SET AT: 80 FEET
WATER AT END OF TEST: 1 ☑ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☑ DEEP
RECOMMENDED PUMP SETTING: 85' FEET
RECOMMENDED PUMPING RATE: 8 GPM

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

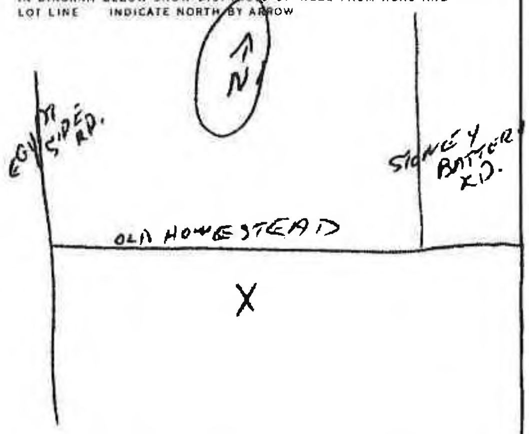
1 ☑ DOMESTIC
2 ☐ STOCK
3 ☐ IRRIGATION
4 ☐ INDUSTRIAL
☐ OTHER
5 ☐ COMMERCIAL
6 ☐ MUNICIPAL
7 ☐ PUBLIC SUPPLY
8 ☐ COOLING OR AIR CONDITIONING
9 ☐ NOT USED

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

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW



68814

DRILLERS REMARKS

CONTRACTOR

NAME OF WELL CONTRACTOR: DOUGLAS TOWERS
WELL CONTRACTOR'S LICENCE NUMBER: 5019
ADDRESS: RR#1 SUTTON
NAME OF WELL TECHNICIAN: DOUG
WELL TECHNICIAN'S LICENCE NUMBER: 0114
SI <Original signed by>
SUBMISSION DATE: DAY 22 MO 9 YR 90

OFFICE USE ONLY

DATA SOURCE:
CONTRACTOR: 5019
DATE RECEIVED: MAY 30 1991
DATE OF INSPECTION:
INSPECTOR:
REMARKS:

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

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 6921659 MUNICIP 69002 CON. CON 03

COUNTY OR DISTRICT [redacted]
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE Georgina
CON., BLOCK, TRACT, SURVEY, ETC. Con 3
LOT 9
Vachell
DATE COMPLETED DAY 9 MO 10 YR 91
ELEVATION
BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	sand	rocks		0	6
Brown	clay	silty		6	12
Gray	clay	stones		12	49
White	clay	stones		49	61
Gray	Lime Stones			61	100

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
100	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	DEPTH - FEET TO
6 2/8	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	0	61
6 2/8	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☑ OPEN HOLE 5 ☐ PLASTIC	[illegible]	61	100
	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	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD AIR 1 ☐ PUMP 2 ☐ BAILER
PUMPING RATE 1/2 GPM
DURATION OF PUMPING 4 HOURS MINS
STATIC LEVEL 34 FEET
WATER LEVEL END OF PUMPING 100 FEET
WATER LEVELS DURING 1 ☑ PUMPING 2 ☐ RECOVERY

15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
100 FEET	100 FEET	160 FEET	100 FEET

IF FLOWING GIVE RATE GPM
PUMP INTAKE SET AT 100 FEET
WATER AT END OF TEST 1 ☑ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE ☐ SHALLOW ☐ DEEP
RECOMMENDED PUMP SETTING FEET
RECOMMENDED PUMPING RATE GPM

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

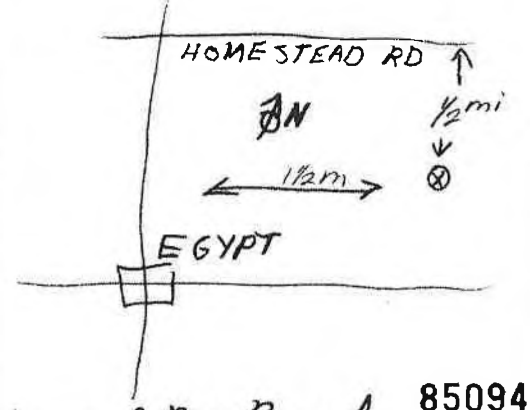
1 ☑ DOMESTIC
2 ☐ STOCK
3 ☐ IRRIGATION
4 ☐ INDUSTRIAL
☐ OTHER
5 ☐ COMMERCIAL
6 ☐ MUNICIPAL
7 ☐ PUBLIC SUPPLY
8 ☐ COOLING OR AIR CONDITIONING
9 ☐ NOT USED

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

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



85094

DRILLERS REMARKS 2 Bags Bensed

CONTRACTOR

NAME OF WELL CONTRACTOR Wilson Water Wells Ltd
WELL CONTRACTOR'S LICENCE NUMBER 5459
ADDRESS RR 4 Stouffville Ont
NAME OF WELL TECHNICIAN X Hadrock
WELL TECHNICIAN'S LICENCE NUMBER 0234
SIGNATURE <Original signed by>
SUBMISSION DATE DAY 21 MO 10 YR 91

OFFICE USE ONLY

DATA SOURCE
CONTRACTOR 5459
DATE RECEIVED NOV 01 1991
DATE OF INSPECTION
INSPECTOR
REMARKS

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/88) FORM 9

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 6921841 MUNICIP. 69002 CON. CON 04

COUNTY OR DISTRICT: YORK
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: GEORGINA
CON. BLOCK, TRACT, SURVEY, ETC.: CON 4
LOT: 9

[redacted] LD 7259 HOMSTEAD RD.

DATE COMPLETED: DAY 24 MO 1 YR 92

[redacted] 04830 RC. ELEVATION 245 RC BASIN CODE

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	GRAVEL	PACKED	0	2
BROWN	CLAY	STONES	HARD	2	18
BLUE	CLAY	STONES	HARD	18	42
BLUE	CLAY	PEBBLES	DENSE	42	48
GRAY	CLAY	BOULDERS	HARD	48	82
BROWN	SHALE		FRACTURED	82	85'
GRAY	LIMESTONE		HARD.	85'	105'

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
82/105'	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	DEPTH - FEET TO
5"	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188"	12	82
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			
	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	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☑ BAILER
PUMPING RATE: 5 GPM
DURATION OF PUMPING: 2 HOURS ___ MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☑ PUMPING 2 ☐ RECOVERY — 15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
18 FEET	93 FEET	85 FEET	90 FEET	93 FEET	93 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: 100 FEET
RECOMMENDED PUMPING RATE: 4 GPM

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

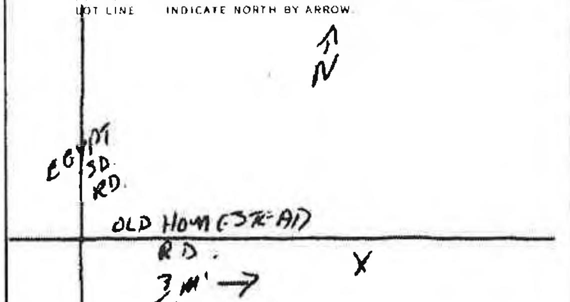
1 ☑ DOMESTIC
2 ☐ STOCK
3 ☐ IRRIGATION
4 ☐ INDUSTRIAL
☐ OTHER
5 ☐ COMMERCIAL
6 ☐ MUNICIPAL
7 ☐ PUBLIC SUPPLY
8 ☐ COOLING OR AIR CONDITIONING
9 ☐ NOT USED

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

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



016 804

44353

DRILLERS REMARKS

CONTRACTOR

NAME OF WELL CONTRACTOR: DOUGLAS TOWERS
WELL CONTRACTOR'S LICENCE NUMBER: 5019
ADDRESS: RR# 1 SUTTON
NAME OF WELL TECHNICIAN: DOUG
WELL TECHNICIAN'S LICENCE NUMBER: 0774
<Original signed by>
SUBMISSION DATE: DAY 24 MO 2 YR 92

OFFICE USE ONLY

DATA SOURCE:
CONTRACTOR: 5019
DATE RECEIVED: MAR 16 1992
DATE OF INSPECTION:
INSPECTOR:
REMARKS:

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/88) FORM 9

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 6922827 MUNICIP 69002 CON. CON 04

[redacted]

COUNTY OR DISTRICT

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: RGINA

CON., BLOCK, TRACT, SURVEY, ETC.: CON 4 PART #12

D HOMESTEAD ROAD.

DATE COMPLETED: DAY 6 MO 8 YR 94

RC 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	BOULDERS	HARD	0	11
BLUE	CLAY	BOULDERS	HARD.	11	50
GRAY	SHALE	RUBBLE	LOOSE	50	53
GRAY	LIMESTONE		FRACTURED	53	78

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
50/78	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
5 1/2"	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	188"	+2	53
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			
	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 ☑ PUMP 2 ☐ BAILER
PUMPING RATE: 12 GPM
DURATION OF PUMPING: 3 HOURS MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING 1 ☑ PUMPING 2 ☐ RECOVERY 15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
4 FEET	29 FEET	29 FEET	29 FEET	29 FEET	29 FEET

IF FLOWING GIVE RATE: GPM
PUMP INTAKE SET AT: 35' FEET
WATER AT END OF TEST: 1 ☑ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☑ DEEP
RECOMMENDED PUMP SETTING: 50 FEET
RECOMMENDED PUMPING RATE: 10 GPM

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

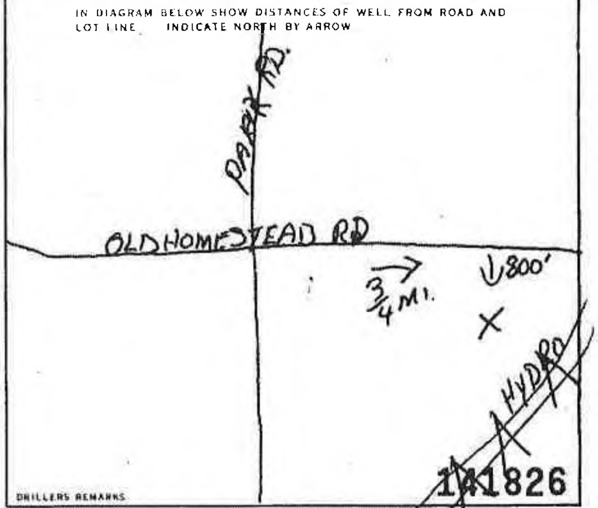
1 ☑ DOMESTIC
2 ☐ STOCK
3 ☐ IRRIGATION
4 ☐ INDUSTRIAL
☐ OTHER
5 ☐ COMMERCIAL
6 ☐ MUNICIPAL
7 ☐ PUBLIC SUPPLY
8 ☐ COOLING OR AIR CONDITIONING
9 ☐ NOT USED

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

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW



141826

DRILLERS REMARKS

CONTRACTOR

NAME OF WELL CONTRACTOR: DOUGLAS TOWERS
WELL CONTRACTOR'S LICENCE NUMBER: 5019
ADDRESS: RR#1 SUTTON
NAME OF WELL TECHNICIAN: DOUG
WELL TECHNICIAN'S LICENCE NUMBER: 0119
SIGNATURE OF TECHNICIAN/CONTRACTOR: <Original signed by>
SUBMISSION DATE: DAY 6 MO 9 YR 94

OFFICE USE ONLY

DATA SOURCE
CONTRACTOR: 5019
DATE RECEIVED: SEP 20 1994
DATE OF INSPECTION
INSPECTOR
REMARKS

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FORM NO. 0506 (11/86) FORM 9

Ministry of Environment and Energy
Ontario

The Ontario Water Resources Act
WATER WELL RECORD

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11

6924818

Municipality: 69002 Con.: CON 05

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot
YORK	GEORGINA	5	10

[redacted]

Address: Old Homestead Rd. Pefferlaw, ON
Date completed: 17 day 03 month 99 year 99

21 Northing RC Elevation RC Basin Code

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth – feet From	Depth – feet To
Brown	Sand		Packed	0	13
Grey	Clay		Hard	13	37
Grey	Clay	Stones	Hard	37	70
Grey	Gravel		Cemented	70	76
Grey	Limestone		Hard	76	117

31

32

41 WATER RECORD

Water found at – feet	Kind of water
76-117	☒ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas
	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas
	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas
	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas
	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth – feet From	Depth – feet To
6¼	☒ Steel ☐ Galvanized ☐ Concrete ☐ Open hole ☐ Plastic	188	0	76
	☐ Steel ☐ Galvanized ☐ Concrete ☐ Open hole ☐ Plastic			
	☐ Steel ☐ Galvanized ☐ Concrete ☐ Open hole ☐ 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.)
0	20	Benseal

71 PUMPING TEST

Pumping test method: ☐ Pump ☒ Bailer AIR
Pumping rate: 8 GPM
Duration of pumping: 2 Hours Mins

Static level	Water level end of pumping	Water levels during ☒ Pumping ☐ Recovery: 15 minutes	30 minutes	45 minutes	60 minutes
14 feet	80 feet	feet	feet	feet	80 feet

If flowing give rate: GPM
Pump intake set at: 80 feet
Water at end of test: ☒ Clear ☐ Cloudy
Recommended pump type: ☐ Shallow ☒ Deep
Recommended pump setting: 80 feet
Recommended pump rate: 6 GPM

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

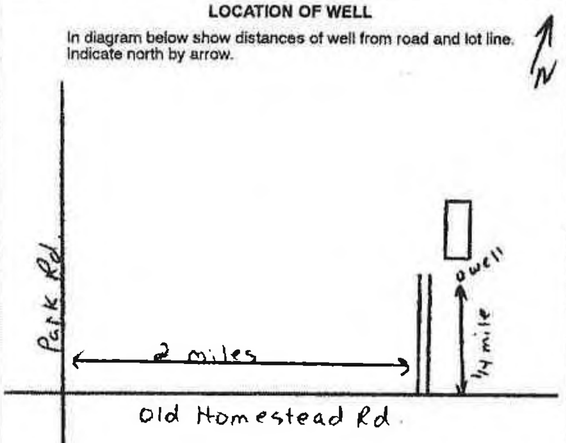
- 1 ☒ Domestic
- 2 ☐ Stock
- 3 ☐ Irrigation
- 4 ☐ Industrial
- 5 ☐ Commercial
- 6 ☐ Municipal
- 7 ☐ Public supply
- 8 ☐ Cooling & air conditioning
- 9 ☐ Not used
- 10 ☐ Other

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

LOCATION OF WELL

In diagram below show distances of well from road and lot line. Indicate north by arrow.



188932

Name of Well Contractor: Roger Boadway Ent., Ltd.
Well Contractor's Licence No.: 1413
Address: Box 397 Sutton West, ON L0E 1R0
Name of Well Technician: Grant Boadway
Well Technician's Licence No.: T0029
<Original signed by>
Submission date: 17 03 99

MINISTRY USE ONLY
Data source
Contractor: 1413
Date received: APR 29 1999
Date of inspection
Inspector
Remarks: CSS.ES9

0506 (07/94) Front Form 9

2 - MINISTER OF ENVIRONMENT & ENERGY COPY

Ministry of Environment and Energy
Ontario

The Ontario Water Resources Act
WATER WELL RECORD

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11

6924897

Municipality 69002 Con. CON 04

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot
YORK	GEORGINA	CON 4	PART # 9
[redacted]	Address OLD HOMESTEAD RD.	Date completed 1 day 5 month 99 year	

21 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	To
BROWN	SAND	STONES	LOOSE	0	10
BROWN	CLAY	STONES	HARD.	10	18
BLUE	CLAY	STONES	HARD.	18	36
GRAY	GRAVEL	SAND.	LOOSE	36	50

31

32

41 WATER RECORD

Water found at – feet	Kind of water
36/50	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
5"	1 ☑ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic	188"	+2	50
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			
	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	To	Material and type (Cement grout, bentonite, etc.)
0	20	BENSEAL.
20	25	SCURRY BENSEAL

71 PUMPING TEST

Pumping test method 1 ☑ Pump 2 ☐ Bailer
Pumping rate 25 GPM
Duration of pumping 3 Hours 40 Mins

Static level	Water level end of pumping	Water levels during 1 ☑ Pumping 2 ☐ Recovery 15 minutes	30 minutes	45 minutes	60 minutes
12 feet	18 feet	18 feet	18 feet	18 feet	18 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 30 feet
Recommended pump rate 10 GPM

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

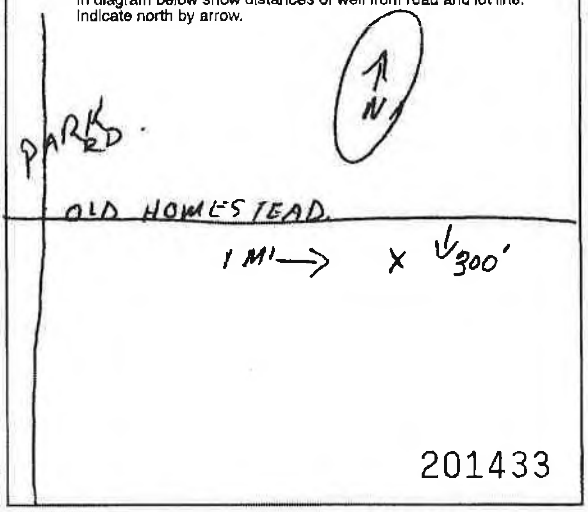
1 ☑ Domestic
2 ☐ Stock
3 ☐ Irrigation
4 ☐ Industrial
5 ☐ Commercial
6 ☐ Municipal
7 ☐ Public supply
8 ☐ Cooling & air conditioning
9 ☐ Not used
10 ☐ Other

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

LOCATION OF WELL

In diagram below show distances of well from road and lot line.
Indicate north by arrow.



201433

Name of Well Contractor DOUGLAS TOWERS
Well Contractor's Licence No. 5019
Address RR#1 SUTTON
Name of Well Technician DOUG KEITH
Well Technician's Licence No. 0114
Signature of Technician/Contractor <Original signed by>
Submission date 1 day 6 mo 99 yr

MINISTRY USE ONLY
Data source
Contractor 5019
Date received JUN 0 4 1999
Date of inspection
Inspector
Remarks CSS.ES9

0506 (07/94) Front Form 9

2 - MINISTER OF ENVIRONMENT & ENERGY COPY

Ontario Ministry of the Environment

Well Tag No. *(Place Sticker and/or Print Below)*

Tag#: A144310

Well Record

Regulation 903 Ontario Water Resources Act

Page ______ of ______

Measurements recorded in: ☐ Metric ☑ Imperial

Well Owner's Information

First Name:
Last Name / Organization: Kerry's Place Autism Services
E-mail Address:
☐ Well Constructed by Well Owner
Mailing Address (Street Number/Name): 34 Berczy St. Suite 190
Municipality: Aurora
Province: ON
Postal Code: L4G1W7
Telephone No. *(inc. area code)*: 9058416611

Well Location

Address of Well Location (Street Number/Name): 7173 Old Homestead Rd.
Township: Georgina
Lot: pt. 9
Concession: 4
County/District/Municipality: York
City/Town/Village: Pefferlaw
Province: Ontario
Postal Code: L0E1N0
UTM Coordinates Zone: NAD 83 17 Easting: 635972 Northing: 4904995
Municipal Plan and Sublot Number:
Other:

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Brown	Sand	Clay	Till	0	10
Grey	Clay	Pebbles	Soft	10	57
Grey	Clay	Stones	Hard	57	77
Grey	Gravel	Clay Trace	Cemented	77	88
Grey	Limestone		Hard	88	100

Annular Space

Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used *(Material and Type)*	Volume Placed *(m³/ft³)*
0	20	Benseal	

Method of Construction

☐ Cable Tool
☑ Rotary (Conventional)
☐ Rotary (Reverse)
☐ Boring
☐ Air percussion
☐ Other, *specify*
☐ Diamond
☐ Jetting
☐ Driving
☐ Digging

Well Use

☐ Public
☑ Domestic
☐ Livestock
☐ Irrigation
☐ Industrial
☐ Other, *specify*
☐ Commercial
☐ Municipal
☐ Test Hole
☐ Cooling & Air Conditioning
☐ Not used
☐ Dewatering
☐ Monitoring

Construction Record - Casing

Inside Diameter *(cm/in)*	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness *(cm/in)*	Depth (m/ft) From	Depth (m/ft) To
6¼	Steel	.219	0	88

Construction Record - Screen

Outside Diameter *(cm/in)*	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To

Status of Well

☑ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, *specify*
☐ Other, *specify*

Results of Well Yield Testing

After test of well yield, water was:
☑ Clear and sand free
☐ Other, *specify*
If pumping discontinued, give reason:
Pump intake set at *(m/ft)*: 80
Pumping rate *(l/min / GPM)*: 10
Duration of pumping: 1 hrs + ____ min
Final water level end of pumping *(m/ft)*: 80
If flowing give rate *(l/min / GPM)*:
Recommended pump depth *(m/ft)*: 80
Recommended pump rate *(l/min / GPM)*: 8
Well production *(l/min / GPM)*: 10
Disinfected? ☑ Yes ☐ No

Draw Down Time *(min)*	Draw Down Water Level *(m/ft)*	Recovery Time *(min)*	Recovery Water Level *(m/ft)*
Static Level	12		
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60		60	

Water Details

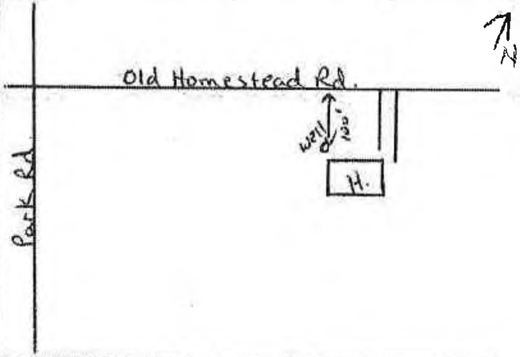
Water found at Depth 100 (m/ft) ☐ Gas Kind of Water: ☑ Fresh ☑ Untested ☐ Other, *specify*
Water found at Depth ____ (m/ft) ☐ Gas Kind of Water: ☐ Fresh ☐ Untested ☐ Other, *specify*
Water found at Depth ____ (m/ft) ☐ Gas Kind of Water: ☐ Fresh ☐ Untested ☐ Other, *specify*

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter *(cm/in)*
0	20	10
20	88	6 5/8
88	100	6 1/8

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor: Roger Boadway Ent., Ltd.
Well Contractor's Licence No.: 1413
Business Address (Street Number/Name): Box 397, Sutton West
Municipality: York
Province: ON
Postal Code: L0E1R0
Business E-mail Address: boadwaywells@bellnet.ca
Bus. Telephone No. *(inc. area code)*: 9057225362
Name of Well Technician (Last Name, First Name): Boadway, Grant
Well Technician's Licence No.: 0029
<Original signed by>
Date Submitted: 20140225

Well owner's information package delivered ☐ Yes ☐ No
Date Package Delivered:
Date Work Completed: 20131217

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FEB 27 2014
Received

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Read the **plan to safely reopen Ontario (https://covid-19.ontario.ca/plan-safely-reopen-ontario-and-manage-covid-19-long-term)** and continue to follow the **restrictions and public health measures (https://covid-19.ontario.ca/public-health-measures)**.

Map: Well records

This map allows you to search and view well record information from reported wells in Ontario.

Full dataset is available in the Open Data catalogue (https://data.ontario.ca/dataset/well-records).

Go Back to Map ()

Well ID

Well ID Number: 7329148
Well Audit Number: *Z288939*
Well Tag Number: *A249386*
This table contains information from the original well record and any subsequent updates.

Well Location

Address of Well Location	25347 Stoney Batter Rd.
Township	GEORGINA TOWNSHIP (GEORGINA)
Lot	013
Concession	CON 05
County/District/Municipality	YORK
City/Town/Village	PEFFERLAW
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 637920.00 Northing: 4906830.00
Municipal Plan and Sublot Number	
Other	

Overburden and Bedrock Materials Interval

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To
BLCK	LOAM			0 m	.3 m
BRWN	CLAY	STNS		.3 m	5.4 m
GREY	CLAY	STNS	HARD	5.4 m	9.1 m
GREY	CLAY		SOFT	9.1 m	15.5 m
GREY	LMSN	CLAY	HARD	15.5 m	21.9 m

Annular Space/Abandonment Sealing Record

Depth From	Depth To	Type of Sealant Used (Material and Type)	Volume Placed
0 m	6 m	BENTONITE SLURRY	
6 m	15.8 m	BENTONITE SLURRY	

Method of Construction & Well Use

Method of Construction	Well Use
Rotary (Convent.)	Livestock
	Domestic

Status of Well

Water Supply

Construction Record - Casing

Inside Diameter	Open Hole or material	Depth From	Depth To
15.4 cm	STEEL	-.6 m	15.8 m

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth To

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 7108

Results of Well Yield Testing

After test of well yield, water was	CLEAR
If pumping discontinued, give reason	
Pump intake set at	15 m
Pumping Rate	32 LPM
Duration of Pumping	1 h:30 m
Final water level	9.35 m
If flowing give rate	
Recommended pump depth	15 m
Recommended pump rate	32 LPM
Well Production	
Disinfected?	Y

Draw Down & Recovery

Draw Down Time(min)	Draw Down Water level	Recovery Time(min)	Recovery Water level
SWL	2.39 m		
1	3.75 m	1	7.81 m
2	4.67 m	2	6.56 m
3	5.36 m	3	5.5 m
4	5.9 m	4	4.71 m
5	6.34 m	5	4.08 m
10	7.51 m	10	2.81 m
15	8.27 m	15	2.65 m
20	8.63 m	20	2.6 m
25	8.83 m	25	2.56 m
30	8.96 m	30	2.53 m
40	9.12 m	40	2.49 m
45		45	
50	9.22 m	50	2.46 m
60	9.25 m	60	2.43 m

Water Details

Water Found at Depth	Kind
19 m	Fresh

Hole Diameter

Depth From	Depth To	Diameter
0 m	6 m	25.4 cm
6 m	15.8 m	22.86 cm
15.8 m	21.9 m	15.36 cm

Audit Number: Z288939

Date Well Completed: January 06, 2019

Date Well Record Received by MOE: February 26, 2019

Updated: October 18, 2021
Published: March 20, 2014

Related

How to use a Ministry of the Environment map (/page/how-use-ministry-environment-map#wells)

Technical documentation: Metadata record (https://data.ontario.ca/dataset/well-records/resource/3031344e-e3f2-48d5-888c-c1deadfd2f77)

Ontario

Ministry of the Environment
and Climate Change

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. *(Place Sticker and/or Print Below)*
A257065

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

[redacted]

Address of Well Location (Street Number/Name): 7261 Old Homestead Rd.
Township: Georgina
Lot: 9
Concession: 4
County/District/Municipality: York
City/Town/Village: Pefferlaw
Province: **Ontario**
Postal Code: L0E 1N0
UTM Coordinates: NAD 83 Zone 17 Easting 636229 Northing 4905084
Municipal Plan and Sublot Number:
Other:

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Brown	Clay	Stones	Soft	0	14
Grey	Clay	Stones	Hard	14	79
Grey	Gravel	Clay	Cemented	79	86
Grey	Limestone		Hard Fractured	86	98

Annular Space

Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used *(Material and Type)*	Volume Placed *(m³/ft³)*
0	20	Benseal	

Method of Construction

☐ Cable Tool
☑ Rotary (Conventional)
☐ Rotary (Reverse)
☐ Boring
☐ Air percussion
☐ Other, *specify*
☐ Diamond
☐ Jetting
☐ Driving
☐ Digging

Well Use

☐ Public
☑ Domestic
☐ Livestock
☐ Irrigation
☐ Industrial
☐ Other, *specify*
☐ Commercial
☐ Municipal
☐ Test Hole
☐ Cooling & Air Conditioning
☐ Not used
☐ Dewatering
☐ Monitoring

Construction Record - Casing

Inside Diameter *(cm/in)*	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness *(cm/in)*	Depth (m/ft) From	Depth (m/ft) To
6 1/4	Steel	188	+2	86
6 1/8	Open Hole		86	98

Status of Well

☑ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, *specify*
☐ Other, *specify*

Construction Record - Screen

Outside Diameter *(cm/in)*	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To

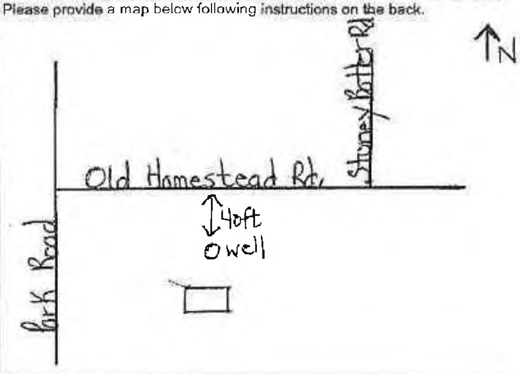
Results of Well Yield Testing

After test of well yield, water was:
☑ Clear and sand free
☐ Other, *specify*
If pumping discontinued, give reason:
Pump intake set at *(m/ft)*: 85
Pumping rate *(l/min / GPM)*: 6
Duration of pumping: 1 hrs + ____ min
Final water level end of pumping *(m/ft)*: 85
If flowing give rate *(l/min / GPM)*:
Recommended pump depth *(m/ft)*: 87
Recommended pump rate *(l/min / GPM)*: 5
Well production *(l/min / GPM)*: 6
Disinfected? ☑ Yes ☐ No

Draw Down Time *(min)*	Draw Down Water Level *(m/ft)*	Recovery Time *(min)*	Recovery Water Level *(m/ft)*
Static Level	30		
1		1	
2		2	
3	Air	3	
4	Lift	4	
5		5	
10		10	
15		15	
20		20	
25		25	
30	85	30	
40	85	40	
50	85	50	
60	85	60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Water Details

Water found at Depth	Kind of Water
98 (m/ft) ☐ Gas	☑ Fresh ☐ Untested ☐ Other, *specify*
(m/ft) ☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*
(m/ft) ☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter *(cm/in)*
0	20	10
+2	86	6 5/8
86	98	6 1/8

Well Contractor and Well Technician Information

Business Name of Well Contractor: Roger Boadway Ent. Ltd.
Well Contractor's Licence No.: 1 1 4 1 1 3
Business Address (Street Number/Name): P.O. Box 397 Sutton W
Municipality: York
Province: ON
Postal Code: L0E 1R0
Business E-mail Address: boadwaywells@bellnet.ca
Bus. Telephone No. *(inc. area code)*: 9057225362
Name of Well Technician (Last Name, First Name): Boadway, Grant
Well Technician's Licence No.: 10029
Signature of Technician and/or Contractor: <Original signed by>
Date Submitted: Y Y Y Y M M D D

Well owner's information package delivered: ☑ Yes ☐ No
Date Package Delivered: 2019 01 08
Date Work Completed: 2018 12 10

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Received MAR 11 2019

0506E (2014/11)

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APPENDIX D

Preliminary Geotechnical Investigation

Peto MacCallum Ltd.
CONSULTING ENGINEERS

PRELIMINARY GEOTECHNICAL INVESTIGATION PROPOSED SUTTON AERODROME DEVELOPMENT SUTTON, ONTARIO

for

AVIA NG INC.

PETO MacCALLUM LTD.
19 CHURCHILL DRIVE
BARRIE, ONTARIO
L4N 8Z5
PHONE: (705) 734-3900
FAX: (705) 734-9911
EMAIL: barrie@petomaccallum.com

Distribution:
1 cc: Avia NG Inc. (email only)
1 cc: PML Barrie

PML Ref.: 21BF043
Report: 1
November 2021

Peto MacCallum Ltd.
CONSULTING ENGINEERS

November 11, 2021

PML Ref.: 21BF043
Report: 1

Mr. Bernhard Schropp, P.Eng.
Avia NG Inc.
23 Albert Street North
Southampton, Ontario
N0H 2L0

Dear Mr. Schropp

Preliminary Geotechnical Investigation
Proposed Sutton Aerodrome Development
Sutton, Ontario

Peto MacCallum Ltd (PML) is pleased to present the results of the preliminary geotechnical investigation recently completed at the above noted project site. Authorization for the work was provided by Mr. B. Schropp in an email dated August 24, 2021.

An aerodrome development is proposed for an existing rural property on Old Homestead Road, near Sutton, in the Town of Georgina. The concept is still being developed however, currently two runways are proposed up to 991 m, including taxiways and support buildings. Both airside and groundside pavements are also proposed.

A preliminary geotechnical investigation has been requested to assess the subsurface conditions at the site, and based on this information, provide comments and preliminary geotechnical engineering recommendations for pavements, along with recommendations for building foundations and parameters for septic tile bed design.

The comments and recommendations provided in this report are based on the subsurface conditions as revealed in a limited number of boreholes. Development plans for the site have not been finalized. Accordingly, the comments and recommendations provided in this report are general in nature, and suitable only for preliminary planning purposes. When final design details are available, they should be submitted to PML for review, and may require additional analyses and supplementary investigation in order to finalize the geotechnical recommendations.

This report is subject to the Statement of Limitations that is included in Appendix A and must be read in conjunction with the report.

Geoenvironmental services (observations, recording, chemical testing or assessment of the environmental conditions of the soil and ground water) were not within the terms of reference for this assignment, and no work has been carried out in this regard. If excess excavated soils requiring transportation off-site are generated, a program of sampling and chemical testing will be needed to determine the chemical properties of the soil to evaluate appropriate receiving site options, in accordance with O.Reg. 406/19.

INVESTIGATION PROCEDURES

The field work for the assignment was carried out on October 5, 8 and 12, 2021 and comprised a total of 20 boreholes. Boreholes 1 to 4 were drilled adjacent to proposed buildings and advanced to 4.7 to 5.0 m depth and Boreholes 5 to 20 were advanced to 3.5 m across the remaining areas of the site. The boreholes were drilled at the locations shown on the appended Borehole Location Plan, Drawing 1.

Borehole locations were laid out in the field by PML based on a plan provided by the Client. Co-ordination for clearances of underground utilities was provided by PML. The boreholes were drilled cognizant of the underground utilities.

The ground surface elevation at the borehole locations was obtained with a Sokkia SHC5000 GPS System equipped with a GCX3 (network RTK rover) Global Navigation Satellite System (GNSS) Receiver. Vertical and horizontal accuracy of this unit are 0.1 m and 0.5 m, respectively. All elevations in this report are geodetic and expressed in metres.

The boreholes were advanced with a D-50 track mounted drill rig equipped with continuous flight solid/hollow stem augers, supplied and operated by a specialist drilling contractor. All of the boreholes were backfilled in accordance with O.Reg. 903.

Representative samples of the overburden were recovered at frequent depth intervals for identification purposes using a conventional 51 mm OD split spoon sampler. The sampler excludes particles larger than 38 mm. Standard penetration tests were carried out simultaneously with the sampling operations to assess the strength characteristics of the subsoil. The ground water conditions in the boreholes were assessed during drilling by visual examination of the soil samples, the sampler, and drill rods as the samples were retrieved, and measurement of the water level in the open boreholes, if any.

The field work was supervised throughout by a member of PML's engineering staff who directed the drilling and sampling process, prepared the stratigraphic logs, monitored ground water conditions and cared for the recovered samples.

All samples secured in the field were returned to our laboratory for detailed visual examination as well as natural moisture content determination tests. The laboratory testing programme included five particle size distribution analyses on subgrade soils and two Atterberg limits tests. One Modified Proctor moisture density relationship and one California Bearing Ratio (CBR) test were also carried out on a bulk sample of the subgrade soil. Results are presented on Figures 1 to 6 and Table I, appended.

SUMMARIZED SUBSURFACE CONDITIONS

Reference is made to the appended Log of Borehole sheets for details of the subsurface conditions, including topsoil thicknesses, soil classifications, inferred stratigraphy and thicknesses, Standard Penetration N values (N values, blows per 300 mm of penetration of the split spoon sampler), ground water observations, and the results of laboratory moisture content determinations and Atterberg Limits Tests.

Due to the soil sampling procedures and limited sample size, depth demarcations on the borehole logs must be viewed as "transitional" zones between layers and cannot be construed as exact geologic boundaries between layers. PML should be retained to assist in defining the geologic boundaries in the field during construction, if required.

Soil

Topsoil was at the surface of all boreholes and was 100 to 200 mm thick, locally 70 mm thick.

A sand to silty sand unit was underlying the topsoil in Boreholes 4, 8 to 12 and 16 to 18, extending to 0.7 to 2.4 m depth (elevation 231.4 to 239.05). The unit varied from sand trace silt and trace gravel to a silty sand with some gravel and trace clay. A sample of the silty sand was submitted for laboratory testing and the results are provided on Figure 1, appended. The soil was very loose to dense with N values of 3 to 46 and moist to wet with moisture contents of 4 to 24%.

A thin layer of sandy silt was below the topsoil in Boreholes 5, 14, 15 and 20, being penetrated at 0.7 to 1.4 m depth (elevation 234.0 to 242.45). The layer comprised sandy silt with trace to some gravel and trace clay. The soil was very loose to loose (N values of 3 to 6), locally compact with an N value of 12. The material was moist to wet with moisture contents of 10 to 26%.

Local layers of clayey silt were noted in Boreholes 3, 14 and 17. In Borehole 3 the material was present below the topsoil to 1.4 m depth (elevation 234.2). In Borehole 14 the layer occurred from 1.4 to 2.4 m depth (elevation 233.0 to 234.0), and in Borehole 17 the unit was below the sand and extended to the 3.5 m depth of exploration. The layers contained trace sand and gravel. N values were 5 to 14 (firm to stiff). Moisture contents were 5 to 22%.

A silty clay unit was present in Boreholes 7 and 12. In Borehole 7 the unit occurred from 1.4 to 3.1 m depth (elevation 235.0 to 236.7) and in Borehole 12 from 0.7 to 2.1 m depth (elevation 236.4 to 237.8). The unit contained some sand and trace gravel. A sample of the material was submitted for grain size analysis and the results are provided on Figure 2, attached. Atterberg limit tests are provided on Figure 3, attached. The soil was firm to stiff with N values of 7 to 12. Moisture contents were 10 to 25%.

A sand and silt deposit was revealed in Boreholes 9 and 11, below the sand/silty sand. In Borehole 9 the deposit extended to the 3.5 m depth of exploration. In Borehole 11 the unit was penetrated at 2.4 m depth (elevation 233.7). A sample of the deposit was submitted for laboratory testing and the results are presented on Figure 4, attached. The N values were 2 to 5 in Borehole 11 (very loose to loose) and 19 to greater than 50 in Borehole 9 (compact to very dense). Moisture contents were 10 to 21% (moist to wet).

A major silt till deposit was below the upper soil layers in all boreholes, except Boreholes 9 and 17. The deposit extended to the 3.5 to 5.0 m depth of exploration. The till typically comprised a sandy silt, some clay and trace to some gravel, varying to a clayey silt, trace to some gravel. Cobbles and boulders were noted during drilling. Two samples of the material were submitted for grain size analysis and the results are provided in Figure 5, attached. Atterberg Limits test results are provided on Figure 6, appended. A large bulk sample was also submitted for Modified Proctor moisture density relationship (2.215 t/m³ at 7.5% moisture content) and California Bearing Ratio (CBR) tests (soaked and unsoaked values of 10) with results are summarized on Table I. N values in the till ranged from 4 to greater than 50 (loose to very dense). Moisture contents ranged from 5 to 23%, typically moist with wet seams noted.

Ground Water

The first ground water strike (during drilling) and the water level/ wet cave measured in the boreholes upon completion are summarized below.

BOREHOLE	FIRST GROUND WATER STRIKE (DEPTH (m) / ELEVATION)	WATER LEVEL UPON COMPLETION (DEPTH (m) / ELEVATION)
1	No Water	No Water
2	No Water	No Water
3	1.8 / 233.8	4.6 / 231.0
4	0.9 / 235.3	4.7 / 231.5
5	No Water	No Water
6	2.4 / 236.4	3.4 / 235.4
7	No Water	No Water
8	1.8 / 237.9	0.6 / 239.1
9	3.3 / 236.3	3.3 / 236.3
10	1.8 / 231.9	3.3 / 230.4
11	0.9 / 235.2	3.3 / 232.8
12	No Water	No Water

BOREHOLE	FIRST GROUND WATER STRIKE (DEPTH (m) / ELEVATION)	WATER LEVEL UPON COMPLETION (DEPTH (m) / ELEVATION)
13	No Water	No Water
14	1.8 / 233.6	3.4 / 232.0
15	3.4 / 234.6	3.3 / 234.7
16	1.8 / 232.6	1.8 / 232.6
17	1.3 / 232.2	1.3 / 232.2
18	No Water	No Water
19	2.4 / 235.7	3.3 / 234.8
20	No Water	No Water

The ground water levels noted in the boreholes appear to reflect local perched water in the soil above the till, and local wet seams in the till.

Ground water levels are subject to fluctuations due to precipitation and seasonal variation.

GEOTECHNICAL ENGINEERING CONSIDERATIONS

Foundations

A main terminal building and a skydiving hanger building are currently proposed. It is assumed that the buildings will be slab-on-grade, although it is understood that the floor slab elevations were not established at the time of this report.

Boreholes 1 and 2 were drilled in the area of the skydiving hanger building and Boreholes 3 and 4 were advanced in the main terminal building area. The following table provides the bearing resistance values on a borehole by borehole basis for the top 2 to 3 m of stratigraphy.

BOREHOLE	MINIMUM DEPTH (m) / ELEVATION	ANTICIPATED SUBGRADE SOIL TYPE	GEOTECHNICAL BEARING RESISTANCE AT SLS (kPa)	FACTORED BEARING RESISTANCE AT ULS (kPa)
1	0.7 / 239.1	Silt Till	75	110
	1.5 / 238.3	Silt Till	150	225
	2.2 / 237.6	Silt Till	250	375
2	0.7 / 239.1	Silt Till	200	300
3	0.7 / 234.9	Clayey Silt / Silt Till	150	225
	2.2 / 233.4	Silt Till	250	375
4	0.7 / 235.5	Sand	150	225
	1.5 / 234.7	Silt Till	200	300

SLS – Serviceability Limit State
ULS – Ultimate Limit State

The geotechnical bearing resistance at SLS is based on 25 mm or settlement in the bearing stratum with differential settlement not exceeding 75% of the value.

Footings subject to frost action should be provided with a minimum 1.2 m of earth cover or equivalent insulation.

Prior to placement of structural concrete, all founding surfaces must be examined by PML to check the design bearing capacity is available, and/or to reassess the available soil capacity.

Seismic Design

Based on the soil profile revealed in the boreholes (N Values), Site Classification D is applicable for Seismic Site Response as set out in Table 4.1.8.4.A of the Ontario Building Code (2012). Based on the type and relative density of the soil cover at the site, the soils have a low potential for liquefaction.

Site Grading and Engineered Fill

Finalized grades were not provided at the time of this report, however it is assumed that some cut and fill will be required based on the ground surface elevation at the borehole locations.

The existing topsoil and typically the upper very loose to loose native soil in the upper 0.7 m of the site are unsuitable to support footings and floor slab-on-grade or pavements due to potential for excessive gross and differential settlement. In this regard, it is recommended that existing topsoil and upper unsuitable native soil be removed and replaced. Where grades are to be raised under structures (building, paved areas and site servicing) the fill should be constructed as engineered fill.

In general, engineered fill construction requires, removal of unsuitable soil, compaction/ proofrolling of exposed soil, placement and compaction of suitable material in 200 mm thick loose lifts, compacted to minimum 100% Standard Proctor maximum dry density (SPMDD) in building areas and 95% SPMDD in groundside pavement areas. Airside pavement subgrade preparation is discussed later in the report.

More detailed recommendations can be provided when site grading plans are developed.

Floor Slab-on-Grade

Floor slab-on-grade construction is considered feasible on native soil or engineered fill, constructed as described earlier in the report.

A minimum 200 mm thick base layer of crushed stone (nominal 20 mm size) is recommended directly beneath the floor slab. Where a vapour sensitive floor finish is to be used then the use of polyethylene sheeting or similar means should be incorporation as a vapour barrier. Underfloor drains are not considered necessary, provided the floor is at least 150 mm above exterior grade.

Exterior grades should be established to promote surface drainage away from the building.

Excavation and Ground Water Control

Excavation for the building foundations and pavements is expected to extend as much as about 1.5 to 2.0 m depth. Excavation will encounter topsoil, and sand/silty sand, sandy silt, clayey silt, silty clay, sand and silt and the upper portion of the till. Harder digging and cobbles and boulders should be expected in the till deposit.

Subject to ground water control, the site soils should be considered as Type 3 soil requiring excavation sidewalls to be constructed at no steeper than one horizontal to one vertical (1H:1V) from the base of the excavation in accordance with the Occupational Health and Safety Act.

In general, perched water was encountered at the site, and it is anticipated that seepage from the perched water can be handled by conventional sump pumping, for excavation to about 2.0 m depth.

Excavation during the dry summer months is also recommended to aid in reducing ground water control requirements.

Water taking in Ontario is governed by the Ontario Water Resources Act (OWRA) and the Water Taking and Transfer Regulation O.Reg. 387/040, Section 34 of the OWRA requires any one taking more than 50,000 L/d to obtain a Permit-to-Take-Water (PTTW). This requirement applies to all withdrawals, whether for consumption, temporary construction dewatering or permanent drainage improvements. Projects assessed to be taking more than 50,000 L/d but less than 400,000 L/d of ground water can obtain a permit/permission online via the Environmental Activity and Sector Registry (EASR) system. If it is assessed that more than 400,000 L/d is required then a Category 3 PTTW will be required.

Based on the discussion above, a PTTW or registry on the EASR system is not anticipated. However, this should be reviewed when grading and servicing are established to review ground water/control requirements.

Preliminary Septic System Parameters

Septic systems will be required for both the skydiving building and the main terminal building however, design details are not available at this time. Preliminary values for a percolation rate T–time for septic tile bed design have been requested.

Boreholes 1 and 2 were drilled at the skydiving hanger and revealed silt till soil below the topsoil. Based on the grain size curves of the till soil in Figure 5 an estimated coefficient of permeability, K, of the tested site soils is less than 1 x 10^{-6} cm/sec with a corresponding T-time greater than 50 min/cm.

Boreholes 3 and 4 were drilled at the main terminal building and revealed either clayey silt or wet sand over the till deposit. An estimated coefficient of permeability, K, of the clayey silt is less than 1 x 10^{-6} cm/sec with a corresponding T-time greater than 50 min/cm. The sand may have an estimated coefficient of permeability, K, of about 1 x 10^{-4} cm/sec with a corresponding T-time of 12 min/cm, however the ground water table lies at about 0.9 m depth.

The K value derived from the particle size distribution curve does not take into consideration site specific details such as compaction, soil structure, organic content and/or the degree of saturation.

The site soils are generally unacceptable for conventional inground septic systems and this is complicated further by the typically high perched ground water table. In general, the requirement for raised septic beds is likely.

Pavement Construction and Design

Airside Pavements

Two runways are proposed for the development, Runway 04-22 and Runway 08-26. PML understands that the airside pavements for the aerodrome will support a mix of aircraft. The design aircraft will be the Cessna Stationair, the Cessna Citation Jet, the Cessna Caravan, Pilatus PC12 and future consideration for the ATR 42. The Air Craft Load Rating (ALR) for these planes will be less than 5.0.

The pavement design methods used in our analysis are in general accordance with Transport Canada guidelines as outlined in ASG-19 *Manual of Pavement Structural Design*.

The CBR test conducted on the anticipated silt till revealed a soaked CBR value of 10, which correlates to a Spring Reduced Subgrade Bearing Strength of about 80 kN.

It is noted that since the subgrade soil for the pavements generally comprises frost susceptible silty soils, design procedures recommend the total pavement thickness be based on frost protection requirements to minimize differential frost heaving. For an air freezing Index of about 700 Degree Days (C) for the location, the total pavement structure depth required would be 730 mm.

Prior to pavement construction, all surficial topsoil should be removed and the exposed subgrade must be allowed to dry and be proofrolled with a heavy vibrating compactor under the full-time supervision of qualified geotechnical personnel. The subgrade preparations should occur in dry weather. Any soft, organic or otherwise deleterious soils encountered during the proofrolling process should be subexcavated to the level of competent soil. Any subgrade fill requirement should be constructed as engineered fill (placement in 200 mm thick lifts) and compacted to 95% MPMDD, with the upper 150 mm of the pavement subgrade compacted to 98% MPMDD.

The airside pavement embankments should extend at least 5 m past the asphalt edge, and down to the native subgrade level at a slope of 45 degrees to the horizontal. Beyond the 5 m embankment the site should be level graded with on-site soil placed as engineered fill compacted to minimum 90% MPMDD.

Once the preparation of the subgrade is complete, the following pavement structure should be placed. As noted above, frost requirements will govern the design and will achieve a Pavement Load Rating (PLR) of 9, exceeding design requirement of 5, with a tire pressure restriction of 1.0 MPa:

LAYER	THICKNESS (mm)
Asphalt Surface HL 4	40
Asphalt Binder HL 4	40
Granular A Base	230
Granular B Subbase	420
Total	730

The above pavement designs consider that construction will be carried out on a stable subgrade as determined by proofrolling operations inspected by geotechnical personnel. If the subgrade is wet or unstable during construction activities, additional aggregate subbase material or geogrid might be required. The need for additional items will be best determined during construction.

The Granular A base course should be placed in maximum 150 mm lifts and be compacted to a minimum 100% Modified Proctor Maximum Dry Density (MPMDD). The Granular A base should meet OPS specifications.

The granular subbase course should meet OPS specifications for Granular B and should be placed in maximum 150 mm thick lifts and be compacted to a minimum of 98% MPMDD.

Asphalt courses should comprise HL 4 and be modified to contain a minimum 5.5% asphalt cement with a PGAC of 64-28. The asphalt should be placed in maximum 50 mm loose lifts and compacted to at least 97% Marshal (75 blows). A tack coat should be placed between all asphalt lifts.

The pavement recommendations provided above consider that construction will be carried out during the drier time of the year and that the base is stable and uniform, as determined by proofrolling inspected by PML personnel.

Frequent inspection, sampling and testing by PML personnel is recommended to approve the granular compaction and the design properties and placement of the asphalt.

Subdrains should be constructed in new airside pavement areas. Subdrains should comprise 150 mm diameter perforated pipe surrounded with a filter sleeve and bedded and covered with concrete sand up top the underside of the granular subbase. The pipe should be set at least 0.3 m below the pavement subgrade and set at sufficient slope to flow to frost free discharge points.

All construction materials proposed for this airport project should conform to Transport Canada Specifications. Inspection and testing of all pavement construction operations and subgrade preparation should be carried out on a continuous basis by experienced specialist geotechnical/materials quality assurance testing staff to ensure that appropriate materials, procedures and equipment are used to construct the work.

Groundside Pavements

Similar to the airside pavements, grading has not been established and it is assumed the subgrade will comprise near surface soils at the site. The following designs must be reviewed when the subgrade soil has been confirmed.

MATERIAL	**PARKING LOTS (MEDIUM DUTY) (mm)**	**PRIMARY ROADS (HEAVY DUTY) (mm)**
Asphalt (two lifts)	80	110
Granular A Base Course	150	150
Granular B Subbase Course	350	500

It is recommended that following rough grading to the subgrade level, subgrade preparation should include proof-rolling and compacting the exposed subgrade with a heavy compactor to 95% SPMDD under geotechnical review. Any unstable zones identified during this process should be sub-excavated and replaced with compacted select site material, subject to geotechnical field review. Any grade raises required should be constructed as engineered fill as described earlier in the report.

Imported material for the granular base and subbase should conform to OPSS gradation specifications for Granular A and Granular B, and should be compacted to 100% SPMDD. Asphalt should be compacted in accordance with OPSS 310.

The pavement design considers the construction will be carried out during the dry time of the year and the subgrade is stable and not heaving under construction traffic. If wet or unstable subgrade conditions are encountered, addition sub-excavation, additional granular subbase, the use of Granular B Type II and/or the use of geogrid may be required, subject to geotechnical review during construction.

For the pavement to function properly, it is essential that provisions be made for water to drain out of and not collect in the base material. The incorporation of side ditches or subdrains should be considered in conjunction with crowning of the final subgrade to promote drainage towards the pavement edge. Subdrains should be installed similar to airside pavements. Maintenance hole/catchbasins should be backfilled with free draining Granular B. The above measures will help drain the pavement structure as well as alleviate the problems of differential frost movement between the catchbasins and pavement.

Geotechnical Review and Construction Inspection and Testing

It is recommended that the final design drawings be submitted to PML for geotechnical review for compatibility with site conditions and recommendations of this report.

The comments and recommendations provided in the report are based on the information revealed in the previous boreholes. Conditions away from and between boreholes may vary, considering previous activity at the site. Geotechnical review during construction should be on going to confirm the subsurface conditions are substantially similar to those encountered in the previous boreholes, which may otherwise require modification to the original recommendations.

CLOSURE

We trust this report is complete within our terms of reference, and the information presented is sufficient for your present purposes. If you have any questions, or when we may be of further assistance, please do not hesitate to call our office.

Sincerely

Peto MacCallum Ltd.

<Original signed by>

LICENSED PROFESSIONAL ENGINEER
G. R. WHITE
Nov. 11/2021
PROVINCE OF ONTARIO

Geoffrey R. White, P.Eng.
Director
Manager, Geotechnical Services

<Original signed by>

LICENSED PROFESSIONAL ENGINEER
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Nov 11/21
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Senior Consultant

GRW/GM:tc

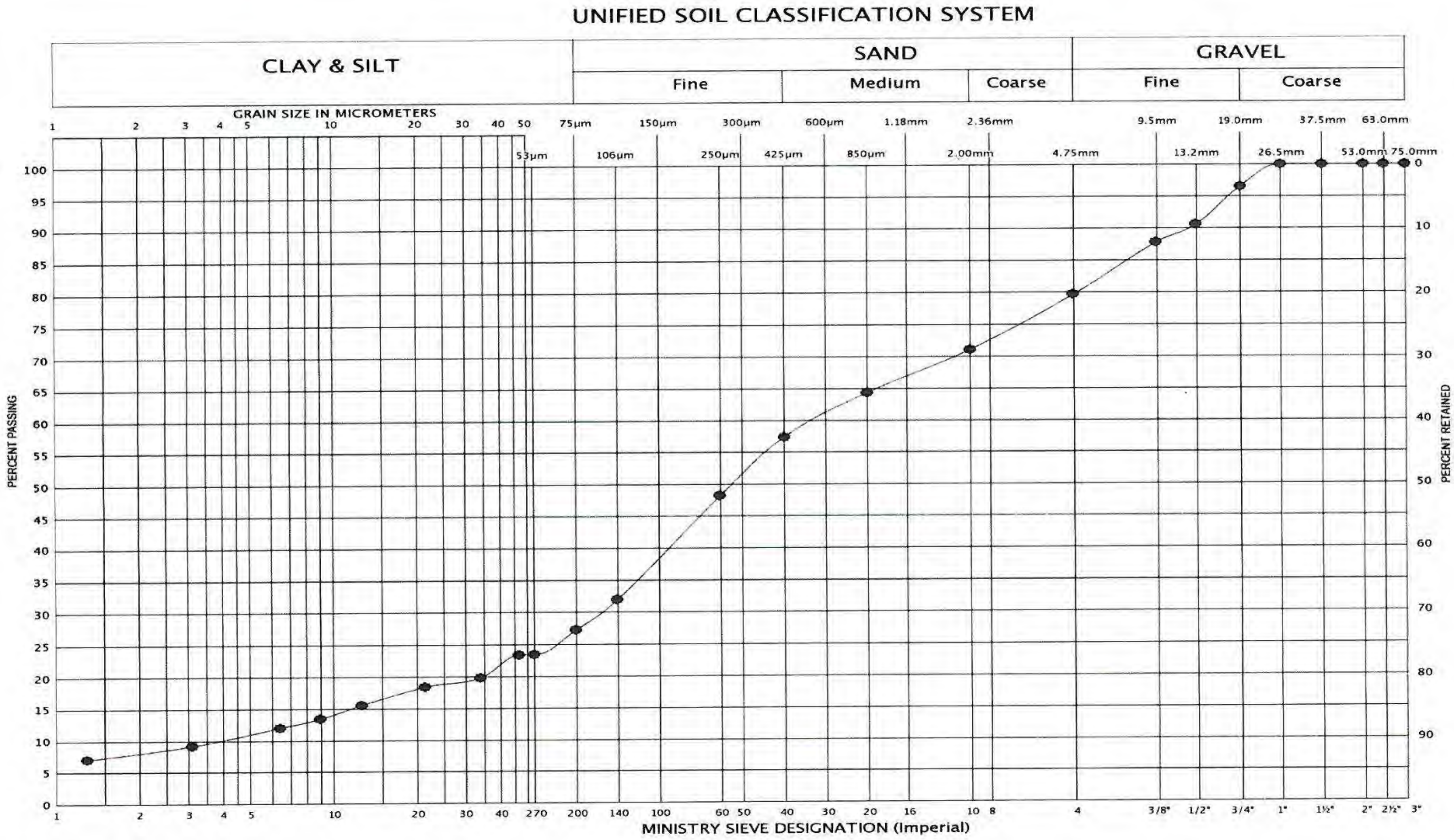
Enclosure(s):
Table I – Compaction and CBR Test Results
Figures 1 to 6 – Grain Size Analysis and Atterberg Limits Tests
List of Abbreviations
Log of Boreholes Nos. 1 to 20
Drawing No. 1 – Borehole Location Plan
Appendix A – Statement of Limitations

TABLE I

COMPACTION AND CBR TEST RESULTS

SOIL DESCRIPTION	SAMPLE NO.	MODIFIED PROCTOR COMPACTION		CALIFORNIA BEARING RATIO						
				UNSOAKED				SOAKED CONDITION		
		MAXIMUM DRY DENSITY (t/m^3)	OPTIMUM WATER CONTENT (%)	DRY DENSITY (t/m^3)	PERCENT COMPACTION	WATER CONTENT (%)	CBR[1]	WATER CONTENT (%)	CBR[1]	SWELL (%)
Silt Till	Bulk sample	2.216	7.5	2.150	99	7.6	10	8.7	10	0

NOTE: 1. CBR Values recorded at 0.1" (2.5 mm) penetration



LEGEND	BH	8
	SAMPLE	2
	SYMBOL	●

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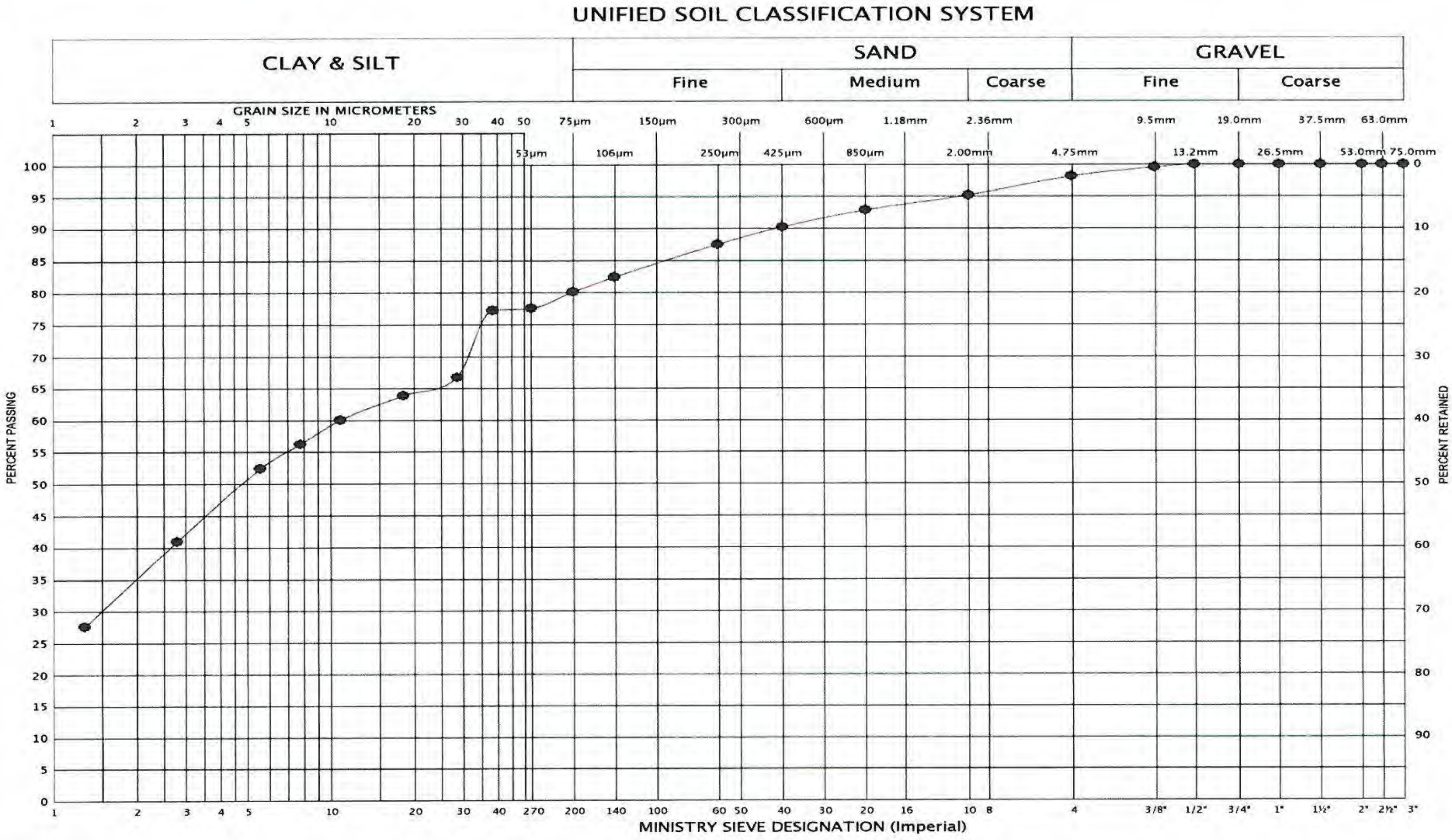
GRAIN SIZE DISTRIBUTION

SILTY SAND, Some gravel, Trace clay

FIG No.: 1

Project No.: 21BF043



LEGEND	**BH**	12
	SAMPLE	3
	SYMBOL	●

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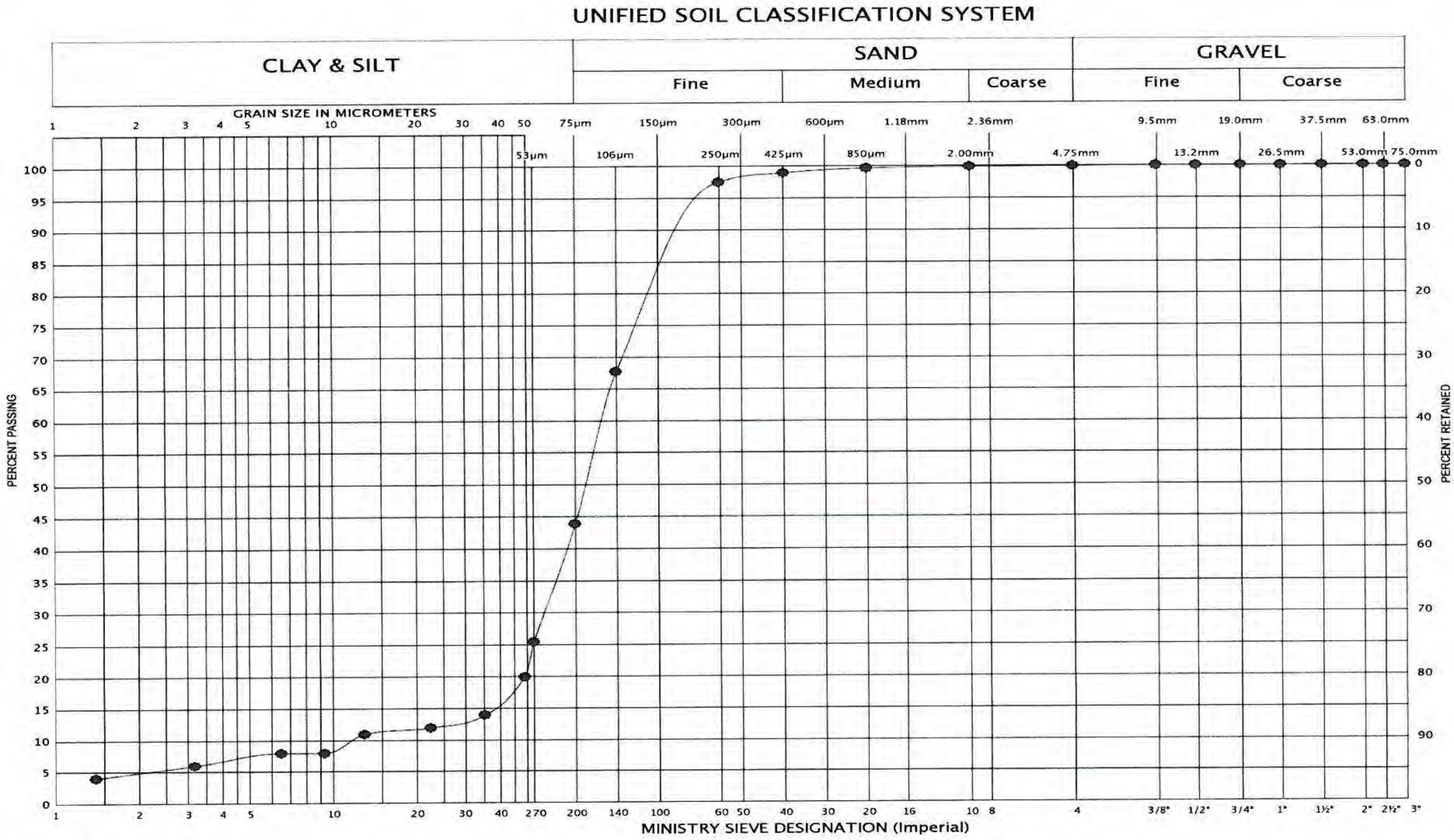
GRAIN SIZE DISTRIBUTION

SILTY CLAY, Some Sand, Trace Gravel

FIG No.: 2

Project No.: 21BF043



LEGEND		
	BH	11
	SAMPLE	2
	SYMBOL	●

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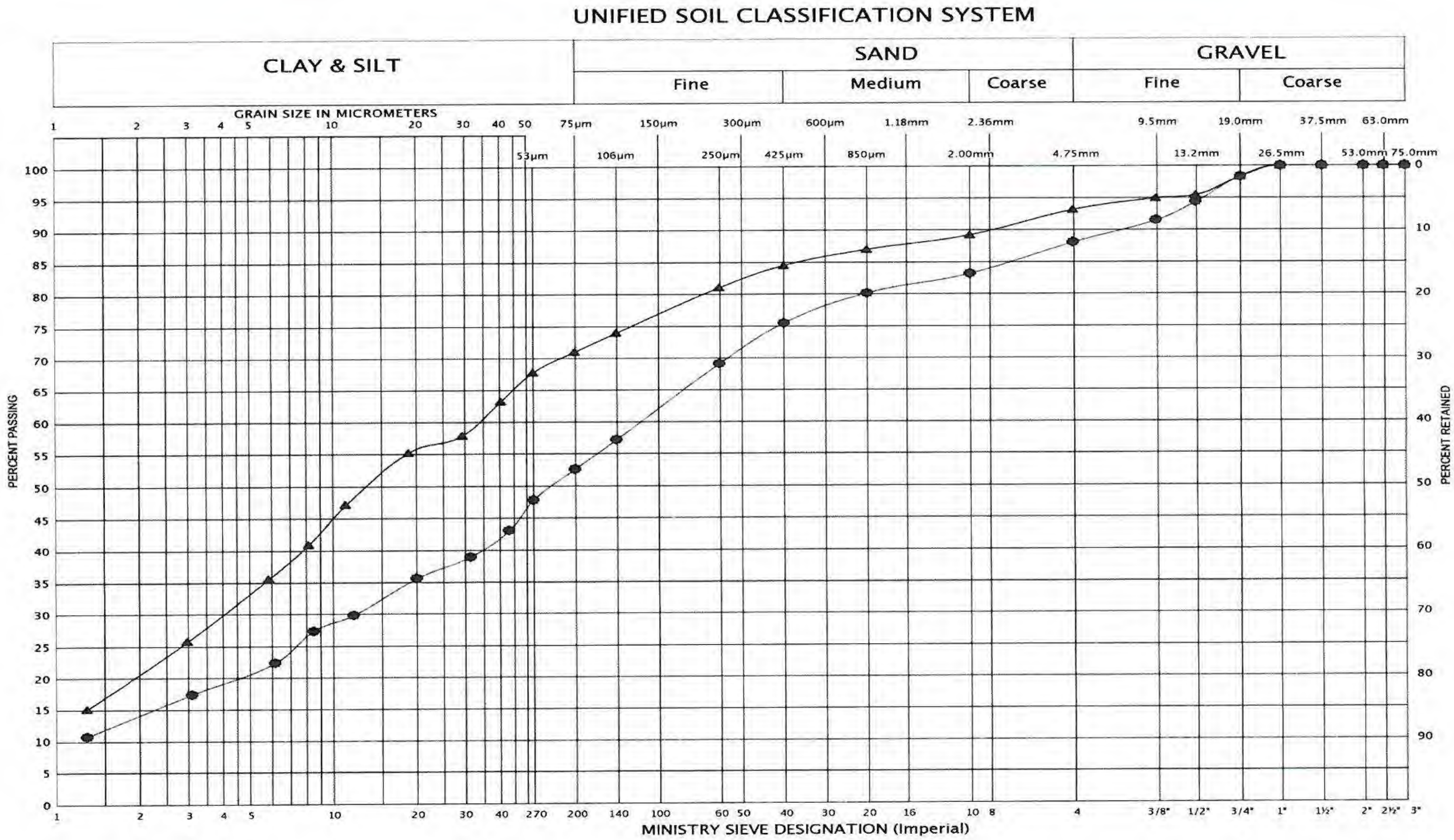
GRAIN SIZE DISTRIBUTION

SAND AND SILT, Trace Clay, Trace Gravel

FIG No.: 4

Project No.: 21BF043



LEGEND	BH	1	5
	SAMPLE	3	3
	SYMBOL	●	▲

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GRAIN SIZE DISTRIBUTION

SILT TILL; Sandy Silt, Some Clay, Trace to Some Gravel

FIG No.: 5

Project No.: 21BF043

LIST OF ABBREVIATIONS

PENETRATION RESISTANCE

Standard Penetration Resistance N: - The number of blows required to advance a standard split spoon sampler 0.3 m into the subsoil. Driven by means of a 63.5 kg hammer falling freely a distance of 0.76 m.

Dynamic Penetration Resistance: - The number of blows required to advance a 51 mm, 60 degree cone, fitted to the end of drill rods, 0.3 m into the subsoil. The driving energy being 475 J per blow.

DESCRIPTION OF SOIL

The consistency of cohesive soils and the relative density or denseness of cohesionless soils are described in the following terms:

CONSISTENCY	N (blows/0.3 m)	c (kPa)	DENSENESS	N (blows/0.3 m)
Very Soft	0 - 2	0 - 12	Very Loose	0 - 4
Soft	2 - 4	12 - 25	Loose	4 - 10
Firm	4 - 8	25 - 50	Compact	10 - 30
Stiff	8 - 15	50 - 100	Dense	30 - 50
Very Stiff	15 - 30	100 - 200	Very Dense	> 50
Hard	> 30	> 200		

WTLL	Wetter Than Liquid Limit
WTPL	Wetter Than Plastic Limit
APL	About Plastic Limit
DTPL	Drier Than Plastic Limit

TYPE OF SAMPLE

SS	Split Spoon	ST	Slotted Tube Sample
WS	Washed Sample	TW	Thinwall Open
SB	Scraper Bucket Sample	TP	Thinwall Piston
AS	Auger Sample	OS	Oesterberg Sample
CS	Chunk Sample	FS	Foil Sample
GS	Grab Sample	RC	Rock Core

PH	Sample Advanced Hydraulically
PM	Sample Advanced Manually

SOIL TESTS

Qu	Unconfined Compression	LV	Laboratory Vane
Q	Undrained Triaxial	FV	Field Vane
Qcu	Consolidated Undrained Triaxial	C	Consolidation
Qd	Drained Triaxial		

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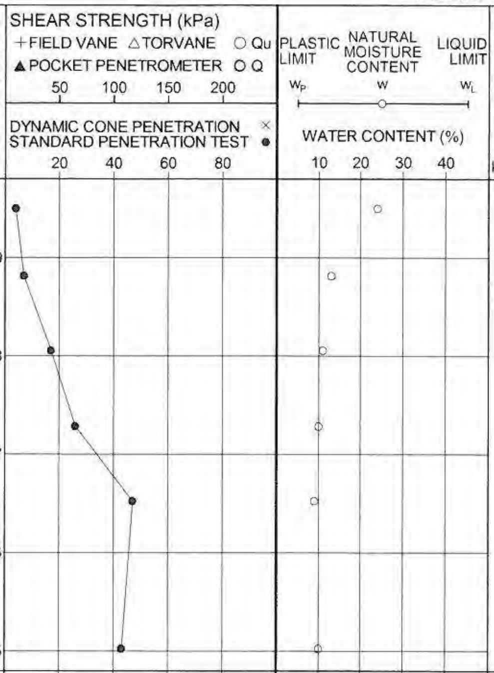
LOG OF BOREHOLE NO. 1

1 of 1

17T 636693E 4905893N

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 08, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

DEPTH / ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
	SURFACE ELEVATION 239.80				
0.10 239.70	TOPSOIL: Dark brown, sandy silt, some organics, trace gravel, moist	1	SS	4	
	SILT TILL: Loose to dense, brown, sandy silt some clay to clayey silt, trace to some gravel, cobbles and boulders, moist	2	SS	7	
		3	SS	17	
		4	SS	26	
		5	SS	47	
	Becoming grey	6	SS	43	
5.0 234.8	BOREHOLE TERMINATED AT 5.0 m				Upon completion of augering No water No cave



UNIT WEIGHT kN/m³

GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL

DEPTH scale: 0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0

NOTES

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LOG OF BOREHOLE NO. 2

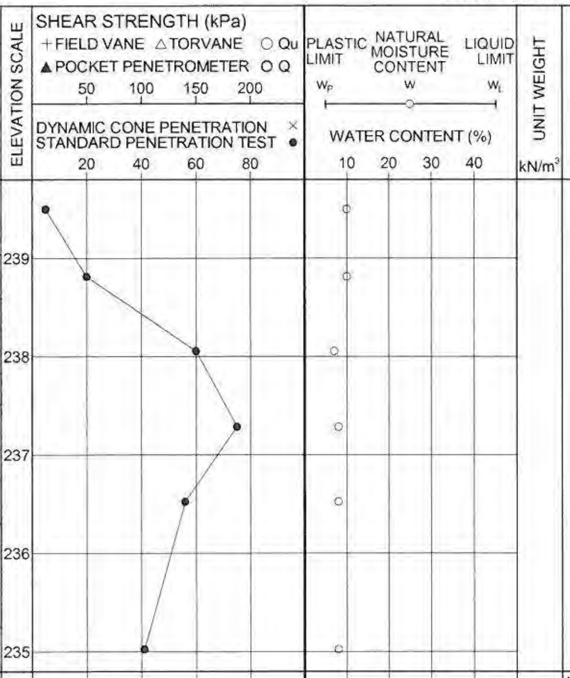
1 of 1

17T 636713E 4905853N

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 08, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

SURFACE ELEVATION 239.80

DEPTH / ELEV (metres)	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
0.20 239.60	TOPSOIL: Dark brown, silty sand, some organics, trace gravel, moist	1	SS	5	
	SILT TILL: Loose to very dense, brown, sandy silt some clay to clayey silt, trace to some gravel, cobbles and boulders, moist	2	SS	20	
		3	SS	60	
		4	SS	75	
	Becoming grey	5	SS	56	
5.0 234.8		6	SS	41	
	BOREHOLE TERMINATED AT 5.0 m				Upon completion of augering No water No cave



GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL

NOTES

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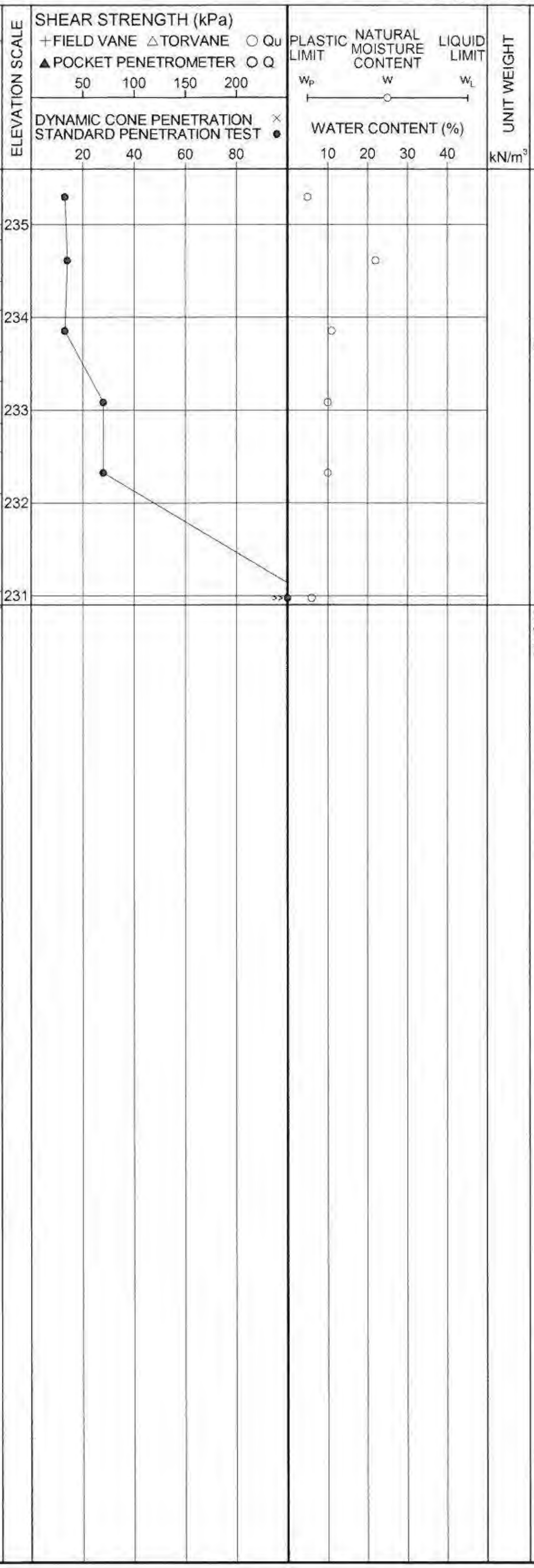
LOG OF BOREHOLE NO. 3

17T 637317E 4905949N

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 05, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

DEPTH / ELEV (metres)	SOIL PROFILE DESCRIPTION	SAMPLE NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
	SURFACE ELEVATION 235.60				
0.16 235.44	TOPSOIL: Dark brown, sand, some organics, trace gravel, moist	1	SS	13	
	CLAYEY SILT: Stiff, brown, clayey silt, trace gravel, trace sand, APT to WTPL	2	SS	14	
1.4 234.2	SILT TILL: Compact to very dense, brown to grey, sandy silt, some clay, trace to some gravel, moist	3	SS	13	First water strike at 1.8 m
		4	SS	28	
		5	SS	28	
4.7 230.9	BOREHOLE TERMINATED AT 4.7 m	6	SS	50/150 mm	Upon completion of augering Water at 4.6 m No cave



GRAIN SIZE DISTRIBUTION (%)
GR SA SI&CL

Depth scale (m): 0.0, 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, 13.0, 14.0, 15.0

NOTES

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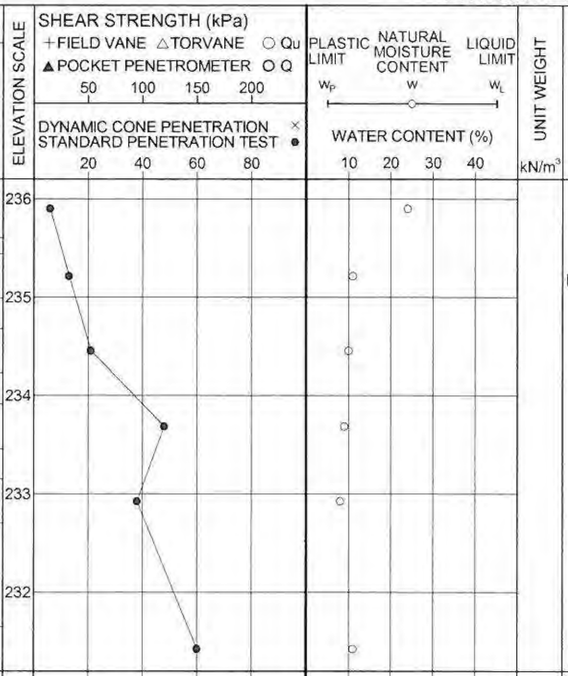
LOG OF BOREHOLE NO. 4

17T 637340E 4906003N

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 05, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

SURFACE ELEVATION 236.20

DEPTH ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
0.17 236.03	TOPSOIL: Dark brown, sand, some organics, trace gravel, moist	1	SS	6	
	SAND: Loose to compact, dark brown, sand, trace silt, trace gravel, moist to wet	2	SS	13	First water strike at 0.9 m
1.4 234.8	SILT TILL: Compact to very dense, brown, sandy silt, some clay, trace to some gravel, cobbles and boulders, moist	3	SS	21	
		4	SS	48	
		5	SS	38	
		6	SS	60	
5.0 231.2	BOREHOLE TERMINATED AT 5.0 m				Upon completion of augering Water at 4.7 m No cave



GRAIN SIZE DISTRIBUTION (%)
GR SA SI&CL

NOTES

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LOG OF BOREHOLE NO. 5

17T 636650E 4906173N

1 of 1

PROJECT Proposed Sutton Aerodrome Development

LOCATION Sutton, Ontario

BORING METHOD Continuous Flight Solid Stem Augers

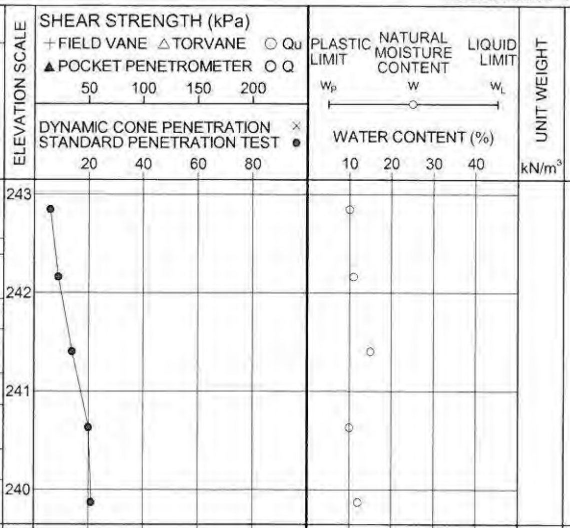
BORING DATE October 8, 2021

PML REF. 21BF043

ENGINEER GW

TECHNICIAN FF

DEPTH ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
0.0	SURFACE ELEVATION 243.15				
0.16 242.99	TOPSOIL: Dark brown, sandy silt, some organics, trace gravel, moist	1	SS	6	
0.70 242.45	SANDY SILT: Loose, brown, sandy silt, some gravel, moist				
	SILT TILL: Loose to compact, brown, sandy silt some clay to clayey silt, trace to some gravel, cobbles and boulders, moist	2	SS	9	
		3	SS	14	
		4	SS	20	
		5	SS	21	
3.5 239.7	BOREHOLE TERMINATED AT 3.5 m				Upon completion of augering No water No cave



NOTES

LOG OF BOREHOLE NO. 6

17T 636869E 4906250N

PROJECT Proposed Sutton Aerodrome Development

LOCATION Sutton, Ontario

BORING METHOD Continuous Flight Solid Stem Augers

BORING DATE October 8, 2021

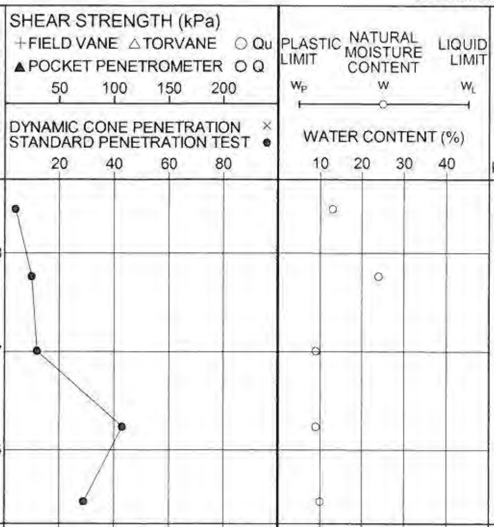
PML REF. 21BF043

ENGINEER GW

TECHNICIAN FF

SURFACE ELEVATION 238.75

DEPTH ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	ELEVATION SCALE	UNIT WEIGHT kN/m³	GROUND WATER OBSERVATIONS AND REMARKS
0.16 238.59	TOPSOIL: Dark brown, clayey silt, some organics, trace gravel, moist	1	SS	4			
	SILT TILL: Loose to dense, brown, sandy silt some clay to clayey silt, trace to some gravel, cobbles and boulders, moist, wet seams	2	SS	10	238		
		3	SS	12	237		
		4	SS	43	236		First water strike at 2.4 m
	Becoming grey	5	SS	29			
3.5 235.3	BOREHOLE TERMINATED AT 3.5 m						Upon completion of augering Water at 3.4 m No cave



GRAIN SIZE DISTRIBUTION (%)
GR SA SI&CL

NOTES

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LOG OF BOREHOLE NO. 7

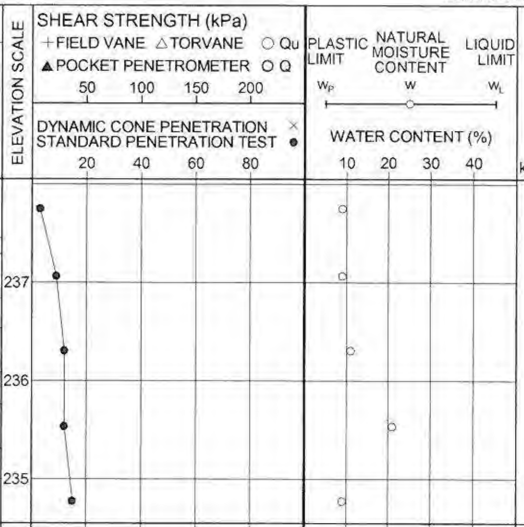
1 of 1

17T 637102E 4906352N

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 08, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

SURFACE ELEVATION 238.05

DEPTH / ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
0.13 237.92	TOPSOIL: Dark brown, sandy silt, some organics, trace gravel, moist	1	SS	3	
	SILT TILL: Very loose to loose, grey, sandy silt some clay to clayey silt, trace to some gravel, cobbles and boulders, moist	2	SS	9	
1.4 236.7	SILTY CLAY: Stiff, brown, silty clay, some sand, trace gravel, APL to WTPL	3	SS	12	
		4	SS	12	
3.1 235.0	SILT TILL: Compact, grey, sandy silt some clay to clayey silt, trace to some gravel, cobbles and boulders, moist	5	SS	15	
3.5 234.6	BOREHOLE TERMINATED AT 3.5 m				Upon completion of augering No water No cave



GRAIN SIZE DISTRIBUTION (%)
GR SA SI&CL

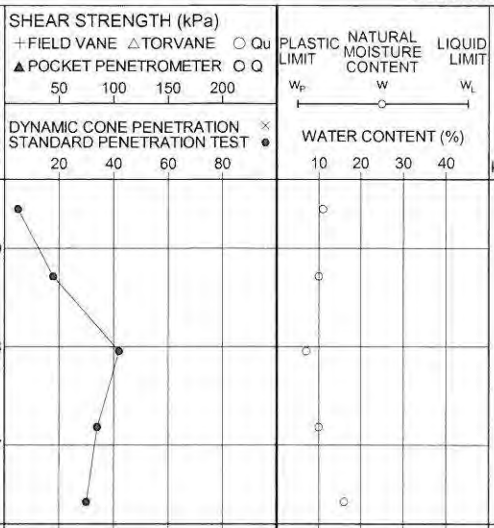
NOTES

LOG OF BOREHOLE NO. 8

17T 637263E 4906396N

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 12, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

DEPTH ELEV (metres)	SOIL PROFILE DESCRIPTION	NUMBER	TYPE	"N" VALUES	ELEVATION SCALE	GROUND WATER OBSERVATIONS AND REMARKS
	SURFACE ELEVATION 239.70					
0.16 239.54	TOPSOIL: Dark brown, silty sand, some organics, trace gravel, moist	1	SS	5		
	SILTY SAND: Loose to dense, brown, silty sand, some gravel, trace clay, moist to wet	2	SS	18	239	
		3	SS	42	238	First water strike at 1.8 m
2.4 237.3	SILT TILL: Dense, brown, sandy silt some clay to clayey silt, trace to some gravel, cobbles and boulders, moist	4	SS	34	237	
		5	SS	30		
3.5 236.2	BOREHOLE TERMINATED AT 3.5 m					Upon completion of augering Wet cave at 0.6 m



UNIT WEIGHT kN/m³
GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL

0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0

NOTES

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CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 9

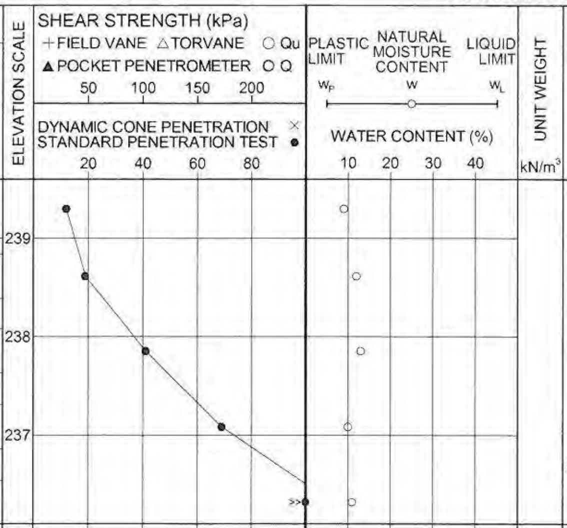
17T 637360E 4906527N

1 of 1

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 12, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

SURFACE ELEVATION 239.60

DEPTH / ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
0.16 239.44	TOPSOIL: Dark brown, sand, some organics, trace gravel, moist	1	SS	12	
0.70 238.90	SILTY SAND: Compact, brown, silty sand, some gravel, moist				
	SAND AND SILT: Compact to very dense, brown, silty sand to sandy silt, trace gravel, trace clay, moist	2	SS	19	
		3	SS	41	
		4	SS	69	
	Wet seams				First water strike at 3.3 m
		5	SS	96/290 mm	
3.5 236.1	BOREHOLE TERMINATED AT 3.5 m				Upon completion of augering Water at 3.3 m No cave



NOTES

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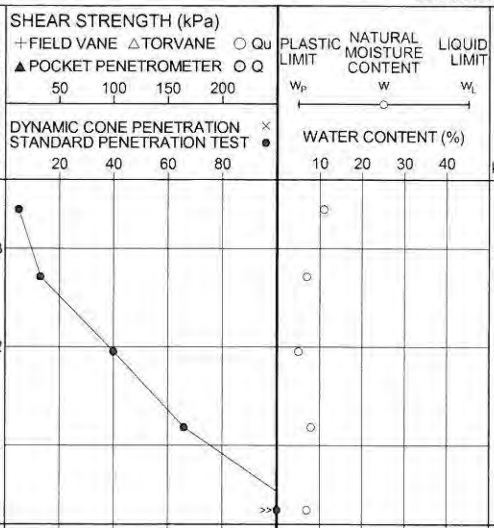
LOG OF BOREHOLE NO. 10

17T 636996E 4905719N

1 of 1

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 05, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

DEPTH ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
0.12	SURFACE ELEVATION 233.70				
233.58	TOPSOIL: Dark brown, silty sand, some organics, moist	1	SS	5	
	SILTY SAND: Loose to compact, brown, silty sand, some gravel, trace clay, moist to wet	2	SS	13	
1.4 232.3	SILT TILL: Dense to very dense, brown, sandy silt, some clay, trace to some gravel, cobbles and boulders, moist	3	SS	40	First water strike at 1.8 m
		4	SS	66	
		5	SS	50/140mm	
3.5 230.2	BOREHOLE TERMINATED AT 3.5 m				Upon completion of augering Water at 3.3 m Cave at 3.4 m



UNIT WEIGHT kN/m³

GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL

Depth scale: 0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0

NOTES

LOG OF BOREHOLE NO. 11

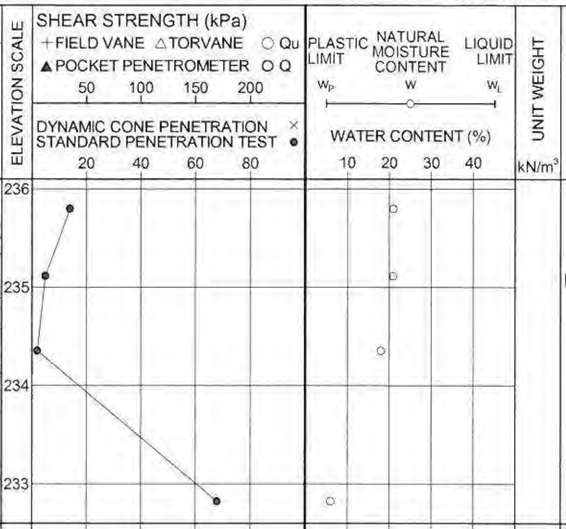
1 of 1

17T 637048E 4905975N

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 05, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

SOIL PROFILE	
DEPTH ELEV (metres)	DESCRIPTION
	SURFACE ELEVATION 236.10
0.13 235.97	TOPSOIL: Dark brown, sand, some organics, trace gravel, moist
0.70 235.40	SAND: Compact, brown, sand, trace gravel, trace silt, moist
	SAND AND SILT: Loose to very loose, grey, silty sand to sandy silt, trace gravel, trace clay, wet to moist
2.4 233.7	SILT TILL: Very dense, grey, sandy silt some clay to clayey silt, trace to some gravel, cobbles and boulders, moist
3.5 232.6	BOREHOLE TERMINATED AT 3.5 m

SAMPLES		
NUMBER	TYPE	"N" VALUES
1	SS	14
2	SS	5
3	SS	2
5	SS	68



GROUND WATER OBSERVATIONS AND REMARKS

GRAIN SIZE DISTRIBUTION (%)
GR SA SI&CL

First water strike at 0.9 m

Upon completion of augering
Water at 3.3 m
No cave

0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0

NOTES

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 12

17T 637213E 4906220N

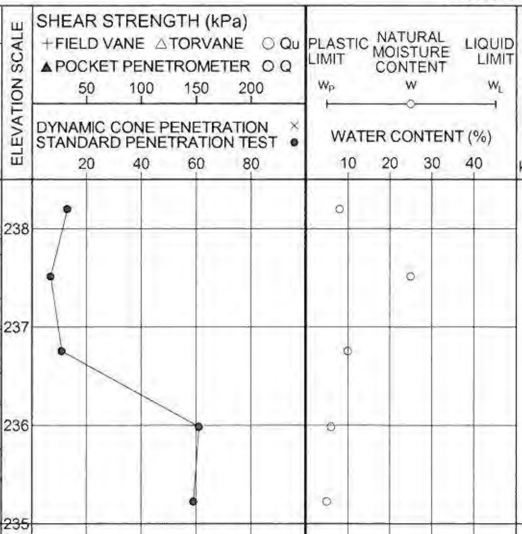
1 of 1

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 08, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

SURFACE ELEVATION 238.50

DEPTH ELEV (metres)	DESCRIPTION
0.13 238.37	TOPSOILL: Dark brown, sand, some gravel, trace orgaics, moist
0.70 237.80	SAND : Compact, brown, sand, trace gravel, trace silt, moist
2.1 236.4	SILTY CLAY: Firm to stiff, brown, silty clay, some sand, trace gravel, WTPL to APL
3.5 235.0	SILT TILL: Very dense, brown, sandy silt some clay to clayey silt, trace to some gravel, cobbles and boulders, moist
	BOREHOLE TERMINATED AT 3.5 m

NUMBER	TYPE	"N" VALUES
1	SS	13
2	SS	7
3	SS	11
4	SS	61
5	SS	59



UNIT WEIGHT kN/m^3

GROUND WATER OBSERVATIONS AND REMARKS

GRAIN SIZE DISTRIBUTION (%)
GR SA SI&CL

Upon completion of augering
No water
No cave

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

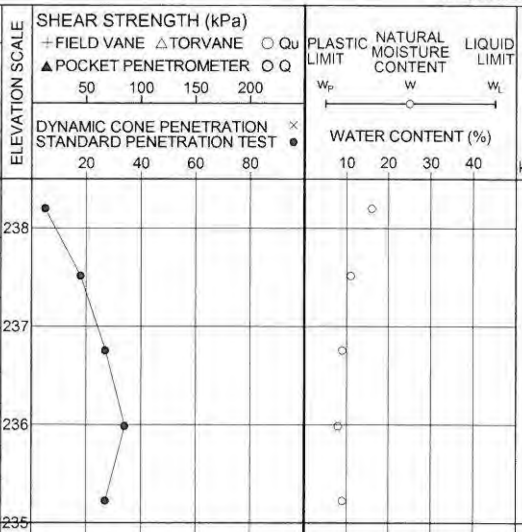
LOG OF BOREHOLE NO. 13

17T 636788E 4905913N

1 of 1

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 08, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

DEPTH ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	UNIT WEIGHT kN/m³	GROUND WATER OBSERVATIONS AND REMARKS	GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL
	SURFACE ELEVATION 238.50						
0.10 238.41	TOPSOIL: Dark brown, sand, some silt, trace organics, moist	1	SS	5			
	SILT TILL: Loose to dense, brown to grey, sandy silt some clay to clayey silt, trace to some gravel, cobbles and boulders, moist	2	SS	18			
		3	SS	27			
		4	SS	34			
		5	SS	27			
3.5 235.0	BOREHOLE TERMINATED AT 3.5 m					Upon completion of augering No water No cave	



NOTES

PML - BH/TP LOG GEO/ENV WITH MWS 21BF043 BH LOGS 2021-10-13.GPJ ON_MOT.GDT 2021-11-01 3:04:23 PM

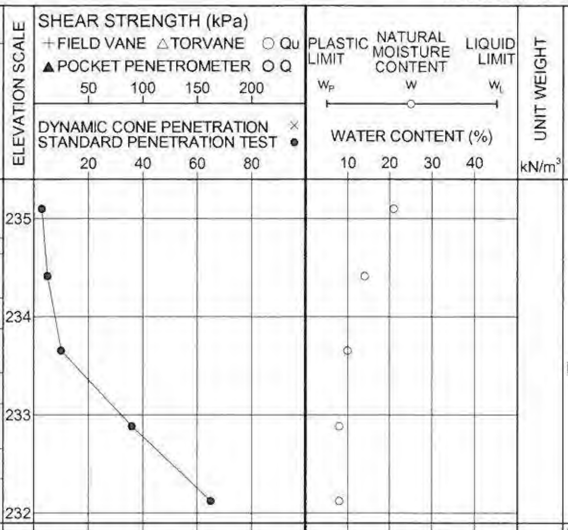
LOG OF BOREHOLE NO. 14

1 of 1

17T 637198E 4906055N

PROJECT Proposed Sutton Aerodrome Development
PML REF. 21BF043
LOCATION Sutton, Ontario
BORING DATE October 05, 2021
ENGINEER GW
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN FF

DEPTH / ELEV (metres)	SOIL PROFILE DESCRIPTION	SAMPLES NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
	SURFACE ELEVATION 235.40				
235.28	TOPSOIL: Dark brown, sand, some silt, some organics, trace gravel, moist	1	SS	3	
	SANDY SILT: Very loose to loose, brown, sandy silt, trace gravel, very moist	2	SS	5	
1.4 234.0	CLAYEY SILT: Stiff, grey, clayey silt, trace gravel, trace sand, APL	3	SS	10	First water strike at 1.8 m
2.4 233.0	SILT TILL: Dense to very dense, grey, sandy silt, some clay, trace to some gravel, cobbles and boulders, moist	4	SS	36	
		5	SS	65	
3.5 231.9	BOREHOLE TERMINATED AT 3.5 m				Upon completion of augering Water at 3.4 No cave



GRAIN SIZE DISTRIBUTION (%)
GR SA SI&CL

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

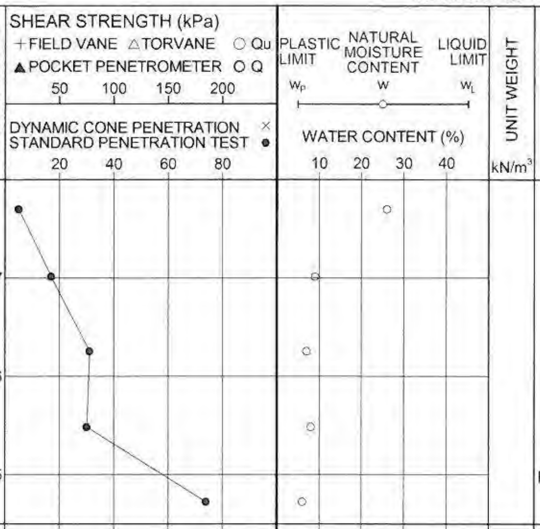
LOG OF BOREHOLE NO. 15

1 of 1

17T 637451E 4906213N

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 12, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

DEPTH / ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	ELEVATION SCALE	GROUND WATER OBSERVATIONS AND REMARKS
	SURFACE ELEVATION 238.00					
0.16 237.84	TOPSOIL: Dark brown, sand, trace gravel, trace organics, moist	1	SS	5		
	SANDY SILT: Loose to compact, brown, sandy silt, trace gravel, wet to moist					
1.1 236.9		2	SS	17	237	
	SILT TILL: Dense to very dense, grey, sandy silt, some clay, trace to some gravel, cobbles and boulders, moist	3	SS	31		
					236	
		4	SS	30		
	Wet seams				235	First water strike at 3.4 m
3.5		5	SS	74		
234.5	BOREHOLE TERMINATED AT 3.5 m					Upon completion of augering Water at 3.3 m No cave



GRAIN SIZE DISTRIBUTION (%)
GR SA SI&CL

Depth scale (metres): 0.0, 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, 13.0, 14.0, 15.0

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 16

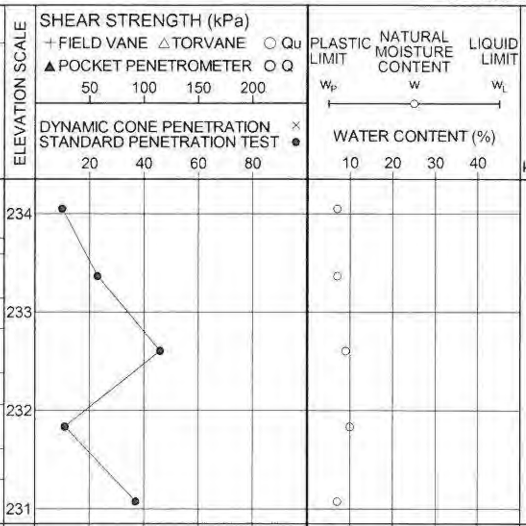
17T 637254E 4905813N

1 of 1

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 05, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

DEPTH / ELEV (metres)	SOIL PROFILE – DESCRIPTION	GROUND WATER OBSERVATIONS AND REMARKS
	SURFACE ELEVATION 234.35	
0.18 234.17	TOPSOIL: Dark brown, sand, some organics, trace gravel, moist	
	SAND: Compact to dense, brown, sand, trace gravel, trace silt, moist to wet	First water strike at 1.8 m
2.1 232.3	SILT TILL: Compact to dense, grey, sandy silt, some clay, trace to some gravel, cobbles and boulders, moist	
3.5 230.9	BOREHOLE TERMINATED AT 3.5 m	Upon completion of augering Wet cave at 1.8 m

NUMBER	TYPE	"N" VALUES
1	SS	10
2	SS	23
3	SS	46
4	SS	11
5	SS	37



UNIT WEIGHT kN/m³

GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL

NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

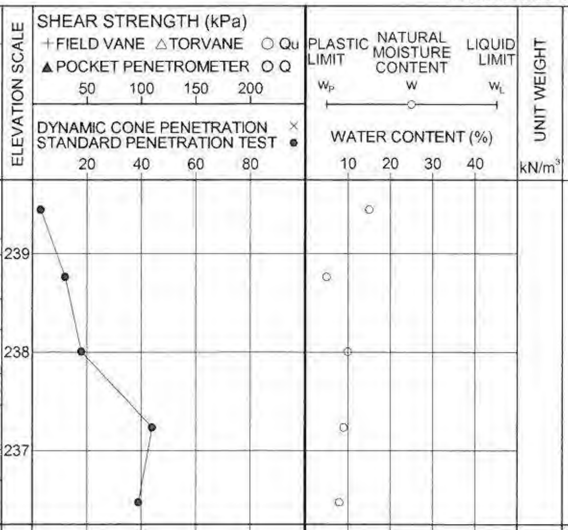
LOG OF BOREHOLE NO. 18

1 of 1

17T 636866E 4906332N

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING DATE October 08, 2021
BORING METHOD Continuous Flight Solid Stem Augers
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

SOIL PROFILE		SAMPLES			GROUND WATER OBSERVATIONS AND REMARKS
DEPTH ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL
	SURFACE ELEVATION 239.75				
0.14 239.61	TOPSOIL: Dark brown, silty sand, some organics, moist	1	SS	3	
0.70 239.05	SILTY SAND: Very loose, brown, silty sand, trace gravel, moist				
	SILT TILL: Compact to dense, brown, sandy silt, some clay, trace to some gravel, cobbles and boulders, moist	2	SS	12	
		3	SS	18	
		4	SS	44	
		5	SS	39	
3.5 236.3	BOREHOLE TERMINATED AT 3.5 m				Upon completion of augering No water No cave



NOTES

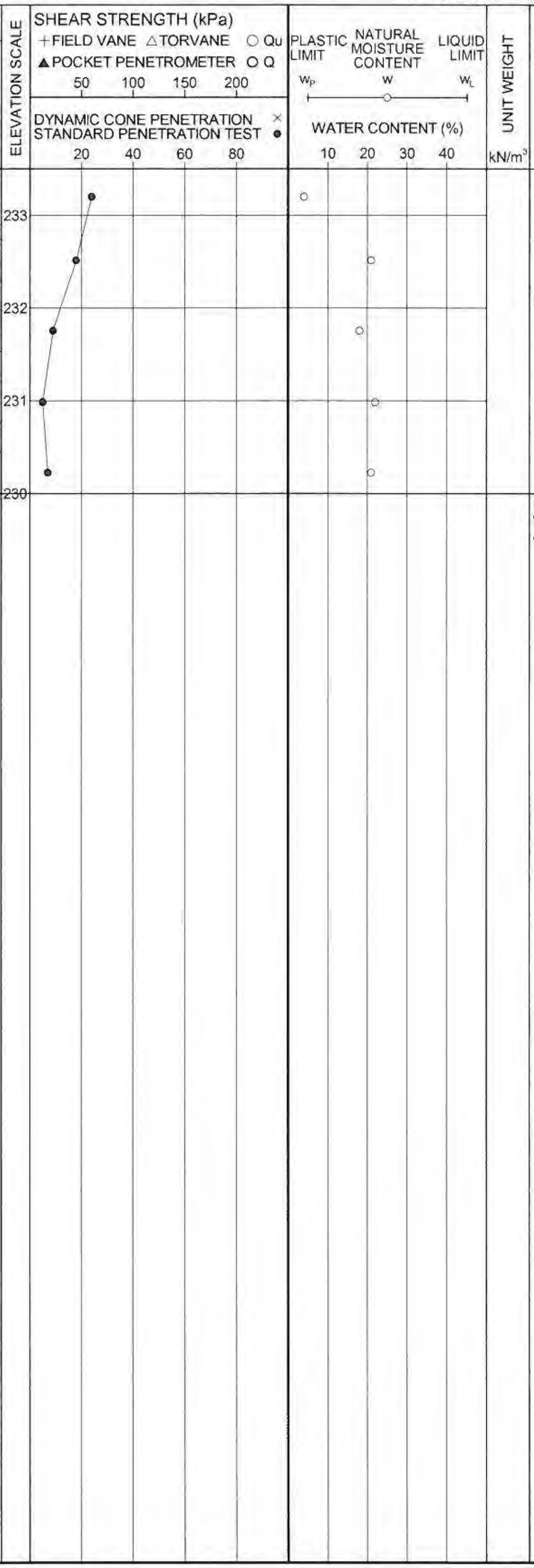
LOG OF BOREHOLE NO. 17

17T 637517E 4905856N

1 of 1

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 12, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

DEPTH ELEV (metres)	SOIL PROFILE DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
	SURFACE ELEVATION 233.50					
0.07 233.43	TOPSOIL: Dark brown, sand, some silt, some organics, trace gravel, moist		1	SS	24	
	SAND: Compact to loose, brown to grey, sand, some gravel, some silt, wet		2	SS	18	
						First water strike at 1.3 m
			3	SS	9	
2.1 231.4	CLAYEY SILT: Firm, grey, clayey silt, trace sand, trace gravel, APL to WTPL		4	SS	5	
			5	SS	7	
3.5 230.0	BOREHOLE TERMINATED AT 3.5 m					Upon completion of augering Water at 1.3 m Cave at 1.5 m



NOTES

LOG OF BOREHOLE NO. 19

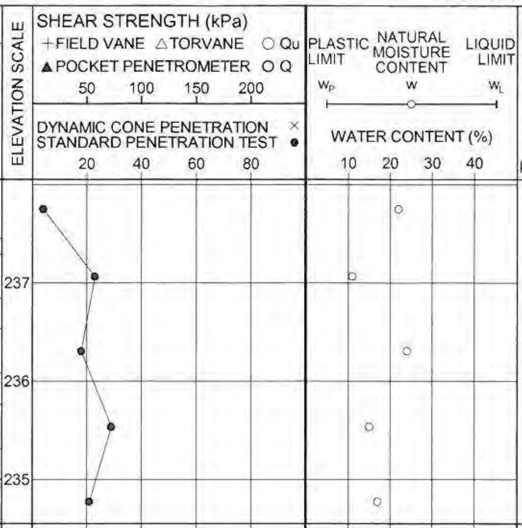
17T 637073E 4906593N

1 of 1

PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 12, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

SHEAR STRENGTH (kPa): + FIELD VANE △ TORVANE ○ Qu ▲ POCKET PENETROMETER ○ Q
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L
WATER CONTENT (%)

DEPTH / ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
	SURFACE ELEVATION 238.05				
0.17 237.88	TOPSOIL: Dark brown, sand, some organics, trace gravel, moist	1	SS	4	
	SILT TILL: Loose to compact, brown, sandy silt, some clay, trace to some gravel, cobbles and boulders, moist, wet seams	2	SS	23	
		3	SS	18	
		4	SS	29	First water strike at 2.4 m
		5	SS	21	
3.5 234.6	BOREHOLE TERMINATED AT 3.5 m				Upon completion of augering Water at 3.3 m No cave



NOTES

Peto MacCallum Ltd.
CONSULTING ENGINEERS

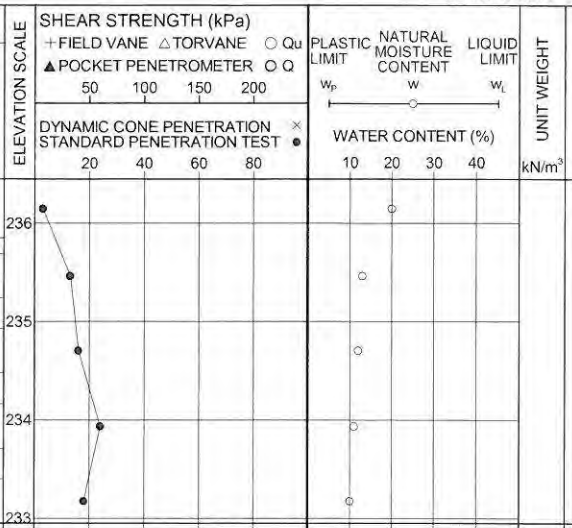
LOG OF BOREHOLE NO. 20

17T 637273E 4906665N

1 of 1

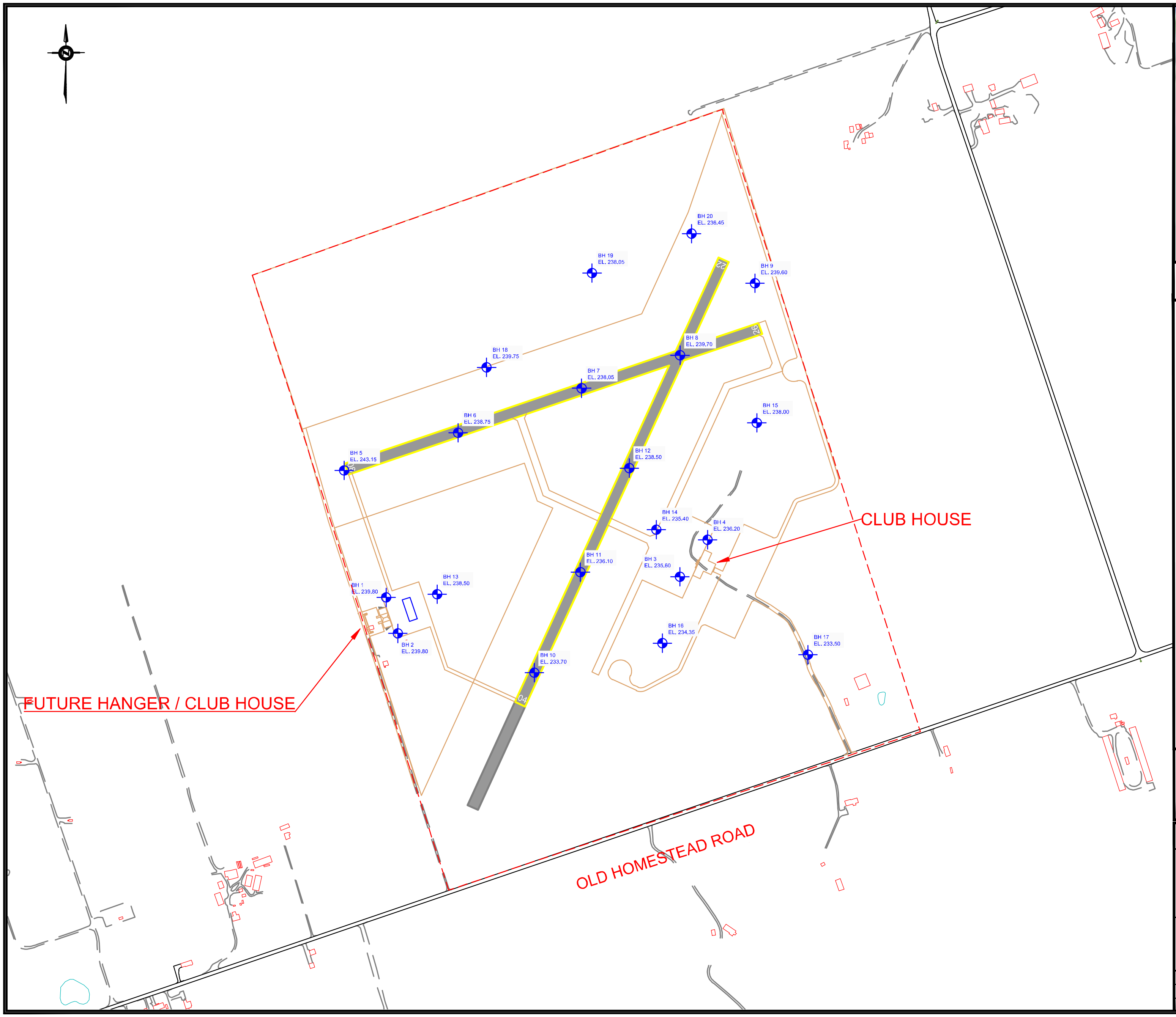
PROJECT Proposed Sutton Aerodrome Development
LOCATION Sutton, Ontario
BORING METHOD Continuous Flight Solid Stem Augers
BORING DATE October 12, 2021
PML REF. 21BF043
ENGINEER GW
TECHNICIAN FF

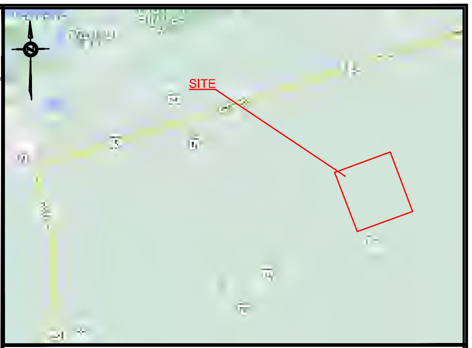
DEPTH ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES	GROUND WATER OBSERVATIONS AND REMARKS
	SURFACE ELEVATION 236.45				
0.17 236.28	TOPSOIL: Dark brown, sandy silt, some organics, trace gravel, moist	1	SS	3	
0.70 235.75	SANDY SILT: Very loose, brown, sandy silt, some gravel, trace clay, very moist				
	SILT TILL: Compact, brown to grey, sandy silt, some clay, trace to some gravel, cobbles and boulders, moist	2	SS	13	
		3	SS	16	
		4	SS	24	
3.5 233.0		5	SS	18	
	BOREHOLE TERMINATED AT 3.5 m				Upon completion of augering No water No cave



GRAIN SIZE DISTRIBUTION (%)
GR SA SI&CL

NOTES





KEY PLAN
SUTTON, ONTARIO

LEGEND:

⊕ BH 1 EL. 239.80	BOREHOLE 1 SURFACE ELEVATION
– – – – – –	APPROXIMATE SITE LIMIT

REFERENCE:
BASE PLAN PRODUCED BY THE CLIENT

0m 60 120 180 240 300

BOREHOLE LOCATION PLAN

PROPOSED SUTTON AERODOME DEVELOPMENT
SUTTON, ONTARIO

Peto MacCallum Ltd.
CONSULTING ENGINEERS

		DATE	SCALE	PML REF.	DRAWING NO.
DRAWN	FF	NOV. 2021	AS SHOWN	21BF043	1
CHECKED	GW				
APPROVED	GW				

APPENDIX A

Statement of Limitations

STATEMENT OF LIMITATIONS

This report is prepared for and made available for the sole use of the client named. Peto MacCallum Ltd. (PML) hereby disclaims any liability or responsibility to any person or entity, other than those for whom this report is specifically issued, for any loss, damage, expenses, or penalties that may arise or result from the use of any information or recommendations contained in this report. The contents of this report may not be used or relied upon by any other person without the express written consent and authorization of PML.

This report shall not be relied upon for any purpose other than as agreed with the client named without the written consent of PML. It shall not be used to express or imply warranty as to the fitness of the property for a particular purpose. A portion of this report may not be used as a separate entity: that is to say the report is to be read in its entirety at all times.

The report is based solely on the scope of services which are specifically referred to in this report. No physical or intrusive testing has been performed, except as specifically referenced in this report. This report is not a certification of compliance with past or present regulations, codes, guidelines and policies.

The scope of services carried out by PML is based on details of the proposed development and land use to address certain issues, purposes and objectives with respect to the specific site as identified by the client. Services not expressly set forth in writing are expressly excluded from the services provided by PML. In other words, PML has not performed any observations, investigations, study analysis, engineering evaluation or testing that is not specifically listed in the scope of services in this report. PML assumes no responsibility or duty to the client for any such services and shall not be liable for failing to discover any condition, whose discovery would require the performance of services not specifically referred to in this report.

STATEMENT OF LIMITATIONS
(continued)

The findings and comments made by PML in this report are based on the conditions observed at the time of PML's site reconnaissance. No assurances can be made and no assurances are given with respect to any potential changes in site conditions following the time of completion of PML's field work. Furthermore, regulations, codes and guidelines may change at any time subsequent to the date of this report and these changes may affect the validity of the findings and recommendations given in this report.

The results and conclusions with respect to site conditions are therefore in no way intended to be taken as a guarantee or representation, expressed or implied, that the site is free from any contaminants from past or current land use activities or that the conditions in all areas of the site and beneath or within structures are the same as those areas specifically sampled.

Any investigation, examination, measurements or sampling explorations at a particular location may not be representative of conditions between sampled locations. Soil, ground water, surface water, or building material conditions between and beyond the sampled locations may differ from those encountered at the sampling locations and conditions may become apparent during construction which could not be detected or anticipated at the time of the intrusive sampling investigation.

Budget estimates contained in this report are to be viewed as an engineering estimate of probable costs and provided solely for the purposes of assisting the client in its budgeting process. It is understood and agreed that PML will not in any way be held liable as a result of any budget figures provided by it.

The Client expressly waives its right to withhold PML's fees, either in whole or in part, or to make any claim or commence an action or bring any other proceedings, whether in contract, tort, or otherwise against PML in anyway connected with advice or information given by PML relating to the cost estimate or Environmental Remediation/Cleanup and Restoration or Soil and Ground Water Management Plan Cost Estimate.

ARA
ARCHAEOLOGY | HERITAGE | OUTREACH | EDUCATION

Stage 1 Archaeological Assessment
Sutton Aerodrome Development
Town of Georgina
Regional Municipality of York
Part of Lots 10–12, Concession 5
Geographic Township of Georgina
Former York County, Ontario

Prepared for
Avia NG Airport Consutants
23 Albert Street North
Southampton, ON N0H 2L0
Tel: (519) 483-3434

Licensed under
P.J. Racher
MTCS Licence #P007
PIF #P007-1243-2021
ARA File #2021-0410

07/09/2022

Original Report

EXECUTIVE SUMMARY

Under a contract awarded in August 2021, Archaeological Research Associates Ltd. carried out a Stage 1 assessment of lands involved in the Aerodrome Feasibility Study for the Sutton Aerodrome in the Town of Georgina, Regional Municipality of York, Ontario. The project involves a variety of preliminary studies to inform a potential Aerodrome Master Plan application. The assessment was carried out as part of the proponent's due diligence process but may be formally triggered by the requirements set out in Section 2.6 of the Provincial Policy Statement, 2020 issued under Section 3 of the *Planning Act* if the Master Plan application is pursued. This report documents the background research and potential modelling involved in the investigation and presents conclusions and recommendations pertaining to archaeological concerns.

The Stage 1 assessment was conducted in September 2021 under Project Information Form #P007-1243-2021. Legal permission to enter and conduct all necessary fieldwork activities within the assessed lands was granted by the property owner. At the time of assessment, the study area consisted of former agricultural fields, part of two former farmsteads and various wooded areas, scrub lands and wetlands.

The Stage 1 assessment determined that the study area comprises a mixture of areas of archaeological potential and areas of no archaeological potential. It is recommended that the identified areas of archaeological potential be subject to a Stage 2 property assessment in accordance with Section 2.1 of the 2011 *Standards and Guidelines for Consultant Archaeologists*. If any in-water work is needed within the tributary of Lake Simcoe in the south, the Criteria for Evaluating Marine Archaeological Potential checklist should be consulted. There are no current plans for any in-water work.

The identified areas of no archaeological potential do not require any additional assessment. Given that there are still outstanding archaeological concerns within the property, no ground alterations or development of any kind may occur until the required investigation is complete, a recommendation that the lands require no further archaeological assessment is made, and the associated report is entered into the Ontario Public Register of Archaeological Reports.

TABLE OF CONTENTS

MAPS

IMAGES

TABLES

ABBREVIATIONS

ARA – Archaeological Research Associates Ltd.
MTCS – Ministry of Tourism, Culture and Sport
PIF – Project Information Form
S&Gs – Standards and Guidelines for Consultant Archaeologists

PERSONNEL

Project Director: P.J. Racher (#P007)
Operations Manager: C.E. Gohm (#R187)
Project Archaeologist: M. McCready (#P490)
Field Director: S. Clarke (#R446)
Cartographers: A. Bailey (#R1069), K. Brightwell (#R341)
Report Writer: D. Worby (#R1190)
Editor: C.J. Gohm

ENGAGED GROUPS

Alderville First Nation
Contact: D. Simpson

Beausoleil First Nation
Contact: D. Monague

Chippewas of Rama First Nation
Contact: S. James

Curve Lake First Nation
Contacts: J. Kapyrka, J. MacArthur

Georgina Island First Nation
Contacts: N. Charles, J.L. Porte

Hiawatha First Nation
Contacts: T. Cowie, S. Davison, M. McGonigle

Huron-Wendat Nation
Contact: M.-S. Gendron

Mississaugas of Scugog Island First Nation
Contacts: W. Birch, D. Mowat

1.0 PROJECT CONTEXT

1.1 Development Context

Under a contract awarded in August 2021, Archaeological Research Associates Ltd. (ARA) carried out a Stage 1 assessment of lands involved in the Aerodrome Feasibility Study for the Sutton Aerodrome in the Town of Georgina, Regional Municipality of York, Ontario. The project involves a variety of preliminary studies to inform a potential Aerodrome Master Plan application. The assessment was carried out as part of the proponent's due diligence process but may be formally triggered by the requirements set out in Section 2.6 of the Provincial Policy Statement, 2020 issued under Section 3 of the *Planning Act* if the Master Plan application is pursued. This report documents the background research and potential modelling involved in the investigation and presents conclusions and recommendations pertaining to archaeological concerns.

The study area consists of a rectangular parcel of land with an area of 137.34 ha (Map 1). This parcel is generally bounded by wooded areas to the north and northwest, Morning Glory Road to the northeast, a mixture of forested lands and wetlands to the southeast, Old Homestead Road to the south and agricultural fields to the west. In legal terms, the study area falls on part of Lots 10–12, Concession 5 in the Geographic Township of Georgina, former York County. The Crown initially believed that they had obtained these lands as part of the Johnson-Butler Purchase in 1787/1788, but the extent was not properly documented. The area was formally ceded as part of the Williams Treaties in 1923. The parcel falls within the treaty and shared traditional territories of the Williams Treaties First Nations, which include the Mississauga communities of Curve Lake First Nation, Hiawatha First Nation, Scugog Island First Nation and Alderville First Nation, and the Chippewa communities of Georgina Island First Nation, Rama First Nation and Beausoleil First Nation. This area also falls within the ancestral territory of the Huron-Wendat Nation.

The Stage 1 assessment was conducted in September 2021 under Project Information Form (PIF) #P007-1243-2021. The investigation encompassed the entire property. Legal permission to enter and conduct all necessary fieldwork activities within the assessed lands was granted by the property owner. In compliance with the objectives set out in Section 1.0 of the 2011 *Standards and Guidelines for Consultant Archaeologists* (*S&Gs*), this investigation was carried out to:

- Provide information concerning the geography, history and current land condition of the study area;
- Determine the presence of known archaeological sites in the study area;
- Present strategies to mitigate project impacts to such sites, if they are located;
- Evaluate in detail the archaeological potential of the study area; and
- Recommend appropriate strategies for Stage 2 archaeological assessment, if some or all of the study area has archaeological potential.

The Ministry of Tourism, Culture and Sport (MTCS) is asked to review the results and recommendations presented herein and enter the report into the Ontario Public Register of Archaeological Reports. A Record of Indigenous Engagement is included in the project report package in accordance with the requirements set out in Section 7.6.2 of the 2011 *S&Gs*.

1.2 Historical Context

After a century of archaeological work in southern Ontario, scholarly understanding of the historical usage of the area has become very well-developed. With occupation beginning in the Palaeo period approximately 11,000 years ago, the greater vicinity of the study area comprises a complex chronology of Indigenous and Euro-Canadian histories. Section 1.2.1 summarizes the region's settlement history, Section 1.2.2 presents the available traditional knowledge associated with the engaged groups and Section 1.2.3 documents the study area's past and present land uses. One previous archaeological report containing relevant background information was obtained during the research component of the study. This report is summarized in Section 1.3.3, and the reference (including title, author and PIF number) appears in Section 7.0.

1.2.1 Settlement History

1.2.1.1 Pre-Contact

The Pre-Contact history of the region is lengthy and rich, and a variety of Indigenous groups inhabited the landscape. Archaeologists generally divide this vibrant history into three main periods: Palaeo, Archaic and Woodland. Each of these periods comprise a range of discrete sub-periods characterized by identifiable trends in material culture and settlement patterns, which are used to interpret past lifeways. The principal characteristics of these sub-periods are summarized in Table 1.

Table 1: Pre-Contact Settlement History
(Wright 1972; Ellis and Ferris 1990; Warrick 2000; Munson and Jamieson 2013)

Sub-Period	Timeframe	Characteristics
Early Palaeo	9000–8400 BC	Gainey, Barnes and Crowfield traditions; Small bands; Mobile hunters and gatherers; Utilization of seasonal resources and large territories; Fluted points
Late Palaeo	8400–7500 BC	Holcombe, Hi-Lo and Lanceolate biface traditions; Continuing mobility; Campsite/Way-Station sites; Smaller territories are utilized; Non-fluted points
Early Archaic	7500–6000 BC	Side-notched, Corner-notched (Nettling, Thebes) and Bifurcate traditions; Growing diversity of stone tool types; Heavy woodworking tools appear (e.g., ground stone axes and chisels)
Middle Archaic	6000–2500 BC	Stemmed (Kirk, Stanly/Neville), Brewerton Side- and Corner-notched traditions; Reliance on local resources; Populations increasing; More ritual activities; Fully ground and polished tools; Net-sinkers common; Earliest copper tools
Late Archaic	2500–900 BC	Narrow Point (Lamoka), Broad Point (Genesee) and Small Point (Crawford Knoll) traditions; Less mobility; Use of fish-weirs; True cemeteries appear; Stone pipes emerge; Long-distance trade (marine shells and galena)
Early Woodland	900–400 BC	Meadowood tradition; Crude cord-roughened ceramics emerge; Meadowood cache blades and side-notched points; Bands of up to 35 people
Middle Woodland	400 BC–AD 600	Point Peninsula tradition; Vinette 2 ceramics appear; Small camp sites and seasonal village sites; Influences from northern Ontario and Hopewell area to the south; Hopewellian influence can be seen in continued use of burial mounds
Middle/Late Woodland Transition	AD 600–900	Gradual transition between Point Peninsula and later traditions; Princess Point tradition emerges elsewhere (i.e., in the vicinity of the Grand and Credit Rivers)
Late Woodland (Early)	AD 900–1300	Glen Meyer tradition; Settled village-life based on agriculture; Small villages (0.4 ha) with 75–200 people and 4–5 longhouses; Semi-permanent settlements
Late Woodland (Middle)	AD 1300–1400	Uren and Middleport traditions; Classic longhouses emerge; Larger villages (1.2 ha) with up to 600 people; More permanent settlements (30 years)

Sub-Period	Timeframe	Characteristics
Late Woodland (Late)	AD 1400–1600	Huron-Petun tradition; Globular-shaped ceramic vessels, ceramic pipes, bone/antler awls and beads, ground stone celts and adzes, chipped stone tools, and even rare copper objects; Large villages (often with palisades), temporary hunting and fishing camps, cabin sites and small hamlets; Territorial contraction in early 16th century; Fur trade begins ca. 1580; European trade goods appear

Although Iroquoian-speaking populations tended to leave a much more obvious mark on the archaeological record and are therefore emphasized in the Late Woodland entries above, it must be understood that Algonquian-speaking populations also represented a significant presence in southern Ontario. Due to the sustainability of their lifeways, archaeological evidence directly associated with the Anishinaabeg remains elusive, particularly when compared to sites associated with the more sedentary agriculturalists. Many artifact scatters in southern Ontario were likely camps, chipping stations or processing areas associated with the more mobile Anishinaabeg, utilized during their travels along the local drainage basins while making use of seasonal resources. This part of southern Ontario represents the ancestral territory of various Indigenous groups, each with their own land use and settlement pattern tendencies.

1.2.1.2 Post-Contact

The arrival of European explorers and traders at the beginning of the 17th century triggered widespread shifts in Indigenous lifeways and set the stage for the ensuing Euro-Canadian settlement process. Documentation for this period is abundant, ranging from the first sketches of Upper Canada and the written accounts of early explorers to detailed township maps and lengthy histories. The Post-Contact period can be effectively discussed in terms of major historical events, and the principal characteristics associated with these events are summarized in Table 2.

Table 2: Post-Contact Settlement History
(Smith 1846; Mulvany et al. 1885; Coyne 1895; Lajeunesse 1960; Mika 1972; Ellis and Ferris 1990; Surtees 1994; AO 2015)

Historical Event	Timeframe	Characteristics
Early Exploration	Early 17th century	Brûlé explores southern Ontario in 1610/11; Champlain travels through in 1613 and 1615/1616, making contact with a number of Indigenous groups (including the Algonquin, Huron-Wendat and other First Nations); European trade goods become increasingly common and begin to put pressure on traditional industries
Increased Contact and Conflict	Mid- to late 17th century	Conflicts between various First Nations during the Beaver Wars result in numerous population shifts; European explorers continue to document the area, and many Indigenous groups trade directly with the French and English; 'The Great Peace of Montreal' treaty established between roughly 39 different First Nations and New France in 1701
Fur Trade Development	Early to mid-18th century	Growth and spread of the fur trade; Peace between the French and English with the Treaty of Utrecht in 1713; Ethnogenesis of the Métis; Hostilities between French and British lead to the Seven Years' War in 1754; French surrender in 1760
British Control	Mid- to late 18th century	*Royal Proclamation* of 1763 recognizes the title of the First Nations to the land; Numerous treaties subsequently arranged by the Crown; First land cession under the new protocols is the Seneca surrender of the west side of the Niagara River in 1764; The Niagara Purchase (Treaty 381) in 1781 included this area

Historical Event	Timeframe	Characteristics
Loyalist Influx	Late 18th century	United Empire Loyalist influx after the American Revolutionary War (1775–1783); British develop interior communication routes and acquire additional lands; Johnson-Butler Purchase completed in 1787/1788, but the extent was not documented; *Constitutional Act* of 1791 creates Upper and Lower Canada
County Development	Late 18th to early 19th century	Southern portion became part of York County's 'East Riding' in 1792; A. Jones began to survey Yonge Street in 1794; Johnson-Butler document declared invalid in 1794; Northern lands added to York County's 'East Riding' in 1798; Western portion acquired during the Toronto Purchase (Treaty 13) in 1805; Northern townships added in 1821 and 1838; Eastern portion acquired as part of the Williams Treaties in 1923; Three large parcels were ceded, but compensation, land and harvesting issues remained; Settlement Agreement reached in 2018; York County independent after the abolition of the district system in 1849
Township Formation	Early 19th century	Surveyed and settled later than other townships in York; Laid out by D. McDonald in 1817, though settlement began in 1815; First patents granted in 1819; Earliest settlers were Captain J. O'Brien Bouchier and J. Comer; Originally united with the Township of North Gwillimbury for administrative purposes; Separated in 1826
Township Development	Mid-19th to early 20th century	Population reached 586 in 1842; 4,786 ha taken up by 1846, with 1,074 ha under cultivation; Two grist mills, three saw mills and one distillery in operation at that time;Traversed by the Lake Simcoe Junction Railway (1877) and James Bay/Canadian Northern Railway (1906); Georgina had nine churches and nine schools by 1878; 11,926 ha taken up by 1885, 6,855 ha of which had been improved; Principal community was Sutton, with smaller settlements at Baldwin, Jackson's Point, Pefferlaw, Port Bolster, Vachell and Virginia

1.2.2 Traditional Knowledge

The study area occupies lands that fall within the treaty, traditional and/or ancestral territories of numerous First Nations. Indeed, this area was used and shared by many Indigenous groups over the millennia; each with their own traditions as to how they arrived, how they lived and the major events that punctuated their time there. Amongst the engaged groups, only the Curve Lake First Nation and Huron-Wendat Nation were able to provide traditional knowledge for inclusion in the report. These contributions are reproduced in Table 3–Table 4 (ordered alphabetically). It is hoped that other such accounts can be incorporated into studies like this as they become available. It should be noted that one group's traditional knowledge does not necessarily reflect the views of other groups, or the consultant archaeologist.

Table 3: Curve Lake First Nation Oral History
(Provided by Curve Lake First Nation)

Michi Saagiig Historical/Background context
The traditional homelands of the Michi Saagiig (Mississauga Anishinaabeg) encompass a vast area of what is now known as southern Ontario. The Michi Saagiig are known as "the people of the big river mouths" and were also known as the "Salmon People" who occupied and fished the north shore of Lake Ontario where the various tributaries emptied into the lake. Their territories extended north into and beyond the Kawarthas as winter hunting grounds on which they would break off into smaller social groups for the season, hunting and trapping on these lands, then returning to the lakeshore in spring for the summer months. The Michi Saagiig were a highly mobile people, travelling vast distances to procure subsistence for their people. They were also known as the "Peacekeepers" among Indigenous nations. The Michi Saagiig homelands were located directly between two very powerful Confederacies: The Three Fires Confederacy to the north and the Haudenosaunee Confederacy to the south. The Michi Saagiig were the negotiators, the messengers, the diplomats, and they successfully mediated peace throughout this area of Ontario for countless generations.

Michi Saagiig Historical/Background context

Michi Saagiig oral histories speak to their people being in this area of Ontario for thousands of years. These stories recount the "Old Ones" who spoke an ancient Algonquian dialect. The histories explain that the current Ojibwa phonology is the 5th transformation of this language, demonstrating a linguistic connection that spans back into deep time. The Michi Saagiig of today are the descendants of the ancient peoples who lived in Ontario during the Archaic and Paleo-Indian periods. They are the original inhabitants of southern Ontario, and they are still here today.

The traditional territories of the Michi Saagiig span from Gananoque in the east, all along the north shore of Lake Ontario, west to the north shore of Lake Erie at Long Point. The territory spreads as far north as the tributaries that flow into these lakes, from Bancroft and north of the Haliburton highlands. This also includes all the tributaries that flow from the height of land north of Toronto like the Oak Ridges Moraine, and all of the rivers that flow into Lake Ontario (the Rideau, the Salmon, the Ganaraska, the Moira, the Trent, the Don, the Rouge, the Etobicoke, the Humber, and the Credit, as well as Wilmot and 16 Mile Creeks) through Burlington Bay and the Niagara region including the Welland and Niagara Rivers, and beyond. The western side of the Michi Saagiig Nation was located around the Grand River which was used as a portage route as the Niagara portage was too dangerous. The Michi Saagiig would portage from present-day Burlington to the Grand River and travel south to the open water on Lake Erie.

Michi Saagiig oral histories also speak to the occurrence of people coming into their territories sometime between 500-1000 A.D. seeking to establish villages and a corn growing economy – these newcomers included peoples that would later be known as the Huron-Wendat, Neutral, Petun/Tobacco Nations. The Michi Saagiig made Treaties with these newcomers and granted them permission to stay with the understanding that they were visitors in these lands. Wampum was made to record these contracts, ceremonies would have bound each nation to their respective responsibilities within the political relationship, and these contracts would have been renewed annually (see Gitiga Migizi and Kapyrka 2015). These visitors were extremely successful as their corn economy grew as well as their populations. However, it was understood by all nations involved that this area of Ontario were the homeland territories of the Michi Saagiig.

The Odawa Nation worked with the Michi Saagiig to meet with the Huron-Wendat, the Petun, and Neutral Nations to continue the amicable political and economic relationship that existed – a symbiotic relationship that was mainly policed and enforced by the Odawa people.

Problems arose for the Michi Saagiig in the 1600s when the European way of life was introduced into southern Ontario. Also, around the same time, the Haudenosaunee were given firearms by the colonial governments in New York and Albany which ultimately made an expansion possible for them into Michi Saagiig territories. There began skirmishes with the various nations living in Ontario at the time. The Haudenosaunee engaged in fighting with the Huron-Wendat and between that and the onslaught of European diseases, the Iroquoian speaking peoples in Ontario were decimated.

The onset of colonial settlement and missionary involvement severely disrupted the original relationships between these Indigenous nations. Disease and warfare had a devastating impact upon the Indigenous peoples of Ontario, especially the large sedentary villages, which mostly included Iroquoian speaking peoples. The Michi Saagiig were largely able to avoid the devastation caused by these processes by retreating to their wintering grounds to the north, essentially waiting for the smoke to clear.

Michi Saagiig Elder Gitiga Migizi (2017) recounts:

"We weren't affected as much as the larger villages because we learned to paddle away for several years until everything settled down. And we came back and tried to bury the bones of the Huron but it was overwhelming, it was all over, there were bones all over – that is our story.

There is a misnomer here, that this area of Ontario is not our traditional territory and that we came in here after the Huron-Wendat left or were defeated, but that is not true. That is a big misconception of our history that needs to be corrected. We are the traditional people, we are the ones that signed treaties with the Crown. We are recognized as the ones who signed these treaties and we are the ones to be dealt with officially in any matters concerning territory in southern Ontario.

We had peacemakers go to the Haudenosaunee and live amongst them in order to change their ways. We had also diplomatically dealt with some of the strong chiefs to the north and tried to make peace as much as possible. So we are very important in terms of keeping the balance of relationships in harmony.

Some of the old leaders recognized that it became increasingly difficult to keep the peace after the Europeans introduced guns. But we still continued to meet, and we still continued to have some wampum, which doesn't mean we negated our territory or gave up our territory – we did not do that. We still consider ourselves a sovereign nation despite legal challenges against that. We still view ourselves as a nation and the government must negotiate from that basis."

Michi Saagiig Historical/Background context
Often times, southern Ontario is described as being "vacant" after the dispersal of the Huron-Wendat peoples in 1649 (who fled east to Quebec and south to the United States). This is misleading as these territories remained the homelands of the Michi Saagiig Nation. The Michi Saagiig participated in eighteen treaties from 1781 to 1923 to allow the growing number of European settlers to establish in Ontario. Pressures from increased settlement forced the Michi Saagiig to slowly move into small family groups around the present day communities: Curve Lake First Nation, Hiawatha First Nation, Alderville First Nation, Scugog Island First Nation, New Credit First Nation, and Mississauga First Nation. The Michi Saagiig have been in Ontario for thousands of years, and they remain here to this day. **This historical context was prepared by Gitiga Migizi, a respected Elder and Knowledge Keeper of the Michi Saagiig Nation.** Publication reference: Gitiga Migizi and Julie Kapyrka 2015 Before, During, and After: Mississauga Presence in the Kawarthas. In Peterborough Archaeology, Dirk Verhulst, editor, pp.127-136. Peterborough, Ontario: Peterborough Chapter of the Ontario Archaeological Society.

Table 4: Huron-Wendat Nation History
(Provided by Huron-Wendat Nation)

History of the Nation Huronne-Wendat
As an ancient people, traditionally, the Huron-Wendat, a great Iroquoian civilization of farmers and fishermen-hunter-gatherers and also the masters of trade and diplomacy, represented several thousand individuals. They lived in a territory stretching from the Gaspé Peninsula in the Gulf of Saint Lawrence and up along the Saint Lawrence Valley on both sides of the Saint Lawrence River all the way to the Great Lakes. Huronia, included in Wendake South, represents a part of the ancestral territory of the Huron-Wendat Nation in Ontario. It extends from Lake Nipissing in the North to Lake Ontario in the South and Île Perrot in the East to around Owen Sound in the West. This territory is today marked by several hundred archaeological sites, listed to date, testifying to this strong occupation of the territory by the Nation. It is an invaluable heritage for the Huron-Wendat Nation and the largest archaeological heritage related to a First Nation in Canada. According to our own traditions and customs, the Huron-Wendat are intimately linked to the Saint Lawrence River and its estuary, which is the main route of its activities and way of life. The Huron-Wendat formed alliances and traded goods with other First Nations among the networks that stretched across the continent. Today, the population of the Huron-Wendat Nation is composed of more than 4000 members distributed on-reserve and off-reserve. The Huron-Wendat Nation band council (CNHW) is headquartered in Wendake, the oldest First Nations community in Canada, located on the outskirts of Quebec City (20 km north of the city) on the banks of the Saint Charles River. There is only one Huron-Wendat community, whose ancestral territory is called the Nionwentsïo, which translates to "our beautiful land" in the Wendat language. The Huron-Wendat Nation is also the only authority that have the authority and rights to protect and take care of her ancestral sites in Wendake South.

1.2.3 Past and Present Land Use

1.2.3.1 Overview

During Pre-Contact and Early Contact times, the vicinity of the study area would have comprised a mixture of coniferous trees, deciduous trees and open areas. Indigenous communities would have managed the landscape to some degree. During the early 19th century, Euro-Canadian settlers arrived in the area and began to clear the forests for agricultural and settlement purposes. The study area was located northeast of the historical community of Vachell. The land use at the time of assessment can be classified as a mixture of residential, agricultural and greenspace.

1.2.3.2 Mapping and Imagery Analysis

In order to gain a general understanding of the study area's past land uses, one patent plan, two historical settlement maps, one topographic map and five aerial images were examined during the research component of the study. Specifically, the following resources were consulted:

- The *Georgina Township* Patent Plan (No Date) (AO 2015);
- *Tremaine's Map of the County of Ontario, Upper Canada* (1860) (U of T 2021);
- *Illustrated Historical Atlas of the County of York and the Township of West Gwillimbury & Town of Bradford in the County of Simcoe, Ontario* (1878) (MU 2001);
- A topographic map from 1929 (OCUL 2021); and
- Aerial images from 1954, 1978, 1988, 1999 and 2014 (York Region 2020).

The limits of the study area are shown on georeferenced versions of the consulted historical resources in Map 2–Map 10.

The *Georgina Township* Patent Plan was initiated on a copy of an original survey plan and updated with patent information until the records were transferred to the Archives of Ontario. This plan indicates that Lots 10–12, Concession 5 were patented to Benjamin Baffie, the Canada Company and William Allan, respectively (Map 2). Road allowances appear to the north and south.

Tremaine's Map of the County of York, Canada West (1860) depicts the study area as being occupied or owned by J.O. Bourenier in the eastern part of Lot 10, the Canada Company in the southern half of Lot 11, Arthur Dodge in the northern half of Lot 11 and George Evans in the western part of Lot 12 (Map 3). No structures are illustrated within or adjacent to the study area, although Old Homestead Road appears to the south. It should be noted that this particular map depicted few private structures in the surrounding lots, so the absence of illustrated buildings is not necessarily an indication that the study area was unimproved.

The *Illustrated Historical Atlas of the County of York and the Township of West Gwillimbury & Town of Bradford in the County of Simcoe, Ontario* (1878) lists Mrs. Cameron as the subsequent occupant of the eastern portion of Lot 10, with Jonathan Kay in the northern half of Lot 11 and George Evans in the southern half of Lot 11 and western part of Lot 12 (Map 4). The Kay farmhouse and orchard appear within the northern part of the study area. Unlike the previous map, more farmsteads are depicted along Old Homestead Road, particularly as it approaches the community of Vachell to the west. The topographic map from 1929 indicates that the study area primarily comprised cleared agricultural land, and a wooden house and barn are shown east of a laneway extending north from Old Homestead Road in roughly the same location as the extant farm buildings (Map 5). Wooded lands appear to the northwest and southeast, with marshland in the centre and southeast.

The aerial image from 1954 confirms that the property comprised a series of agricultural fields, and a variety of structures appear east of the laneway in the southwest, including at least one home, a large barn and several outbuildings (Map 6). The aerial image from 1978 indicates that the study area remained relatively unchanged, but the aerial image from 1988 depicts an additional home, barn and outbuilding in the southeast corner along with a laneway extending north from Old Homestead Road (Map 7–Map 8). It is unclear if these structures were strictly agricultural in nature, as the laneway extends into the east-central part of the study area where it appears as though some kind of development was occurring. However, that part of the study area seems to have reverted back to a more natural state by 1999, though by 2014 it appears as though that area was utilized as a parking/dumping area (Map 9–Map 10).

1.3 Archaeological Context

The Stage 1 assessment (property inspection) was conducted on September 23 and 24, 2021 under PIF #P007-1243-2021. The limits of the study area were confirmed using aerial imagery showing physical features in relation to the subject lands.

The archaeological context of any given study area must be informed by 1) the condition of the property as found (Section 1.3.1), 2) a summary of registered or known archaeological sites located within a minimum 1 km radius (Section 1.3.2) and 3) descriptions of previous archaeological fieldwork carried out within the limits of, or immediately adjacent to the property (Section 1.3.3).

1.3.1 Condition of the Property

The study area lies within the Great Lakes–St. Lawrence forest region, which is a transitional zone between the southern deciduous forest and the northern boreal forest. This forest extends along the St. Lawrence River across central Ontario to Lake Huron and west of Lake Superior along the border with Minnesota, and its southern portion extends into the more populated areas of Ontario. This forest is dominated by hardwoods, featuring species such as maple, oak, yellow birch, white and red pine. Coniferous trees such as white pine, red pine, hemlock and white cedar commonly mix with deciduous broad-leaved species, such as yellow birch, sugar and red maples, basswood and red oak (MNRF 2022).

In terms of local physiography, the subject lands fall within the Simcoe Lowlands. This region consists of an approximately 284,899 ha area bordering Georgian Bay and Lake Simcoe. Specifically, the study area lies within the eastern part of the region (the Lake Simcoe basin), which was once flooded by Lake Algonquin and is bordered by shorecliffs, beaches and bouldery terraces. Along the northern and western shores of the lake, the Lake Simcoe basin comprises a narrow bouldery terrace mostly confined by a low bluff cut by the highest stage of Lake Algonquin, and to the south and east there are broader plains (Chapman and Putnam 1984:177–182).

According to the Ontario Soil Survey, the study area consists of Sargent sandy loam in the northeast, Emily loam in the north, Otonabee loam in the west, Tecumseth sandy loam in the southwest, muck in the south-centre and Granby sandy loam in the southeast. All of these soils, save for muck, are characterized by a smooth to gently sloping topography. Granby sandy loam features poor drainage qualities while Emily loam and Tecumseth sandy loam are imperfectly drained. Otonabee loam and Sargent sandy loam have good drainage qualities, whereas muck forms in depressions and has very poor natural drainage (Hoffman and Richards 1955).

The subject lands fall within the Black River drainage basin, which is under the jurisdiction of the Lake Simcoe Region Conservation Authority (LSRCA 2016). Specifically, the study area is traversed by a tributary of Lake Simcoe, two unnamed waterbodies and several parts of the Vachell Swamp Wetland Complex and Zephyr-Egypt Wetland Complex. At the time of assessment, the study area consisted of former agricultural fields, part of two former farmsteads, and various wooded areas, scrub lands and wetlands. Soil conditions were ideal for the activities conducted. No unusual physical features were encountered that affected the results of the Stage 1 assessment.

1.3.2 Registered or Known Archaeological Sites

The Ontario Archaeological Sites Database and the Ontario Public Register of Archaeological Reports were consulted to determine whether any registered or known archaeological resources occur within a 1 km radius of the study area. The available search facility returned three registered sites located within at least a 1 km radius (the facility returns sites in a rectangular area, rather than a radius, potentially resulting in returns beyond the specified distance). No unregistered sites were identified within a 1 km radius of the study area. The sites are summarized in Table 5.

Table 5: Registered or Known Archaeological Sites

Borden No. / ID No.	Site Name / Identifier	Time Period	Affinity	Site Type	Distance from Study Area
BbGt-29	-	Post-Contact	Euro-Canadian	Dump	300 m–1 km
BbGt-30	-	Post-Contact	Euro-Canadian	Unspecified	300 m–1 km
BbGt-31	H1	Post-Contact	Euro-Canadian	Homestead	300 m–1 km

None of these previously identified sites are located within or immediately adjacent to the subject lands; accordingly, they have no potential to traverse the study area. These sites represent distant archaeological resources located over 300 m away.

1.3.3 Previous Archaeological Work

A review of available archaeological management plans and/or other archaeological potential mapping was undertaken to inform the assessment process. Specifically, York Region's *Archaeological Potential* GIS layer was examined for information that could influence the choice of fieldwork techniques or recommendations. The associated mapping indicates that the majority of the study area has archaeological potential (Map 11).

Reports documenting assessments conducted within the subject lands and assessments that resulted in the discovery of sites within adjacent lands were also sought during the research component of the study. In order to ensure that all relevant past work was identified, an investigation was launched to identify reports involving assessments within 50 m of the study area. The investigation determined that there is one available report documenting previous archaeological fieldwork within the specified distance. The relevant results and recommendations are summarized below as required by Section 7.5.8 Standards 4–5 of the 2011 *S&Gs*.

In April 2012, Stage 1 and 2 assessments were conducted for the EarthLight LP Solar Project under PIF #P120-130-2012 (TAI 2012). The assessed area falls within 50 m of the southern edge of the study area. The investigation resulted in the discovery of one location of archaeological materials: H1 (BbGt-31). The site was found to be of further CHVI, and it was recommended that a Stage 3 site-specific assessment be conducted (TAI 2012:12).

2.0 STAGE 1 BACKGROUND STUDY

2.1 Background

The Stage 1 assessment involved background research to document the geography, history, previous archaeological fieldwork and current land condition of the study area. This desktop examination included research from archival sources, archaeological publications and online databases. It also included the analysis of a variety of historical maps and aerial imagery. The results of the research conducted for the background study are summarized below.

With occupation beginning approximately 11,000 years ago, the greater vicinity of the study area comprises a complex chronology of Pre-Contact and Post-Contact histories (Section 1.2.1). Artifacts associated with Palaeo, Archaic, Woodland and Early Contact traditions are well-attested in the Regional Municipality of York, and Euro-Canadian archaeological sites dating to pre-1900 and post-1900 contexts are likewise common. The presence of three previously identified sites in the surrounding area demonstrates the desirability of this locality for early settlement (Section 1.3.2). The investigation confirmed that none of these sites extend into the subject lands. Background research did not identify any areas of previous assessment within the study area (Section 1.3.3).

The natural environment of the study area would have been attractive to both Indigenous and Euro-Canadian populations as a result of proximity to a tributary of Lake Simcoe. The areas of Sargent sandy loam and Otonabee loam would have been ideal for agriculture, and the diverse local vegetation would also have encouraged settlement throughout Ontario’s lengthy history. Euro-Canadian populations would have been particularly drawn to Old Homestead Road and Morning Glory Road, both of which were historically-surveyed thoroughfares.

In summary, the background study included an up-to-date listing of sites from the Ontario Archaeological Sites Database (within at least a 1 km radius), the consideration of previous local archaeological fieldwork (within at least a 50 m radius), the analysis of historical maps (at the most detailed scale available) and the study of aerial imagery. A review of an archaeological management plan was also carried out. ARA therefore confirms that the standards for background research set out in Section 1.1 of the 2011 *S&Gs* were met.

2.2 Field Methods (Property Inspection)

In order to gain first-hand knowledge of the geography, topography and current condition of the study area, a property inspection was conducted on September 23 and 24, 2021. Environmental conditions were ideal during the inspection and a breakdown of the specific fieldwork activities, weather and lighting conditions appears in Table 6. ARA therefore confirms that fieldwork was carried out under weather and lighting conditions that met the requirements set out in Section 1.2 Standard 2 of the 2011 *S&Gs*.

Table 6: Fieldwork Activities and Environmental Conditions

Date	Activity	Lighting	Cloud Cover	Precipitation	Temperature (°C)
23/09/2021	Visual inspection	Low	Overcast	None	16
24/09/2021	Visual inspection	Bright	Overcast	None	12

The study area was subjected to random spot-checking. The inspection confirmed that all surficial features of archaeological potential were present where they were previously identified and did not result in the identification of any additional features of archaeological potential not visible on mapping (e.g., relic water channels, patches of well-drained soils, etc.).

The inspection determined that parts of the study area were disturbed by past construction activities, and several permanently wet areas were also encountered. No other natural features (e.g., sloped lands, overgrown vegetation, heavier soils than expected, etc.) or significant built features (e.g., heritage structures, landscapes, plaques, monuments, cemeteries, etc.) that would affect assessment strategies were identified.

2.3 Analysis and Conclusions

In addition to relevant historical sources and the results of past archaeological assessments, the archaeological potential of a property can be assessed using its soils, hydrology and landforms as considerations. Section 1.3.1 of the 2011 *S&Gs* recognizes the following features or characteristics as indicators of archaeological potential: previously identified sites, water sources (past and present), elevated topography, pockets of well-drained sandy soil, distinctive land formations, resource areas, areas of Euro-Canadian settlement, early transportation routes, listed or designated properties, historic landmarks or sites, and areas that local histories or informants have identified with possible sites, events, activities or occupations.

The Stage 1 assessment resulted in the identification of several features of archaeological potential in the vicinity of the study area (Map 12). The closest and most relevant indicators of archaeological potential (i.e., those that would directly affect survey interval requirements) include three primary water sources (a tributary of Lake Simcoe and two unnamed waterbodies), multiple secondary water sources (parts of the Zephyr-Egypt and Vachell Swamp Wetland Complexes), four physiographic landforms (an abandoned shore bluff and abandoned beach bars), two historical roadways (Old Homestead Road and Morning Glory Road) and four historical structure localities (late 19th-century houses). Background research did not identify any features indicating that the study area has potential for deeply buried archaeological resources.

Although proximity to a feature of archaeological potential is a significant factor in the potential modelling process, current land conditions must also be considered. Section 1.3.2 of the 2011 *S&Gs* emphasizes that 1) quarrying, 2) major landscaping involving grading below topsoil, 3) building footprints and 4) sewage/infrastructure development can result in the removal of archaeological potential, and Section 2.1 states that 1) permanently wet areas, 2) exposed bedrock and 3) steep slopes (> 20°) in areas unlikely to contain pictographs or petroglyphs can also be evaluated as having no or low archaeological potential. Areas previously assessed and not recommended for further work also require no further assessment.

York Region's *Archaeological Potential* GIS layer indicates that the majority of the study area has archaeological potential (Map 11). However, this modelling was not the result of a property-specific assessment and therefore does not fully account for land-use history and current conditions. Background research did not identify any previously assessed areas of no further concern within the study area.

ARA's visual inspection, coupled with the analysis of historical sources and digital environmental data, resulted in the identification of several areas of no archaeological potential. Specifically, deep land alterations have resulted in the removal of archaeological potential from the footprints of the extant barn and structures in the southeast and west as well as along the laneways extending north from Old Homestead Road (Image 1–Image 4). These areas have clearly been impacted by past earth-moving/construction activities, resulting in the disturbance of the original soils to a significant depth and severe damage to the integrity of any archaeological resources. Two permanently wet areas associated with the Vachell Swamp Wetland Complex were identified in the northeast, and another wetland was encountered in the southeast. The tributary of Lake Simcoe in the southern part of the study area was documented (Image 5–Image 6), but archaeological potential modelling for watercourses is beyond the purview of any land-based assessment.

The remainder of the study area has potential for Indigenous and Euro-Canadian archaeological materials or requires test pit survey to confirm disturbance (Image 7–Image 18). In general, the areas of archaeological potential include the former agricultural fields in the west and the various grassed and treed areas throughout the remainder of the study area. It seems likely that the northern part of the eastern laneway and the more developed portions of the western farmstead were previously impacted, but this could not be verified based on the inspection alone. Similarly, a large area along the north side of Old Homestead Road and the west side of the tributary of Lake Simcoe could be permanently wet (instead of just seasonally wet). These lands have been categorized as areas of archaeological potential and must be empirically tested to confirm that they have no archaeological potential.

In summary, the Stage 1 assessment determined that the study area comprises a mixture of areas of archaeological potential and areas of no archaeological potential. The potential modelling results are presented in Map 13–Map 14. The study area is depicted as a layer in these maps.

3.0 RECOMMENDATIONS

The Stage 1 assessment determined that the study area comprises a mixture of areas of archaeological potential and areas of no archaeological potential. It is recommended that the identified areas of archaeological potential be subject to a Stage 2 property assessment in accordance with Section 2.1 of the 2011 *S&Gs*. If any in-water work is needed within the tributary of Lake Simcoe in the south, the Criteria for Evaluating Marine Archaeological Potential checklist should be consulted. There are no current plans for any in-water work.

The former agricultural fields must be assessed using the pedestrian survey method at an interval of 5 m. All ground surfaces must be recently ploughed (typically within the month prior to assessment), weathered by one heavy rainfall or several light rains, and provide at least 80% visibility. If archaeological materials are encountered, the transect interval must be decreased to at least 1 m and a close inspection of the ground must be conducted over a minimum of a 20 m radius around the find. This interval must be continued until the full extent of the scatter has been defined.

The grassed and wooded areas must be assessed using the test pit survey method. A survey interval of 5 m will be required due to the proximity of the lands to the identified features of archaeological potential. Given the likelihood that the northern part of the eastern laneway and parts of the western farmstead were previously impacted, a combination of visual inspection and test pit survey should be utilized to confirm the extent of disturbance in accordance with Section 2.1.8 of the 2011 *S&Gs*. This will allow for the empirical evaluation of the integrity of the soils and the depth of any impacts. Judgemental test pit survey should similarly be carried out to confirm the extent of the possible permanently wet area in the southern part of the study area. If these areas are determined to have archaeological potential, then a test pit survey interval of 5 m must be maintained. Each test pit must be excavated into at least the first 5 cm of subsoil, and the resultant pits must be examined for stratigraphy, potential features and/or evidence of fill. The soil from each test pit must be screened through mesh with an aperture of no greater than 6 mm and examined for archaeological materials. If archaeological materials are encountered, all positive test pits must be documented, and intensification may be required.

The identified areas of no archaeological potential do not require any additional assessment. Given that there are still outstanding archaeological concerns within the property, no ground alterations or development of any kind may occur until the required investigation is complete, a recommendation that the lands require no further archaeological assessment is made, and the associated report is entered into the Ontario Public Register of Archaeological Reports.

4.0 ADVICE ON COMPLIANCE WITH LEGISLATION

Section 7.5.9 of the 2011 *S&Gs* requires that the following information be provided for the benefit of the proponent and approval authority in the land use planning and development process:

- This report is submitted to the Minister of Tourism, Culture and Sport 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 that are 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 MTCS, 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.
- 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 Archaeology Reports referred to in Section 65.1 of the *Ontario Heritage Act*.
- 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 consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (1) of the *Ontario Heritage Act*.
- The *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 requires that any person discovering human remains must notify the police or coroner and the Registrar at the Ministry of Public and Business Service Delivery.

5.0 IMAGES

Image 1: Disturbed Lands
(September 24, 2021; Facing Northwest)

Image 2: Disturbed Lands
(September 24, 2021; Facing Northeast)

Image 3: Disturbed Lands
(September 23, 2021; Facing West)

Image 4: Disturbed Lands
(September 23, 2021; Facing Northwest)

Image 5: Watercourse
(September 23, 2021; Facing Southeast)

Image 6: Watercourse
(September 24, 2021; Facing Northeast)

Image 7: Area of Potential
(September 24, 2021; Facing West)

Image 8: Area of Potential
(September 24, 2021; Facing East)

Image 9: Area of Potential
(September 24, 2021; Facing East)

Image 10: Area of Potential
(September 23, 2021; Facing Southwest)

Image 11: Area of Potential
(September 23, 2021; Facing North)

Image 12: Area of Potential
(September 23, 2021; Facing East)

Image 13: Area of Potential
(September 24, 2021; Facing South)

Image 14: Area of Potential
(September 24, 2021; Facing Northeast)

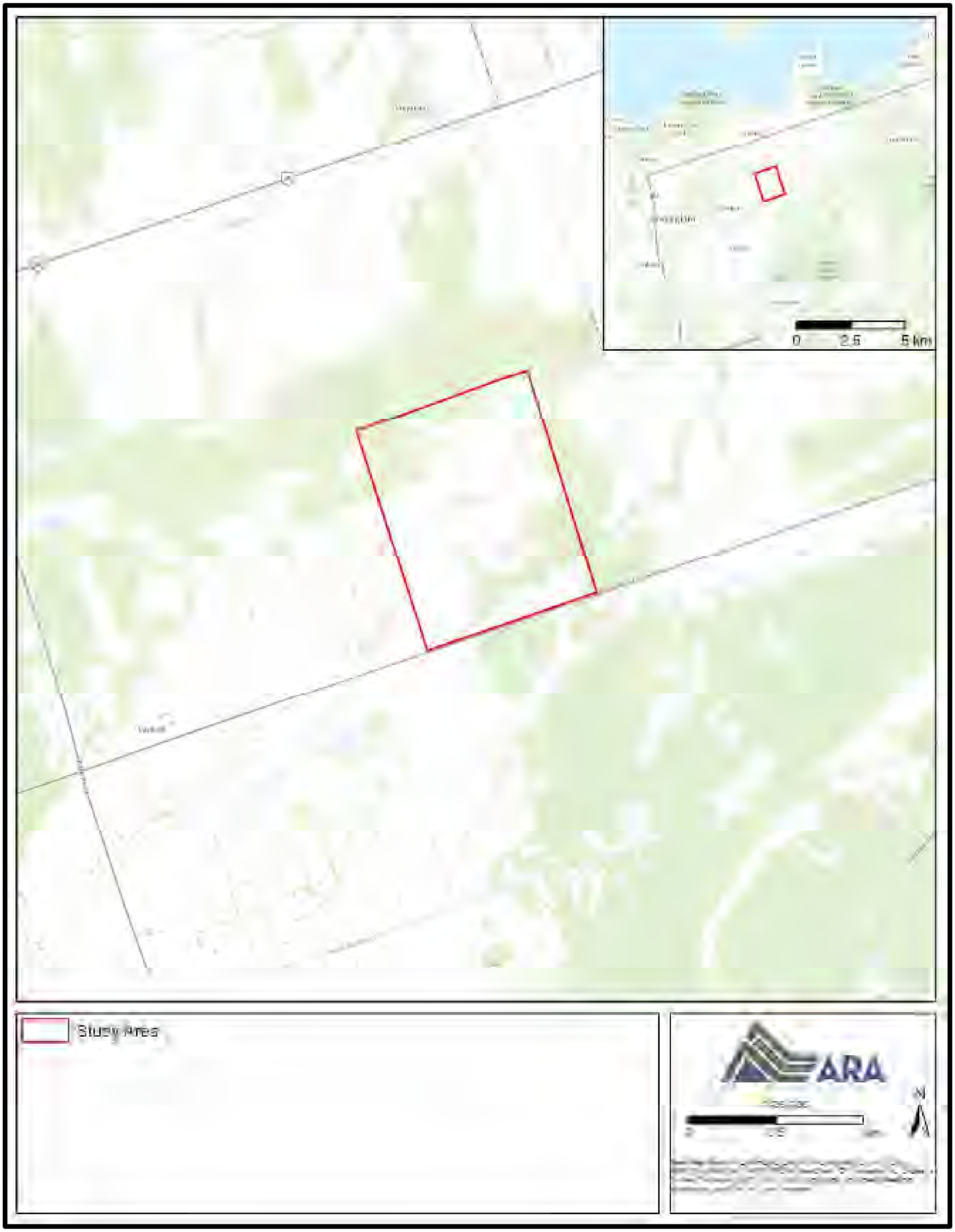
Image 15: Area of Potential
(September 24, 2021; Facing Northeast)

Image 16: Area of Potential
(September 23, 2021; Facing North)

Image 17: Area of Potential
(September 23, 2021; Facing North)

Image 18: Area of Potential
(September 23, 2021; Facing North)

6.0 MAPS



Map 1: Location of the Study Area
(Produced under licence using ArcGIS® software by Esri, © Esri)

Map 2: ***Georgina Township*** **Patent Plan (No Date)**
(Produced under licence using ArcGIS® software by Esri, © Esri; AO 2015)

Map 3: ***Tremaine's Map of the County of Ontario, Canada West*** **(1860)**
(Produced under licence using ArcGIS® software by Esri, © Esri; U of T 2021)

Map 4: ***Illustrated Historical Atlas of the County of York and the Township of West Gwillimbury & Town of Bradford in the County of Simcoe, Ontario*** **(1878)**
(Produced under licence using ArcGIS® software by Esri, © Esri; MU 2001)

Map 5: Topographic Map (1929)
(Produced under licence using ArcGIS® software by Esri, © Esri; OCUL 2021)

Map 6: Aerial Image (1954)
(Produced under licence using ArcGIS® software by Esri, © Esri; York Region 2020)

Map 7: Aerial Image (1978)
(Produced under licence using ArcGIS® software by Esri, © Esri; York Region 2020)

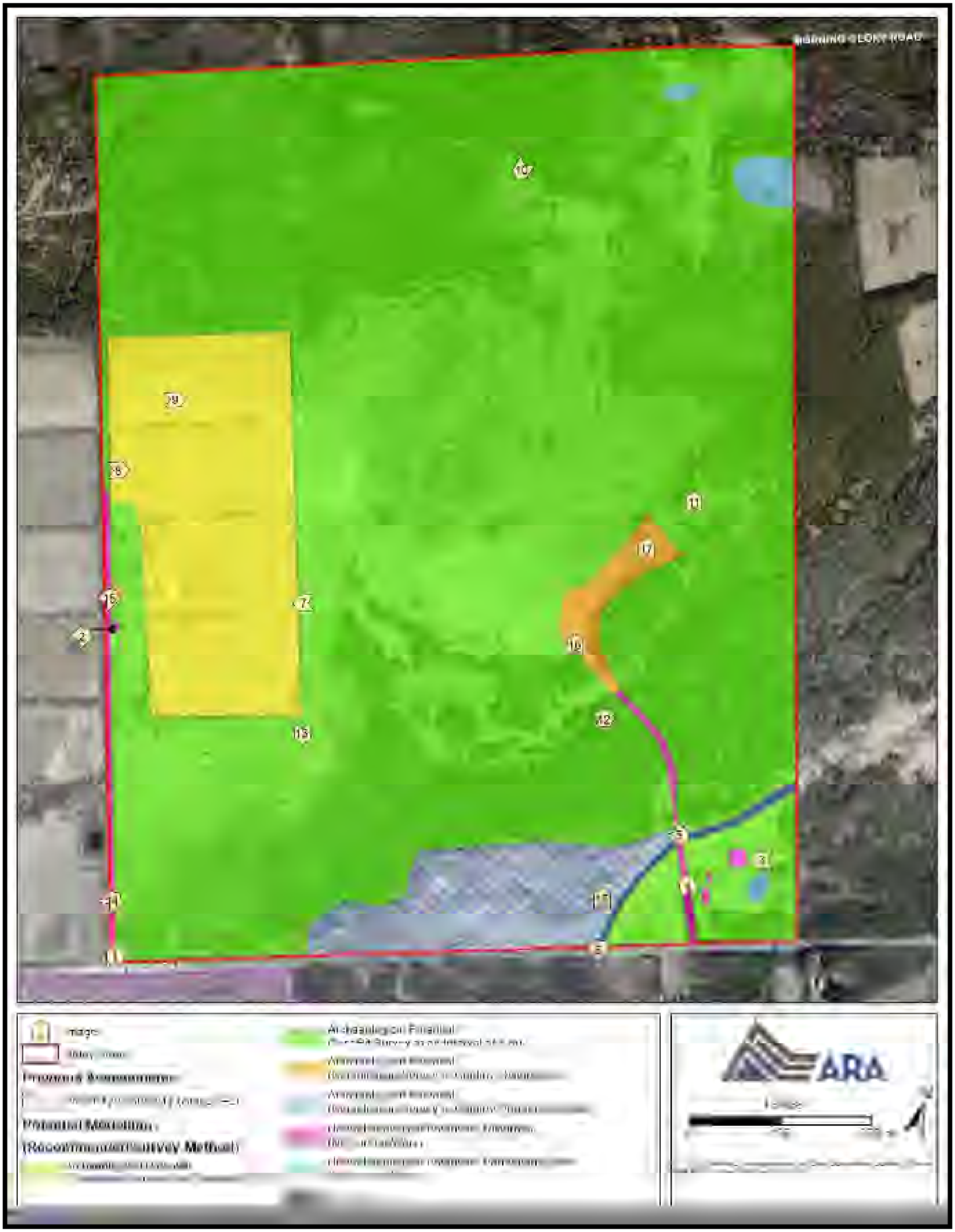
Map 8: Aerial Image (1988)
(Produced under licence using ArcGIS® software by Esri, © Esri; York Region 2020)

Map 9: Aerial Image (1999)
(Produced under licence using ArcGIS® software by Esri, © Esri; York Region 2020)

Map 10: Aerial Image (2014)
(Produced under licence using ArcGIS® software by Esri, © Esri; York Region 2020)

Map 11: York Region's *Archaeological Potential* GIS Layer
(Produced under licence using ArcGIS® software by Esri, © Esri; York Region 2020)

Map 12: Features of Potential
(Produced under licence using ArcGIS® software by Esri, © Esri)



Map 13: Potential Modelling and Recommendations (Aerial Image)
(Produced under licence using ArcGIS® software by Esri, © Esri)

Map 14: Potential Modelling and Recommendations (Development Plan)
(Produced under licence using ArcGIS® software by Esri, © Esri)

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ARCHAEOLOGY | HERITAGE | OUTREACH | EDUCATION

Stage 1 Archaeological Assessment
Sutton Aerodrome Development
Town of Georgina
Regional Municipality of York
Part of Lots 10–12, Concession 5
Geographic Township of Georgina
Former York County, Ontario

Prepared for
Avia NG Airport Consutants
23 Albert Street North
Southampton, ON N0H 2L0
Tel: (519) 483-3434

Licensed under
P.J. Racher
MTCS Licence #P007
PIF #P007-1243-2021
ARA File #2021-0410

07/09/2022

Record of Indigenous Engagement

TABLE OF CONTENTS

ROIE TABLES

ROIE APPENDICES

1.0 RECORD OF INDIGENOUS ENGAGEMENT

1.1 Summary of Events

The identification of Indigenous engagement contacts was based on knowledge about treaty areas and traditional territories. Subsequent to approval from the proponent, the following groups were contacted to determine whether they had an interest in participating in the project:

- Alderville First Nation (AFN);
- Beausoleil First Nation (BFN);
- Chippewas of Rama First Nation (CRFN);
- Curve Lake First Nation (CLFN);
- Georgina Island First Nation (GIFN);
- Hiawatha First Nation (HFN);
- Huron-Wendat Nation (HWN); and
- Mississaugas of Scugog Island First Nation (MSIFN).

Archaeological Research Associates Ltd. (ARA) engaged or attempted to engage with each of these groups over the course of the investigation. In keeping with the requirements set out in Section 7.6.2 of the 2011 *Standards and Guidelines for Consultant Archaeologists*, a description of ARA's involvement in the process is summarized below. The 2011 *Engaging Aboriginal Communities in Archaeology* draft technical bulletin was also consulted for guidance.

ARA's involvement in the engagement process began with the circulation of a project notification letter (RoIE Appendix A). Within this letter, ARA provided opportunities to submit Traditional or Ecological Knowledge for inclusion in the Stage 1 report, to join the field crew for the site visit and/or to review the draft report. No representatives joined ARA in the field during the property inspection. A summary of engagement events appears in RoIE Table 1.

RoIE Table 1: Summary of Engagement Events

Group	Date	Engagement Event	Nature
AFN *Contact:* *D. Simpson*	07-Sep-21	Project introduction and invitation to participate circulated.	Email
	19-Jul-22	Circulation of draft report for review and comment.	Email
	07-Sep-22	No comments received.	-
BFN *Contact:* *D. Monague*	07-Sep-21	Project introduction and invitation to participate circulated.	Email
	19-Jul-22	Circulation of draft report for review and comment.	Email
	07-Sep-22	No comments received.	-
CRFN *Contact:* *S. James*	07-Sep-21	Project introduction and invitation to participate circulated.	Email
	19-Jul-22	Circulation of draft report for review and comment.	Email
	07-Sep-22	No comments received.	-
CLFN *Contacts:* *J. Kapyrka,* *J. MacArthur*	07-Sep-21	Project introduction and invitation to participate circulated.	Email
	09-Sep-21	J. MacArthur responded to state that the CLFN did not have a monitor available to attend the site visit and that they would defer to the GIFN. J. MacArthur also indicated that the community would like the opportunity to review the report once it was available.	Email
	19-Jul-22	Circulation of draft report for review and comment. Received an out of office reply from J. Kapyrka until July 25, 2022.	Email

Group	Date	Engagement Event	Nature
	26-Jul-22	J. Kapyrka provided the results of the draft report review and requested a differentiation be made between provided oral histories and statements of histories.	Email
	24-Aug-22	S. Clarke provided the updated Traditional Knowledge section of the report to CLFN for review.	Email
	06-Sep-22	J. Kapyrka replied with thanks for the revision.	Email
GIFN *Contacts:* *N. Charles,* *J.L. Porte*	07-Sep-21	Project introduction and invitation to participate circulated.	Email
	08-Sep-21	N. Charles responded to indicated interest in participating in any environmental or archaeological work for the project. V. Cafik responded to request a standard agreement for signature.	Email
	15-Sep-21	Deployment details provided for the following week. N. Charles indicated that she would be available on the 24th and would send an agreement as soon as she were able.	Email
	23-Sep-21	V. Cafik provided deployment information for the following day and requested that an agreement be forwarded for signature. N. Charles responded to note that she had planned on bringing the agreement with her to the field but with the scheduling change she would no longer be able to attend the site visit. N. Charles requested that ARA provide her a summary of results of the site visit.	Email
	27-Sep-21	V. Cafik provided a daily summary of result for the site visit that was completed on Sept 23 and 24, 2021.	Email
	19-Jul-22	Circulation of draft report for review and comment.	Email
	04-Aug-22	J.L. Porte replied that GIFN was not able to review the report in the requested timeline. Porte also noted that GIFN stands with the Town of Georgina and local residents against the project and has sent letters outlining their reasoning and complaints. S. Clarke inquired if additional time to review the report would be helpful and noted that ARA had not received copies of those letters, but that they would be reviewed if provided to ARA.	Email
	07-Sep-22	No letters or other comments were received.	-
HFN *Contacts:* *T. Cowie,* *S. Davison,* *M. McGonigle*	07-Sep-21	Project introduction and invitation to participate circulated.	Email
	19-Jul-22	Circulation of draft report for review and comment.	Email
	05-Aug-22	M. McGonigle responded that the report had been reviewed and that she was appreciative for the inclusion of the paragraph regarding Anishinaabeg presence in southern Ontario despite the lack of archaeological evidence.	Email
HWN *Contact:* *M.-S. Gendron*	07-Sep-21	Project introduction and invitation to participate circulated.	Email
	10-Sep-21	M.-S. Grendon indicated that the HWN would not be able to provide any traditional knowledge but would like to attend the site visit and to provide the deployment details once they were available.	Email
	15-Sep-21	Deployment details provided for the following week.	Email
	17-Sep-21	M.-S. Gendron indicated that she could provide a monitor for the site visit and included a quote for the work. After receiving the quote, the proponent requested that ARA inquire if there were other options for engagement at the Stage 1 level. V. Cafik telephoned M.-S. Gendron to request that HWN consider a report review only, which M.-S. Gendron agreed to. V. Cafik followed up with an email to confirm what had been discussed over the phone.	Telephone/E mail
	19-Jul-22	Circulation of draft report for review and comment.	Email
	20-Jul-22	M.-S. Gendron replied that HWN would not be able to provide a review within the timeframe requested but requested to be informed of Stage 2 work. S. Clarke replied to inquire if additional review time to review the report would be beneficial.	Email
	21-Jul-22	M.-S. Gendron replied that HWN has decided not to review the report.	Email
MSIFN *Contacts:* *W. Birch,* *D. Mowat*	07-Sep-21	Project introduction and invitation to participate circulated.	Email
	19-Jul-22	Circulation of draft report for review and comment.	Email
	07-Sep-22	No comments received.	-

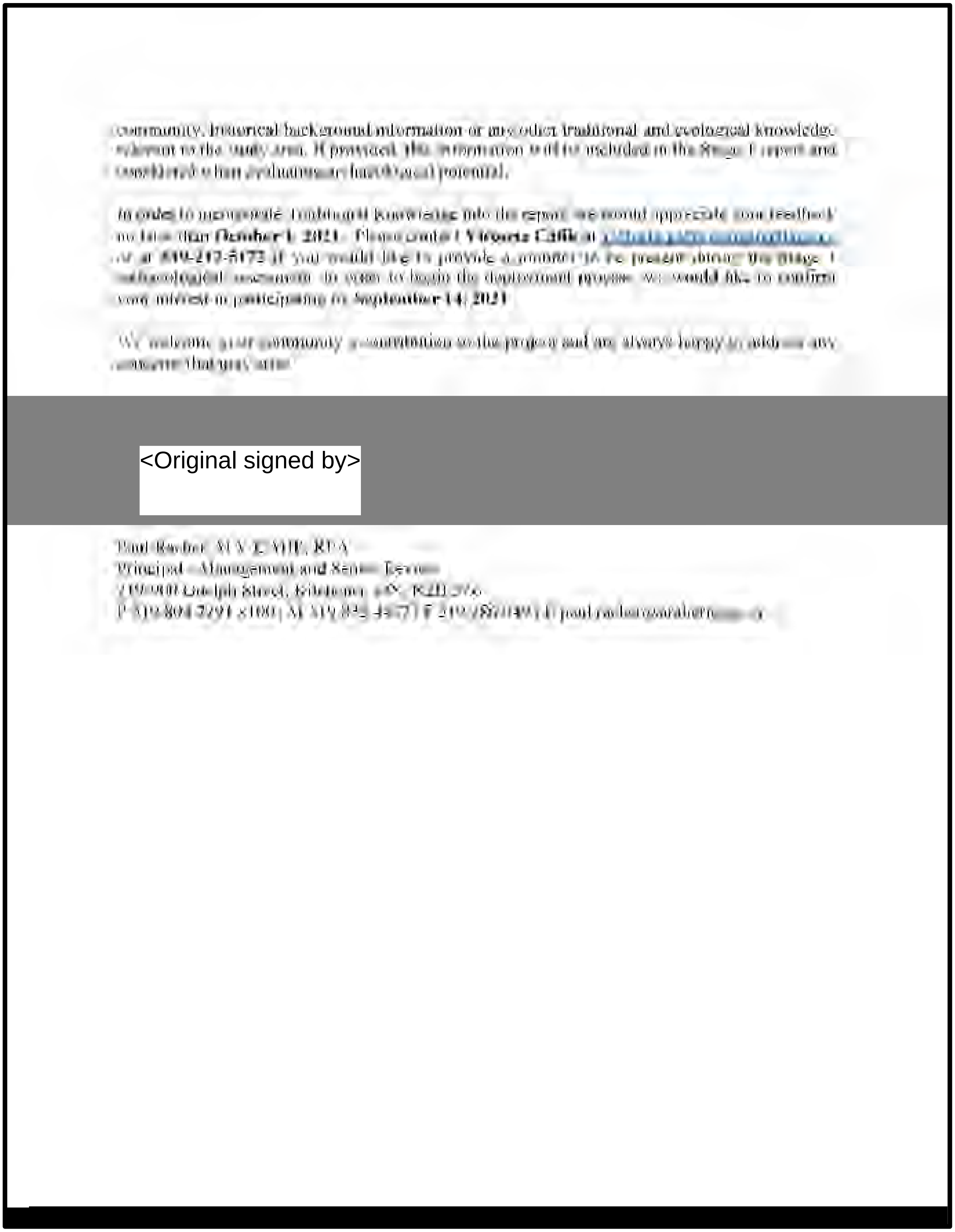
ROIE APPENDICES

RoIE Appendix A: Invitation to Participate

September 7, 2021

[ADDRESSEE]

RE: Request for Participation in the Stage 1 Archaeological Assessment for the Sutton Aviation Development Project in the Town of Georgina, Ontario



[redacted]

<Original signed by>


Map 1: Location of Study Area
Study Area
ARA

GUIDING SOLUTIONS IN THE
NATURAL ENVIRONMENT

Natural Heritage Study
7818 and 7486 Old Homestead Road
Town of Georgina

Prepared For:

Avia NG Airport Consultants

Prepared By:

Beacon Environmental Limited

Date:	*Project:*
November 2021	**221387**

Table of Contents

Figures

Tables

1. Introduction

Beacon Environmental Limited (Beacon) has been retained by Avia AG Airport Consultants to prepare a Natural Heritage Study at the properties municipally known as 7818 and 7486 Old Homestead Road (herein referred to as ‘subject property’) in the Town of Georgina, Regional Municipality of York (**Figure 1**).

The subject property is approximately 137 ha (338 ac) and located entirely in the Growth Plan for the Greater Golden Horseshoe. The subject property is currently subject to the natural heritage planning policies of this plan, as well as the natural heritage polices of the Town of Georgina, Regional Municipality of York, Lake Simcoe Region Conservation Authority (LRSCA) and the Provincial Policy Statement. Should these lands become an aerodrome the applicability of these policies will change and shift toward a federal jurisdiction.

The purpose of this natural heritage study is to provide an assessment of the existing conditions on and adjacent to the subject property and to identify those features which pose as constraints to development, as well as the areas that provide development potential.

2. Policy Review

The following natural heritage policies and regulations apply to the subject property, the applicability of these policies will change if the lands are designated an aerodrome by Transport Canada due to a shift toward a federal policy framework.

2.1 Federal *Fisheries Act* (1985)

In Ontario, Fisheries and Oceans Canada (DFO) manages fish habitat and the Ministry of Natural Resources and Forestry (MNRF) manages fisheries. There is a single watercourse mapped on the subject property which may be regulated under the Act, subject to confirmation through seasonal field surveys.

Fish and fish habitat are protected under the federal *Fisheries Act* (1985) which was last amended on August 28, 2019. The protection provisions of the *Fisheries Act* apply to all fish and fish habitat throughout Canada and the *Act* sets out authorities for the regulation of works, undertakings or activities that risk harming fish and fish habitat. Specifically, the protection provisions include two core prohibitions. One is against persons carrying on works, undertakings or activities that result in the “death of fish by means other than fishing” (subsection 34.4[1]), and the other is “harmful alteration, disruption or destruction of fish habitat” (subsection 35[1]; also referred to as “HADD”). The protection provisions are applied in conjunction with other applicable federal laws and regulations related to aquatic ecosystems, including the *Species at Risk Act*.

Fish habitat is defined in subsection 2(1) of the *Fisheries Act* to include all waters frequented by fish and any other areas upon which fish depend directly or indirectly to carry out their life processes. The types of areas that can directly or indirectly support life processes include, but are not limited to, spawning grounds and nursery, rearing, food supply and migration areas.

Under subsection 35(1) a person may carry on such works, undertakings or activities without contravening this prohibition, provided that they are carried on under the authority of one of the exceptions listed in subsection 35(2), and in accordance with the requirements of the appropriate exception. In most cases, this exception would be Ministerial authorizations granted to proponents in accordance with the *Authorizations Concerning Fish and Fish Habitat Protection Regulations* under the *Fisheries Act.*

Proponents are responsible for planning and implementing works, undertakings or activities in a manner that avoids harmful impacts, specifically the death of fish and HADD. Where proponents believe that their work, undertaking or activity will result in harmful impacts to fish and fish habitat, DFO will work with proponents to assess the risk of their proposed work, undertaking or activity resulting in the death of fish or HADD of fish habitat and provide advice and guidance on how to comply with the *Fisheries Act*.

2.2 *Migratory Birds Convention Act* (1994)

The Federal MBCA (1994) protects the nests, eggs and young of most bird species from harassment, harm or destruction. On the subject property, this legislation would apply in relation to any proposed vegetation clearing as part of the implementation of the proposed site development plan, once approved. Although there are no permitting requirements, proponents must comply with the legislation and may be fined if found to be in contravention of the MBCA.

Environment Canada currently considers the “high risk” period for encountering nesting birds in southern Ontario to be from mid-March to late August. Therefore, to ensure compliance with the MBCA, vegetation clearing during this period is typically discouraged, particularly in natural or naturalized areas. Although screening for active nests can be conducted, it is typically very difficult to detect all active nests during the breeding season. However, vegetation clearing outside this window, and even within this window, is generally permissible as long as there is no evidence of nesting birds in the areas to be disturbed.

Regardless of the date, any nest and the habitat to support the nesting birds is protected under the MBCA, and therefore even for proposed vegetation clearing outside of the “high risk” window, surveys should be conducted by a qualified environmental inspector to screen for active nests prior to works being undertaken.

2.3 Species at Risk Act (2004)

The listing process under the federal *Species at Risk Act* (SARA) typically involves species status reports provided as a draft to the members of the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). If a species is declared by COSEWIC to be threatened or endangered, the federal SARA would apply; however, the full extent of the SARA general prohibitions apply only to species listed on Schedule 1 of the Act.

The general prohibitions of the Act are as follows:

Site Location	Figure 1
Sutton Aerodrome- Preliminary Natural Heritage Review	
BEACON ENVIRONMENTAL	Project: 221387 Last Revised: October 2021
Client: Avia NG Inc.	Prepared by: BD Checked by:
N 1:16,000	Inset Map: 1:100,000

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Orthoimagery Baselayer: 2020 (FBS)

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- *No person shall kill, harm, harass, capture or take an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species;*
- *No person shall possess, collect, buy, sell or trade an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species, or any part or derivative of such an individual; and*
- *No person shall damage or destroy the residence of one or more individuals of a wildlife species listed as an endangered species or threatened species or that is listed as an extirpated species, if a recovery strategy has recommended the reintroduction of that extirpated species.*

These prohibitions apply on all federal lands in a province. On private land, these prohibitions apply only to:

- Aquatic species listed as endangered, threatened or extirpated in Schedule 1 of SARA; and
- Migratory birds listed in the *Migratory Birds Convention Act*, 1994 but only to the extent that the MBCA applies.

These restrictions protect the “Residence”, which is defined as follows:

> *Residence means a dwelling-place, such as a den, nest or other similar area or place, that is occupied or habitually occupied by one or more individuals during all or part of their life cycles, including breeding, rearing, staging, wintering, feeding or hibernating.*

Once listed, the responsible minister must prepare a Recovery Strategy. The intent of the Recovery Strategy is to identify what needs to be done to stop or reverse the decline of a species. It sets goals and objectives and identifies the main areas of activities to be undertaken. This is also the first opportunity to define critical habitat for the species. Following the preparation of the Recovery Strategy, an Action Plan is developed. The Action Plan outlines the projects or activities required to meet the goals and objectives outlined in the Recovery Strategy. This includes information on the species habitat, protection measures, and an evaluation of the socio-economic costs and benefits. The Action Plan also provides an opportunity to identify critical habitat or refine definitions as established in the Recovery Strategy.

Critical habitat is a key phrase under SARA. This is the habitat necessary for the survival or recovery of a listed endangered or threatened species. Critical habitat is identified in the Recovery Strategy or the Action Plan for each listed species and is posted on the SARA Public Registry. SARA requires that the critical habitat of all listed species when found on federal lands, or species protected by the *Migratory Bird Convention Act* or aquatic species on all lands, be legally protected within six months after it is identified in a finalized SARA Recovery Strategy or Action Plan. Therefore, for the full force of the SARA to apply, an Action Plan must be extant or alternatively, critical habitat be identified in the Recovery Strategy.

Currently there are 297 finalized Recovery Strategies in place and 54 finalized Action Plans, however, SARA is only in full force when either an Action Plan is in place or the Recovery Strategy defines critical habitat.

2.4 Provincial Policy Statement (2020)

Natural Heritage Policy 2.1 of the *Provincial Policy Statement* (PPS) (MMAH 2020) provides direction to regional and local municipalities regarding planning policies for the protection and management of natural heritage features and resources for applications pursuant to the *Planning Act*. It took effect on May 1, 2020, superseding the PPS of 2014. The PPS defines natural heritage features and provides planning policies for each. The key text from the PPS that applies to the study area is reproduced below. The study area is situated in Ecoregion 6E.

> 2.1.4 *Development* and *site alteration* shall not be permitted in:
> - *Significant wetlands* in Ecoregions 5E, 6E and 7E; and
> - *Significant coastal wetlands*.
>
> 2.1.5 *Development and site alteration shall not be permitted in:*
> - *Significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E and 7E;*
> - *Significant woodlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);*
> - *Significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);*
> - *Significant wildlife habitat;*
> - *Significant areas of natural and scientific interest (ANSIs); and*
> - *Coastal wetlands in Ecoregions 5E, 6E and 7E 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.*

Of these features, provincially significant wetlands (PSW) and significant ANSIs are identified directly by the Ministry of Natural Resources and Forestry (MNRF). Woodlands may be identified using MNRF criteria and other significant features may be identified using MNRF criteria or municipal criteria that meet the same standard. In Ontario, Fisheries and Oceans Canada (DFO) manages fish habitat and the MNRF manages fisheries. Habitat of endangered and threatened species is mainly governed by the provincial *Endangered Species Act* (2007) (See Section 2.5).

Furthermore, development and site alteration shall not be permitted on “adjacent lands” to the natural heritage features/areas (i.e., within 120 m) addressed in policies 2.1.4, 2.1.5, 2.1.6 and 2.1.7 “unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated [through an EIS] that there will be no negative impacts on the natural features or on their ecological functions.” Adjacent lands are defined in the PPS as “those lands contiguous to a specific natural heritage feature or area where it is likely that development or site alteration would have a negative impact on the feature or area.” Therefore, it can be assumed that any development or site alteration on lands that lie beyond 120 m of the feature will:

- Not have a negative impact; and
- Does not require an EIS.

2.5 Greenbelt Plan (2017)

The subject property is located entirely within the provincial Greenbelt Plan area identified as a Protected Countryside with a natural Heritage System designation. “The Natural Heritage System includes core areas and linkage areas of the Protected Countryside with the highest concentration of the most sensitive and/or significant natural features and functions.”

Key Natural Heritage Features (KNHF) include:

- Habitat of endangered species and threatened species;
- Fish habitat;
- Wetlands;
- Life Science Areas of Natural and Scientific Interest (ANSIs);
- Significant valleylands;
- Significant woodlands;
- Significant wildlife habitat (including habitat of species of special concern);
- Sand barrens, savannahs and tallgrass prairies; and
- Alvars.

Key Hydrologic Features (KHFs) include:

- Permanent and intermittent streams;
- Lakes (and their littoral zones);
- Seepage areas and springs; and
- Wetlands.

Development and site alteration within KNHFs and KHF is not permitted except for conservation and wildlife management, flood or erosion control projects, infrastructure, aggregate, recreations, shoreline and existing use. A 30 m minimum vegetation protection zone is applied to all KNHFs ad KHFs.

2.6 Lake Simcoe Protection Plan (2009)

The Lake Simcoe Protection Plan (LSPP) was developed by the Ontario Ministry of the Environment in 2009 and is a plan that addresses the promotion and protection of Lake Simcoe proper, its shoreline, and the natural heritage features and functions associated with the entire Lake Simcoe watershed. The subject property is located within a settlement area in this regulated area.

Settlement areas are urban areas and rural settlement areas (e.g. cities, towns, villages and hamlets) where development is concentrated and lands are designated in municipal official plans for development over the long term. The following policies apply to those settlement areas designated in official plans as they existed on the date the Plan came into effect and to settlement area expansions.

Policies 6.32 - 6.34 apply to existing settlement areas and areas of Lake Simcoe adjacent to these lands, including the littoral zone, and these areas are not subject to policies 6.1 – 6.3, 6.5, 6.11 and policies 6.20 - 6.29.

> *An application for development or site alteration shall, where applicable:*
> - *Increase or improve fish habitat in streams, lakes and wetlands, and any adjacent riparian areas;*
> - *Include landscaping and habitat restoration that increase the ability of native plants and animals to use valleylands or riparian areas as wildlife habitat and movement corridors;*
> - *Seek to avoid, minimize and/or mitigate impacts associated with the quality and quantity of urban run-off into receiving streams, lakes and wetlands; and*
> - *Establish or increase the extent and width of a VPZ adjacent to Lake Simcoe to a minimum of 30 metres where feasible.*

2.7 Regional Municipality of York Official Plan (2019- Office Consolidation)

The Region of York Official Plan was approved by the Minister of Municipal Affairs and Housing on September 7, 2010 and appealed to the Ontario Municipal Board (OMB). Since that time, the York Region Official Plan – 2010 has been partially approved by the OMB and specific policies of the York Region Official Plan and are shown in the April 2019 Office Consolidation.

The York Region Official Plan is a document that outlines the policies of the Regional Municipality of York to guide economic, environmental and community building decisions. These policies inform the strategic decisions of York Region and its nine local municipalities and are intended to help coordinate planning efforts across York Region.

The following maps and figures to the Official Plan were reviewed to determine which sections pertain to the subject property:

- Map 1: Regional Structure identifies the subject property as being within Protected Countryside;
- Map 2: depicts the entire subject property as Regional Greenlands System;
- Map 3: does not depict any Environmentally Significant Area (ESAs) on or adjacent to the subject property;
- Map 4: Key Hydrologic Features identifies wetlands and a watercourse on the subject property; and
- Map 5: Depicts woodlands throughout the subject property.

The basis of the natural environment protection system in York Region is the Regional Greenlands system. This system is comprised of Key Natural Heritage Features (KNHFs) and Key Hydrologic Features (KHFs). The function of the Greenland system is to protect these features and appropriate adjacent lands and corridors and linkages. Development is prohibited within these features and proposed development within 120 m of KNHFs, KHFs or Regional Greenlands will require a Natural Heritage Evaluation(NHE).

Section 2.2 of the OP discusses natural features and Section 2.2.3 indicates that:

> *KNHFs and KHFs shall be precisely delineated on a site-by-site basis using procedures established by the Province, where applicable. Such delineation shall occur through the approval of Planning Act applications supported by appropriate technical studies such as master environmental servicing plans, EIS, natural heritage or hydrological evaluations. Where such delineation refines boundaries shown on Maps within the Plan, refinements to these Maps can occur without an amendment to this Plan.*

According to Section 2.2.14:

> *Development or site alteration is not permitted in KNHF and KHF or associated VPZ on the Oak Ridges Moraine, in the Greenbelt, and in the Lake Simcoe watershed, except as provided in the ORMCP, the Greenbelt Plan and the LSPP.*

2.8 Town of Georgina Official Plan (2020- Office Consolidation)

The Town of Georgina Official Plan is a result of the comprehensive review of the previous Official Plan, originally approved by the Regional Municipality of York. This Official Plan supports an "ecosystem approach" to planning to ensure that environmental, economic, social and cultural factors are considered and balanced in the decision-making process and has been prepared in accordance with the *Planning Act*.

Natural Environment objectives of the Official Plan are to protect "key natural heritage features" and "key hydrologic features" from land use activities that may adversely affect those features and their ecological function.

Section 5.1.1.5 of the Official Plan states

> *An application for development or site alteration within 120 m of a key natural heritage feature or key hydrologic feature, shall be accompanied by an Environmental Impact Study, that identified a vegetation protection zone which :*
>
> *a) Is of sufficient width to protect the key natural heritage feature or key hydrologic feature and its ecological function from the impacts of the proposed change and associated activities that may occur before, during, and after, construction, and where possible, restore or enhance the feature and/or its function;*
> *b) Is a minimum of 30 metres from the key natural heritage features and key hydrologic features identified in 5.3.1;*
> *c) Is established to achieve, and be maintained as natural self-sustaining vegetation; and*
> *d) Is consistent with the requirements of the Greenbelt Plan, 2005 and Lake Simcoe Watershed.*

2.9 Lake Simcoe Region Conservation Authority (2006) and Guidelines (2015)

2.9.1 Conservation Authorities Act (Ontario Regulation 179/06) (2006)

The LSRCA regulates hazard lands, including creeks, valleylands, shorelines, and wetlands along with their applicable setback areas.

LSRCA regulates a portion of the subject property as the online regulation mapping indicates the presence of the Zephyr- Egypt PPSW, unevaluated wetlands and a watercourse on the subject property. Additionally, all watercourses and wetlands are regulated by the conservation authority, regardless of whether they have been previously mapped. Any site alteration or development within regulated areas may require a permit from the LSRCA.

2.9.2 *LSRCA Watershed Development Policies*

The LSRCA's Watershed Development Policies aim to protect the environmental integrity of the Lake Simcoe watershed through implementation of the Regulation as well as providing technical review support to their member municipalities.

Policies provide direction regarding valleyland, watercourse and wetland protection, Environmentally Significant Areas, stormwater management, floodplain management, hazard lands; as well as guidance on plan review and approvals.

Generally, the LSRCA directs development away from: regulatory floodplains; Environmentally Significant Areas; wetlands; Areas of Natural and Scientific Interest; significant woodlands; significant valleylands; sensitive and/or significant wildlife habitat(s); habitats of Endangered and Threatened species; areas of unstable slopes; and fish habitat.

Section 4 provides watercourse protection guidance and under policy 4.0.3, requires a 15 m setback from the edge of the watercourse features (e.g., meander belt, flood plain, top of slope, etc.). Typically setbacks are only required to intermittent or permanent streams. Seasonal field investigations, including hydrogeological investigations and consultation with LSRCA is required to determine the characterization of watercourses.

LSRCA requires a 30 m minimum buffer from all other wetlands for all new development unless it can be demonstrated that the hydrological function of adjacent lands has been evaluated and it has been demonstrated through the submission of a hydrologic study to the satisfaction of the LSRCA that there will be no negative impacts on the wetland as a result of the proposed development.

2.10 *Endangered Species Act* (2007)

The provincial *Endangered Species Act* (ESA) regulates species listed as Threatened or Endangered by the Committee on the Status of Species at Risk in Ontario (COSSARO). Depending on the timing of a species' listing, habitat is regulated either under a General Habitat provision or a Species-Specific Habitat provision.

An endangered or threatened species is protected, as is its habitat. Specifically, Section 9 of the ESA generally prohibits the killing or harming of a Threatened or Endangered species, while Section 10 of the ESA prohibits the damage or destruction of the habitat of all Endangered and Threatened species.

Permitting is required under Section 17(2)(c) of the ESA for works within habitat of a Threatened or Endangered species.

Seasonally appropriate field investigations are necessary to determine the presence or absence of endangered and threatened species and their habitat.

Legend

▭ Subject Property

Ecological Communities

[illegible]

[illegible]

[illegible]

Code	Wetland Communities
MAM	Meadow Marsh
MAS	Shallow Marsh
MAS/MAM	Shallow and Meadow Marsh
[illegible]	[illegible]
[illegible]	[illegible]
	Forest Communities
FOC	Coniferous Forest
FOD	Deciduous Forest
FOM	Mixed Forest
	Cultural Communities
CUM	Cultural Meadow
CUT	Cultural Thicket
	Other Communities
ANT	Anthropogenic
HE	Hedgerow

Existing Conditions

Figure 2

Sutton Aerodrome Preliminary Natural Heritage Review

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Client: Avia NG Inc.

Prepared by: BD
Checked by:

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3. Existing Conditions

Staff were on site on September 10, 2021 to conduct a reconnaissance level site visit, which included the completion of high-level Ecological Land Classification (ELC) and a general habitat assessment for potential endangered and/or threatened wildlife. The vegetation communities are depicted on **Figure 2** and are to be referenced in conjunction with this section. A summary of natural features is provided below in **Table 1**.

Table 1. Summary of Significant Natural Heritage Features

Natural Heritage Feature	Site-Specific Comments and Assessment Criteria
Provincially Significant Wetlands	Several units of the Zephyr-Egypt Provincially Significant Wetland (PSW) Complex are situated on the subject property and are illustrated in blue on **Figure 2**. These units were deemed to be significant from the provincial regulatory ministry, the Ministry of Natural Resources and Forestry (MNRF). These wetlands are also regulated by the LSRCA. Vegetation community types include Meadow Marsh (MAM), Shallow Marsh (MAS), Swamp Thicket (SWT) and Mixed Swamp (SWM).
Unevaluated Wetlands	Several unevaluated wetland units were flagged by the provincial database (Land Information Ontario; LIO) that were not included in the PSW assessment. These are indicated in yellow on **Figure 2**. Some of these areas have been slightly expanded as there was an underestimation of the amount of wetland habitat present. Due to the presence of Provincially Significant Wetlands in proximity there is potential for any wetland on this land to become complexed as part of the identified PSW. Unevaluated wetland vegetation community types include Meadow Marsh (MAM), Mixed Swamp (SWM) and Swamp Thicket (SWT).
Significant Woodlands	There are a number of woodland features that were identified on and adjacent to the subject property. These woodland communities are shown as Woodlands within the Regional Official Plan, as well as on the Georgina Official Plan. As per the Regional Official Plan, the northwest Mixed and Coniferous forest communities meet the criteria for Significant Woodlands. The Coniferous woodland on the eastern boundary of the subject property also meets the size requirement to be considered a Significant Woodland. Vegetation community types include Coniferous Forest (FOC), Mixed Forest (FOM) and Deciduous Forest (FOD).
Other Woodlands	There are a number of woodland features that were identified on the subject property that do not meet the size threshold to be considered 'Significant Woodlands', as defined by the Regional and Municipal Official Plans. These units are generally smaller and are not contiguous with the larger woodland blocks on the property.
Watercourses and Fish Habitat	There is one provincially mapped watercourse on the property, in the southeastern corner. A culvert was noted under Old Homestead Road and underneath the access pathway to permit flow in an east-west direction.

Natural Heritage Feature	Site-Specific Comments and Assessment Criteria
	Water pools were noted around the culverts however the remainder of the watercourse did not appear permanent, though will be subject to seasonal aquatic surveys.
Significant Valleylands	These features are absent on the subject property
Habitat of Endangered and/or Threatened Wildlife	Potentially suitable habitat is present on the subject property for the following wildlife protected under the provincial *Endangered Species Act*: • Butternut (*Juglans cinerea*); • Bobolink (*Dolichonyx oryzivorus*); • Eastern Meadowlark (*Sturnella magna*); • Endangered Bat Species (Eastern Small-footed Myotis, *Myotis leibii*; Little Brown Myotis, *Myotis lucifugus*; Northern Myotis, *Myotis septentrionalis*; and Tri-coloured Bat, *Perimyotis subflavus*); • Blandings Turtle (*Emydoidea blandingii*) and, • Barn Swallow (*Hirundo rustica*). These species are also protected under the federal *Species at Risk Act* (SARA).

4. Opportunities and Constraints Analysis

Based on the results of the preliminary field investigation, review of aerial photography and review of relevant policy documents, we offer the following analysis of:

- Areas of constraint due to existing environmental or ecological conditions and/or features;
- Areas requiring further study; and
- Areas likely to represent a land development opportunity (subject to planning approvals).

The constrained areas, areas requiring further study and potentially developable areas are provided in **Figure 3.**

4.1 Natural Heritage Constraints

4.1.1 High Constraint

Wetlands +30 m

There are several wetland communities (MAM, MAS, SWM, and SWT) that have been identified through the site reconnaissance. All wetland communities are considered *Key Natural Heritage Features* and warrant a 30 m buffer under the Greenbelt Plan and the regulations and policies of LSRCA.

Woodlands + 30 m

There are a number of woodland features that were identified on and adjacent to the subject property. These woodland communities are shown as Woodlands within the Regional Official Plan, as well as on the Georgina Official Plan. As per the Regional Official Plan, the northwest FOM and FOC communities

Legend

- ▭ Subject Property
- Ecological Communities
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]

Code	Wetland Communities
MAM	Meadow Marsh
MAS	Shallow Marsh
MAS/MAM	[illegible]
SWT	[illegible]
SWM	[illegible]
	Forest Communities
FOC	[illegible]
FOD	[illegible]
FOM	[illegible]
	Cultural Communities
CUT	[illegible]
CUM	[illegible]
	Other Communities
ANT	Anthropogenic
HE	Hedgerow

Constraint Analysis | **Figure 3**

Sutton Aerodrome- Preliminary Natural Heritage Review

Project: 221387

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meet the criteria for Significant Woodlands. The FOC woodland on the eastern boundary of the subject property also meets the size requirement to be considered a Significant Woodland.

A 30 m buffer has been applied to the dripline of the woodland communities to conform to the Greenbelt Plan.

Watercourse +30 m

There is a MNRF mapped watercourse on the southern portion of the property. This feature is located entirely within a meadow marsh community. A 30 m setback to this feature is required per the Greenbelt Plan. The feature and required MVPZ are within the wetland and buffer.

4.1.2 Further Study

Woodlands +10 m

There are a number of smaller woodland communities that were identified on the subject property that do not meet the size threshold to be considered 'Significant Woodlands', as defined by the Regional and Municipal Official Plans. On this basis, a 10 m buffer has been applied to the dripline of these features.

Threatened and Endangered Species

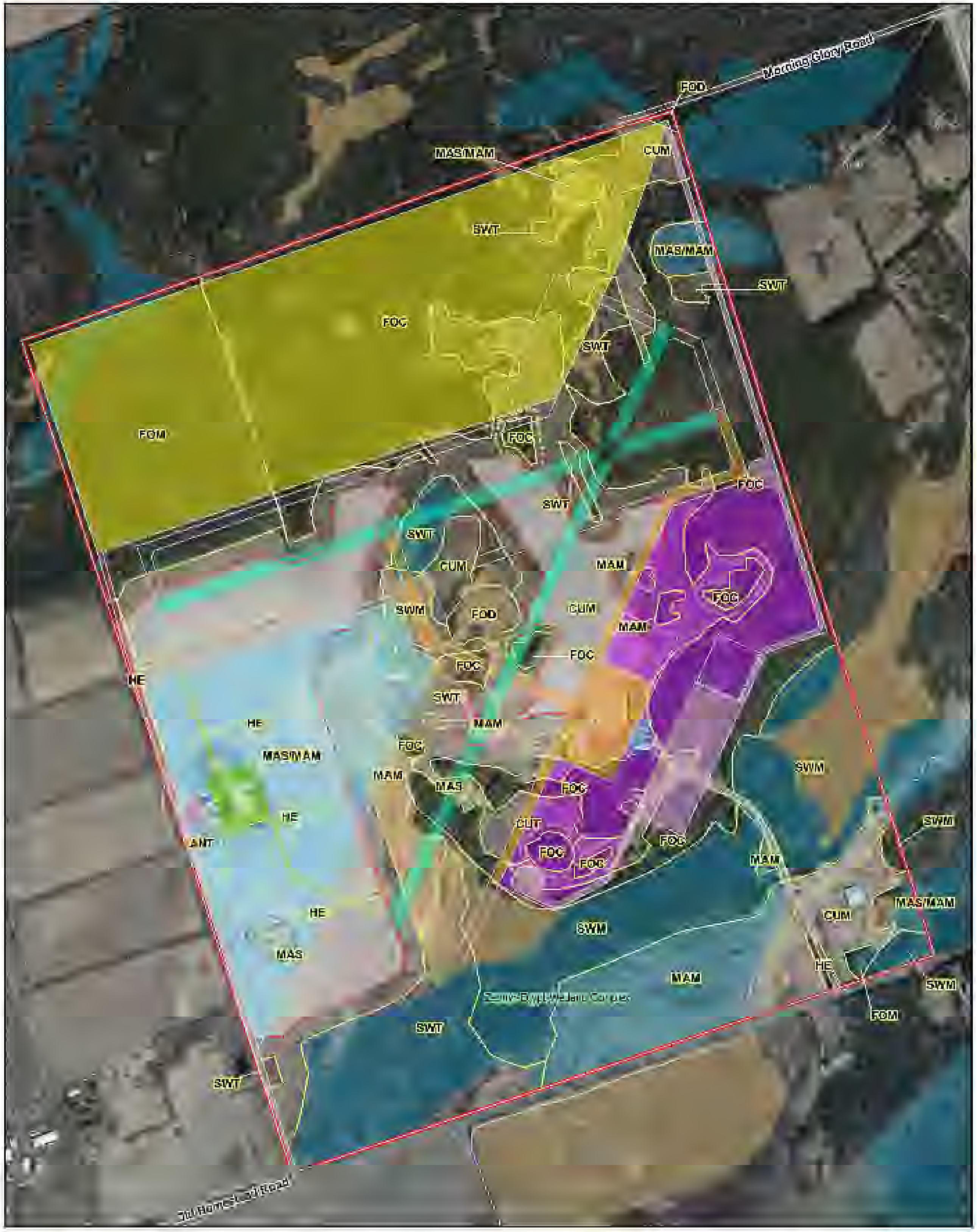
It is of our opinion that the subject property currently provide habitat for a variety of species that are protected under both the provincial *Endangered Species Act* (i.e. bats, birds, butternut, turtles) and the federal *Species at Risk Act* (SARA). Seasonal field surveys would be required to determine if any of these species are present.

If regulated species are found to be using the available habitat on these properties, there are permits and regulatory processes available under the *Endangered Species Act* and/or *Species at Risk Act* to address most situations.

4.1.3 Development Potential

From a natural heritage perspective, applying the provincial and municipal policies currently applicable to the subject property, the agricultural areas and anthropogenic areas are potentially developable.

Figure 4 provides an overlay of the proposed aerodrome conceptual plan on the natural heritage features on the subject property.



Legend

- 🟥 Subject Property
- Ecological Communities
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- Potentially Developable Area
- Proposed Development

Code	Wetland Communities
MAM	Meadow Marsh
MAS	Shallow Marsh
MAS/MAM	Shallow Marsh and Meadow Marsh
SWM	Mixed Swamp
SWT	Thicket Swamp
	Forest Communities
FOC	Coniferous Forest
FOD	Deciduous Forest
FOM	Mixed Forest
	Cultural Communities
CUT	Cultural Thicket
CUM	Cultural Meadow
	Other Communities
ANT	Anthropogenic
HE	Hedgerow

Proposed Aerodrome

Figure 4

Sutton Aerodrome- Preliminary Natural Heritage Review

Project 221387

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5. Summary and Next Steps

Beacon has reviewed the existing policy documents and technical studies pertaining to the subject property and conducted preliminary field investigations to identify and describe the natural heritage features on the site.

In summary, approximately of 137 ha (339 ac) subject property:

- Natural Features and Buffers: 113.48 ha (280.5 ac); and
- Potentially Developable: 23.75 ha (59 ac).

During the project's detail design phase, requirements of several government agency approvals and permits will need to be addressed with respect to specific natural heritage development policies and regulations. An Environmental Impact Study to identify potential impacts and mitigation measures, triggered by the fact that there are a number of natural heritage features (provincially significant wetland, unevaluated wetlands, significant woodland and habitat of regulated species) on the property, as well as features directly adjacent to the subject property.

There are several important determinations that need to be made with both LRSCA and the municipality in order to finalize any development limits on the subject property with respect to the natural feature limits, including:

- Seasonal field studies to fully establish the existing conditions and determine if regulated species are present (e.g., bats, breeding birds, breeding amphibians and flora);
- Assess the subject property for any headwater drainage features and determine ecological and hydrological functions;
- Site visit and discussion with LRSCA/MNRF to confirm and stake the driplines and wetland boundaries; and
- Determine the applicability of the policy framework relative to the proposed aerodrome which is regulated under the *Federal Aeronautics Act*.

Additional planning, hydrogeological, stormwater and geotechnical studies will be required by others in order to further inform next steps.

Should you have any questions or require further information please contact the undersigned (Quinn)

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<Original signed by>

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