Terraprobe

Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

D-4 WASTE MANAGEMENT STUDY
MAPLEVIEW DRIVE EAST & 20TH SIDEROAD
BARRIE, ONTARIO

Prepared for:

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TABLE OF CONTENTS

SECTION

FIGURES

APPENDICES

1.0 EXECUTIVE SUMMARY

Terraprobe was retained by Dorsay Development Cooperation to carry out a D-4 Landfill Assessment for the new subdivision development located at the intersections of 20th Sideroad & Mapleview Drive East, and 20th Sideroad & Lockhart Drive in the City of Barrie, Ontario, hereafter referred to as *"The Property."*

The subject site (Property or Site) is an approximately 80.1 hectares (197.9 acres) property located southwest quarter of Mapleview Drive East and 20th Sideroad, Barrie, Ontario, and is identified as Part of Lot 20, Concession 11. The site is currently undeveloped agricultural land. It is located in a primarily agricultural area.

Based on the Conceptual Site Plan, *Part of Lot 20, Concession 11, City of Barrie, prepared for DIV Development (Barrie) Limited, by MGP Malone giver Parsons, Project No.: 12-2089, dated March 29, 2023,* provided by Dorsay Development Corporation, it is understood that the Site consists of three parts, and will be developed with 958 residential units, to include single detached, street townhouses, condominium townhouses, stacked townhouses, elementary school, park, parkettes, vistas, landscape blocks, walkways, stormwater management, pumping station, natural heritage system, roads and road widenings. It is presumed that the subdivision will be fully municipally serviced, connecting to existing infrastructure on the surrounding municipal roadways.

The subject land is within a 500 m zone from a proposed landfill site, number 517, according to the County of Simcoe website. The landfill, hereafter referred to as "Landfill 517" .

Landfill 517 was identified using the County of Simcoe web page, as a non-operating waste disposal site (duration and type of waste materials unknown). As such, the Property under review falls within 500 meters of the waste disposal Site and is considered to be within a D-4 Assessment Area. According to the Ministry of the Environment, Conservation and Parks (MECP) D-4 Guideline Landfill Impact Assessment, the D-4 Assessment Area refers to the area considered to be potentially impacted by existing and previous waste disposal site operations. Terraprobe understands that the City of Barrie & Town of Innisfil will require an assessment of the Property with respect to the MECP Guideline D-4 Impact Assessment to be completed for the proposed development in connection with the City's Conformity Review Process. The assessment is required to characterize the local and regional geologic and hydrogeological conditions around the proposed development Site and to determine the likelihood of any adverse effect, particularly with respect to leachate generation and/or methane gas generation impacting the proposed works.

Based on available background information on the landfill site, which was obtained by Terraprobe and on-Site observation of the Property and the landfill Site, the following conclusions are summarized below:

Ground and surface water contamination by leachate and Surface Runoff

Based on the review of the topography of the Property and Landfill 517 obtained from the County of Simcoe web map, the results are as follows. The Property is sloped from the highest point in elevation at 262 masl

in the southwest corner of the lot and drops to approximately 246 masl in the lowest northeast areas of the site (watercourses run through this area). The Landfill 517 site is similar, with peak elevations at 260 masl in the southwest corner, and dropping to approximately 240 masl in the lowest northeast corner. Landfill 517 is sloped down-gradient away from the Property site in low-lying areas.

Ground Water Contamination by Leachate

Based on the review of groundwater levels and existing wells on and around the property and the landfill, obtained from the Oak Ridges Moraine Groundwater Program (ORMGP) mapping software and the Ministry of the Environment, Conservation and Parks (MECP), the following conclusions can be made. The groundwater level contour map is shown in **Appendix A**, and visually represents the elevation in which groundwater is found on-site in meters above sea level (masl) and the gradient in which groundwater flows can be interpreted from these results. The figure displays the landfill site outlined in orange and the proposed development outlined in purple. In the study area, the groundwater table is measured at the highest elevation in the southwest corner of the proposed development, dropping from peak measurements at 258 masl to the lowest measurement of 246 masl in the low northeast corner of the Property. The landfill groundwater levels drop even further, reaching 239 masl in the lowest northwest corner of the site. Therefore, groundwater is interpreted to flow north to northeast through the proposed development property initially and then through the proposed landfill 517 site. Flow direction is down the Sandy Cove Creek tributaries and towards Lake Simcoe. As such, no potential impacts are expected from groundwater contamination by leachate.

Surface Water Contamination by Leachate / Surface Run-off

Based on the review of the topography of the Property and Landfill 517 obtained from the County of Simcoe web map (shown in **Appendix A)**, the results are as follows. The Property is sloped from the highest point in elevation at 262 masl in the southwest corner of the lot and drops to approximately 246 masl in the lowest northeast areas of the site (watercourses run through this area). The Landfill 517 site is similar, with peak elevations at 260 masl in the southwest corner, and dropping to approximately 240 masl in the lowest northeast corner. Landfill 517 is sloped down-gradient away from the Property site in low-lying areas.

The nearest surface water is located directly on the proposed Property, flowing down the Sandy Cove Creek tributaries and ultimately ending up in Lake Simcoe. Tributaries flow initially through the Property and then reach the Landfill 517 site, located approximately 20 m east of the Property. As such, the risk of surface water contamination by leachate and surface water runoff due to the adjacent proposed landfill 517 are low, and no potential impacts are expected.

Ground Settlement

The subject property is not located on the landfill material. Little to no waste was encountered at the Property during the site visit. There is no information available for review on a buffer distance between the

Property and the landfill site. Currently, the 20th Sideroad acts as the only known buffer between the proposed development and the proposed landfill site. Should more information arise regarding the proposed landfill's properties, this can be revised as needed.

Also, based on the MECP guideline (Appendix B), a buffer area between the perimeter of the fill area and the waste disposal site boundary limits is a requirement for the Certificate of Approval. Therefore, the potential for settlement issues associated with degradation of loose and/or organic fills at the proposed development is low.

Visual Impact

The non-operating waste disposal Site is east of the Property. The 20th Sideroad exists and acts as a barrier between the proposed development and the proposed landfill 517 site. Few rural residences also serve as a barrier between the Property and proposed landfill 517; this excludes any visual impact on the proposed development from the landfill because there was little to no clear line of sight between the two, as well as being separated by the 20th Sideroad. Based on site inspection, currently, the landfill site periphery is fenced with dense and mature trees, rural residences and agricultural areas. Evidence of the non-operating waste disposal Site, such as wastes, fences, and access roads, were not observed during the site visit. In addition, no visible stressed vegetation was identified on the Property during the site visit or from a review of the aerial photos.

Soil Contamination and Hazardous Waste

No hazardous waste or soil contamination was observed at the Property during the site visit. Based on the anticipated direction of groundwater flow and the upgradient location of the subject property, there is no potential for hazardous waste or soil contamination at the landfill site to impact the groundwater, which would migrate toward the subject property.

Odour, Noise, Air Emission, Vehicle Traffic, Fires, or Vectors and Vermin

Odour, noise, air emission, vehicle traffic, fires, or vectors and vermin are potential concerns related to operating and/or recently closed landfills. However, there would be no concern to the proposed development from these elements since the landfill has presumed to be closed for decades (duration remains unknow). Site inspection within the scope of this study did not encounter unpleasant odour, noise, traffic or Vectors and Vermin related to a landfill operation. Therefore, these elements of the assessment are not a concern.

Moreover, it is Terraprobe's opinion that the non-operating waste disposal site will not impact the proposed development since no landfill waste with contaminants that could migrate to the proposed remained in the landfill site.

Landfill Generated Gases (Methane)

Methane is a by-product of decomposing organic matter. Methane moves readily through porous, granular soils. The landfill being assessed in this report appears to have been non-operating for decades (duration remains unknown). However, the risk of methane gas from the non-operating waste disposal Site to the subject property depends on a number of factors, including the type and age of refuse, average depth, and the density of the waste, as well as the annual average precipitation. These factors will be assessed in the following stages of this project.

In summary, Terraprobe believes the risk of landfill leachate and landfill-generated gases impacting the subject Property is low.

1. This is based on the Property's physical setting, hydrogeological conditions, and the surrounding area. The Property and the surrounding area have been in agricultural land use and are currently in agricultural land use with some residential use.
2. A review of provincial government, public and private agencies records did not indicate any information of active or closed landfill/ waste disposal sites on the site or the surrounding area within 500 m of the Property. Conversely, the City of Barrie and Simcoe County official maps indicated a landfill site (517) adjacent to the subject Property; no additional information (land closure environmental report) was available for review by the City/County regarding the identified landfill. In addition, the client (Dorsay Development Cooperation) enquired further and reported that there are no additional records on file from the Province/City/County regarding the landfill apart from the Official Plan.
3. No further investigation is required since there are no other facts/additional information apart from the Official Plan indicating a closed landfill site adjacent to the Property; we are unable to come to a conclusion on further testing. However, should more information or facts become available, Terraprobe will recommend any investigations necessary on the subject Property to confirm that the landfill adjacent to the subject site does not impact future development."

2.0 INTRODUCTION

Terraprobe was retained by Dorsay Development Cooperation to carry out a D-4 Landfill Assessment for the new subdivision development located at the intersections of 20th Sideroad & Mapleview Drive East, and 20th Sideroad & Lockhart Drive in the City of Barrie, Ontario, hereafter referred to as *"The Property."*

Based on the Conceptual Site Plan, *Part of Lot 20, Concession 11, City of Barrie, prepared for DIV Development (Barrie) Limited, by MGP Malone giver Parsons, Project No.: 12-2089, dated March 29, 2023,* provided by Dorsay Development Corporation, it is understood that the Site consists of three parts, and will be developed with approximately 960 residential units, to include single detached, street townhouses, condominium townhouses, stacked townhouses, elementary school, park, parkettes, vistas, landscape blocks, walkways, stormwater management, pumping station, natural heritage system, roads and road widenings. It is presumed that the subdivision will be fully municipally serviced, connecting to existing infrastructure on the surrounding municipal roadways.

The subject site (Property or Site) is an approximately 80.1 hectares (197.9 acres) property located southwest quarter of Mapleview Drive East and 20th Sideroad, Barrie, Ontario, and is identified as Part of Lot 20, Concession 11. The site is currently undeveloped agricultural land. It is located in a primarily agricultural area.

Based on the O. Reg. 347, a Landfill D-4 Assessment Study is required due to the historical land use of an adjacent property located at municipal addresses of 1400 & 1450 Lockhart Drive, and 3153, 3115, 3087 & 3035 20th Sideroad, Town of Innisfil, City of Barrie, Ontario.

The subject land is within a 500 m zone from a proposed landfill site, number 517, according to the County of Simcoe website. The landfill, hereafter referred to as "Landfill 517," lies approximately 20 m east of the proposed development area and is currently zoned as "AG" for agricultural general and occupied by multiple residential dwellings.

Landfill 517 is identified on the County of Simcoe's web map as a non-operating waste disposal site. As such, the Property under review falls within 500 meters of the waste disposal Site and is considered to be within a D-4 Assessment Area. According to the Ministry of the Environment, Conservation and Parks (MECP) D-4 Guideline Landfill Impact Assessment, the D-4 Assessment Area refers to the area considered to be potentially impacted by existing and previous waste disposal site operations. Terraprobe understands that the City of Barrie & Town of Innisfil will require an assessment of the Property with respect to the MECP Guideline D-4 Impact Assessment to be completed for the proposed development in connection with the City's Conformity Review Process.The assessment is required to characterize the local and regional geologic and hydrogeological conditions around the proposed development Site and to determine the likelihood of any adverse effect, particularly with respect to leachate generation and/or methane gas generation impacting the proposed works.

However, there was no online information regarding the type and age of refuse, average depth and density of waste, as well as the annual precipitation for the non-operating waste disposal site referred to as Landfill 517. These factors will be assessed in the following stages of this project. Should new information arise, we will revise this report as needed.

3.0 REVIEW OF THE BACKGROUND INFORMATION

The Property is located on the border of the Town of Innisfil and the City of Barrie, in the County of Simcoe, Canada. The County of Simcoe requires that where development is proposed within 500 meters of a waste disposal site, a D-4 study be undertaken to evaluate the presence and impact of any adverse effects or risks to health and safety and any necessary remedial measures necessary for a proposed development in compliance with the Guideline D-4 including, but not limited to, ground and surface water (hydrogeology and hydrology), noise, odour, and dust, methane gas migration, traffic impact, land use compatibility, and other studies considered appropriate.

In reference to Section 4.2 of the D-4 Guideline entitled “Environmental Conditions,” Landfill 517 would be categorized as a “non-operating” Site. As such, the guideline suggests that it is important to consider impacts with respect to ground and surface water contamination by leachate, surface runoff, ground settlement, visual impact, soil contamination and hazardous waste and landfill-generated gases when assessing subject lands within 500m of non-operating Sites.

4.0 REVIEW OF PREVIOUS REPORTS

Previously, the following Environmental Impact Study Reports were completed for the Property, as summarized below:

4.1 Hydrogeological Assessment Report (December 2020)

Report Title	Hydrogeological Study in Support of Draft Plan – Dorsay Lands Phase 1
Report Date	December 2020
File No.	300043693.0000
Prepared By	R.J. Burnside & Associates Limited
Prepared For	Dorsay Development Corporation, Barrie, Ontario

The study report presented the following results:

- The purpose of the report was to review the geological and hydrogeological setting of the Site, including topography, surficial geology and bedrock geology mapping to assess the regional and local hydrogeological setting.
- Review of the Ministry of the Environment, Conservation and Parks (MECP) water well records: The MECP maintains a database that provides geological records of water supply wells drilled in the province. A list of the available MECP water well records for local wells and the well locations can be found in the report. These well data were compiled and mapped to characterize the local groundwater resources and assess potential impacts to the local private wells from the development of the subject lands.
- Groundwater monitoring locations were established to characterize seasonal variations in the water table in both the shallow and deep aquifers. Monitoring wells previously constructed by Soil Engineers Ltd. on the Phase 1 lands were incorporated into the monitoring network. An additional 5 monitoring wells were installed by Burnside within the Phase 2 lands. Groundwater levels at the monitoring wells ranged from 246.6 masl to 254.9 masl, with expected seasonal fluctuations. Groundwater is interpreted to flow towards the tributaries of Sandy Cove Creek.
- Shallow wells in southern Ontario typically show a pattern of groundwater fluctuations that is related to seasonal variations in precipitation and infiltration. This pattern shows the highest groundwater levels occurring in the spring, levels declining throughout the summer and early fall and then rising again in the late fall/early winter. This pattern is apparent in the wells located on the subject lands(Figures D-1 to D-11, in Appendix D). The seasonal variation in water levels shows a range from 0.7 m to 1.5 m (Figures D-1 to D-7). Seasonal variations at drive-point piezometers (Figures D-8 and D-9) were generally less than 1 m.
- Continuous water level data obtained from dataloggers at one-hour frequency were plotted against precipitation to determine whether there is a correlation between precipitation events (recharge

events) and changes in water level (Figures D-1, D-4, D-6 and D-7). Water level response is observed at DS-MW7 following three days of heavy rain at the end of October 2019 (Figure D-4, Appendix D). At DS-MW12d, water levels increased by 0.5 m in response to a large rain event in January 12, 2020. Water levels also increased by 0.6 m after three days of heavy rain at the end of October 2019 (Figure D-7, Appendix D). At DS-MW1, water levels show a response of 0.5 m after a heavy rainfall in July 2020.

- During geotechnical investigations on the subject lands, representative soil samples were collected and analysed for grain size distribution. The grain size analyses indicate that the sediments encountered on the subject lands are mainly sand and silty sand with occasional layers with a greater percentage of fines. Computed hydraulic conductivities based on these analyses indicate a range of 10 -3 to 10 -6 cm/sec, which is regarded as moderate to low.
- Burnside conducted single well response tests in order to determine soil hydraulic conductivity. Single-well response tests were completed at two groundwater monitoring wells. Hydraulic conductivity testing completed by Soil Engineers Ltd. in 2017 was reviewed in the report. Computed hydraulic conductivities based on the report indicates a range of 10^{-3} to 10^{-6} cm/sec, which is regarded as moderate to high. Single well response tests in wells screened in the silty sand till indicated moderate hydraulic conductivities in the order of 10^{-4} cm/sec to 10^{-5} cm/sec.
- Surface water monitoring was completed at three monitoring stations located along watercourses that traverse the subject lands. The stations were inspected for water depth and flow on each site visit. The seasonal variation in water levels shows a range from 0.7 m to 1.5 m. Seasonal variations at drive-point piezometers were generally less than 1 m.
- The City of Barrie groundwater supply wells are located in deep aquifers (A3 and A4 in the regional hydrostratigraphy). These aquifers are interpreted to be found at elevations of 150 masl to 195 masl and 115 masl to 160 masl, respectively and are therefore significantly below (approximately 100 to 150 m below the surficial layer found on the subject lands) and separated from any potential impact due to the proposed development.
- Services to be installed below the water table should be constructed to prevent redirection of groundwater flow. Due to the potential for encountering the water table during construction, the dewatering of local aquifers may be required in order for services to be installed below the water table.

4.2 Phase One Environmental Site Assessment (April 13, 2012)

Report Title	Phase One Environmental Site Assessment, Lot 20 Concession 11, Barrie, Ontario
Report Date	April 13, 2012
File No.	12-0688
Prepared By	Dillon Consulting Limited
Prepared For	Dorsay Development Corporation

- The purpose of the study was to satisfy the intent of the requirements, methodology, and practices for a Phase One ESA as described in Ontario Regulation 153/04 (as amended).
- There were four potentially contaminating activities (PCAs) identified on the Site:
    - Heating oil may have been used on the Site. The partial demolition of the barn and rural residence has removed evidence of whether heating fuels may have been used or stored at the Site;
    - Farm equipment maintenance may have occurred in proximity to the former rural residence and barn on the north side of the Site. The partial demolition of the barn and rural residence has removed evidence of the locations where farm equipment maintenance activities may have been conducted;
    - Waste generated by the farm and rural residence may have been buried or burned at an unknown location(s) on the Site; and
    - The incomplete combustion of wood in an open fire pit, during the production of maple syrup shack located on the Site.
- There were no PCAs identified on the properties in the Phase I ESA study area.
- There were two identified APECs:
    - The unsaturated near-surface soils at the Site, localized to the general area around the residence, barn, maple syrup shack, and possibly as yet unknown locations where waste may have been burned or buried; and
    - Groundwater in areas with soil contamination (if soil contamination is present)
- Based on the results of the Phase I ESA, if the Site is to be redeveloped following the purchase, the following future actions are recommended:
    - Prior to the removal or handling of the debris on the Site, have an appropriate contractor confirm there are no Designated Substances present;

  - During debris and/or structure removal, but before topsoil stripping, return site visit(s) by an ESA professional are recommended to observe these areas. Shallow soil samples may be collected to assess the near surface soil conditions at that time, if indications of soil contamination are observed (i.e., surface staining or olfactory indicators);
  - Decommission the dug well in accordance with Ontario Regulation 903; and
  - Remove the vegetation and re-observe the surface conditions.
- If these activities identify the presence of actual contamination, additional assessments may be required.

4.3 Geotechnical Investigation Report

Report Title	A Geotechnical Investigation for Proposed Residential Development
Report Date	March 2023
File No.	2211-S092
Prepared By	Soil Engineers Limited
Prepared For	DIV Development (Barrie) Limited

- The objective of a geotechnical investigation conducted for the property was to assess its geotechnical suitability for the intended development.
- The 2016 and 2023 investigations consist of a total of thirty-three (33) exploratory and/or sampling boreholes.
- The prevailing subsurface soil conditions obtained from the borehole logs provided in the report are as follows in measurements of meters below ground surface (mbgs).
  - Sand occupied most of the boreholes with values ranging from 0.0 mbgs to 7.2 mbgs
  - Silty clay deposits encountered from 0.0 mbgs to 0.8 mbgs
  - Silty clay till encountered from 0.0 mbgs to 5.6 mbgs
  - Sandy silt encountered from 0.0 mbgs to 2.1 mbgs
  - Silty sand till/sandy silt till encountered from 0.0 mbgs to 6.6 mbgs
  - Sandy silt/silt encountered from 2.9 mbgs to 5.6 mbgs
  - Fine sand was encountered at found at 2.1 mbgs to 4.0 mbgs
  - Silty fine sand was encountered at 2.1 mbgs to 6.6 mbgs
  - Silty fine sand/sandy silt encountered from 2.9 mbgs to 8.1 mbgs

*Note above values and soil types were obtained from borehole logs for the entire site.

- The geotechnical investigation determined the prevailing subsurface soil and groundwater conditions and provided geotechnical engineering recommendations for the design of proposed building foundations, basement floor-slab, earthquake and earth pressure design parameters, basement drainage, shoring design parameters, pipe bedding and installation of underground utilities. In addition, comments are also included on the pertinent project construction aspects, including excavation, backfill and groundwater control.

5.0 ENVIRONMENTAL SETTINGS

5.1 Physiography, Surficial Geology and Bedrock

Geological mapping indicates that the subject property and the landfill are generally located within the area known as the Peterborough Drumlin Field. The bedrock on the Site is the Lindsay formation (fine- to coarse-grained, fossiliferous, commonly nodular, argillaceous limestone; the upper member (Collingwood) is black, organic-rich, fissile, very fine-grained limestone). The overburden consists of Till: Ice-contact stratified deposits of sand and gravel, minor silt and clay till. The geological maps are provided in **Appendix E**.

5.2 Topography

Based on the review of the topography of the Property and Landfill 517 obtained from the County of Simcoe web map, the results are as follows. The Property is sloped from the highest point in elevation at 262 masl in the southwest corner of the lot, and drops to approximately 246 masl in the lowest northeast areas of the site (watercourses run through this area). The Landfill 517 site is similar, with peak elevations at 260 masl in the southwest corner, and dropping to approximately 240 masl in the lowest northeast corner. Landfill 517 is sloped down-gradient away from the Property site in low-lying areas.

The subject lands are located within the Innisfil Creek and Hewitt's Creek sub-watershed of the larger Lake Simcoe watershed. The topography of the subject lands is generally flat to gently rolling. Elevations range from a high of 260 meters above sea level (masl) in the northwest corner of the subject lands to a low of 248 masl along Sideroad 20 along the tributaries of Sand Cove Creek. The topographical map is provided in **Appendix A.**

5.3 Soil Stratigraphy and Hydrogeology

The MECP well record database was reviewed for properties within 500m of the Property boundaries. A total of 73 wells were located within the 500 m radius with depths ranging from 4.8 mbgs to 152 mbgs. The well records obtained is attached in **Appendix C**. Data from previous reports has also been incorporated.

Stratigraphy (Property/ Study Area)	• 0 to 0.4 m – Topsoil • 0.8 to 2.3 m – Silty sand till/ sandy silt till • Depth up to ~ 13.7 m - Sandy clay till/ silty clay in some areas • Depth of ~ 2 m – Sands in some areas (Values provided by Geotechnical Report created by Soil Engineers Limited for the proposed Property)

Groundwater Levels	• Elevations range from 254.4 to 248.5 m in the northern area of the site, and El. 256.2 to 251.1 m in the southern region of the site, with seasonal fluctuations (Values provided by Geotechnical Report created by Soil Engineers Limited for the proposed Property)
Depth to Bedrock	• Bedrock was not encountered in the MECP well record
Inferred Groundwater Flow Direction	• The non-operating closed waste disposal Site Landfill 517 is located approximately 20 m east of the Property boundary. Shallow groundwater and surface water are expected to follow the topography and flow to the east/northeast along the tributaries of Sand Cove Creek, into Hewitt's Creek, and ultimately into Lake Simcoe.

5.4 Access Environment

MECP's Access Environment was reviewed within a 500 m radius of the Property and a non-operating closed waste disposal Site (Landfill 517). Record of Site Condition (RSC), Environmental Compliance Approval (ECA), Environmental Activity and Sector Registrations (EASR), and Permit to Take Water (PTTW) were searched using the database. The results indicated records with respect to RSCs, ECAs, EASRs, and PTTWs found on the Study Area. There were no records on the Property. The map showing the location of the applicable environmental approvals and registrations is provided in **Appendix A.**

Record of a current ECA located at the municipal address of 3153 20th Sideroad, Innisfil, is located within the proposed landfill 517 area.

5.5 Source Protection Atlas, Official Plan, and MNRF

Terraprobe also reviewed the Municipal Official Plan of the Ontario Ministry of Natural Resources and Forestry (MNRF) Natural Heritage Information Centre for information specific to natural areas, such as locations of environmentally sensitive areas. The non-operating waste disposal Site and the Property were assessed as shown below.

- No Area of Natural and Scientific Interest (ANSI) were identified at the Property and the non-operating waste disposal Site.

- Non-operating closed waste disposal Site Landfill 517 is located approximately 20m east of Property. This is shown in orange colour on the MNRF Heritage map provided in **Appendix A.**

However, the Property falls within MECP wellhead protection areas and intake protection zones associated with the Simcoe County water supply systems. As shown in the Source Water Protection figure located in

Appendix A, the property and proposed landfill 517 are located in areas with highly vulnerable aquifers and intake protection zone 3 as per the MECP web mapping software. Considerations should be made regarding this environmentally significant area.

6.0 AERIAL PHOTOGRAPHS

Aerial and satellite photographs dating 2009, 2012 and 2021 were reviewed for both the Property and Landfill 517. Satellite photos does not indicate any signs of developments or landfill operations in the subject property or the landfill sites. The satellite photographs are provided in **Appendix D.**

7.0 ZONING BY-LAWS

According to the by-law no. 054-04 currently in place for the Corporation of the Town of Innisfil, the proposed landfill 517 is zoned as Rural Residential (RR), Agricultural General (AG) and Environmental protection (EP) areas. The Property is also zoned by the Town of Innisfil, even though it resides just inside the borders of Barrie, as per the City of Barrie's Zoning Map. Copies of the Town of Innisfil and the City of Barrie zoning maps are provided in **Appendix A**.

8.0 SITE VISIT

Terraprobe visited the site on May 30, 2023 to perform a D-4 assessment. Access to the Property is from Lockhart Road, Mapleview Drive East, & 20th Sideroad entrances. The surrounding properties are a mix of residential, commercial and agricultural land use. During the visit, the subject property appeared to be a relatively flat agricultural property comprised of many separate farming fields with a low-lying wet strip through the middle of the property. There was evidence of two pre-existing residential homes/properties that have since been demolished, with some remnants of the occupants left behind, such as home foundations, garbage, etc. One of these properties is located off of the east end of Lockhart Drive, and the other off the east end of Mapleview Drive East. The remainder of the Property is occupied by vegetation strips surrounding fields and natural vegetation, including many mature trees. There were no structures on the property at the time of inspection. Drainage ditches exist along the roadways and the northern side of the property and through the middle of the property along the tributaries of Sandy Cove Creek heading towards the northeast corner of the Property. Scattered debris and minimal litter waste was encountered at the Property in locations where preexisting residential structures were removed; this could also be related to roadway litters. The landfill area was not fully inspected due to the inability to access occupied residents' homes and businesses; however, no waste was discovered at accessible areas of the landfill Site during the inspection. The visual inspection of the Property indicated that the landfill Site was at a similar elevation and sloped towards the northeast. No stains or evidence of impact was noted on the driveways; no stained soil or stressed vegetation was noted at the Property. Site inspection photographs are provided in **Appendix F**.

The landfill site is located East and Southeast of the subject property and separated by 20th Sideroad, and few rural residential properties, and an aggregates business. The landfill site is vegetated with long grass, bushes and trees along the edges of the presumed closed Landfill property boundaries and was farmed on the eastern side of the landfill property. The business and residential properties which now reside on the proposed landfill site were not accessible during the site visit, and, therefore, not assessed. The proposed landfill site appears to be fenced along all perimeters, separated by residential boundaries, farm fields, and natural vegetated property lines. The North edge of proposed landfill 517 appears to be heavily vegetated and dips downgradient towards Sandy Cove Creek tributaries. There were no observable monitoring wells or gas probes on the Landfill 517 site. The landfill site is observed to be topographically cross and downgradient from the subject property. The wind direction is observed to be from the south to the north. Site inspection photographs are provided in **Appendix F.**

9.0 DISCUSSION WITH RESPECT TO MECP D4 GUIDELINE (LAND USE ON OR NEAR LANDFILLS AND DUMPS)

In reference to Section 4, "Environmental Conditions" of MECP D-4 guideline, the landfill Site would be categorized as indicated in 4.2 as a "non-operating" Site. The guidelines suggest that the following factors should be considered for the D-4 Assessment:

Ground water contamination by leachate

Based on the review of groundwater levels and existing wells on and around the property and the landfill obtained from the ORMGP mapping software and the MECP, the following conclusions can be made. The groundwater level contour map is shown in **Appendix D**, and visually represents the elevation in which groundwater is found on-site in meters above sea level (masl) and the gradient in which groundwater flows can be interpreted from these results. The figure displays the landfill site outlined in orange and the proposed development outlined in purple. In the study area, the groundwater table is measured at the highest elevation in the southwest corner of the proposed development, dropping from peak measurements at 258 masl to the lowest measurement of 246 masl in the low northeast corner of the Property. The landfill groundwater levels drop even further, reaching 239 masl in the lowest northwest corner of the site. Therefore, groundwater is interpreted to flow north to northeast through the proposed development property initially and then through the proposed landfill 517 site. Flow direction is down the Sandy Cove Creek tributaries and towards Lake Simcoe. As such, no potential impacts are expected from groundwater contamination by leachate.

Surface Water Contamination By Leachate / Surface Run-off

Based on the review of the topography of the Property and Landfill 517 obtained from the County of Simcoe web map (Appendix D), the results are as follows. The Property is sloped from the highest point in elevation at 262 masl in the southwest corner of the lot, and drops to approximately 246 masl in the lowest northeast areas of the site (watercourses run through this area). The Landfill 517 site is similar, with peak elevations at 260 masl in the southwest corner, and dropping to approximately 240 masl in the lowest northeast corner. Landfill 517 is sloped down-gradient away from the Property site in low-lying areas. As such, the risk of surface water contamination by leachate and surface water runoff due to the adjacent proposed landfill 517 are low, and no potential impacts are expected.

Furthermore, the nearest surface water is located directly on the proposed Property, flowing down the Sandy Cove Creek tributaries and ultimately ending up in Lake Simcoe. Tributaries flow initially through the Property and then reach the Landfill 517 site, located approximately 20 m east of the Property.

The shallow groundwater and surface run-off from Landfill 517 will follow the topography and flow northeast from the non-operating closed waste disposal site toward Lake Simcoe. The subject property is located upgradient and west of Landfill 517. Since the proposed landfill 517 is located east of the Property,

and groundwater travels northeast away from the Property, and towards the landfill site, there is barely any possibility of soil and water contamination to occur at the proposed development Site. The risk of the leachate impact should be low as the drainage typically would follow downgradient from Landfill site 517, away from the proposed development.

Ground Settlement

The subject property is not located on the landfill material. Little to no waste was encountered at the Property during the site visit. There is no information available for review on a buffer distance between the Property and the Landfills site. However, based on the MECP guideline (Appendix B), a buffer area between the perimeter of the fill area and the waste disposal site boundary limits is a requirement for the Certificate of Approval. Therefore, the potential for settlement issues associated with degradation of loose and/or organic fills at the proposed development is low.

Additionally, the 20th Sideroad acts as the only known buffer between the proposed development and the proposed landfill site. Should more information arise regarding the proposed landfill's properties, this should be revised as needed.

Visual Impact

The non-operating waste disposal Site is located east of the Property. The 20th Sideroad currently exists and acts as a barrier between the proposed development and the proposed landfill 517 site. Few rural residences also serve as a barrier between the Property and proposed landfill 517; this excludes any visual impact on the proposed development from the landfill because there was little to no clear line of sight between the two, as well as being separated by the 20th Sideroad. Based on site inspection, currently, the landfill site periphery is fenced with dense and mature trees, rural residences and agricultural areas. Evidence of the non-operating waste disposal Site, such as wastes, fences, and access roads, were not observed during the site visit. In addition, no visible stressed vegetation was identified on the Property during the site visit or from a review of the aerial photos.

Soil Contamination and Hazardous Waste

No hazardous waste or soil contamination was observed at the Property during the site visit. Based on the anticipated direction of groundwater flow and the upgradient location of the subject property, there is no potential for hazardous waste or soil contamination at the landfill site to impact the groundwater, which would migrate toward the subject property.

Odour, Noise, Air Emission, Vehicle Traffic, Fires, or Vectors and Vermin

Odour, noise, air emission, vehicle traffic, fires, or vectors and vermin are potential concerns related to operating and/or recently closed landfills. However, there would be no concern to the proposed development from these elements since the landfill has been closed for decades (duration remains unknow).

Site inspection within the scope of this study did not encounter unpleasant odour, noise, traffic or Vectors and Vermin related to a landfill operation. Therefore, these elements of the assessment are not a concern.

Landfill Generated Gases (Methane)

Methane is a by-product of decomposing organic matter. Methane moves readily through porous, granular soils. The landfill being assessed in this report appears to have been non-operating for decades (duration remains unknown). However, the risk of methane gas from the non-operating waste disposal Site to the subject property depends on a number of factors, including the type and age of refuse, average depth, and the density of the waste, as well as the annual average precipitation.

10.0 CONCLUSIONS AND RECOMMENDATIONS

In summary, it is Terraprobe's opinion that the risk of landfill leachate and landfill-generated gases to impact the subject property is low with consideration. This is based on the available information to evaluate the physical setting and hydrogeological conditions of the property. However, the landfill is located adjacent to the subject property, and no information on the closure environmental report of the landfill was available for review. There is also no information on the depth, age, or type of waste buried, and the environmental status of the landfill site at the time of closing is unknown.

In summary, Terraprobe believes the risk of landfill leachate and landfill-generated gases impacting the subject Property is low.

4. This is based on the Property's physical setting, hydrogeological conditions, and the surrounding area. The Property and the surrounding area have been in agricultural land use and are currently in agricultural land use with some residential use.
5. A review of provincial government, public and private agencies records did not indicate any information of active or closed landfill /waste disposal sites on the site or the surrounding area within 500 m of the Property. Conversely, the City of Barrie and Simcoe County official maps indicated a landfill site (517) adjacent to the subject Property; no additional information (land closure environmental report) was available for review by the City/County regarding the identified landfill. In addition, the client (Dorsay Development Cooperation) enquired further and reported that there are no additional records on file from the Province/City/County regarding the landfill apart from the official Plan.
6. No further investigation is required since there are no other facts/additional information apart from the Official Plan indicating a closed landfill site adjacent to the Property; we are unable to come to a conclusion on further testing. However, should more information or facts become available, Terraprobe will recommend any investigations necessary on the subject Property to confirm that the landfill adjacent to the subject site does not impact future development."

We trust that this report adequately summarizes our recent assessment of the potential impact of the landfill Site on the subject property. If you should have any questions or need further assistance, please do not hesitate to contact the undersigned.

Sincerely,

Terraprobe Inc.

Michaela Sallows, M.Env.Sc., B.Sc.
Environmental Technician, Environmental Group

Samuel Oyedokun, P.Eng., PMP, QP_{ESA}
Associate, Environmental Engineering

11.0 REFERENCES

1. Dillon Consulting Limited, 2012, Phase One Environmental Site Assessment, Lot 20 Concession 11, Barrie, Ontario, File No. 12-0688, April 13th, 2012.

2. Interactive Map - County of Simcoe (GIS)

3. MECP, 1991, *Waste Disposal Site Inventory* produced by the MECP on June 1991

4. Ontario_Landfills.xlsx (live.com)

5. Zoning - Town of Innisfil

6. Zoning – City of Barrie

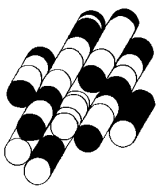
7. Oak Ridges Moraine Groundwater Program (ORMGP) mapping webpage

8. R.J. Burnside & Associates Limited, 2020, Hydrogeological Study in Support of Draft Plan – Dorsay Lands Phase 1, File No. 300043693.0000, December 2020.

9. Soil Engineers Limited, 2022, A Geotechnical Investigation for Proposed Residential Development, Barrie, Ontario, File No. 2211-S092, March 2023.

FIGURES

TERRAPROBE INC.



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Terraprobe
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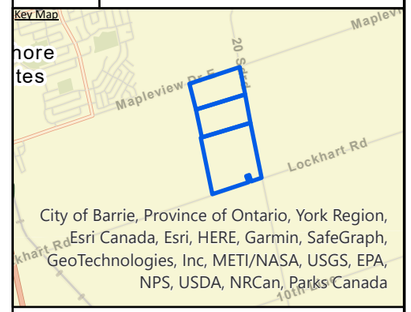
References:

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

Key Map



City of Barrie, Province of Ontario, York Region, Esri Canada, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, NRCan, Parks Canada

Notes:

Legend:

Approximate Property Boundary

Project Title:
Hydrogeological Assessment

Site Location:
Mapleview Drive East and 20th Sideroad
Barrie, Ontario

Figure Title:
Site Location Plan

Designed By: MS	*File No.:* 02303273.000.0100
Drawn By: HK	*Scale:* As Shown
Reviewed By: MM	*Figure No.:* 1
Date: Jun 2023	

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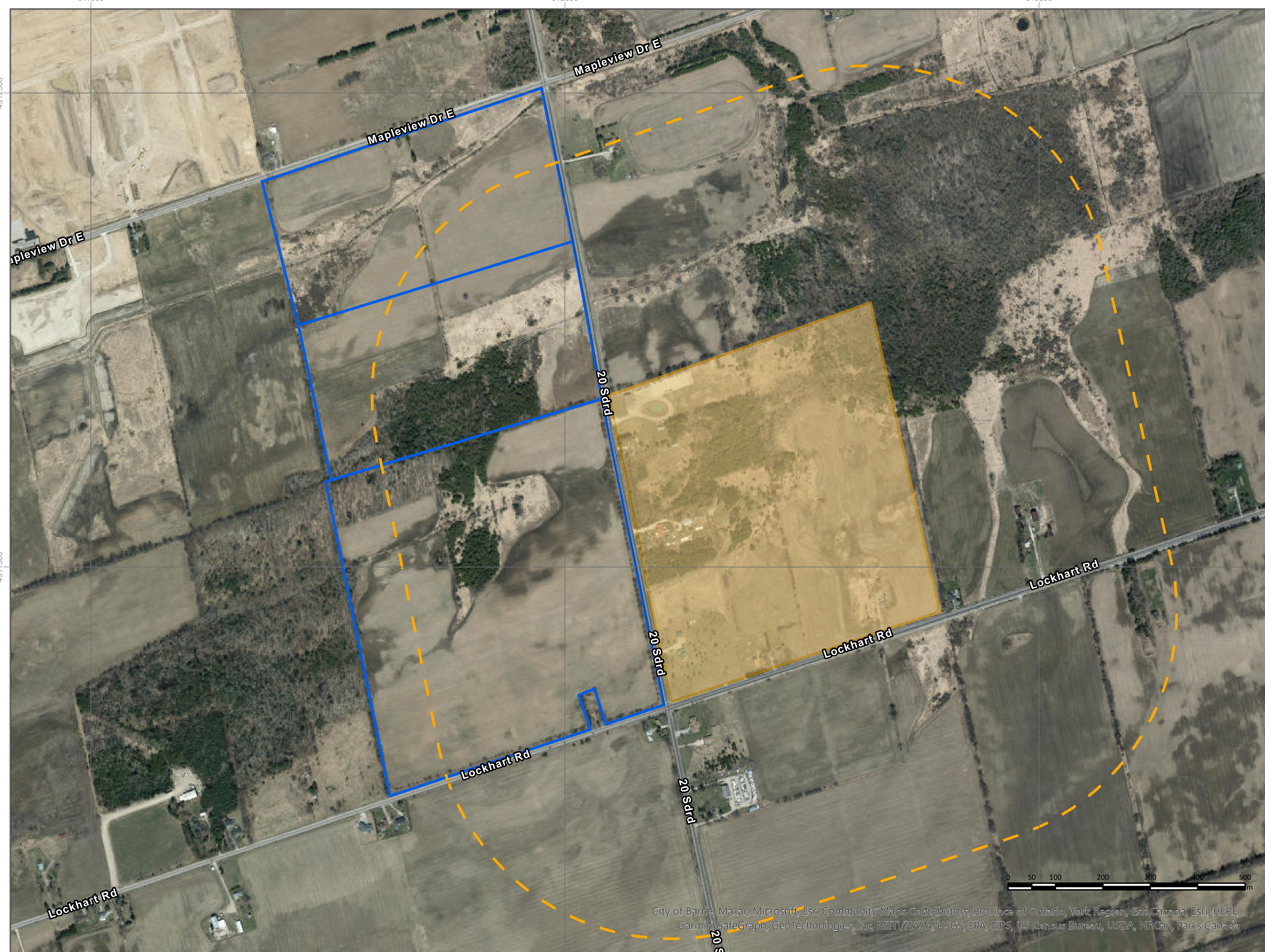

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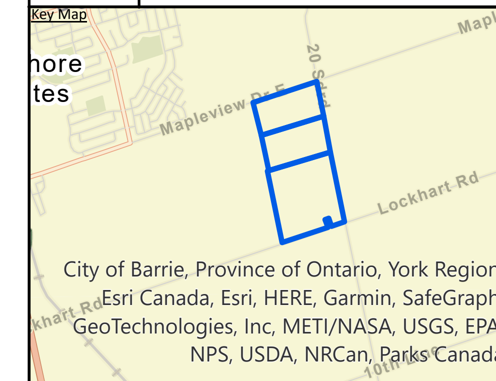
N W E S

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



Notes:

Legend:
- Approximate Property Boundary
- Approximate Landfill Location
- 500 m radius from Landfill

Project Title: Hydrogeological Assessment

Site Location: Mapleview Drive East and 20th Sideroad
Barrie, Ontario

Figure Title: Landfill Location

Designed By: MS	*File No.:* 02303273.000.0100
Drawn By: HK	*Scale:* As Shown
Reviewed By: MM	*Figure No.:* 2
Date: Jun 2023	

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611500 612500 613500

4912500 4911500 4910500

Hyde Park

Empire Dr

William Way

Diana Way

Mapleview Dr E

Lockhart Rd

20 Sdrd

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 34 35 36 37 38 39 40 41 42 43 44 45

0 50 100 200 300 400 500 m

ESRI Community Map Contributors, City of Toronto, Province of Ontario, Esri Canada, Esri, HERE, Garmin, SafeGraph,GeoTechnologies, Inc.,METI/NASA,USGS,EPA,NPS, US Census Bureau, USDA, NRCAN, Parks Canada

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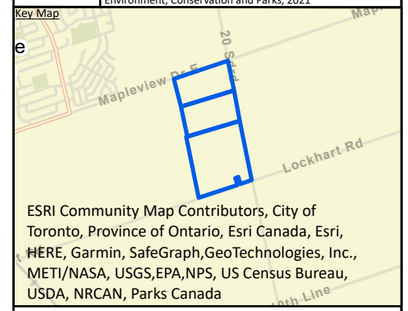
References:

ESRI, DigitalGlobe, GeoEye, EarthstarGeographics, CNES/Airbus Ds, USDA,USGS, AeroGRID, IGN and the GIS User Community produced by Englobe Corp. Copyright (c) Queen's Printer 2020. Water Well Information System Ministry of the Environment, Conservation and Parks, 2021

Key Map



ESRI Community Map Contributors, City of Toronto, Province of Ontario, Esri Canada, Esri, HERE, Garmin, SafeGraph,GeoTechnologies, Inc., METI/NASA, USGS,EPA,NPS, US Census Bureau, USDA, NRCAN, Parks Canada

Notes:

Legend:

- Approximate Site Boundary
- 500 m Study Area

MECP Wells-Final Status

- Unknown
- Abandoned-Other
- Abandoned-Supply
- Monitoring and Test Hole
- Observation Wells
- Other Status
- Test Hole
- Water Supply

Project Title:
Hydrogeological Assessment

Site Location:
Mapleview Drive East and 20th Sideroad
Barrie, Ontario

Figure Title:
MECP Well Records Map

Designed By: MS	*File No.:* 02303273.000.0100
Drawn By: HK	*Scale:* As Shown
Reviewed By: MM	*Figure No.:* 3
Date: Jun 2023	

APPENDIX A

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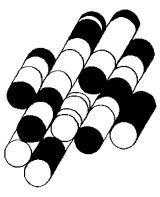
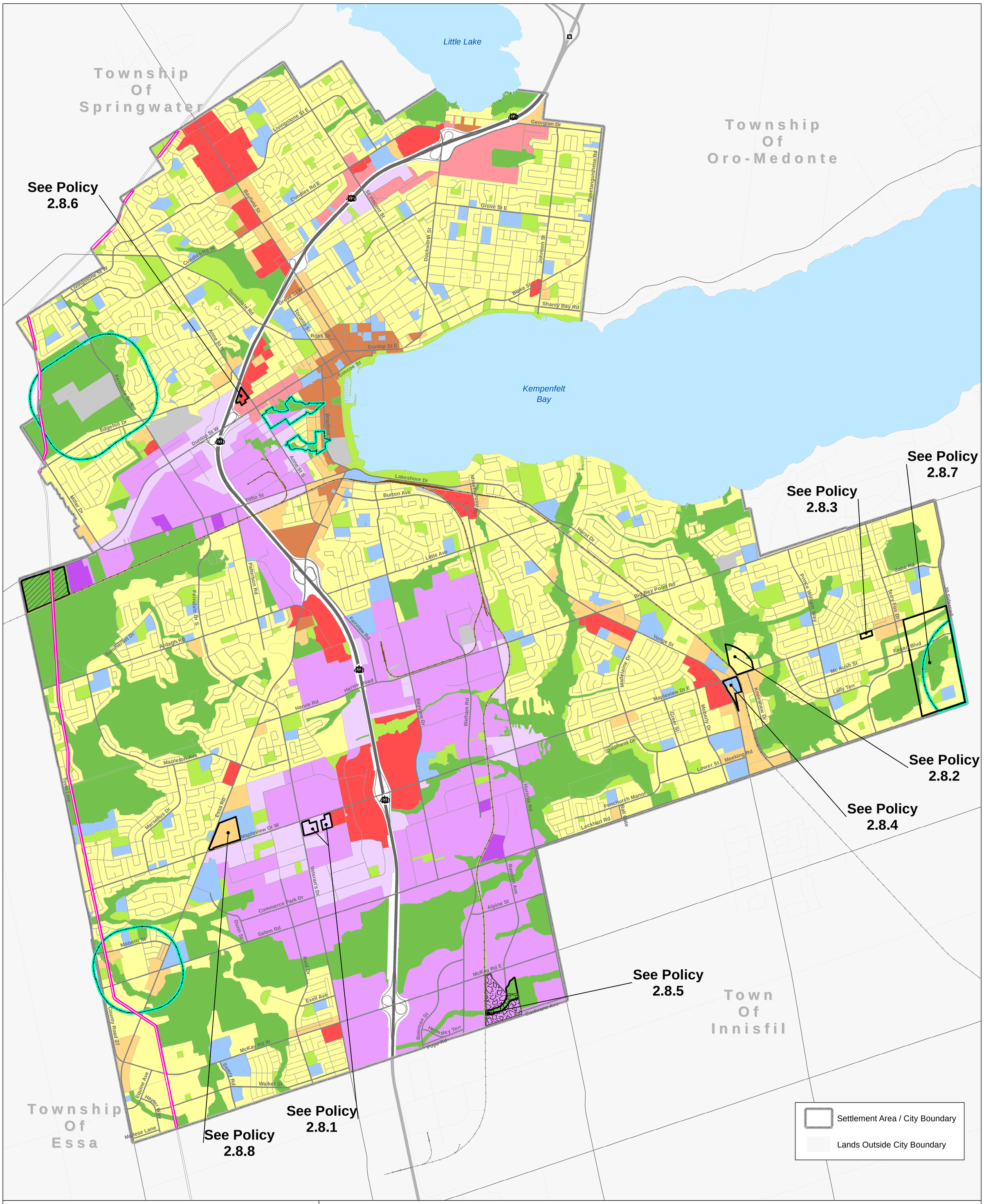




Barrie

OFFICIAL PLAN

MAP 2
Land Use Designations

As Modified and Approved by the Ministry of Municipal Affairs and Housing April 11, 2023

- Neighbourhood Area
- Medium Density
- High Density
- Strategic Employment and Economic District (SEED)
- Commercial District
- Community Hub
- Employment Area - Non Industrial
- Employment Area - Industrial
- Employment Area - Restrictive Industrial
- Natural Heritage System
- Greenspace
- Infrastructure and Utility
- Waste Disposal Assessment
- Extractive Industrial
- Defined Policy Area
- Application Before the Local Planning Appeal Tribunal (LPAT)
- TransCanada Pipeline Right of-way

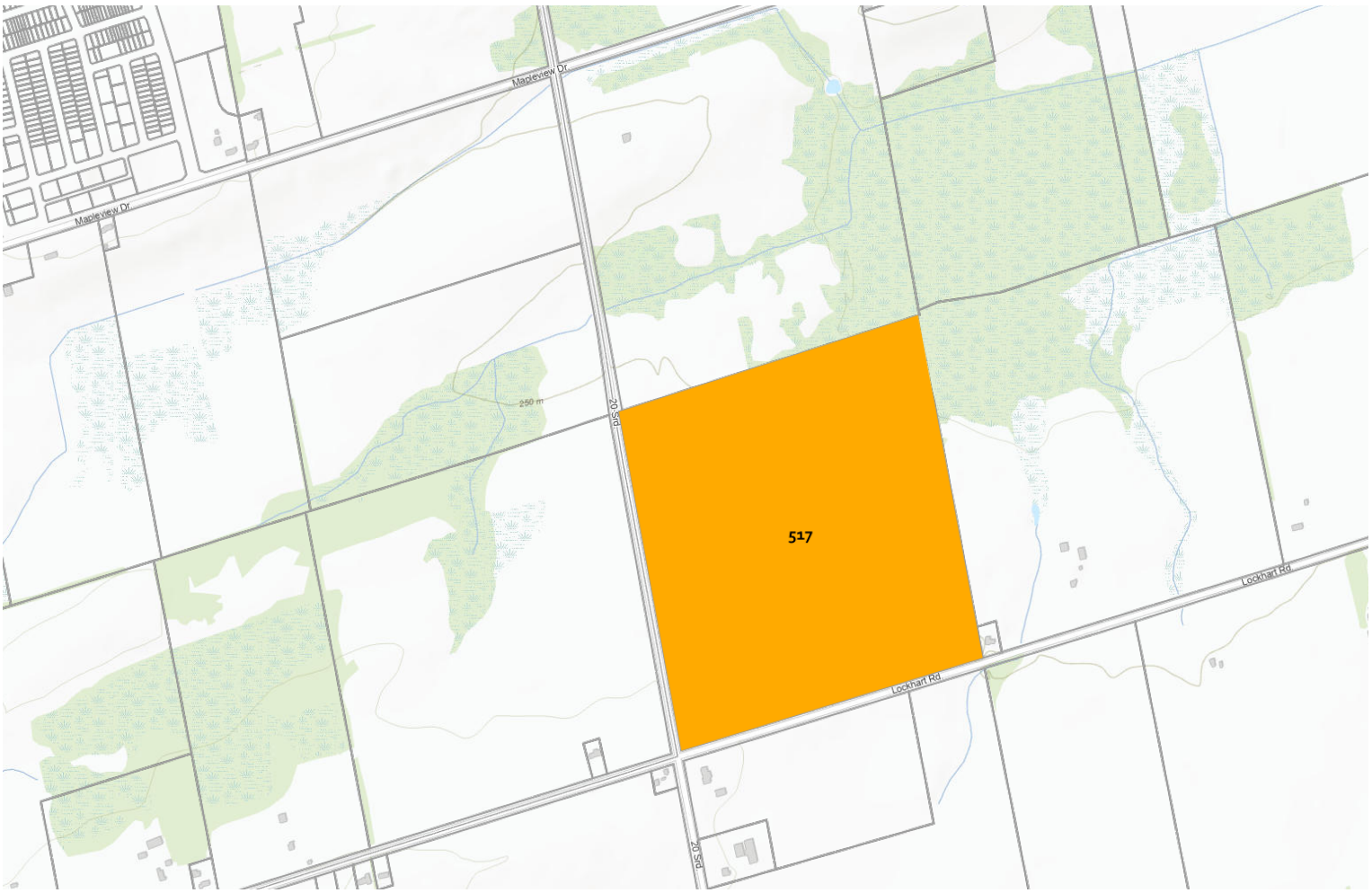
* All land use designations extend to the centre line of the right-of-way for streets. Land use designations, where applicable, extend to/terminate at the boundary of the right-of-way for provincial highways, rail corridors and utility corridors.

** Certain features like roads, parks and trails within the undeveloped designated greenfield area are conceptual and subject to change.

0 1 2 km

Development Services 4/21/2023

County of Simcoe - Web Map

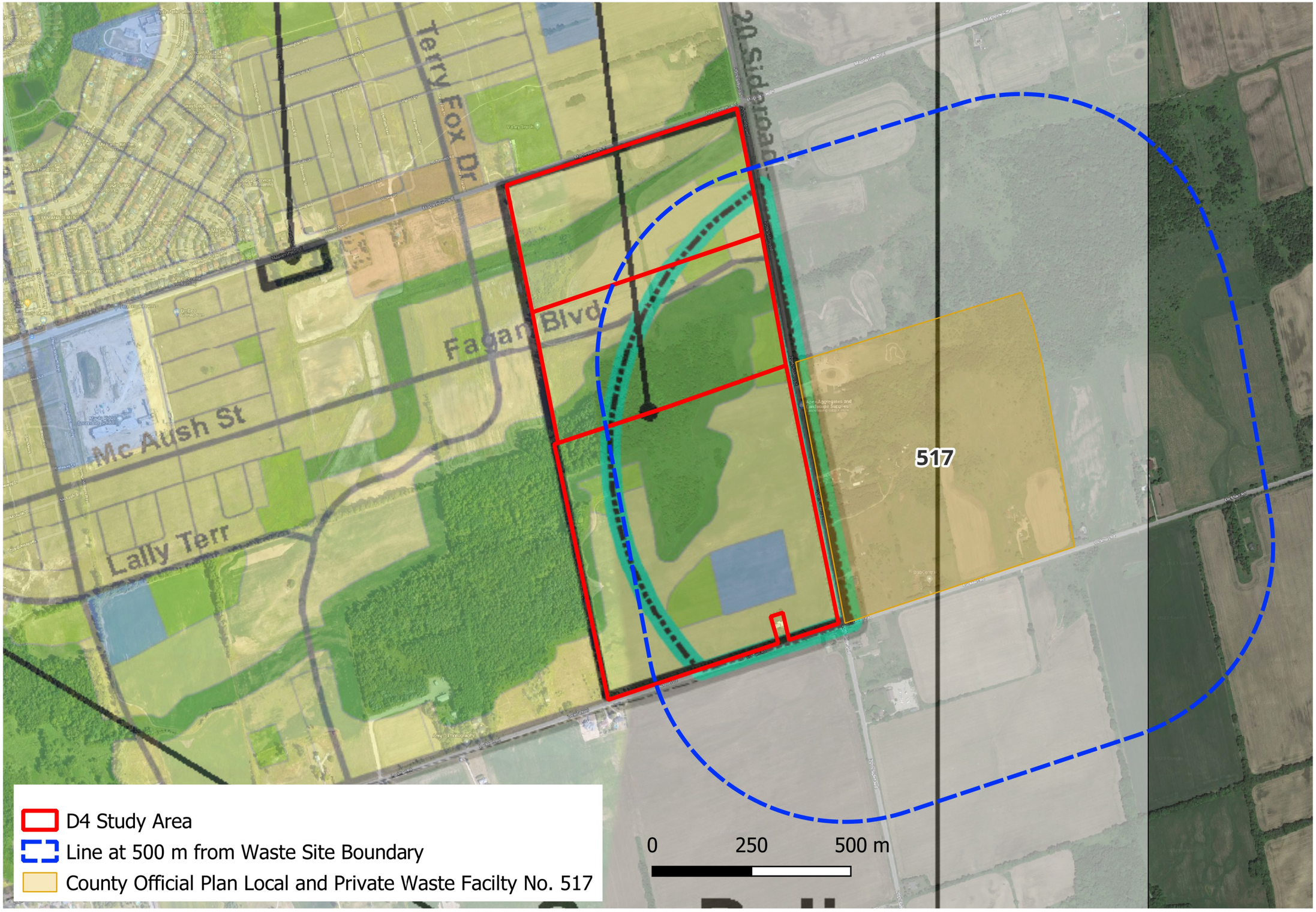


N
W E
S

0 200 400 600m

1 : 9,028

Sep. 18, 2023


Terry Fox Dr
20 Sideroad
Fagan Blvd
Mc Aush St
Lally Terr
517
D4 Study Area
Line at 500 m from Waste Site Boundary
County Official Plan Local and Private Waste Facilty No. 517
0
250
500 m

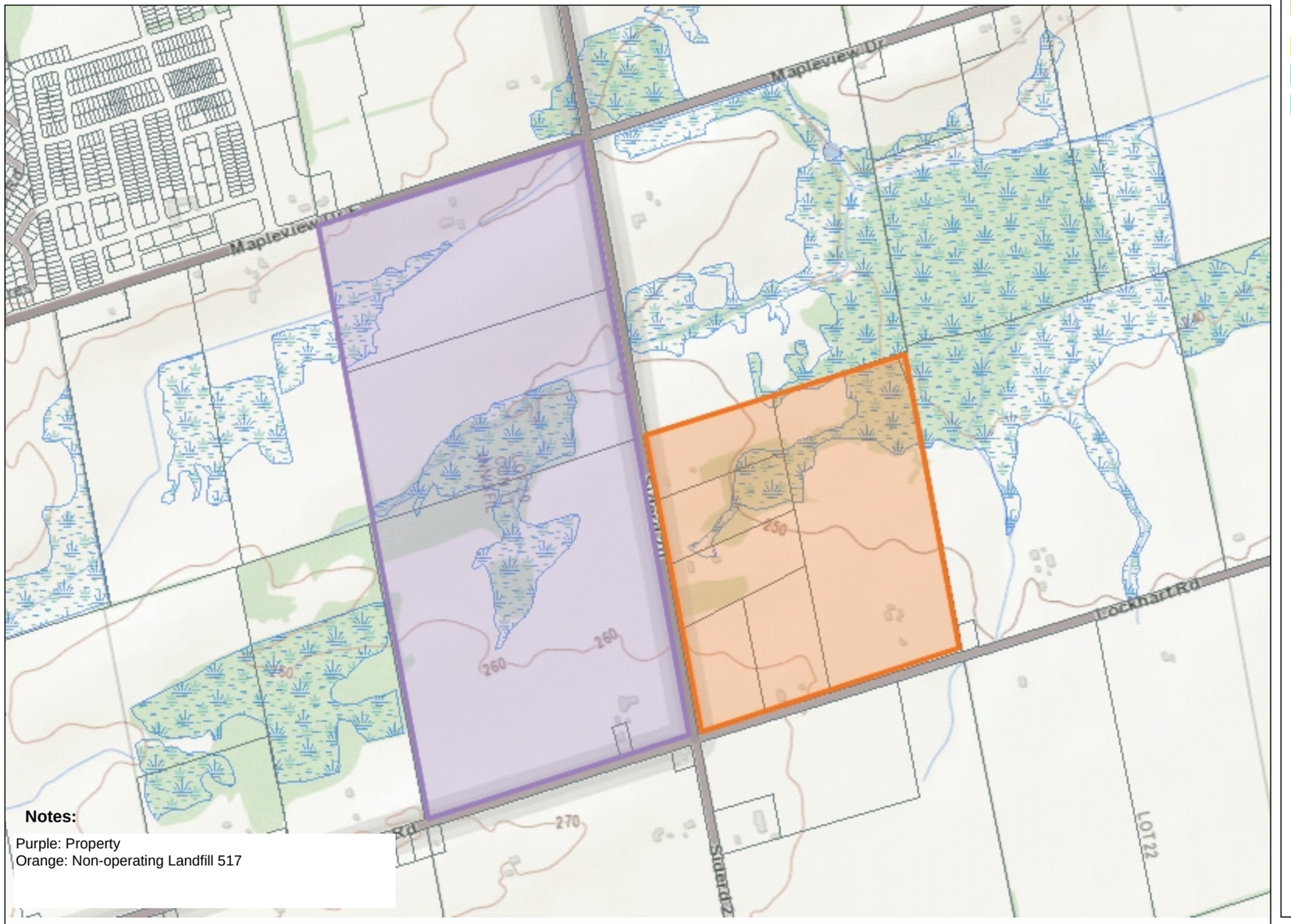
Ontario

Ministry of Natural Resources and Forestry

Make-a-Map: Natural Heritage Areas

MNRF Natural Heritage Areas

Map created:5/31/2023



Notes:

Purple: Property
Orange: Non-operating Landfill 517

Legend

- Assessment Parcel
- ANSI
- Earth Science Provincially Significant/sciences de la terre d'importance provinciale
- Earth Science Regionally Significant/sciences de la terre d'importance régionale
- Life Science Provincially Significant/sciences de la vie d'importance provinciale
- Life Science Regionally Significant/sciences de la vie d'importance régionale
- Evaluated Wetland
- Provincially Significant/considérée d'importance provinciale
- Non-Provincially Significant/non considérée d'importance provinciale
- Unevaluated Wetland
- ORM Land Use Designation
- Countryside Area/zone de campagne
- Natural Core Area/zone centrale naturelle
- Natural Linkage Area/lien naturel
- Palgrave Estates Residential Community/communauté résidentielle de Palgrave Estates
- Rural Settlement/zone de peuplement rurale
- Settlement Area/zone de peuplement
- Natural Heritage System

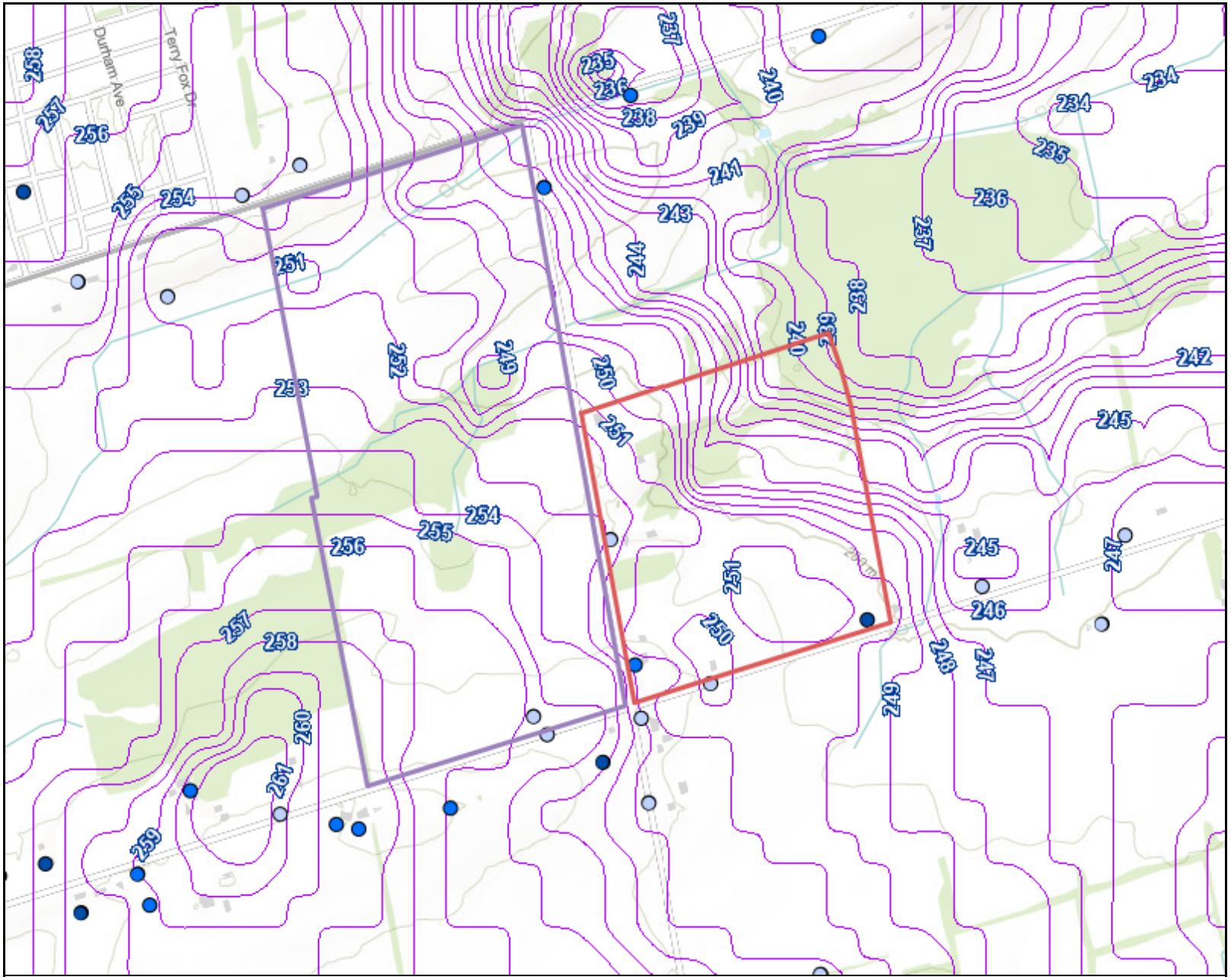
0.7 0 0.33 0.7 Kilometres

Absence of a feature in the map does not mean they do not exist in this area.

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Natural Resources and Forestry(OMNRF) shall not be liable in any way for the use of, or reliance upon, this map or any information on this map.

OakRidgesMoraine GROUNDWATER PROGRAM

Groundwater Level (masl)



Legend

WaterTableTheme_SourceData

- Shallow Wells (Bottom of screen <20 m deep)
- Intermediate Wells (Bottom of screen 20-40 m deep)
- Deep Wells (Bottom of screen >40 m deep)

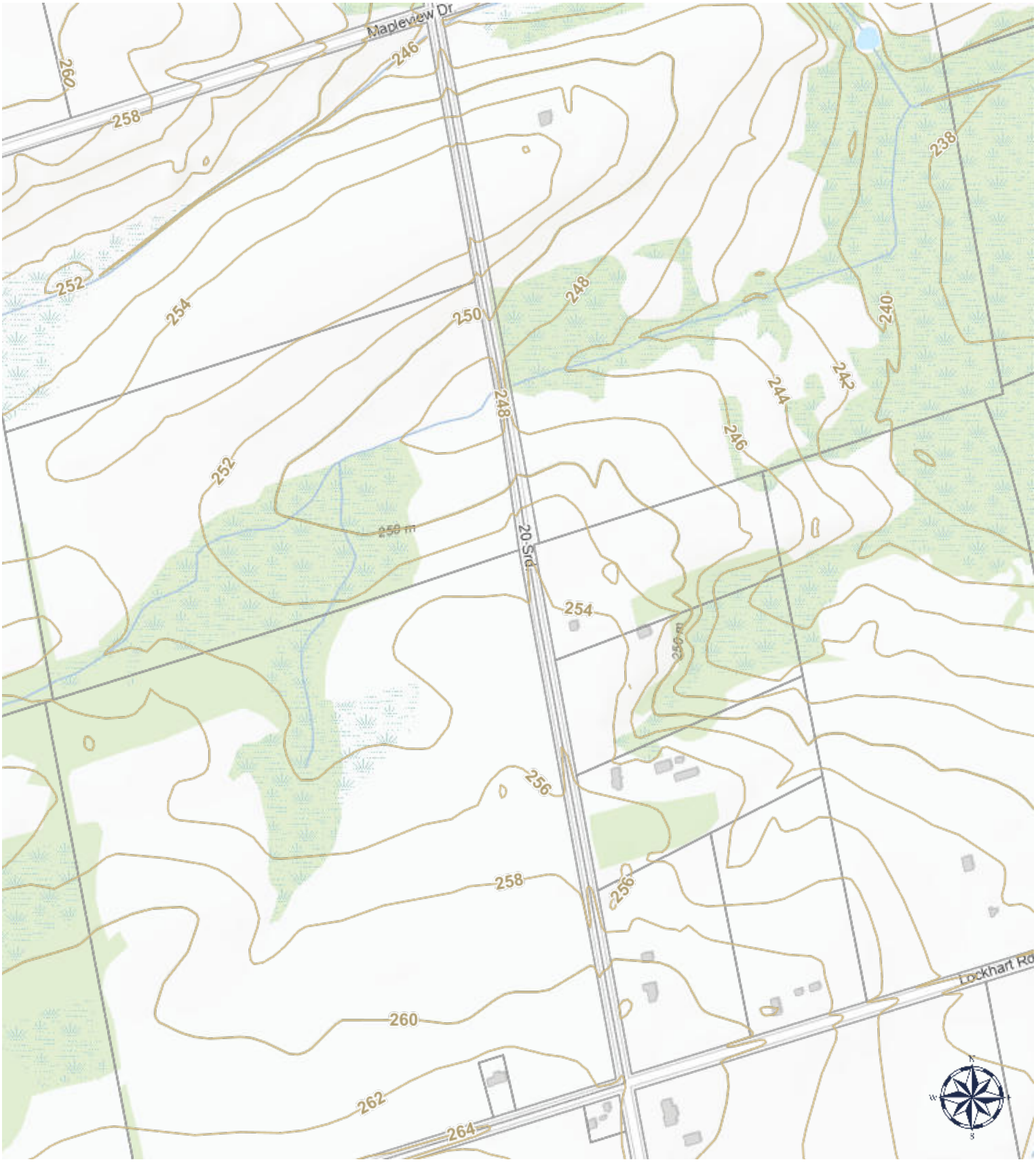
OakRidgesMoraine GROUNDWATER PROGRAM

0 450 900 m

This map is a user generated static output from an Internet mapping site and is for reference only. The Oak Ridges Moraine Groundwater Program takes no responsibility for, nor guarantees, the accuracy of the information contained within the map. DO NOT USE FOR NAVIGATION.

Source: ORMGP, 2023 ; MNRF, 2023
Projection: WGS 1984 Web Mercator Auxillary Sphere
Date Printed: 06/06/2023

County of Simcoe - Web Map



0 100 200 300m

1 : 8,874

May 31, 2023

Innisfil

Search Address for Zoning Info ...

Feedback

Layers

Zoning

Follow @simcoecountygis

Imagery

Topo

Mapleview Dr E

Richmond Rd

Durham Ave

Terry Fox Dr

LOCKHART ROAD

250 m

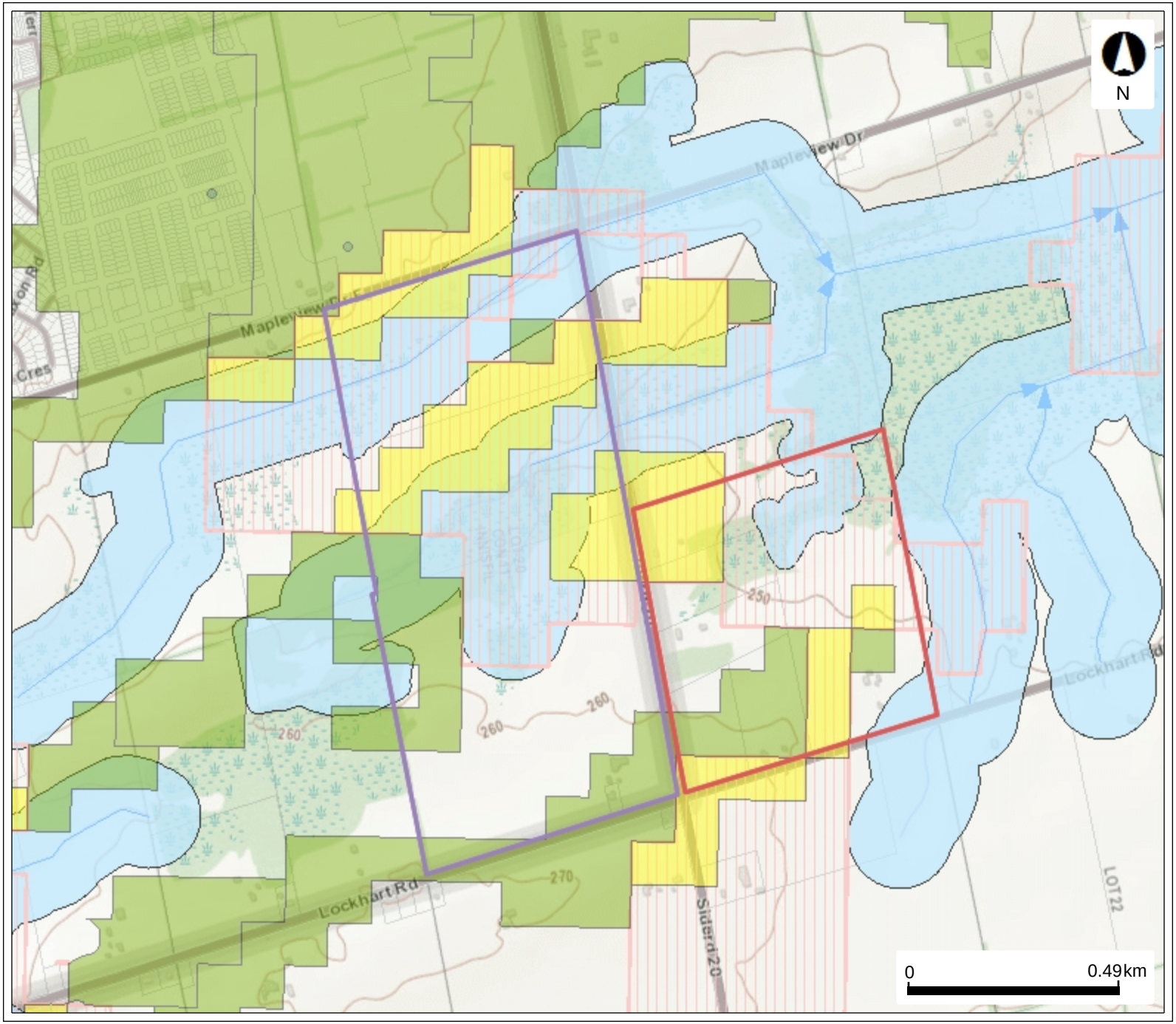
AG

EP

RR

AR-1

Sorce Water Protection



Legend

- Permits To Take Water: Active
- Significant Groundwater Recharge Area
  - N/A
  - 0
  - 2
  - 4
  - 6
- Highly Vulnerable Aquifers
- Intake Protection Zone 1
- Intake Protection Zone 2
- Intake Protection Zone 3
- Watercourse Direction
- Assessment Parcel

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Environment, Conservation and Parks (MECP) shall not be liable in any way for the use or any information on this map. of, or reliance upon, this map.

Ontario

Map Created: 6/6/2023
Map Center: 44.35128 N, -79.58864 W

Zoning By-Law

Brent Harlow
The City of Barrie

View Full Details

Download

Details

Dataset
Feature Layer

May 16, 2022
Info Updated

May 16, 2022
Data Updated

May 24, 2017
Published Date

Records: 4,143
View data table

Public
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View license details

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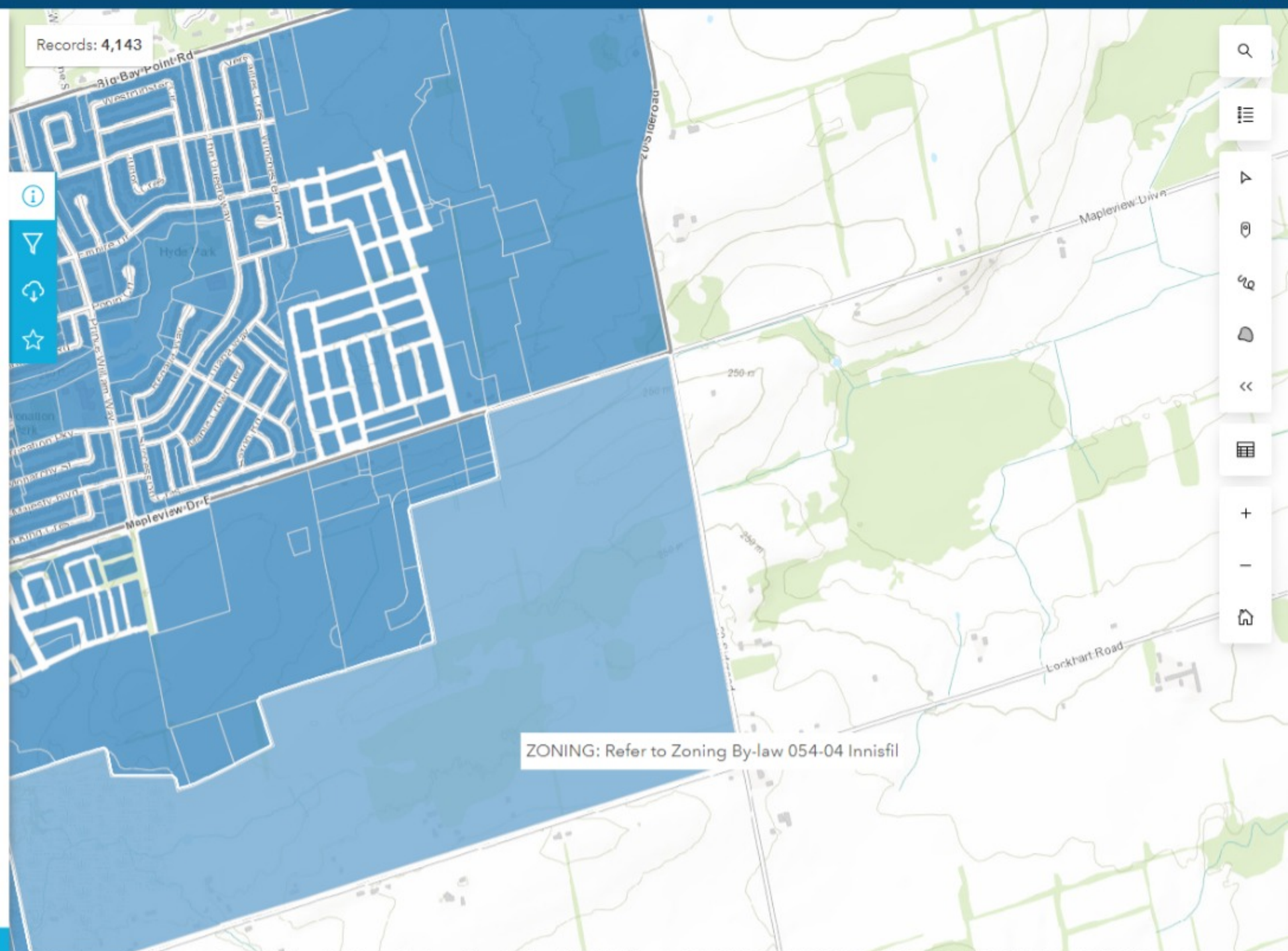
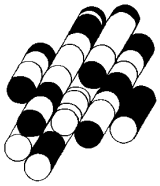


APPENDIX B

TERRAPROBE INC.



COUNTY OF SIMCOE
For the Greater Good

SOLID WASTE MANAGEMENT

D-4 GUIDELINE
LANDFILL IMPACT ASSESSMENTS

Solid Waste Management

D-4

GUIDELINE LANDFILL IMPACT ASSESSMENT

1.0 BACKGROUND

This outline is intended as a best practices guide to provide Qualified Professionals preparing the study with the County's requirements and thereby improve the efficiency of the review process. This document is only applicable to D-4 Study applications submitted to the County for review.

The D-4 is a direct application of Guideline D-1, "Land Use Compatibility" (Guidelines), which specifies restrictions and controls on land use that the Ontario Ministry of Environment and Climate Change (Ministry, or MOECC) outlines for land use in the vicinity of landfills or dumps. The Simcoe County Official Plan requires the application of the D-4 Guideline and extends to proposals for land use changes on or near operating or non-operating landfills. The D-4 Assessment Area refers to the lands considered to be potentially impacted by waste disposal (landfill) site operations, generally within 500 metres of the waste disposal site.

Factors to be considered for land uses in the vicinity of non-operating landfill sites include: (i) ground and surface water contamination by leachate, (ii) surface runoff, (iii) landfill-generated gases, (iv) ground settlement, (v) visual impact and (vi) soil contamination and hazardous waste. The Guideline notes "particular attention shall be given to the production and migration of landfill gas".

Factors to be considered for land uses in the vicinity of operating landfill sites include: (i) ground and surface water contamination by leachate, (ii) surface runoff, (iii) landfill-generated gases, (iv) litter, (v) odour, (vi) contaminant discharges from associated vehicular traffic, (vii) dust, (viii) noise, (ix) other air emissions, (x) visual impact, (xi) fires, and (xii) vectors and vermin. The Guideline notes "particular attention shall be given to the production and migration of landfill gas".

If a landfill site is closed, but active operations / activities occur at the site (e.g., waste transfer station, household hazardous waste collection, recycling, composting, etc.), in addition to reviewing impacts of the non-operating landfill, the current activities shall be evaluated as per the criteria as per the Certificate of Approval / Environmental Compliance Approval (CofA / ECA) approved activities.

It is noted that, with respect to any proposed development in the vicinity of an operating landfill or waste transfer station, consideration be given not only to the zoning standards set out by the local municipality, but also to assess nuisance or health issues relating to the potential sensitive use of the proposed development. Sensitive use is defined in the D-4 Guideline and includes a permanent structure where a person sleeps or is present on a full-time basis. It is recommended that for uses not strictly outlined in the D-4 Guidelines, that the proponent discuss approved uses with the Municipality and the County prior to completion of a detailed D-4 Study. Additional studies may be required to address issues including but not limited to noise, air quality and traffic, which are beyond the standard review outlined herein.

The County will require that the D-4 Study include the following, outlined in more detail in Section 3:

i. The proximity of the D-4 study site to the Waste Disposal Site and the potential for nuisance effects;
ii. Recommendations by the County's peer revie consultant that should be implemented; and
iii. Any subsequent planning applications may require additional D-4 Study.

The County requires these three conditions to ensure that (i) the proximity to the Waste Disposal Site and potential nuisance effects associated with the location of the development are clearly outlined on the title of the property to inform future owners of the property (ii) to guarantee any remedial measures are complied with, and (iii) to ensure the property owners understand that a D-4 study for one development proposal may not apply to another.

2.0 EXPECTATIONS AND RESPONSIBILITIES

Client

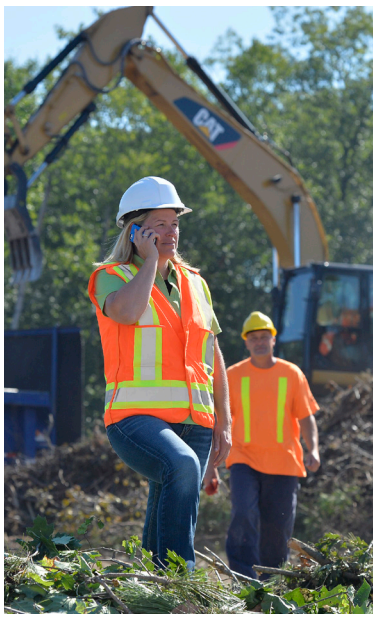
- Identify that the site of a proposed development is located within the Assessment Area of an active or closed landfill site;
- Contract a Qualified Professional, either a licenced professional geoscientist or engineer with the requisite training and experience, to complete a D-4 Study to assess the potential impacts on the property; and,
- Ensure that appropriate control measures, as necessary, are implemented as per recommendations of the Qualified Professional involved in the D-4 Study process, as well as any related Planning approval requirements.

D-4 Consultant (Qualified Person)

- Assess all factors listed above to evaluate the presence and impact of any adverse effects or risks to health and safety, nuisance impacts and degradation of the natural environment taking into consideration the proposed land use(s) and the uses permitted by local zoning bylaws;
- Communicate with the County and the Ministry to request documentation on the relevant landfill site and additional information as required. This could include monitoring reports, well record information, information about operations/activities on site, hours of operation, traffic patterns, dust/odour/noise/litter complaints regarding the landfill, etc.); and,
- Complete a report outlining environmental considerations and, where necessary, propose appropriate engineered remedial / control measure to prevent or minimize adverse effects.

County

- As operators and/or owners of operating and non-operating landfills, the County must comply with the Environmental Protection Act and O.Reg. 347 (Waste Management) requirements for the control of adverse effects caused by the landfill sites;
- Provide the Consultant completing the D-4 Study with recent monitoring reports, operations information and details requested to enable them to sufficiently complete the assessment;
- Ensure the D-4 Study is peer reviewed by a Qualified Professional experienced in landfill impact assessments; and,
- Following receipt of the peer review, the County will require registration on title with the relevant requirements outlined from the study and the peer review.



County's Reviewer

- Peer review the D-4 Study reports to ensure that the Qualified Professional who prepared the report takes into consideration all aspects required under the D-4 Guidelines; and,
- Provide comments and recommendations for follow up assessment, if required.

3.0 GENERAL INFORMATION TO BE PROVIDED IN A D-4 STUDY

- List of reference documentation used in the assessment;

- Discussion of the proposed development at the subject Site being reviewed, including:
  - Site zoning, intended land use on the Site, and planned/permitted land uses;
  - Description of topography on the Site, including grade elevations and noting major features such as ditches;
  - Provide a description of building(s) to be constructed, including uses, design, depths of excavation, height of building(s);
  - Discussion of current / proposed water and sanitary servicing on the site (e.g., municipal servicing for water and sewer). Note if a water supply well drilled as part of the project and, if so, indicate the proposed depth and the proposed hydrostratigraphic unit in which the well will be screened, commenting on the relevant regional known / inferred hydrostratigraphy;
  - For closed landfills, distance to the landfill site boundaries and waste footprint or fill area;
  - For active landfill areas or waste management facilities, as the size of the fill area can change over time, the distance to the property line should be used; and,
  - Provide a detailed Site Plan Drawing showing the location of all planned buildings and structures to be constructed, including septic systems, wells, stormwater management facilities, etc.

- Provide details about the landfill, including whether it is active or closed and a description of any other current operations / activities on the site (e.g., waste transfer station, recycling, composting, etc.)
  - Information of the known waste limits, depth and cover, buffer or perimeter area, presence of any Contaminant Attenuation Zones;
  - Types of waste disposed at the landfill;
  - Reference to active CofA / ECA related to operations / activities on the landfill site, including description of recent monitoring;
  - Description of the history of the landfill and any engineering controls (e.g., liners, leachate collection systems, drainage ditches, etc.);
  - Hours of landfill site operation;
  - Description of surrounding land use; and,

- Any noted complaint history (or lack thereof) based on information received from the County and the Ministry.

- Physiography, Topography and Hydrostratigraphy
  - A review of available information and summary of physiography, topography, surface water features, drainage and hydrogeological conditions in the area of the landfill site and subject development site; and,
  - Confirmation of assumptions or conclusions with respect to groundwater flow, depth to water, soil type, etc. using available information including reports, well records, etc. Where information is not from a report provided by the County, it shall be included in the D-4 Study.

4.0 LANDFILL IMPACTS

Groundwater Contamination By Leachate

- Determine the direction of groundwater flow in the shallowest aquifer under the landfill and subject property using existing referenced information or wells constructed for this purpose;
- Referenced information should provide sufficient details, (summarized as necessary), including water well records, hydraulic boundaries or other influences;
- Describe if the site is upgradient, cross-gradient or downgradient of the landfill;
- Discuss the extent, if known, of any existing groundwater impacts from the landfill;
- If a water supply well will be part of the development, note its potential influence on groundwater flow, the aquifer will likely be constructed into, etc. (as noted above); and,
- Indicate if dewatering will be required on the subject property during construction and discuss the potential for impact of contaminated water during this process.

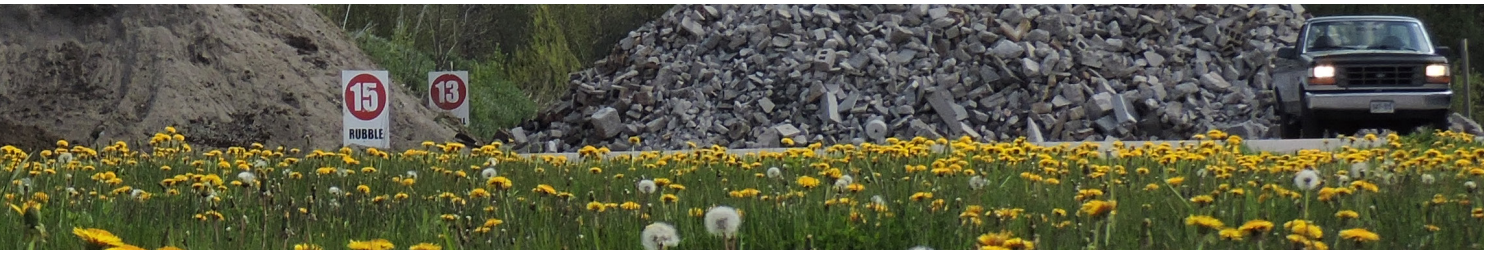
Surface Water Contamination By Leachate / Surface Run-off

- Identify any surface water features on the landfill site and subject property, including streams, creeks, water bodies and wetlands;
- Describe surface water flow directions and drainage at the landfill and subject property using existing referenced information;
- Describe surface runoff from the landfill site, including description of ditching on the site, nature of surficial materials, extent of infiltration, etc. on the landfill site. If there are any hydraulic barriers or other influences they should be discussed;
- Describe if the subject site is upgradient, cross-gradient or downgradient, etc. of the landfill; and,
- Discuss the extent, if known, of any existing surface water impacts from the landfill.

Landfill Generated Gases

Landfill gas (LFG) generation and migration from a landfill to a subject development site is a primary consideration in the D-4 Guideline assessment process. Accordingly, the D-4 Study should focus on the available information including proven soil-gas concentrations (or the absence thereof) or if no information is available, use of existing historic, topographic, geological information, etc. shall be used to assess the potential likelihood for migration of landfill gas to the subject development. Assumptions shall be backed up with available information.

- Review available soil gas monitoring data from any gas probes constructed for this purpose at the landfill site/subject property;
- Describe the depth to the water table in the area of the landfill (i.e., the depth of the unsaturated zone);
- Review the gas probe construction and identify if they are reliable to determine potential combustible gas generation at the landfill;
- If gas probes are constructed between the landfill and the development site, they should be designed to assess migration to likely structures including basements;
- Monitoring of landfill gas concentrations should be undertaken and confirmed (i.e., two or three rounds) including one monitoring round under frozen ground conditions;
- The methods of monitoring including the means to purge and collect representative data provided, and confirmation of monitoring equipment and calibration noted;
- Discuss the extent, if known, of any existing soil gas impacts from the landfill or estimate the extent;
- Discuss the age of the landfill, thickness of the waste below grade, depth to the water table, type of soil at ground surface and the presence of any hydraulic barriers to estimate the potential for migration of landfill gases;
- Discuss if there is a potential for buildup of explosive concentrations of LFG in enclosed spaces; and,
- If there is a potential for landfill gas impacts, propose mitigation measures (e.g., on-site monitoring, building design and relevant codes (e.g., electrical) to address the potential presence of LFG in soil).



Ground Settlement

- Discuss whether or not the proposed development is in the footprint of the waste disposal area or located at a distance from the landfill; and,
- Discuss the age and heterogeneity of the waste and whether or not any settlement is anticipated.

Visual Impact

- Discuss the grade elevations at the landfill site relative to the grades on the development property, in additional to proposed heights of any new building(s);
- Discuss the vegetation/character or the completion of the closed landfill and whether or not any other current operations / activities exist at the landfill site; and,
- Discuss the presence and permanence of any vegetation, trees or other buffers between the landfill and the development; and,
- If the landfill site is operational, including other current operations/ activities on the site that will be visible, evaluate whether or not there are any sensitive land uses on the proposed development that could be impacted.

Soil Contamination and Hazardous Waste

- Describe any known soil contamination or hazardous waste at the landfill site and evaluate whether or not this could impact the proposed development based on the hydrogeological interpretations noted above.

5.0 ADDITIONAL CONSIDERATIONS FOR OPERATING LANDFILL AND WASTE MANAGEMENT FACILITIES

Litter

- Describe current litter control measures at the site, including fencing, covering practices, etc., which would control litter;
- Discuss prevailing wind direction in the vicinity of the landfill site relative to the proposed development in evaluation of potential impact of litter at the proposed development property; and,
- Discuss if the County or Ministry has received any litter complaints for the site operations.

Odour / Other air emissions

- Discuss prevailing wind direction in the vicinity of the landfill site relative to the proposed development in evaluation of potential impact of odour at the proposed development property;
- Discuss the presence of any buffers between the landfill site and the proposed development that could limit impacts from odour/other air emissions;
- Discuss if the County or Ministry has received any odour complaints at the landfill site; and,
- Indicate if there are any sensitive land uses on the proposed property that could be negatively impacted by odour. If so, proposed mitigation or engineering solutions, such as sealing of windows, locations of air intakes, climate control systems, etc., should be identified.

Traffic

- Discuss information from the County related to access routes and hours of operation of waste management vehicles to the active landfill (or other site operations) evaluate their impact on the proposed development; and,
- Discuss if the County or Ministry has received any traffic complaints related to the site.

Dust

- Discuss prevailing wind direction in the vicinity of the site relative to the proposed development in evaluation of potential impact of dust at the proposed development property;
- Discuss the presence of any buffers between the site and the proposed development that could limit impacts from dust;
- Discuss if the County or Ministry has received any dust complaints due to operations at the site; and,
- Indicate if there are any sensitive land uses on the proposed property that could be negatively impacted by dust. If so, discuss proposed mitigation or engineering solutions, such as sealing of windows, locations of air intakes, climate control systems, etc. in consultation with the municipality and County.

Noise

- Discuss operations/activities on site which generate noise at a level anticipated to be detectable off-site;
- Indicate hours of operation at the site;
- Discuss the presence of any buffers between the landfill site and the proposed development that could limit impacts from noise;
- Discuss if the County or Ministry has received any noise complaints due to operations at the landfill site; and,
- Indicate if there are any sensitive land uses on the proposed property that could be negatively impacted by noise. If so, discuss proposed mitigation / engineering solutions to limit the impact from noise.

Fires

- Discuss the potential for fires at the site and the potential impact on the proposed development relative to health and safety including air quality.

Vectors and Vermin

- Discuss the presence of any known vectors and/or vermin at the site and discuss current practices at the site to limit the presence of these vectors and/or vermin impact; and,
- Indicate if the County or Ministry has received any complaint about vectors/vermin at the site.

NOTES:

County of Simcoe

1110 Highway 26
Midhurst, Ontario
L0L 1X0

705-735-6901
simcoe.ca

Ontario (https://www.ontario.ca/page/government-ontario)

D-4 Land Use On or Near Landfills and Dumps

A guide for land use planning authorities on how to decide what types of land uses are appropriate near landfilled waste.

Legislative Authority:
Environmental Protection Act, RSO 1990, Part V, Sections 27and 46
O. Reg. 347, General -- Waste Management
Planning Act, RSO 1990, Sections 2(a)(b)(c)(f)(g)(h), 17(9),22(3), 41(4) and 51(3)
Condominium Act, RSO 1990, Section 50(3)
Environmental Assessment Act, RSO 1990, Section 5(3)

Responsible Director:
Director, Environmental Planning Branch

Last Revision Date:
April, 1994

Synopsis

This guideline specifies restrictions and controls on land use that the Ministry wishes to see implemented in the vicinity of landfills and dumps, in order to protect the health, safety, convenience and welfare of residents near such facilities. It complements existing ministry abatement programs for landfills and dumps, and is a direct application of Guideline D-1: "Land Use Compatibility."

Application of the guideline extends to all proposals for land use on, or near, operating and non-operating landfills, (as defined in O. Reg. 347) and dumps which contain municipal solid waste, industrial solid waste and/or sewage sludges. The guideline applies to all such facilities regardless of ownership. It does not apply to lands certified as organic soil conditioning sites under O. Reg. 347.

Ministry staff shall use the guideline when they are reviewing land use proposals, including official plans and amendments, and plans of subdivision/condominium:

a. at the request of the responsible Ministry or the delegated approving authority, under the Planning Act or the Condominium Act;

b. for land use requests subject to Section 46 of the Environmental Protection Act; and

c. for undertakings subject to the Environmental Assessment Act.

Introduction

This guideline protects the health, safety, convenience and welfare of residents from the potential adverse effects of landfills and dumps, by restricting or controlling land use in their vicinity. It complements the Ministry's existing abatement programs, and Ministry staff shall refer to it when they review land use proposals.

The principles of Guideline D-4 shall also be considered when looking for locations to establish a landfill in Ontario.

Procedure D-1-1: "Land Use Compatibility: Procedure for Implementation" discusses various implementation approaches and tools. Procedure D-1-3: "Land Use Compatibility: Definitions" provides definitions of terms, in addition to those included in Section 2.0 of this guideline.

Definitions

Note: Additional definitions are provided in Procedure D-1-3:"Land Use Compatibility: Definitions".

Fill Area
The area of a waste disposal site set aside for landfilling or dumping (see Conceptual Diagram No. 1. below).

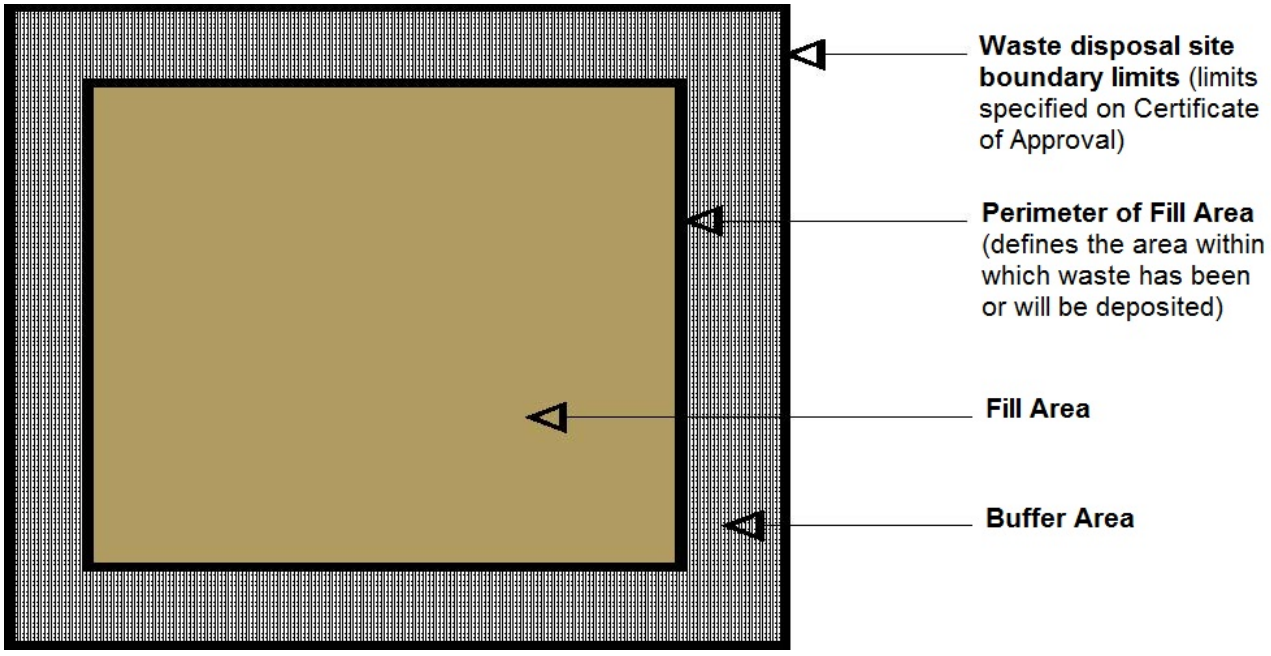
Land Use
Any existing or proposed activity, structure, service, facility, or natural feature, either at, above, or below grade, which conforms to an approved municipal plan.

Land Used for Waste Disposal Purposes
The land comprising the fill area, where landfilling or dumping has occurred, and the land which is being used or is to be used for the leachate buffer area and/or the gas buffer area; the land may be on- or off-site, (see Conceptual Diagram No. 1 below).

Peripheral Area
The area controlled by the site owner/operator between the boundary of the waste disposal site and the fill area; together, the peripheral area and the fill area make up the waste disposal site; the peripheral area will contain the buffer areas required to be on-site (see Conceptual Diagram No. 1 below).

Vectors and Vermin
Disease-carrying organisms, insects, rodents, birds (especially gulls) and other harmful creatures (e.g., bears).

Conceptual diagram no. 1 (plan view)



Application

3.1 General

This guideline applies to all proposals for land use on or near any landfill or dump which contains municipal solid waste, industrial solid waste and/or sewage sludges. It does not apply to lands certified as organic soil conditioning sites under O. Reg. 347.

3.2 Liquid industrial and hazardous waste

For proposals in the vicinity of landfills and dumps that have accepted liquid industrial, toxic or hazardous waste, the Ministry shall expect proponents to undertake further investigations and provide a report to the approving authority. Where there is evidence of off-site migration of contaminants, the Ministry shall require abatement measures beyond those discussed in this guideline.

Environmental considerations

Environmental considerations shall be considered by all parties involved in the production, review and approval of a study/evaluation report.

4.1 Operating sites

Factors to be considered when land use is proposed near an operating site include: landfill-generated gases, ground and surface water contamination by leachate, odour, litter, contaminant discharges from associated vehicular traffic, visual impact, dust, noise, other air emissions, fires, surface runoff, and vectors and vermin. Particular attention shall be given to the production and migration of methane gas.

4.2 Non-operating sites

Factors to be considered when land use is proposed on or near anon-operating site include: ground and surface water contamination by leachate, surface runoff, ground settlement, visual impact, soil contamination and hazardous waste, and landfill-generated gases. Particular attention shall be given to the production and migration of methane gas.

4.3 Assessment

The adverse effects of the factors listed in Sections 4.1 and 4.2of this guideline may create:

a. a hazard or health/safety risk;

b. a nuisance to man; and/or

c. degradation of the natural environment.

The overall extent, number, degree and frequency of contaminant discharges and visual problems can vary with each site. Consideration must be given to the nature of proposed land use(s).

Reference should be made to Reference (a) (Section 7.0), if particular site conditions warrant obtaining further information with respect to methane gas.

4.4 Buffering techniques

One or a combination of buffers, as defined in GuidelineD-1: "Land Use Compatibility", may be employed in a given situation.

4.5 Hydrogeologic/engineering studies

4.5.1 Responsibility

Where the hydrogeologic and geologic setting of the proponent's property and the inter-relationship with gas and/or leachate from the fill area are unknown, Ministry staff shall recommend to the approving authority that the proponent engage a qualified hydrogeologist and/or engineer to determine the subsurface conditions and, where necessary, propose remedial measures.

4.5.2 Exceptions

The Ministry shall not normally recommend a formal site investigation, as recommended in Section 4.5.1, when its staff is satisfied that the evaluation of existing data indicates the absence of a problem.

4.6 Controls and monitoring for adverse effects

Where appropriate, Ministry staff shall recommend, as a condition of approval, that a proponent include controls to deal with adverse effects or risks to health or safety and that the approving authority monitor contaminant migration and carry out inspections of control facilities.

In the event that the approving authorities lack the expertise or resources to perform such inspections, they shall employ qualified consultants to do so.

4.7 Monitoring on private property

Where the approving authority requires monitoring and inspections on private property, Ministry staff shall recommend that a contract be executed between the proponent and the municipality, in the form of, or as part of an agreement that may be registered on title and run with the land. Documents which are able to be registered on title are identified in References (b) and (c) (see Section 7.0).

Land use considerations

5.1 Sensitive land use

The Ministry will normally recommend against proposals for sensitive land use (see Section 5.1.1. for details) adjacent to operating landfills, and on land used for waste disposal purposes where there are completed or partially completed fill areas.

Where land uses are proposed for approval on non operating landfills and dumps under Section 46 of the Environmental Protection Act, the Ministry normally shall not permit residential or other sensitive land use. Further details are provided in Reference (d) of Section 7.0.

5.1.1 Sensitive land uses for landfills currently in operation

Any existing or committed land use which includes:

a. a permanent structure used in animal husbandry; or

b. agricultural land used for pasturing livestock; or

c. a permanent structure where:

i. a person sleeps, or

ii. a person is present on a full time basis;

but not including food or motor vehicle service facilities adjacent to a highway, utility operations, scrap yards, heavy industrial uses, gravel pits, quarries, mining or forestry activities; or

d. cemeteries

5.1.2 Compatible land uses for landfills currently in operation

Compatible land uses may include:

a. utilities and above grade transportation routes except major highways;

b. fences;

c. wood harvesting and other forestry activities;

d. certain farming activities;

e. industrial uses, including incinerators permitted to operate under O. Reg. 347;

f. gravel pits and quarries, and other mining activities(provided the landfill water table is not affected); or

g. such land uses which would not be threatened by any hazard to public health or safety and would not be impaired by nuisance effects.

5.2 Land use within 30 metres of a fill area

5.2.1 Operating sites

No land use may take place within 30 metres of the perimeter of a fill area. This is a minimum distance.

Each operating landfill shall have an on-site operational/maintenance buffer area identified on the Certificate of Approval. This buffer shall be no less than 30 metres; it is normally 60-100 metres.

5.2.2 Non-operating sites

Where technical controls for leachate, or leachate and gas are required surrounding a fill area, no land use may take place within 30 metres of its perimeter. This distance maybe reduced to 20 metres in cases where only gas controls are necessary.

5.3 Land use within 500 metres of a fill area

The Ministry considers the most significant contaminant discharges and visual problems to be normally within 500 metres of the perimeter of a fill area. Accordingly, the Ministry recommends this distance be used as a study area for land use proposals. Ministry staff shall ensure that the proponent has evaluated the presence and impact of any adverse effects or risks to health and safety and that necessary remedial measures are taken when land use proposals are within this distance. This

assessment shall be based on the nature and knowledge of the disposal site, and the nature of land use(s) proposed.

Actual influence areas for the considerations listed in Section4.1 and 4.2 of this guideline will vary with the individual landfill or dump. Where the actual influence area of a site has been determined to be less than the 500 metre study area set out in this section, the study area for land use proposals can be reduced to coincide with the actual influence area.

5.4 Land use beyond 500 metres of a fill area

Where significant impacts are encountered at or beyond 500 metres, the study area within which an assessment for any change in land use is recommended, shall be extended beyond the 500 metre area set out in Section 5.3. Historical evidence in Ontario has shown that the maximum distance within which adverse effects could be experienced while a landfill is operating is up to 3 kilometres.

In exceptional hydrogeologic situations, such as areas of fractured rock or sand, where it is anticipated that leachate or gas from a non-operating landfill or dump could migrate beyond 500 metres and pose a problem, Ministry staff shall recommend that proponents carry out hydrogeologic and/or engineering studies for land use proposals beyond 500 metres of a fill area (see Section 4.5 for more details).

5.5 Significant impacts

The Ministry shall recommend against land use proposals where proponents have not incorporated feasible remedial measures to prevent or minimize adverse effects (as discussed in Section4.3).

5.6 Sequential development

In considering long-range planning, the Ministry may recommend that proponents delay or phase certain types of land use to coincide with closure of sections of a landfill, or the operation itself, as nuisance effects are reduced or eliminated. This approach shall only be permitted in cases where no risks to health or safety are present.

Responsibilities

6.1 Operators and/or owners of landfills or dumps

The Ministry shall require operators and/or owners of operating landfills and non operating landfills and dumps to comply with the Environmental Protection Act and O. Reg. 347 (Waste Management) requirements for the control of adverse effects caused by these facilities.

6.2 Proponents/consultants

Ministry staff shall recommend to the approving authority that the proponent provide a report on environmental considerations(see Section 4.0) and, where necessary, propose and implement appropriate control measures. These measures shall include design details and specifications for any control device or facility.

6.3 Municipalities

The local municipal authority is responsible for ensuring that proponents implement and monitor proper control measures associated with new, sensitive developments. It also shall ensure that periodic inspections of operating landfills and non-operating landfills and dumps for contaminant migration and potential hazards are carried out.

6.4 Ministry

With respect to its mandate for landfills and dumps, the Ministry shall exercise the following responsibilities:

6.4.1 Near land used or to be used for waste disposal purposes

Ministry staff will expect proponents and municipalities to fulfill their responsibility to protect public health and safety in areas of land use near a landfill or dump, and to prevent significant impacts from difficult-to-control nuisance effects which may extend beyond the lands under the Certificate of Approval for an operating landfill.

6.4.2 On land used for waste disposal purposes

Where a proponent submits a land use proposal for approval under Section 46 of the Environmental Protection Act, the proponent must assure Ministry staff and the municipality that the proposal contains adequate measures for the protection of public health and safety, in order to facilitate the Minister making a decision on approval.

Where an approval under EPA Section 46 is not required from the Minister, Section 6.4.1 of this guideline applies.

Reference documents

a. Procedure D-4-1: "Assessing Methane Hazards from Landfill Sites"

b. Ministry of Consumer and Commercial Relations Bulletin No.91003: "Environmental Warnings/Restrictions"

c. Ministry of Consumer and Commercial Relations Bulletin No.80023: "Registration of Certificates & Provisional Certificates"

d. Guideline D-7: "Requests for Land Use Approval Under EPA, Section 46" (under development)

e. Procedure D-1-1: "Land Use Compatibility: Procedure for Implementation"

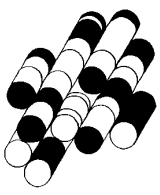
f. Procedure D-1-3: "Land Use Compatibility: Definitions"

g. Guideline D-1: "Land Use Compatibility"

Updated: July 13, 2021
Published: March 02, 2016

APPENDIX C

TERRAPROBE INC.



MECP Well Records Summary										
WELL ID	MECP* WWR ID	Construction Method	Well Depth (m)**	Well Usage		Water Found (mbgs)**	Static Water Level (mbgs)**	Top of Screen Depth (mbgs)**	Bottom of Screen Depth (mbgs)**	Date Completed
				Final Status	First Use					
1	7347374	Other Method	<Null>	Not Used	<Null>	<Null>	4.8	<Null>	<Null>	Tuesday, September 17, 2019
2	7362533	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	Saturday, June 20, 2020
3	7315563	Rotary (Convent.)	12.2	Monitoring	<Null>	<Null>	<Null>	10.7	12.2	Monday, May 14, 2018
4	7328887	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	Friday, October 12, 2018
5	5701423	Cable Tool	<Null>	Livestock	Domestic	9.2	4.6	12.2	13.4	Wednesday, September 15, 1965
6	7336561	Other Method	9.2	Monitoring	<Null>	6.1	<Null>	6.1	9.2	Tuesday, June 11, 2019
7	7324767	Rotary (Convent.)	32.0	Domestic	<Null>	32.0	7.0	30.8	32.0	Saturday, December 1, 2018
8	7324767	Rotary (Convent.)	30.5	Domestic	<Null>	32.0	7.0	30.8	32.0	Saturday, December 1, 2018
9	7324767	Rotary (Convent.)	6.1	Domestic	<Null>	32.0	7.0	30.8	32.0	Saturday, December 1, 2018
10	7051426	<Null>	<Null>	Not Used	<Null>	<Null>	<Null>	<Null>	<Null>	Sunday, July 15, 2007
11	7051427	<Null>	10.1	Not Used	<Null>	<Null>	<Null>	<Null>	<Null>	Saturday, September 15, 2007
12	7309891	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	6.7	7.9	Friday, March 9, 2018
13	5701494	Cable Tool	<Null>	Domestic	<Null>	11.6	7.9	11.6	12.5	Monday, November 9, 1964
14	7309890	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	55.2	57.0	Friday, March 9, 2018
15	7369085	Auger	8.2	Monitoring	<Null>	5.8	<Null>	6.7	8.2	Tuesday, September 15, 2020
16	5701422	Boring	<Null>	Livestock	Domestic	9.5	1.8	<Null>	<Null>	Thursday, October 8, 1964
17	7369086	Auger	6.9	Monitoring	<Null>	4.6	<Null>	5.3	6.9	Tuesday, September 15, 2020
18	7283336	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	Thursday, November 17, 2016
19	5708961	Cable Tool	<Null>	Domestic	<Null>	12.8	6.7	11.9	12.8	Tuesday, June 20, 1972
20	7369065	Auger	7.6	Monitoring	<Null>	5.5	<Null>	6.1	7.6	Monday, September 14, 2020
21	7326317	Rotary (Convent.)	6.0	Domestic	<Null>	22.0	13.8	22.9	24.1	Wednesday, December 19, 2018
22	7326317	Rotary (Convent.)	24.0	Domestic	<Null>	22.0	13.8	22.9	24.1	Wednesday, December 19, 2018
23	7108941	Rotary (Air)	24.4	Domestic	<Null>	<Null>	10.7	<Null>	<Null>	Saturday, May 3, 2008
24	5712065	Cable Tool	<Null>	Domestic	<Null>	24.7	14.3	24.7	26.5	Thursday, November 21, 1974
25	7369064	Auger	6.1	Monitoring	<Null>	1.8	<Null>	4.6	6.1	Monday, September 14, 2020
26	7283695	Boring	<Null>	Monitoring	<Null>	<Null>	<Null>	<Null>	<Null>	Tuesday, December 6, 2016
27	5723059	Cable Tool	<Null>	Domestic	<Null>	13.4	6.4	12.2	13.4	Monday, November 23, 1987
28	5701426	Cable Tool	<Null>	Livestock	Domestic	28.4	7.6	28.1	29.0	Wednesday, April 21, 1965
29	5701425	Cable Tool	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	Wednesday, April 14, 1965
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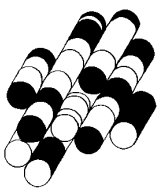
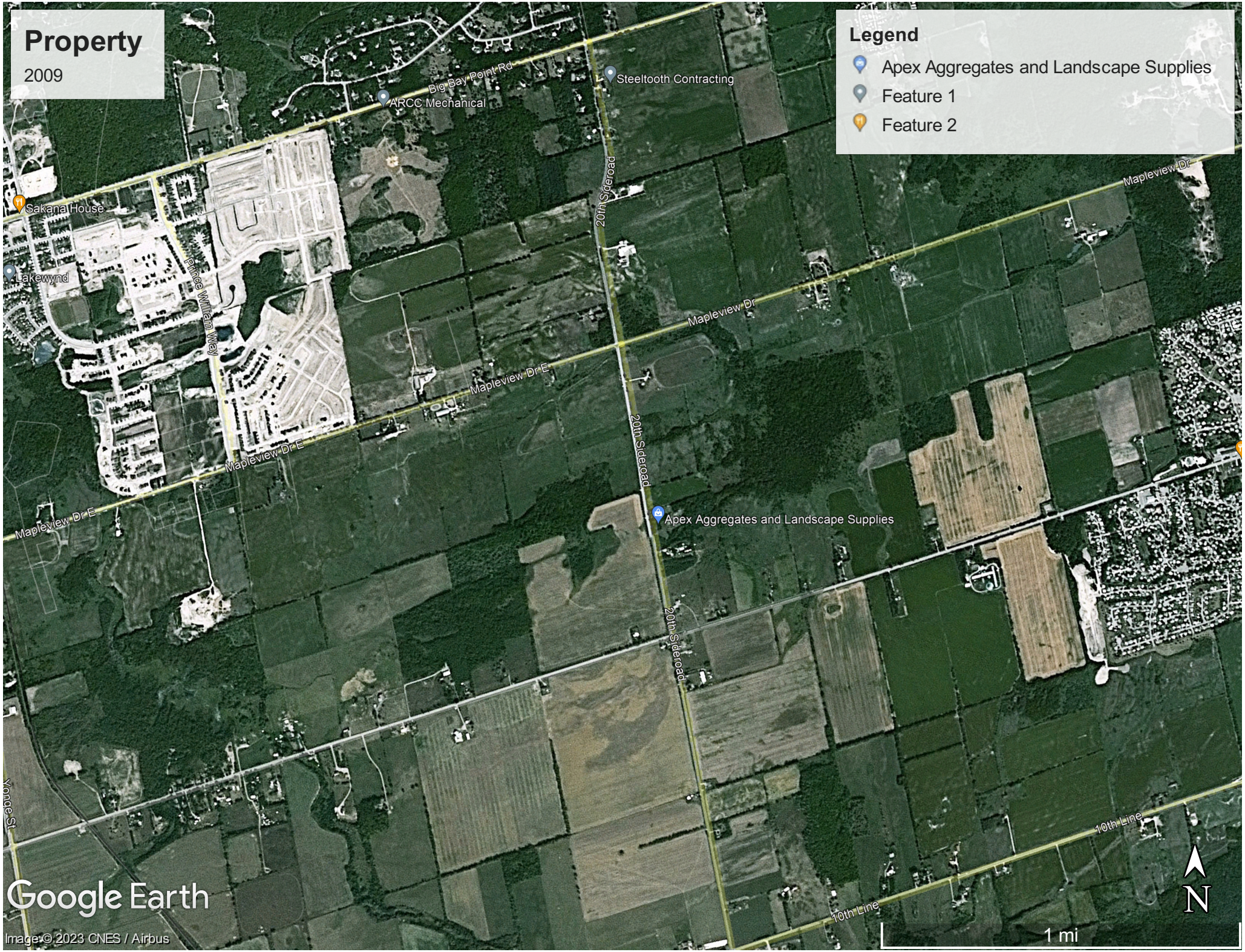
31	5701424	Cable Tool	<Null>	Livestock	Domestic	11.0	8.2	11.9	12.8	Saturday, November 21, 1964
32	7266850	Boring	7.6	Test Hole	<Null>	6.1	<Null>	4.6	7.6	Saturday, April 16, 2016
33	7273615	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	Tuesday, September 20, 2016
34	7266848	Boring	7.6	Test Hole	<Null>	6.1	<Null>	4.6	7.6	Saturday, April 16, 2016
35	7266849	Boring	7.6	Test Hole	<Null>	6.1	<Null>	4.6	7.6	Saturday, April 16, 2016
36	5701344	Cable Tool	<Null>	Domestic	<Null>	91.8	32.0	91.8	92.7	Monday, November 23, 1964
37	5707024	Boring	<Null>	Domestic	<Null>	5.5	3.7	<Null>	<Null>	Thursday, July 10, 1969
38	5729739	Rotary (Convent.)	<Null>	Domestic	<Null>	25.9	12.2	25.9	26.8	Thursday, November 19, 1992
39	5732815	Cable Tool	<Null>	Domestic	<Null>	37.5	10.7	37.5	39.0	Tuesday, April 1, 1997
40	5724096	Boring	<Null>	Domestic	<Null>	<Null>	6.7	<Null>	<Null>	Friday, October 28, 1988
41	5701345	Cable Tool	<Null>	Livestock	Domestic	17.7	10.1	17.7	18.6	Tuesday, June 1, 1965
42	5701427	Cable Tool	<Null>	Livestock	Domestic	16.2	10.7	16.2	17.1	Saturday, September 25, 1965
43	5701427	Cable Tool	<Null>	Livestock	Domestic	16.2	10.7	17.1	18.0	Saturday, September 25, 1965
44	5739203	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	Friday, October 1, 2004
45	5736282	Rotary (Convent.)	<Null>	Domestic	<Null>	18.3	2.1	15.3	18.3	Thursday, May 31, 2001

APPENDIX D

TERRAPROBE INC.



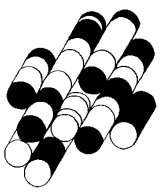

Property
2009
Legend
Apex Aggregates and Landscape Supplies
Feature 1
Feature 2
Big Bay Point Rd
ARCC Mechanical
Steeltooth Contracting
20th Sideroad
Mapleview Dr
Sakanai House
Lakewynd
Prince William Way
Mapleview Dr E
Apex Aggregates and Landscape Supplies
Yonge St
10th Line
Google Earth
Image © 2023 CNES / Airbus
N
1 mi


Property
2012
Legend
Apex Aggregates and Landscape Supplies
Feature 1
Feature 2
Big Bay Point Rd
ARCC Mechanical
Steeltooth Contracting
Sakana House
Lakewynd
Prince William Way
20th Sideroad
Mapleview Dr
Mapleview Dr E
Apex Aggregates and Landscape Supplies
Yonge St
10th Line
Google Earth
Image © 2023 Maxar Technologies
N
1 mi

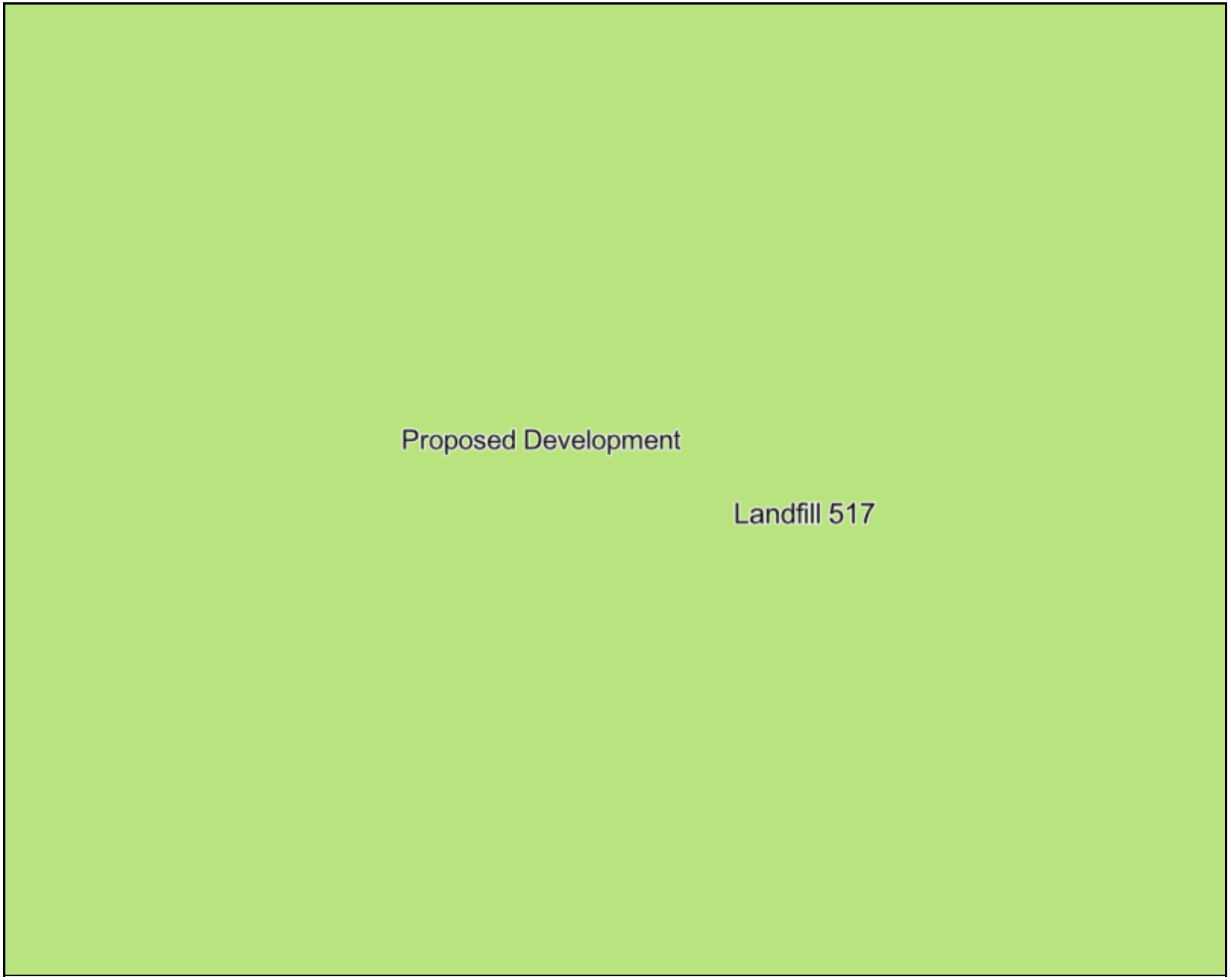

Property
2021
Legend
Apex Aggregates and Landscape Supplies
Feature 1
Feature 2
20th Sideroad
Mapleview Dr
Mapleview Dr E
Mapleview Dr E
l's Bobcat Services - Grading & Excavating
20th Sideroad
Apex Aggregates and Landscape Supplies
Lockhart Rd
Lockhart Rd
Lockhart Rd
20th Sideroad
Google Earth
Image © 2023 CNES / Airbus
N
2000 ft

APPENDIX E

TERRAPROBE INC.



Physiographic Regions



Legend

BOUNDARIES

ORMGP Boundary

GeologyTheme_PhysiographicRegio

Physiographic Regions (OGS)

Peterborough Drumlin Field

Physiography (OGS)

Drumlins

Till Plains (Drumlinized)

0 450 900 m

This map is a user generated static output from an Internet mapping site and is for reference only. The Oak Ridges Moraine Groundwater Program takes no responsibility for, nor guarantees, the accuracy of the information contained within the map. DO NOT USE FOR NAVIGATION.

Source: ORMGP, 2023 ; MNRF, 2023
Projection: WGS 1984 Web Mercator Auxillary Sphere
Date Printed: 05/06/2023

OakRidgesMoraine GROUNDWATER PROGRAM

Surficial Geology

Legend

BOUNDARIES

ORMGP Boundary

GeologyTheme_SurficialGeology

Surficial Geology (OGS MNDM)

- 5b: Stone-poor, carbonate-derived silty to sandy till
- 6: Ice-contact stratified deposits
- 8: Fine-textured glaciolacustrine deposits
- 9: Coarse-textured glaciolacustrine deposits
- 20: Organic deposits

OakRidgesMoraine GROUNDWATER PROGRAM

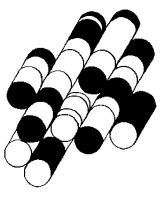
0 450 900 m

This map is a user generated static output from an Internet mapping site and is for reference only. The Oak Ridges Moraine Groundwater Program takes no responsibility for, nor guarantees, the accuracy of the information contained within the map. DO NOT USE FOR NAVIGATION.

Source: ORMGP, 2023 ; MNRF, 2023
Projection: WGS 1984 Web Mercator Auxillary Sphere
Date Printed: 05/06/2023

APPENDIX F

TERRAPROBE INC.



Landfill 517 (1400 & 1450 Lockhart Road and 3153, 3115, 3087 & 3035 20th Sideroad) Photos:

Photograph 1

Location:	Previous Landfill site (1400 Lockhart Road)
Viewing:	Standing on south edge of property viewing northwest
Description:	Farmed areas occupy old landfill site as well, can see farmed land in this image, residential dwelling to the right of viewing

Photograph 2

Location:	Landfill driveway
Viewing:	North
Description:	Showing wetland area to the right of residential unit (1400 Lockhart) on landfill property

Photograph 3

Location:	Landfill site – Lockhart rd.
Viewing:	West
Description:	Can view adjacent residential properties also on landfill 517 area and southwest border

Photograph 4

Location:	Landfill site
Viewing:	North
Description:	Viewing back of landfill in the photo, can see edge of vegetation surrounding house to the left of image

Photograph 5

Location:	Landfill site road access on south edge of property
Viewing:	southwest
Description:	Lockhart Road and driveway to house on property.

Photograph 6

Location:	South edge of property, road access
Viewing:	North
Description:	Residential unit on landfill property, no access to house.

Photograph 7

Location:	East edge of property
Viewing:	West
Description:	Can see vegetation surrounding dwelling and barn structure located directly to the right of house (also in vegetated area)

Photograph 8

Location:	Lockhart Road
Viewing:	North
Description:	1450 Lockhart Rd residence

Photograph 9

Location:	20th sideroad
Viewing:	East
Description:	3035 20th sideroad residence

Photograph 10

Location:	3153 20th Sideroad Apex Aggregates buildings
Viewing:	East
Description:	View from across property boundary to adjacent business

Photograph 11

Location:	20th sideroad
Viewing:	East
Description:	3087 20th sideroad residence, across from property and beside Apex Aggregates

Photograph 12

Location:	20th sideroad
Viewing:	east
Description:	3153 20th sideroad property (shares w Apex Aggregates assumed)

Photograph 13

Location:	20th sideroad
Viewing:	east
Description:	Back end of landfill site to the right of image (farmed areas and vegetated woodlands)

Proposed Property Site Photos:

Photograph 14

Location:	Intersection of 20th Sideroad and Lockhart Rd.
Viewing:	Northeast
Description:	Viewing intersection at the corner of proposed property. Farmed lands & vegetation borders seen in left corner of image.

Photograph 15

Location:	Standing in southeast corner of site
Viewing:	Northwest
Description:	Farmed areas along 20th sideroad.

Photograph 16

Location:	Southeast edge of site along 20th sideroad
Viewing:	Northwest
Description:	Pointing to low lying wet areas located in middle of site (general direction)

Photograph 17

Location:	20th sideroad, middle entrance to property
Viewing:	South
Description:	Vegetation strip between two fields (north and south), monitoring well visible

Photograph 18

Location:	Mapleview Dr E
Viewing:	East
Description:	Viewing remnants of previous dwelling in proposed area. Some debris and little leftover. NE corner of site

Photograph 19

Location:	Mapleview Dr E
Viewing:	North corner of site
Description:	Intersection of Mapleview and 20th sideroad.

Photograph 20

Location:	Middle of proposed property site
Viewing:	southeast
Description:	Standing at base of creek area on site, viewing farmed fields and a monitoring well

Photograph 21

Location:	Mapleview Dr E
Viewing:	West
Description:	Can see vegetated grassed areas separated from farm fields by creek

Photograph 22

Location:	Near Mapleview Dr E road
Viewing:	southwest
Description:	Creek flowing through property towards NE corner of site

Photograph 23

Location:	Mapleview Dr E road
Viewing:	Previous dwelling location on proposed property
Description:	Monitoring well visible, background is an abandoned paved driveway and dwelling foundation covered in vegetation

Photograph 24

Location:	20th sideroad
Viewing:	West
Description:	Access from 20th sideroad

Photograph 25

Location:	Mapleview Dr E
Viewing:	southeast
Description:	Looking towards middle of proposed development area