

Land Survey Analysis

PID Nos. 45089810, 45093390, 45089786, 45239951, 45239944,
45392800, 45052123, 45277357, 45085180, 45085263, 45154259,
45085867, 45085883, 45337664, 45086071, 45086055, Lantz, Nova
Scotia

Municipality of East Hants
Report

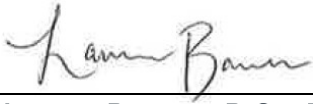
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Municipality of East Hants

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1 Introduction

The Municipality of East Hants is currently in the initial stages of planning and design for development of the Lantz Growth Reserve Area (GRA) which includes lands west and southwest of the new Lantz Hwy 102 interchange. FBM Planning Ltd. (FBM) and Englobe Corp. (Englobe) have been contracted to prepare a Secondary Planning Strategy, which includes two phases: Phase 1 - Desktop and Land Survey Analysis (LSA) and Phase 2 - Needs & Market Evaluation and Design & Plan. The Phase 1 LSA has been completed through a review of available information within the area and identifies environmental constraints and recommendations for the proposed development. As part of this work, a transportation review linking Royal Oaks Way and Garden Road has also been completed.

This report with its associated maps summarizes the findings of the review.

1.1 Objectives

A LSA can determine areas of environmental importance based on physical attributes inherent to a study area of land. The process includes an assessment and mapping of natural systems and critical areas. The purpose is to identify, map and assess vulnerable landforms, sensitive ecological features and climate hazards, including but not limited to any wetlands, watercourses, flood prone areas, steep slopes, forest cover and land use, significant habitats, soil and bedrock, mineral land uses, and water resources.

The objectives of the LSA are to provide a broad scale, desktop overview to identify environmental limitations that may impact the development of the area of interest at the Lantz site, as well as any recommendations for further investigations or analysis.

This assessment is not intended to provide a guarantee that any development of the site will be approved; rather, the assessment will allow a determination if the anticipated environmental constraints will pose a limitation to the proposed development.

The objectives of the transportation review are to develop viable transportation route options within the Lantz GRA. Connections for vehicles, cyclists and pedestrians are determined that provide access to Royal Oaks Way, Garden Road and the communities on the east side of Highway 102 via the Lantz Connector and Highway 214.

1.2 Study Area

A Site Plan providing an overview of the study area is provided in Figure 1, Appendix A.

The current area of interest is comprised of 16 parcels identified as PID Nos. 45089810, 45093390, 45089786, 45239951, 45239944, 45392800, 45052123, 45277357, 45085180, 45085263, 45154259, 45085867, 45085883, 45337664, 45086071, 45086055. The combined parcels cover an area of approximately 787 hectares (1,945 acres).

The site is bound by vacant land to the north, highway 102 to the east and south, Nine Mile River to the south and southwest followed by commercial and residential dwellings along Elmsdale Road, and residential communities to the west and northwest.

2 Methodology

2.1 Land Suitability Analysis Evaluation Framework

All work has been conducted following generally accepted scientific and engineering practices. The assessment focused on identifying environmental factors that may affect the developability of the land. The information for this project was obtained from a review of available information, including environmental assessment reports, government databases and publicly available mapping.

2.2 Valued Ecological Components

The environmental effects evaluation methodology used in this report focuses the evaluation on those environmental components of greatest concern. The Valued Ecological Components (VECs) most likely to be affected by the project are listed below. The VECs were selected based on ecological importance to the existing environment, the relative sensitivity of environmental components to project influences, and their relative social, cultural or economic importance.

This Land Suitability Analysis considers the full range of project / environmental interactions and the environmental factors that could be affected by the project and the significance of related impacts with mitigation.

Mitigation measures, which can be used to reduce the potential impacts of the project on the VECs, are identified where appropriate. Mitigation measures can include both project design, construction practices or project specific measures and are implemented by the proponent to reduce the identified impacts.

The VECs for this project include:

- Wetlands;
- Watercourses;
- Watersheds;
- Flood Prone Areas;
- Steep Slopes;
- Forest Cover
- Land Use;
- Soil and Bedrock;
- Significant Habitats; and
- Mineral Land Use.

2.3 Maps

Constraint mapping for the Lantz GRA site covers a radius of approximately 2 km from the subject site. The nature of the information presented in the maps is dynamic.

The information was collected through a review of information available from Provincial departments & private organizations. The data was sourced from imported downloads or linked feature services and compiled in a digital format using ArcGIS, geographical information systems.

Data sets were transformed or extracted, where required, to a standard datum (NAD83) in the UTM 20 projection.

References for all information sources are presented in Section 2.4.3.

2.4 Traffic

A high-level review of this Land Survey Analysis findings and recommendations was performed to better understand the restrictions and challenges for proposed development both within the study area and the expanded study area. Feasibility of development through the study area is discussed and recommendations for access to these lands are provided in Section 4.

No traffic data was collected as a result of this review. Phase 2 of the project will include a detailed review of provincial traffic counts for the surrounding study area.

2.5 Resources

2.5.1 Natural Features (Impact of Development on Nature)

Natural land features were organized for their ability to support or be an integral component of an ecological system. The following natural land features were evaluated:

- Figure 2 and Section 3.1: Wetlands
- Figure 2 and Section 3.2: Watercourses
- Figure 3 and Section 3.4: Slopes
- Figure 4 and Section 3.5: Forest Cover & Land Use
- Figure 5 and Section 3.6: Significant Habitats
- Figure 6 and Section 3.7: Bedrock
- Figure 7 and Section 3.7: Soil

2.5.2 Natural Hazards (Impact of Nature on Development)

Natural Hazard features were organized into areas with elevated risks associated with natural conditions and historic and ongoing human activities. The following natural hazard features were evaluated:

- Section 3.3: Flood Prone Areas
- Figure 3 and Section 3.4: Slopes
- Figure 6 and Section 3.7: Bedrock
- Figure 7 and Section 3.7: Soil
- Section 3.8: Mineral Land Use

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3 LSA Findings

3.1 Wetlands

The site is currently mostly forested with multiple provincially mapped wetlands. These mapped wetlands are located throughout the site as a combination of swamps, bogs, and fens. There are also other wetlands present on the 1:10,000 National Topographic Series (NTS) maps that are not on the provincial wetland maps. Only some are visible in aerial photography and Google Earth imagery.

Wet Areas Mapping (WAM) was also reviewed for the site. The WAM model predicts where water will naturally flow and/or accumulate in the landscape based on digital elevation (DEM) data and the known location of surface water bodies and wetlands. As such, this index can be used to infer on-site drainage condition (well, moderately well, imperfect, poor, very poor) as affected by local topography and closeness to already mapped open water bodies (streams, lakes, shorelines). Local drainage variations caused by varying soil texture, geological strata, micro-topography, end-of-summer climate conditions, and human disturbances or infrastructure are not reflected by WAM. Where an area's drainage condition is identified as imperfect, poor, or very poor, the area is likely to be either a wetland or watercourse.

According to Nova Scotia Environment and Climate Change (NSECC) predicted wetland of special significance (WSS) GIS layer, there are no WSS in the assessment area.

McCallum Environmental Ltd.'s 2024 Wetland Vulnerability Study within the Shubenacadie Watershed was reviewed as part of this assessment. In terms of identified wetland locations and poor drainage areas, the report yielded very similar results to our findings. The overall wetland vulnerability assessment used in the Study is part of a new wetland "classification". This method is not currently standard practice for wetland significance and therefore does not affect our findings at this time.

The provincially mapped wetlands, as well as the WAM, found during the desktop review are presented on Figure 2, Appendix A.

For an area to be considered wetland, it must satisfy certain wetland criteria including soil, hydrology and vegetation properties that are wetland indicators. There are specific 'rules' that are followed in considering the indicators present and the strength of the evidence in making a determination that a wetland is present. Wetlands are determined using procedures developed by the US Army Corps of Engineers, adapted for the Northeast and North Central regions of the US, and endorsed by NSECC. The determination procedures follow a three-parameter approach, using indicators established for

vegetation, soils and hydrology to identify the presence of wetlands. **Wetland field assessment is required to confirm the presence and boundaries of any wetlands and, especially, WSS onsite.**

Considerations: For any wetland, the Municipality of East Hants requires a buffer. If wetland alteration is required for the development, any wetland alteration between 100 m² and 2 hectares requires an authorization from NSECC through the *Activities Designation Regulations*; wetland alterations greater than 2 hectares require a provincial Environmental Assessment (through the NSECC *Environmental Assessment Regulations*) in addition to this provincial authorization. **If a WSS is confirmed in the assessment area during field surveys, no alteration is permitted within its extents unless it is for public benefit, based on the Nova Scotia Wetland Conservation Policy's goal of no loss of WSSs.**

3.2 Watercourses

The term watercourse is defined in the *Nova Scotia Environment Act*; it includes rivers, streams, lakes, creeks and ponds, and the water contained in them. Some water bodies are obviously watercourses, but other water flows may not be as definitive. There is a screening process to determine if a water feature is a watercourse, and includes:

- If a watercourse is drawn on a NTS map, it is considered a watercourse by NSECC.
- If air photos less than 40 years old show evidence of a watercourse, it may be a watercourse and further review of characteristics is required.
- Field characteristics such as clearly defined channels, flowing water, pools, riffles rapids, aquatic features (fish, insects, plants) are also used to identify watercourses.

In addition to being identified as a watercourse, many water features also can support fish and are considered fish habitat.

There are multiple watercourses present on the available desktop resources (NTS Maps or aerial photos) in the study area, including the Nine Mile River. According to the desktop assessment, the Nine Mile River is also considered fish (and turtle) habitat. **Field assessment is required to confirm the presence of the other suspected watercourses (or any other water features) onsite, and whether they support fish or not.**

The findings of the desktop review are presented on Figure 2.

Considerations: The Municipality of East Hants Land Use Bylaw requires a buffer between a watercourse and any proposed development. The NSECC *Activities Designation Regulations* designate activities that require an Approval from NSECC or a notification to the department related to watercourses. There is no provincial submission requirement for work that does not alter the watercourse. All in stream work such as crossing structures, stream bed realignment, dredging, etc. requires Approval from NSECC. Where appropriate, NSECC consults other provincial and federal departments (such as Fisheries and Oceans Canada (DFO)) to coordinate permitting requirements. For water features that are fish habitat and are not considered a watercourse, consultation with DFO is required to ensure there is no harmful alteration, disruption, or destruction (HADD) to fish or fish habitat under the *Fisheries Act*.

3.3 Watershed Area

Based on the large-scale mapping, the site is located in the Shubenacadie/Stewiacke primary watershed (1DG) and the Shubenacadie R. secondary watershed (1DG-1). There are three tertiary watersheds in the area (1DG-1-L, 1DG-1-M, and 1DG-1-N). The more northeastern portion of the site is within 1DG-1-L, the centre portion is within 1DG-1-M, and the more southwestern portion is within the 1DG-1-N tertiary watershed.

At the site, the surface water flows are generally to the south/southeast, collecting in the Nine Mile River which flows from the northwest to southeast eventually converging with the Shubenacadie River. This flow ultimately discharges into the Shubenacadie Grand Lake to the southwest.

The Shubenacadie/Stewiacke primary watershed (1DG) area is 270,630.9 hectares in size, the Shubenacadie River secondary watershed (1DG-1) area is 248,115.2 hectares in size, the 1DG-1-L tertiary watershed area is 2,853.1 hectares in size, the 1DG-1-M tertiary watershed area is 1,026.2 hectares in size, and the tertiary watershed 1DG-1-N is 27,176.9 hectares.

The watershed boundaries are depicted on Figure 2.

Considerations: Wetlands and watercourses that are considered headwaters are important to conserve. Headwater wetlands occur at the top of watersheds along the moraine's margins where groundwater springs to the surface, giving rise to creeks and streams that flow off the moraine. The wetlands protect water quality, keep water temperatures cool, and are sources of plants and animals for downstream areas. There are no headwater wetlands in the study area.

3.4 Flood Prone Areas

Land development can affect the risk of flooding in a number of ways. Buildings, infilling with earth and other structures placed within flood plains can obstruct the passage of floodwaters. In addition, the potential for flood damage is greatly increased when, through lack of awareness or disregard for the potential danger, unsuitable development takes place in areas that are already subject to flooding.

Based on online predictive modelling by the Municipality of East Hants, **the areas at the site that are expected to be at risk for flooding are the immediate areas surrounding the Nine Mile River.** These flood prone areas are presented on Figure 2.

Considerations: The Municipality of East Hants has moderate and high flood risk zoning. Flood prone areas should be avoided when developing in order to ensure that no damage to the infrastructure occurs caused by rising waters. In addition, climate change considerations such as increased intensity of precipitation events should be incorporated into site design (such as appropriately sized stormwater infrastructure and storage capacity (to reduce the intensity of stormwater peak flows delay the time required to dissipate flows)), to mitigate potential negative impacts onsite and to downstream receptors during construction and operational phases of any new development.

3.5 Steep Slopes

Slope gradient is a key factor in influencing the relative stability of a landscape. It determines the degree to which gravity acts upon a soil mass. Slopes are often irregular and complex, with gradients varying greatly over large areas. Slopes are an important LSA factor when considering what lands are most suitable for development, as well as when considering where to locate roads and other infrastructure. The locations of stormwater, sewer and water infrastructure coincide with road layout, all of which should be considered during the development planning process.

The area of interest has a rolling topography with several topographic high spots throughout. Most slopes are 10 to 20% or less, although there are some steeper slopes in areas that slope toward the wetlands and watercourses. The overall topography in the area slopes to the southeast. All slopes and elevations of the site are presented in Figure 3, Appendix A.

Considerations: None. Although there are no permits required related to slopes, when steep slopes (>15%) are present, there can be elevated potential for transport of sediment during earthworks and other ground disturbance activities. The potential harm from sediment releases is increased when there are downgradient water bodies or other sensitive receptors or receiving environments, including

municipal infrastructure. Mitigation measures would include an appropriately designed erosion and sediment control plan and appropriate buffers around water features.

3.6 Forest Cover and Land Use

3.6.1 Forest cover

The forested areas within the project area were assessed on a desktop level by using the provincial forest cover layers. The site is currently mostly forested, with two different tree communities present. Most of the site is made up of red and black spruce flats, while two large areas near the centre of the site are made up of tolerant mixed wood hummocks, and the area surrounding the Nine Mile River is made up of floodplain habitat.

The tree species that make up the forest habitat at the site and surrounding areas are a mixture of Red maple, Black spruce, Red spruce, White spruce, White birch, Balsam fir, Aspen species, Eastern larch, Unclassified softwood, Unclassified hardwood, and Unclassified species.

There are no mapped old growth forests, however, it is possible that they could exist when long-lived species such as Red spruce and Red maple are present, and canopies have approximately 30% closure, which can be confirmed through a field survey. **A field survey is recommended to screen the site for tree stands with conditions known to be indicators of old-growth forest.**

The forest cover (tree communities) are presented on Figure 4.

Considerations: All work is to be conducted in accordance with the *Migratory Birds Convention Act* (MBCA), which outlines that no migratory bird nests or eggs will be moved or obstructed during the construction or operational phase of the project. To ensure project activities are in compliance with the MBCA, tree clearing will take place outside of the migratory/nesting bird season or a qualified person be onsite to confirm the absence of nesting or migratory birds prior to and during clearing. If indicators of old growth forest are confirmed a follow up field survey to assess for old growth forest in accordance with NSDNRR is recommended. According to NSDNRR, commercial, industrial, and infrastructure-building activities are not permitted in old growth forest areas on Crown lands. The study area does not consist of any crown lands. There are no development restrictions in old growth areas on private land, however, old growth forests are not only supportive of biodiversity but also diverse Mi'kmaq cultural values and practices. Mechanisms should be explored to support and encourage their conservation.

3.6.2 Land Use

The area of interest is predominantly undeveloped (resource lands). Surrounding land use is a mixture of agricultural, residential and commercial. The surrounding area has water supplied by a mixture of private potable wells and municipal services from the East Hants Regional Water Utility (sourced from the East Hants Regional Municipal Natural Surface Water Supply Area). There are two private, domestic, dug wells logged in the study area: one on PID No. 45337664 and one on PID No. 45086071, however according to the well log records, neither one is likely to be present in the study area. There are no mapped surficial aquifers in the study area, however, there are some in surrounding areas to the west and northeast. Generally, the water quality in this area (Carbonate/Evaporite and Sedimentary Groundwater region) can be of poor quality and quantity. Yields are greatly influenced by solution channels in gypsum and limestone. **Additional testing is required to verify this bedrock is present and the impact on potable water quality/quantity.** Municipal servicing is recommended.

The land use and potable water resources are presented on Figure 4.

Considerations: For subdivision developments that are to be supplied water via private wells, a groundwater assessment is recommended. In 2011, NSECC published “Guide to Groundwater Assessments for Subdivisions Serviced by Private Wells” that includes two levels of assessment. For large developments, Level 2 (drilling test wells and conducting pumping tests and water quality testing) is required. The goal of the level 2 assessment is to ensure adequate groundwater quantity to service the subdivision and that it’s of a suitable drinking water quality.

3.7 Significant Habitats

Species at Risk (SAR) appearing on the federal *Species at Risk Act* (SARA) Schedule 1 benefit from all the legal protection afforded and the mandatory recovery planning required under SARA (ECCC, 2021a). Similar protection is afforded to species under the provincial *NS Endangered Species Act*. Information from the Atlantic Canada Conservation Data Centre (ACCDC) was requested by Englobe in April 2024 to understand what species (flora and fauna) may be present in and around the study area.

From a review of the ACCDC report of rare species list within 5km of the subject site, there were 12 flora species listed. All 12 had provincial rarity ranks (S1, S2, or S3) that are considered rare, none were listed on the SARA or *NS Endangered Species Act*. Black ash trees were reported as being present within the 5km study area (location sensitive); these are usually associated with flood plains or wetlands.

From review of the ACCDC report of rare species list within 5km of the subject site, there were 15 fauna species that were on a federal or provincial species at risk list or were considered rare (S1, S2, or S3); there were 7 birds, 3 fish, 1 turtle, 1 salamander, 1 mussel, 1 butterfly, and 1 dragonfly. Wood turtle and bat hibernaculum or bat species were also identified on the location sensitive list.

According to the ACCDC, within the assessment area, there were no species observations, however there have been observations of Canada lily (*Lilium canadense*) along the edge of the Nine Mile River downstream of the site, as well as Eastern pearlshell (*Margaritifera margaritifera*) in the Nine Mile River upstream of the site. Nine Mile River and tributaries associated with it are also considered habitat for Atlantic salmon (*Salmo salar*) - Inner Bay of Fundy population. Wood turtles are known to use Nine Mile River and its flood plain; tributaries of Nine Mile River may also support Wood turtles.

From review of the habitats present in the study area, some species listed in the ACCDC could be present based on their habitat preferences. Milkweed (*Asclepias sp.*), Monarchs’ only host plant, must be growing in the area in order for Monarchs to be present.

It should also be noted that the site has been mapped as part of a larger deer zone.

Nine Mile River (that runs along the south/southwest of the study area), some tributaries from it (one initiating offsite to the north that flows across the study area, and one that initiates in an onsite wetland and flows across the southern portion of the study area), and two other watercourses in the northeastern portion of the study area (one initiating offsite and one initiating in an onsite wetland) are mapped as “species at risk” under “significant habitat” on Provincial Landscape Viewer; this is likely the Atlantic salmon or American eel.

The desktop NS Boreal Felt Lichen google earth prediction layer was checked to see if it is likely to be present in the study area. None was mapped in or near the study area.

Englobe contacted NSDNRR to request information on core/critical habitat for Black ash, turtles and the presence of bat hibernaculum. NSDNRR confirmed that there is Wood turtle and bat critical habitat, and Black ash core habitat in the study area (PID Nos. 45337664 and 45086055 contain Wood turtle critical habitat; PID Nos. 45093390, 45086071, 45337664, 45085867 and 45154259 contain bat critical habitat; PID No. 45277357 contains Black ash core habitat). **The exact location of these habitats has been requested from NSDNRR (for Black ash) and Environment and Climate Change Canada (ECCC) (for Wood turtles and bats). At the time of this assessment only NSDNRR had**

replied. More information on these species can be found in their Recovery Plans at <https://novascotia.ca/natr/wildlife/species-at-risk/>.

The significant habitats resources are presented on Figure 5.

Considerations: Follow up field assessment for SAR (particularly black ash, wood turtles, and bat hibernaculum) is recommended during their pertinent seasons so that appropriate mitigation measures (including avoidance) can be incorporated into design if they are present. Further discussion with NSDNRR regarding the presence of SAR and mitigation measures is required prior to development.

All work is to be conducted in accordance with the MBCA, which outlines that no migratory bird nests or eggs will be moved or obstructed during the construction or operational phase of the project. To ensure project activities are in compliance with the MBCA, tree clearing, if required for the development, will take place outside of the migratory/nesting bird season or a qualified person be onsite to confirm the absence of nesting or migratory birds prior to and during clearing. For any species present at the site identified on the federal or provincial SARA, mitigation measures would be required to ensure that rare species will not be disturbed. Any in stream work must incorporate fish habitat and be protective of Atlantic salmon (or other SAR). If Wood turtles are present, buffers and other mitigation measures may be required. If wetlands contain Black ash trees (or other SAR), they would be classified as WSS and not permitted for alteration.

3.8 Bedrock and Soil

3.8.1 Bedrock Geology

Geological mapping indicates that bedrock underlying the current area of interest is the Mabou Supergroup and Windsor Supergroup. Specifically, the Watering Brook Formation; the Murphy Road, Pesaquid and Green Oaks Formations, and Wentworth Station; the Miller Creek, MacDonald Road and Elderbank Formations are present. The Watering Brook Formation is described as siltstone, minor sandstone, gypsum and anhydrite; the Murphy Road, Pesaquid and Green Oaks Formations are described as siltstone, minor gypsum and shallow marine limestone; and the Wentworth Station, Miller Creek, MacDonald Road and Elderbank Formations are described as gypsum, minor siltstone, marine limestone and dolostone. These Formations are not sulphide bearing nor acid producing; although these types of geology (gypsum, limestone, dolostone) can be susceptible to sink holes.

3.8.2 Karst Risk

According to the Karst Risk Map, the site is located in a high and medium risk zone. The high-risk zone contains 96% of the sinkholes in the NSDNRR Nova Scotia Sinkhole Database and has densities of greater than 1 sinkhole per 100 km². This zone generally includes the Windsor Group, a 500 m buffer zone around the Windsor Group, and the George River Metamorphic Suite. The medium-risk zone contains 3.9% of the sinkholes in the NSDNRR Nova Scotia Sinkhole Database and has densities of between 0.1 and 1 sinkholes per 100 km². This zone generally includes the Horton and Mabou Group. Provincially available LiDAR mapping from 2012 and the Advanced Interactive Karst Risk Map were reviewed for the project area and there were no obvious sink holes noted. **To understand karst risk in the area, a geotechnical investigation would be needed which would include mitigation measures for construction and development.**

3.8.3 Radon in Indoor Air

According to the Potential for Radon in Indoor Air map, the site is mostly located in an area of low risk for radon in indoor air, with a few small areas along the Nine Mile River that are of medium and high risk for radon in indoor air. The NSDNRR test database indicates that 5% of buildings in the low-risk areas exceed the Health Canada guideline for radon in indoor air, 14% of buildings in the medium risk

areas exceed the Health Canada guideline, and 40% of buildings in the high risk areas exceed the Health Canada guideline.

3.8.4 Arsenic in Bedrock Walls

Online mapping indicates that the assessment area and surrounding lands are at medium and low risk of arsenic in bedrock walls. The medium-risk zone is defined as bedrock units where between 5% and 15% of well water samples exceed the arsenic drinking water guideline of 10 µg/L, and in the low-risk areas less than 5% of well water samples exceed the guideline. Arsenic is naturally occurring in Nova Scotia groundwater and exposure to arsenic in well water is associated with a range of adverse health effects. This is a consideration for development where potable drilled wells will be installed and may require water treatment systems.

3.8.5 Surficial Geology

Surficial geology mapping indicates that the native soils in this area are identified as a combination of hummocky ground moraine, organic deposits, and alluvial deposits. Hummocky ground moraine is till (a mixture of gravel, sand and mud of direct glacial origin) often sandy and stony; loose, with inclusions of waterlain sediment. It is an aggregate of poor quality with severe limitations to crop use. Factors affecting use for construction include stoniness, drainage, topography (irregular/rough) and acidity (poor buffer for acid rain). Organic deposits are sphagnum moss, peat, gyttja, and clay that form bogs, fens, and swamps. They are a source of fuel, fertilizer, medicinal and industrial products. Wetlands provide nesting and feeding habitats for wildlife and peat extracts contaminants from groundwater. Alluvial deposits are gravel, sand, mud; bedded, coarse at base, finer at top; stream channels that are generally gravelly sand and floodplains sand. They are deposited by streams and rivers after retreat of the last glaciers. They are a major source of groundwater and aggregate, and utilized for pasture land. Limitations for crop use and construction include flooding, high water table, and poor drainage.

Bedrock geology is presented on Figure 6 and soil geology is presented in Figure 7.

Considerations: None. Although as noted above, there is potential for sink holes and there can be elevated potential for transport of sediment during earthworks and other ground disturbance activities. Additional ground surveys and geotechnical investigation would be required to further evaluate the risk from the bedrock geology. Mitigation measures to soil conditions would include an appropriately designed erosion and sediment control plan. If wetland alteration is required for the development, authorization from NSECC is required. Flood prone areas should be avoided when developing in order to ensure that no damage to the infrastructure occurs caused by rising waters.

3.9 Mineral Land Use

Items including mineral and aggregate resources/occurrences, abandoned mine openings, restricted, conditional and limited use lands were looked at for the study area. The desktop review revealed that none of these items are in the study area.

Permitting Considerations: None.

3.10 Contaminated Sites

Since the 1980s, NSECC has maintained a publicly accessible database of environmental records (registration, installation and removal of petroleum storage tanks, inspection reports, environmental

site assessment reports, remediation reports, contaminated sites files, industrial approvals, etc.) on properties in the Environmental Registry.

No Environmental Registry search requests for information related to the study area were made as part of this LSA. **It is recommended land owners request this information prior to development proposals and conduct Phase I Environmental Site Assessments on the properties within (and adjacent to) the study area to confirm there is no environmental contamination.**

Considerations: None.

3.11 Summary of the Lantz Growth Reserve Area

Our high-level land survey assessment indicates that the Lantz GRA has potential for development with further environmental assessment. Certain areas of the Lantz GRA show great opportunity for development and with careful planning and engineering design, can be accessed through the surrounding area. Follow up field assessments for SAR (during peak season), wetland boundaries and watercourses, old growth forest indicators are among a few of the recommendations made in this LSA. Avoiding development in flood prone areas such as around the Nine Mile River is also recommended.

4 Traffic

A high-level review of the Land Survey Analysis findings and recommendations was performed to provide insight for areas of developable lands and multi-modal connection throughout the study area. In particular, viable connections between the new Lantz interchange and the existing development on the northwest border of the study area were assessed. Feasible options from this desktop analysis are provided for consideration.

The full study area, including the expansion area, consists of 16 parcels which cover an area of approximately 787 hectares (1,945 acres). This large area consists of a number of wetlands, watercourses, waterbodies, species at risk habitats, and steep slopes (as identified in Section 3) that should be restricted from development planning. However, there is lots of opportunity within the study area for development and transportation connections in and around these restricted spaces.

Both study areas (the narrower segment adjacent to Highway 102 and the expansion area) were reviewed for roadway connection options. It would be beneficial to plan development through the full expansion area to make use of existing roads to the north (Royal Oaks Way and Garden Road) and avoid the need for a new connection across the Nine Mile River. The Nine Mile River has quite a few restricted areas for development, so a new bridge connection over the river would likely be costly and require numerous permitting approvals. Taking advantage of the existing infrastructure is recommended, and doing so requires development of the full expansion area.

Additionally, developable land is more abundant within the expansion area than closer to Highway 102. From the Lantz interchange, a connection is feasible to Royal Oaks Way and Garden Road. This connection, though not a straight line between the existing roadways, would weave around existing wetlands in the southwest study area, skirting around the Nine Mile River boundary. This route could provide opportunity for accessible cycling and pedestrian facilities as slopes are gentle through this topography. Recreational trails can also easily be provided near the natural forest and wetlands.

In the north section of the study area, Meadow View Way can be seen extending towards the undeveloped lands. A proposed connection at this roadway could provide access to these lands which are otherwise difficult to access. Steep topography mixed with wetlands restrict development closer to Highway 102 and to the south. However, there may be opportunity to connect to the proposed south

connection and therefore provide access to the Lantz interchange. This type of connection may require infrastructure through steep topography and crossing an identified watercourse. Developing this area could be considered at a later phase in the development process.

It is recommended that development be planned for the full study area and not restricted to the narrow section adjacent to Highway 102. Within this recommendation:

- The southwest section of the study area should be considered as a first stage of development as it has better access opportunity and lands for development;
- Connection between the Lantz interchange and Royal Oaks Way and Garden Road is likely possible with careful consideration of existing wetlands and watercourses; and
- There is also accessible land for development in the north section of the study area assuming a connection to Meadow View Way.

5 Conclusions & Recommendations

Englobe has conducted a desktop evaluation to assess for potential environmental constraints.

Environmental Considerations

Based on the results of this assessment, at this preliminary stage, there were limited environmental constraints identified. Most areas of the site consist of forested lands. Further field investigations will provide more information on the extent of environmental constraints present.

It's predicted that there are many wetlands present at the site. If alteration of these wetlands will be required to develop the lands, and none of them are WSS, and provided that any wetland alteration will follow routine construction practices, approval by NSECC to alter the wetland for this purpose would not be considered an environmental constraint (although alterations greater than 2 hectares would require an Environmental Assessment). Field work is required to support these alteration activities, and sufficient assessment should be conducted to verify there are no SAR in wetlands that may be altered. If a WSS is confirmed in the assessment area, no alteration is permitted within its extents, based on the Nova Scotia Wetland Conservation Policy's goal of no loss of WSSs. The East Hants Municipality requires a buffer around wetlands. Wetlands and watercourses that are considered headwaters are important to conserve.

One water feature (Nine Mile River) and its tributaries that are known to be Atlantic salmon habitat, and multiple other potential water features are present in the study area that also support another SAR. The NSECC *Activities Designation Regulations* designate activities that require an Approval from NSECC or a notification to the department related to watercourses. There is no submission requirement for work that does not alter the watercourse. All in stream work such as crossing structures, stream bed realignment, dredging, etc. requires Approval from NSECC. Where appropriate, NSECC consults other provincial and federal departments (such as DFO) to coordinate permitting requirements. For water features that are fish habitat and are not considered a watercourse, consultation with DFO is required to ensure there is no harmful alteration, disruption, or destruction (HADD) to fish or fish habitat under the *Fisheries Act*. The East Hants Municipality also requires buffers to watercourses. Field assessment of the water features is required to verify their status and if they support fish or other SAR.

The site has a small flood prone area surrounding Nine Mile River. These areas should be avoided when developing in order to ensure that no damage to the infrastructure occurs caused by rising waters. In addition, climate change considerations such as increased precipitation intensity should be taken into account when designing the construction and operational phases of the new development.

The area of interest has a rolling topography with several high spots throughout. Most slopes are 10 to 20% or less, although there are some steeper slopes in areas that slope toward the wetlands and watercourses. When steep slopes are present (especially with highly erodible soils), there can be elevated potential for transport of sediment during earthworks and other ground disturbance activities. The potential harm from sediment releases is increased when there are downgradient water bodies or other sensitive receptors or receiving environments. Mitigation measures would include an appropriately designed erosion and sediment control plan and appropriate buffers around water features.

All work is to be conducted in accordance with the MBCA, which outlines that no migratory bird nests or eggs will be moved or obstructed during the construction or operational phase of the project. To ensure project activities are in compliance with the MBCA, tree clearing will take place outside of the migratory/nesting bird season or a qualified person be onsite to confirm the absence of nesting or migratory birds prior to and during clearing.

Field assessment for SAR (particularly black ash, wood turtles, and bat hibernaculum) is recommended during their pertinent seasons so that appropriate mitigation measures (including avoidance) can be incorporated into design if they are present. For any species present at the site identified on SARA or the *NS Species at Risk Act*, mitigation measures will be required to ensure that rare species will not be disturbed.

There are no mapped old growth forests, however it is possible that they could exist when long-lived species such as Red spruce and Red maple are present, and canopies have approximately 30% closure. A field survey, in accordance with NSDNRR, is recommended to screen the site for tree stands with conditions known to be indicators of old-growth forest. There are no development restrictions in old growth areas on private land, however, old growth forests are not only supportive of biodiversity but also diverse Mi'kmaq cultural values and practices. Mechanisms should be explored to support and encourage their conservation.

There is potential for sink holes in the study area. A geotechnical investigation is required to determine if there are unacceptable karst risk in the area and mitigation measures for construction and development.

It is recommended that developers request Environmental Registry information and conduct Phase I Environmental Site Assessments on the properties within (and adjacent to) the study area to confirm there is no environmental contamination.

An archaeological assessment was not performed as a part of this LSA. An archaeological assessment is recommended. This is an important consideration, especially considering the interest from Mi'kmaq communities.

Traffic Considerations

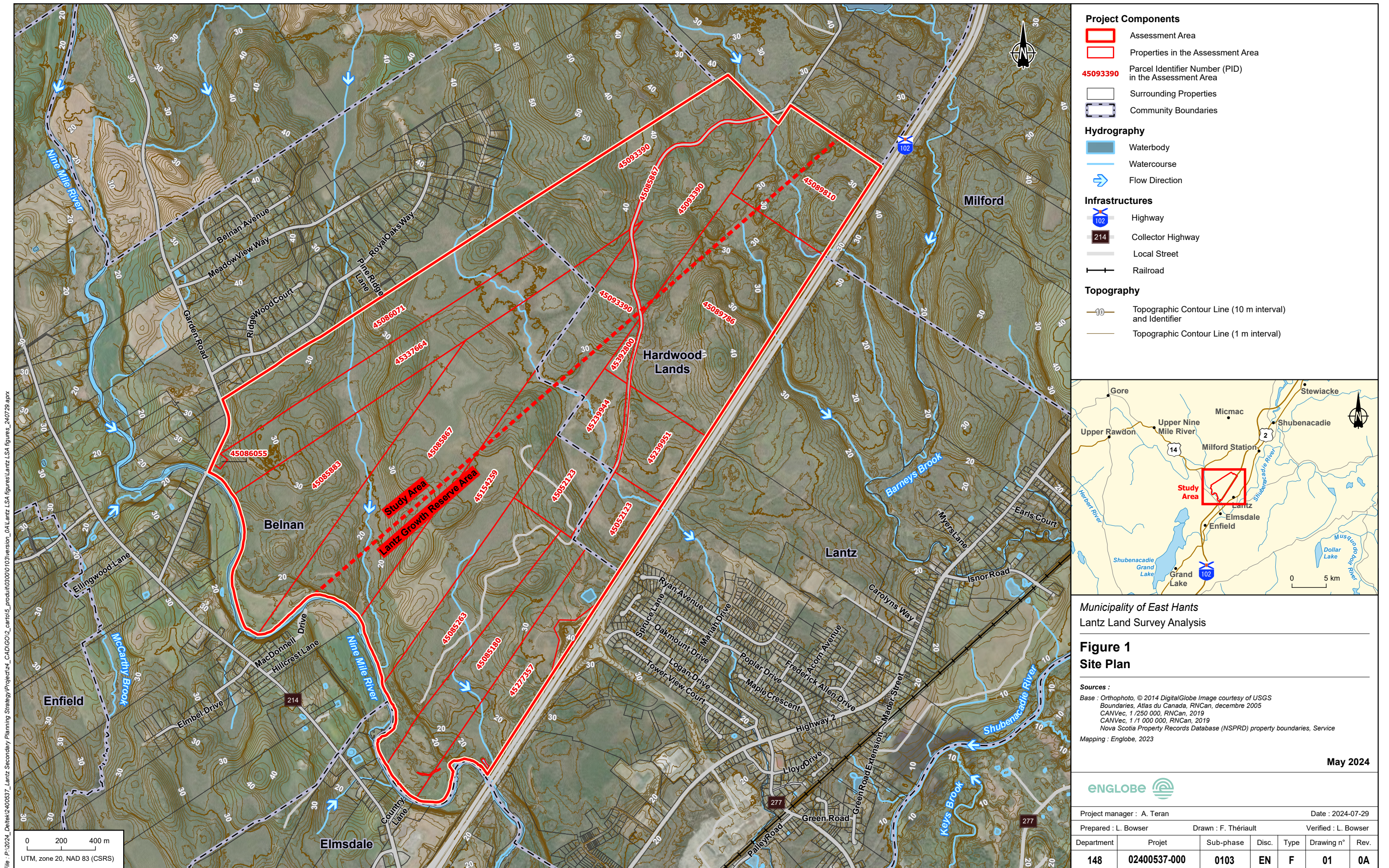
After a high-level review of this LSA, it is recommended that development be planned for the full study area and not restricted to the narrow section adjacent to Highway 102. Within this recommendation:

- The southwest section of the study area should be considered as a first stage of development as it has better access opportunity and lands for development;
- Connection between the Lantz interchange and Royal Oaks Way and Garden Road is likely possible with careful consideration of existing wetlands and watercourses; and
- There is also accessible land for development in the north section of the study area assuming a connection to Meadow View Way.

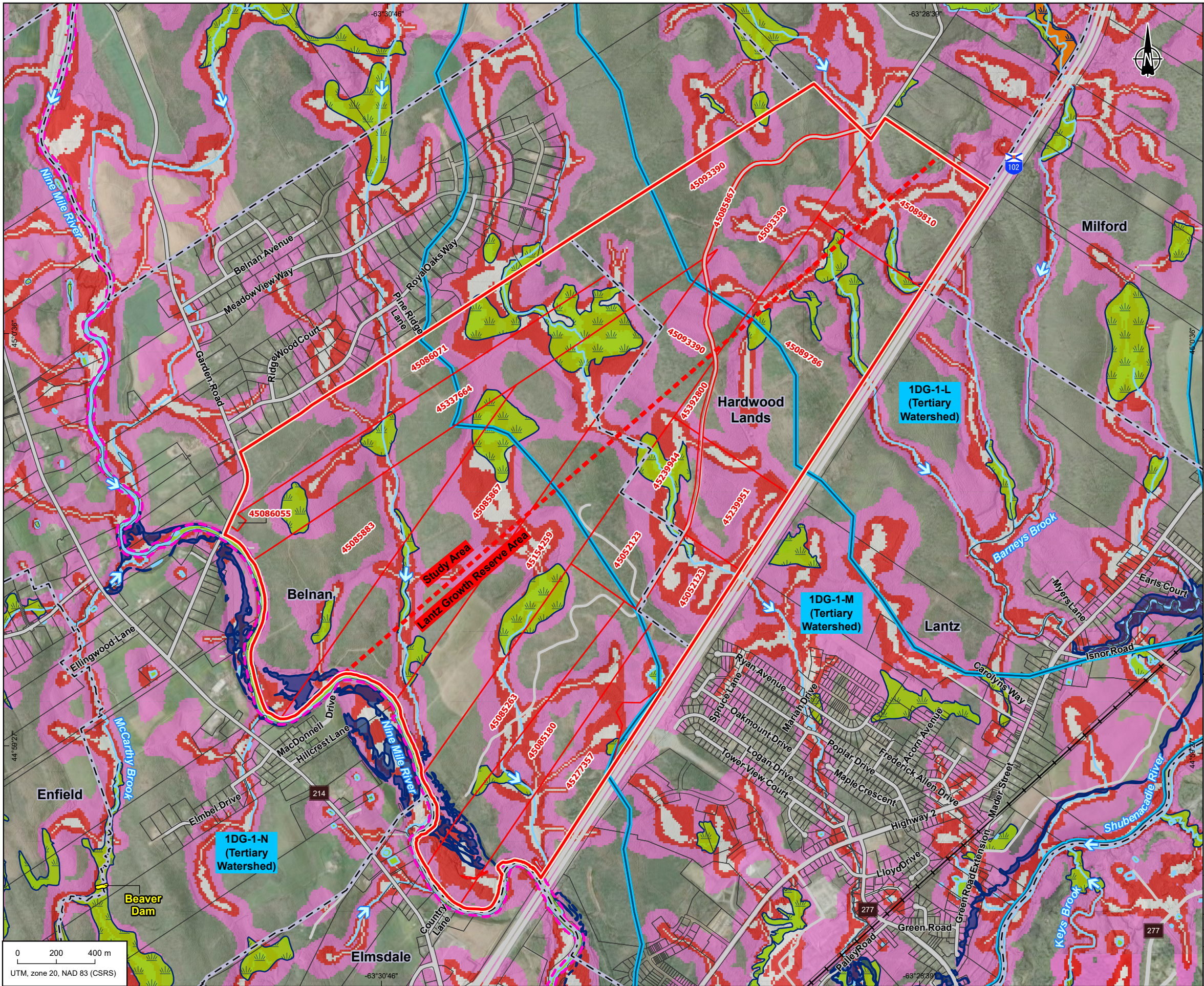
Appendix A

Figures





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Assessment Area

Properties in the Assessment Area

45093390

Parcel Identifier Number (PID) in the Assessment Area

Surrounding Properties

Community Boundaries

Beaver Dam

Fauna

Known Fish Habitat

Wetland of Special Significance (WSS)

Predicted Wetland

Hydrography

Waterbody*

Flood Zone Moderate Risk

Tertiary Watershed

Watercourse

Flow Direction

Highway

Collector Highway

Drainage condition

Poor to very poor (or water)

Imperfect to poor

Moderately-well to imperfect

Local Street

Railroad

* Based on NTS maps

Gore

Upper Rawdon

Upper Nine Mile River

Milford Station

Shubenacadie

Stewiacke

Micmac

Lantz

Elmsdale

Enfield

Grand Lake

Shubenacadie Grand Lake

Herbert River

Shubenacadie River

Mustaford River

Dollar Lake

0

5 km

Municipality of East Hants

Lantz Land Survey Analysis

Figure 2

Wetlands, Watercourses and Flood Risk

Sources :

Base : Orthophoto, © 2014 DigitalGlobe Image courtesy of USGS

Boundaries, Atlas du Canada, RNCan, decembre 2005

CANVec, 1 /250 000, RNCan, 2019

CANVec, 1 /1 000 000, RNCan, 2019

Nova Scotia Property Records Database (NSPRD) property boundaries, Service Government of Nova Scotia, 2012

Mapping : Englobe, 2023

July 2024

ENGLOBE

Project manager : A. Teran

Date : 2024-07-31

Prepared : L. Bowser

Drawn : F. Thériault

Verified : L. Bowser

Department

Projet

Sub-phase

Disc.

Type

Drawing n°

Rev.

148

02400537-000

0103

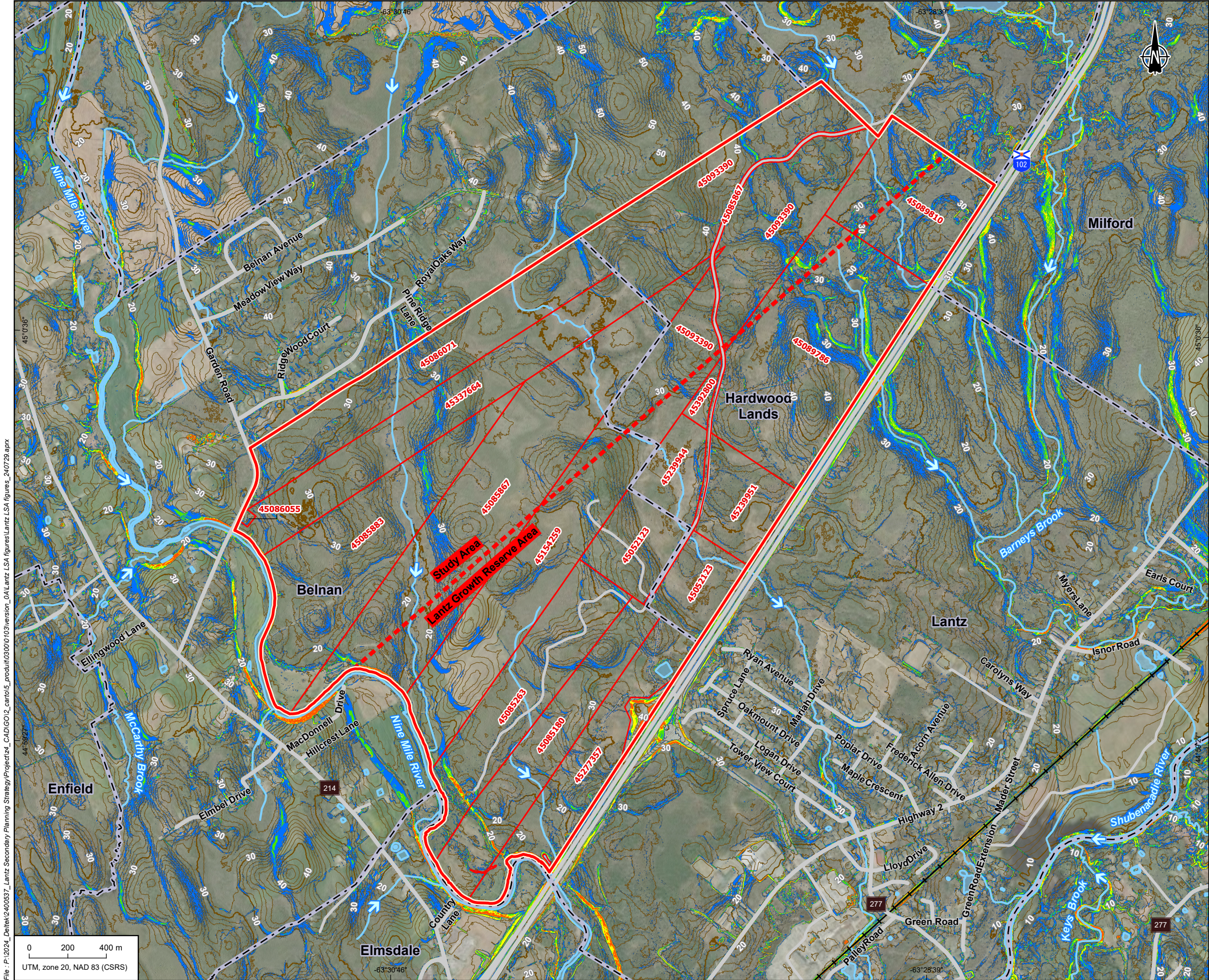
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Project Components

Assessment Area

Properties in the Assessment Area

45093390

Parcel Identifier Number (PID) in the Assessment Area

Community Boundaries

Hydrography

Waterbody

Watercourse

Flow Direction

Infrastructures

102

Highway

214

Collector Highway

Local Street

Railroad

Topography

10

Topographic Contour Line (10 m interval) and Identifier

Topographic Contour Line (1 m interval)

Slopes

0 -10 %

10 -20 %

20 -30 %

30 -40 %

≥ 40 %

Municipality of East Hants

Lantz Land Survey Analysis

Figure 3

Slope

Sources :

Base : Orthophoto, © 2014 DigitalGlobe Image courtesy of USGS

Boundaries, Atlas du Canada, RNCan, decembre 2005

CANVec, 1 /250 000, RNCan, 2019

CANVec, 1 /1 000 000, RNCan, 2019

Nova Scotia Property Records Database (NSPRD) property boundaries, Service

Mapping : Englobe, 2023

May 2024

ENGLOBE

Project manager : A. Teran

Date : 2024-07-29

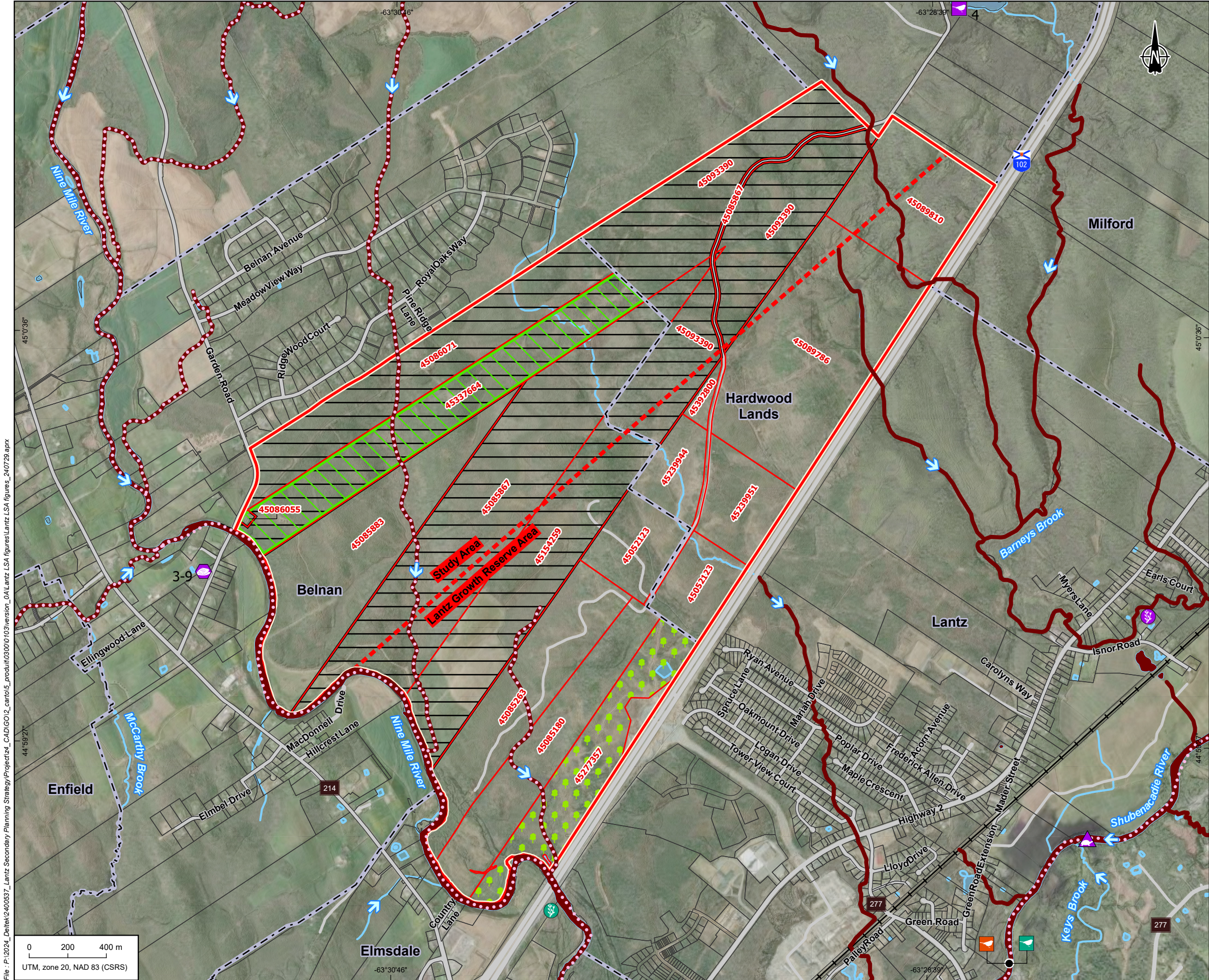
Prepared : L. Bowser

Drawn : F. Thériault

Verified : L. Bowser

Department	Projet	Sub-phase	Disc.	Type	Drawing n°	Rev.
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Project Components

Assessment Area

Properties in the Assessment Area

Parcel Identifier Number (PID) in the Assessment Area
45093390

Surrounding Properties

Community Boundaries

Significant Habitat

Wood Turtle Critical Habitat.

Bat Critical Habitat

Black Ash Core Habitat

Species At Risk

Atlantic Salmon, *Salmo salar*
Inner Bay of Fundy Population

Eastern Pearlshell
Margaritifera margaritifera

Eastern Leatherwood
Dirca palustris

Canada Lily
Lilium canadense

Snapping Turtle
Chelydra serpentina

Rusty Blackbird
Euphagus carolinus

Barn Swallow
Hirundo rustica

Evening Grosbeak
Coccothraustes vespertinus

Hydrography

Waterbody

Watercourse

Flow Direction

Infrastructures

Highway

Collector Highway

Local Street

Railroad

Municipality of East Hants
Lantz Land Survey Analysis

Figure 5 Significant Habitats

Sources :

Base : Orthophoto, © 2014 DigitalGlobe Image courtesy of USGS
Atlantic Canada Conservation Data Centre (ACCDC). 2024. Data Report 7565:
Dartmouth, NS
Boundaries, Atlas du Canada, RNCAN, decembre 2005
CANVec, 1 /250 000, RNCAN, 2019
CANVec, 1 /1 000 000, RNCAN, 2019
Species at risk, Nova Scotia Provincial Landscape Viewer. 2021.
Wildlife – Significant habitat.
Nova Scotia Property Records Database (NSPRD) property boundaries, Service
Mapping : Englobe, 2024

ENGLOBE

Project manager : A. Teran

Date : 2024-07-29

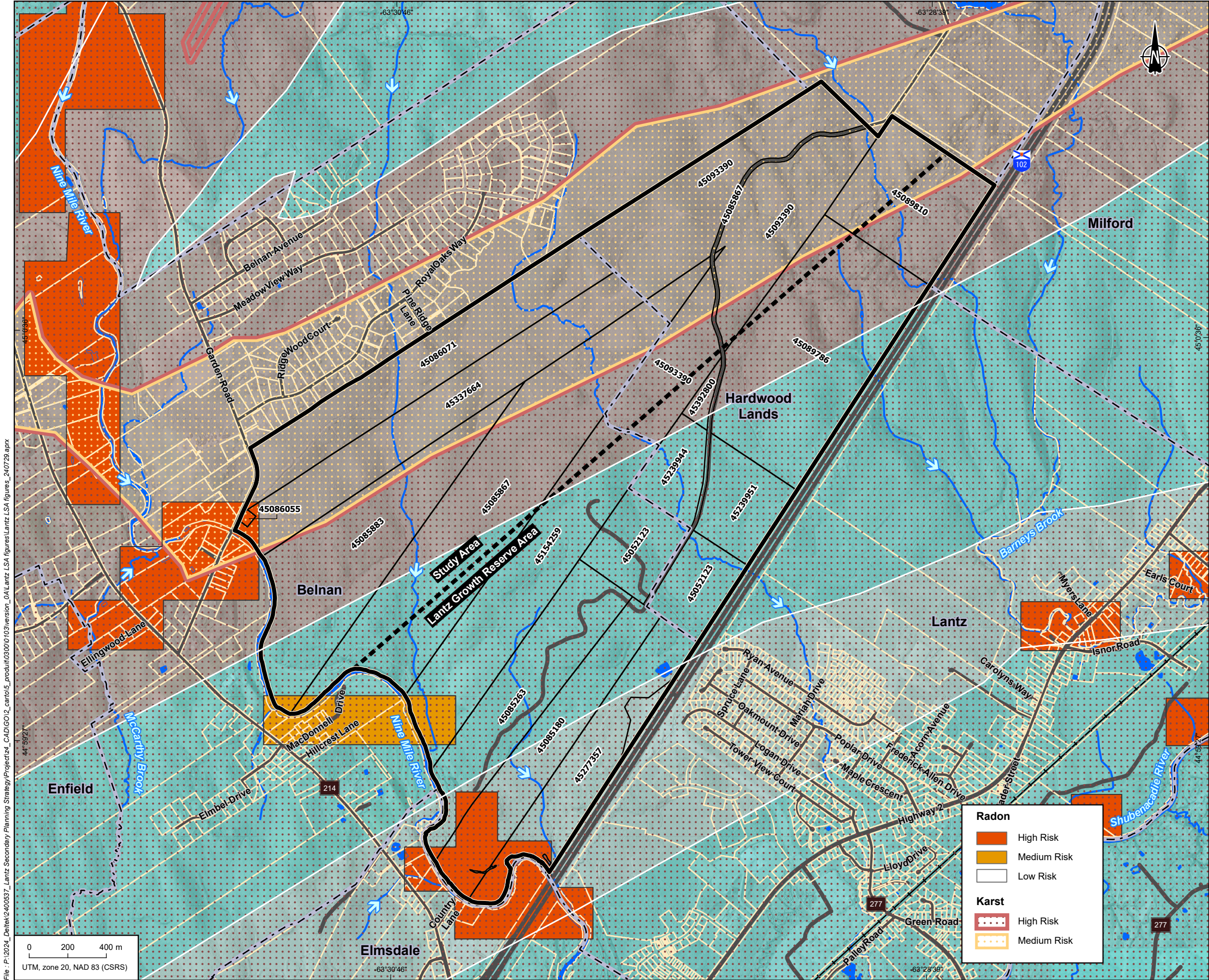
Prepared : L. Bowser

Drawn : F. Thériault

Verified : L. Bowser

Department	Projet	Sub-phase	Disc.	Type	Drawing n°	Rev.
148	02400537-000	0103	EN	F	05	0A

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Project Components

Assessment Area

Properties in the Assessment Area

Parcel Identifier Number (PID) in the Assessment Area

Surrounding Properties

Community Boundaries

Bedrock Geology

Murphy Road, Pesaquid and Green Oaks Formations: siltstone, minor gypsum and shallow marine limestone
***Low Risk of Arsenic in Bedrock Wells**

Wentworth Station, Miller Creek, MacDonald Road and Elderbank Formations: gypsum, minor siltstone, marine limestone and dolostone
***Low Risk of Arsenic in Bedrock Wells**

Watering Brook Formation: siltstone, minor sandstone, gypsum and anhydrite, <150 m
***Medium Risk of Arsenic in Bedrock Wells**

Hydrography

Waterbody

Watercourse

Flow Direction

Infrastructures

Highway

Collector Highway

Local Street

Railroad

Municipality of East Hants

Lantz Land Survey Analysis

Figure 6

Bedrock Geology

Sources :

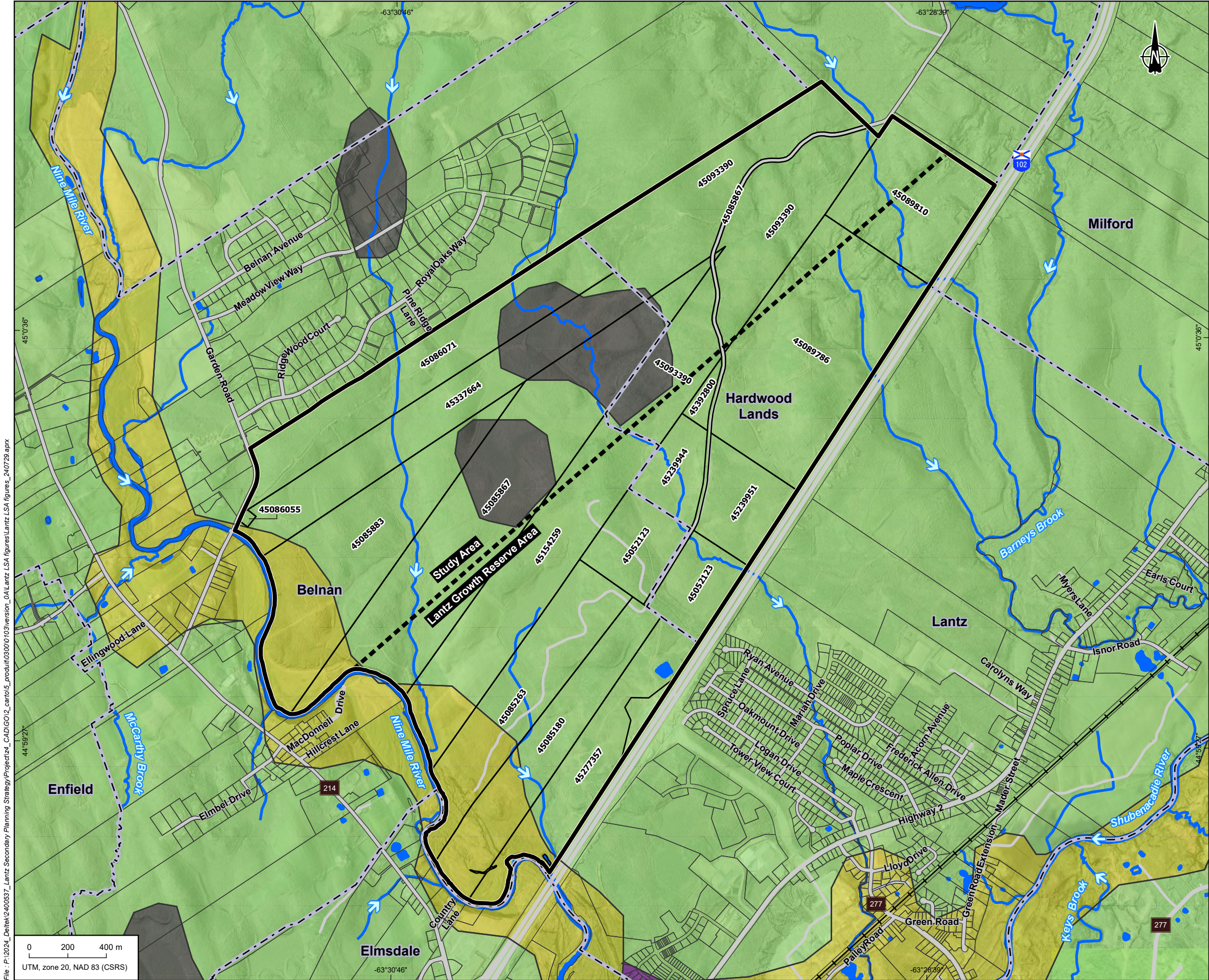
Base : Orthophoto, © 2014 DigitalGlobe Image courtesy of USGS
Boundaries, Atlas du Canada, RNCan, decembre 2005
CANVec, 1 /250 000, RNCan, 2019
CANVec, 1 /1 000 000, RNCan, 2019
Keppie, J.D. (compiler) 2000. Geological Map of the Province of Nova Scotia;
Nova Scotia Department of Natural Resources, Minerals and Energy Branch,
Map ME 2000-1, scale 1:500 000
Nova Scotia Groundwater Atlas, 2021
Nova Scotia Property Records Database (NSPRD) property boundaries, Service Mapping : Englobe, 2023

May 2024

ENGLOBE

Project manager : A. Teran					Date : 2024-07-29		
Prepared : L. Bowser			Drawn : F. Thériault			Verified : L. Bowser	
Department	Projet	Sub-phase	Disc.	Type	Drawing n°	Rev.	
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Project Components

Assessment Area

Properties in the Assessment Area

Parcel Identifier Number (PID) in the Assessment Area
45093390

Surrounding Properties

Community Boundaries

Surficial Geology

Hummocky Ground Moraine

Organic deposits

Galaciolacustrine Deposits

Alluvial Deposits

Hydrography

Waterbody

Watercourse

Flow Direction

Infrastructures

Highway

Collector Highway

Local Street

Railroad

Municipality of East Hants
Lantz Land Survey Analysis

Figure 7 Surficial Geology

Sources :
Base : Orthophoto, © 2014 DigitalGlobe Image courtesy of USGS
Boundaries, Atlas du Canada, RNCAN, decembre 2005
CANVec, 1/250 000, RNCAN, 2019
CANVec, 1/1 000 000, RNCAN, 2019
Nova Scotia Property Records Database (NSPRD) property boundaries, Service Stea, R. R., Conley, H., and Brown, Y. (compilers) 1992. Surficial Geology of the province of Nova Scotia; Nova Scotia Department of Natural Resources, Map 92-3, Scale 1:500 000
Mapping : Englobe, 2023

May 2024

DRAFT

Project manager : A. Teran				Date : 2024-07-29		
Prepared : L. Bowser		Drawn : F. Thériault		Verified : L. Bowser		
Department	Projet	Sub-phase	Disc.	Type	Drawing n°	Rev.
148	02400537-000	0103	EN	F	07	0A