Chapter 15: Township of Oro-Medonte

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15.1 Introduction

This chapter contains information on one drinking water system for the Township of Oro-Medonte that lies within the Nottawasaga Valley Source Protection Area. Various consultants have completed the work presented, which has also been reviewed by South Georgian Bay-Lake Simcoe Source Water Protection staff and members of the Technical Work Group or the Source Protection Committee. In this chapter, each of the groundwater systems and surface water systems is discussed separately for easier readability.

Each municipal system section begins with an introduction of the characteristics of the drinking water system. This includes an overview of the location, number of people served, and source of the water supply. The sections following the system introductions are comprised of a Vulnerability Assessment and Issues and Threats evaluation of the system. The Vulnerability assessment includes the delineation of the Vulnerable Area(s) (Wellhead Protection Area), and the assignment of Vulnerability Score for the delineated area. An Uncertainty Rating is also provided for the Vulnerable Area delineation and the Vulnerability Assessment as per Technical Rules 13-15 (Part I.4 – Uncertainty Analysis – Water Quality (MOE, 2008a)) to express the level of confidence in the results based on the information that was available for the study.

The Issues evaluation is intended to identify chemical parameters or pathogens in the raw drinking water that will limit the ability of the water to serve as a drinking water source either now, or in the future. Any Issues identified for the systems will be listed in this section, along with a map illustrating the Issues Contributing Area if an Issue is known. The Threats evaluation identifies potential Significant Drinking Water Threats within the delineated Vulnerable Areas. This process includes creating lists for Drinking Water Threats for Activities and Conditions, generating maps showing areas that are or would be Significant, Moderate, or Low Drinking Water Threats, and a final enumeration of Significant Drinking Water Threats.

For a more in-depth description of the methods used, readers are encouraged to read Chapter 5: Methods Overview, as well as the responsible consultant reports and memos (found in Appendix MO and OM) and the Glossary for any unfamiliar terms.

15.2 Drinking Water Systems

The Township of Oro-Medonte, located in the middle and northern portion of Simcoe County, operates groundwater-based water supplies in twelve (12) communities and no surface water intakes. As shown below in Figure 15-1 all of the groundwater supplies are within the South Georgian Bay-Lake Simcoe (SGBLS) Source Protection Region (SPR). The list below also indicates

the Source Protection Region and corresponding lead Source Protection Authority (SPA) for all of the drinking water systems (or municipal water supply systems) in Oro-Medonte.

Oro-Medonte Municipal Water Supplies within the Lakes Simcoe and Couchiching/Black River Source Protection Authority are:

- Canterbury Subdivision (Drinking Water Information System Number 220007454) with 2 wells screened in the A2 confined overburden aquifer.
- Cedar Brook Subdivision (Drinking Water Information System Number 220006936) with 2 wells screened in the A2 confined overburden aquifer.
- Harbourwood (Drinking Water Information System Number 220006703) with 2 wells screened in the A3 and A4 confined overburden aquifers.
- Maplewood Estates (Drinking Water Information System Number 220004135) with 2 wells screened in the A4 confined overburden aquifer.
- Shanty Bay (Drinking Water Information System Number 220005198) with 3 wells screened in the A2 and A3 confined overburden aquifers.

Oro-Medonte Municipal Water Supply within the Nottawasaga Valley Source Protection Authority is:

- Craighurst (Drinking Water Information System Number 250001322) with 4 wells screened in the A2 and A3 confined overburden aquifers.

Oro-Medonte Municipal Water Supplies within the Severn Sound Source Protection Authority are:

- Braestone (Drinking Water Information System Number 220005198) with 2 wells screened in the A2 confined overburden aquifer.
- Horseshoe Highlands Subdivision (Drinking Water Information System Number 250001402) with 3 wells screened in the A1-SA4 and A2 confined overburden aquifers.
- Medonte Hills (Drinking Water Information System Number 220003920) with 2 wells screened in the A1-SA4 confined overburden aquifer.
- Robin Crest (Drinking Water Information System Number 220010752) with 2 wells screened in the A1-SA4 confined overburden aquifer.
- Sugar Bush (Drinking Water Information System Number 220001518) with 3 wells screened in the A2 and A3 confined overburden aquifers.
- Warminster (Drinking Water Information System Number 220005125) with 2 wells screened in the A1-SA3 confined overburden aquifer.

Information in the Horseshoe Highlands Subdivision, Medonte Hills, Robin Crest, Sugar Bush and Warminster Water Supply systems can be found in the Severn Sound Assessment Report,

Chapter 9. Information on the Canterbury Subdivision, Cedar Brook Subdivision, Harbourwood, Maplewood, Shanty Bay and Craighurst Water Supply systems can be found in the Lake Simcoe Assessment Report, Chapter 11. Also, WHPAs from five systems, all within the SGBLS SPR, cross into the Township of Oro-Medonte (Table 15-1). WHPAs from the Barrie (City of Barrie) and Hillsdale (Township of Springwater) water supplies extend east over the border into Oro-Medonte – see Chapters 9 and 16 respectively for more information. WHPAs from the Orillia (City of Orillia), and Bass Lake Woodlands and Coldwater (Township of Severn) cross their municipality's borders into Oro-Medonte. For more information on these three systems, see the Severn Sound Assessment Report, Chapters 6 and 10 respectively.

Table 15-1: WHPA that cross into the Township of Oro-Medonte in the SGBLS SPR

Local Municipality that WHPA extends into	Municipality where wellhead is located	Name of Water Supply	Source Protection Region/Lead Conservation Authority (CA)	Location where entire Assessment can be obtained
Township of Oro-Medonte	The Township of Springwater	Hillsdale	SGBLS SPR and Nottawasaga Valley SPA	This Report (Chapter 16)
Township of Oro-Medonte	The City of Orillia	Orillia	SGBLS SPR and Severn Sound SPA	Severn Sound Assessment Report (Chapter 6)
Township of Oro-Medonte	The Township of Severn	Bass Lake Woodlands	SGBLS SPR and Severn Sound SPA	Severn Sound Assessment Report (Chapter 10)
Township of Oro-Medonte	The Township of Severn	Coldwater	SGBLS SPR and Severn Sound SPA	Severn Sound Assessment Report (Chapter 10)
Township of Oro-Medonte	The City of Barrie	Barrie	SGBLS SPR and Lakes Simcoe and Couchiching / Black River SPA	Lake Simcoe Assessment Report (Chapter 8)

15.3 Craighurst Well Supply

The Craighurst Water Supply system is located in the west-central part of the Township of Oro-Medonte, approximately 13 km north of Barrie. The Craighurst Water Supply consists of four water supply wells: Well 2 and Well 3, located approximately 30 m apart within the park area fronting on Procee Circle and Well 4 and Well 5, located approximately 12 m apart on the same property on the northside of Horseshoe Valley Road and east of Penetaguishene Road. The wells 2 and 3 serve the Craighurst subdivision which services an estimated population of 153 (51 lots) based on 2001 data whereas Well 4 and 5 are planned to serve up to 750 residential units. Wells 2 and 3 were drilled and have been in operation since 1991. Well 4 was drilled in 2017, and Well 5 was drilled in 2023. It is noted that the Craighurst drinking water system used to have a production well named Well 1, which was decommissioned in 2020.

According to the Permit to Take Water (PTTW) # 1377-C24PNQ, issued on April 26, 2021 and which expires April 26, 2031 and the Certificate of Approval for this system, the maximum rated capacity for Well 2 is 140 m^3/day and the maximum rated capacity for Well 3 is 229 m^3/day. The combined total rated capacity for the system is 229 m^3/day.

Well 5 is considered a back-up capacity for Well 4 under PTTW No. P-300-4199616712. Concurrent pumping from Wells 4 and 5 should be prohibited until further assessment is undertaken to understand their interference with each other. The combined pumping rate for Well 4 and 5 is 36 L/s.

Well 2 was constructed with a nominal 152 mm diameter steel casing to a depth of 24 m with a 152 mm diameter 1.8 m long telescoping 20-slot stainless steel screen set from 24 to 25.8 metres below ground level (mbgl). Well 3 was constructed with a nominal 152 mm diameter steel casing to a depth of 29 m with a 152 mm diameter 1.8 m long telescoping 12-slot stainless steel screen set from 29 to 30.8 mbgl. Well 4 was constructed with a nominal 292 mm diameter stainless steel high flow well screen from 76.5 to 95.1 mbgs. Well 5 was constructed with a nominal 241 mm diameter telescope stainless steel well screen from approximately 94.5 mbgs to 83.8 mbgs, and a 254 mm diameter permanent casing.

The Craighurst wells 2 and 3 are completed in a confined overburden (sand) aquifer which is locally present at elevations between 230 metres above sea level (masl) and 240 masl. The thickness of the aquifer apparently increases to the east and locally towards the south. It is present at a depth of approximately 20 to 25 mbgl. It is overlain by approximately 10 m of aquitard materials (clay to silty sand) in the vicinity of the wellfield but is reportedly unconfined to the north and east. A second aquifer is also present beneath the wellfield at elevations of approximately 188 to 193 masl but may pinch out to the west and north. Well 4 and Well 5 are screened within a deeper aquifer (Aquifer 3) at elevations of approximately 182 to 202 masl.

The screen intervals have been assigned to the A2 aquifer for Wells 2 and 3, based on the draft regional hydrostratigraphic model prepared by Golder and Aquaresource (2009) and aquifer A3 for Well 4 and Well 5 (Stantec, 2022b; Stantec, 2024). The Groundwater Vulnerability rating will be determined A2 and A3 aquifers.

Information presented for this Chapter is based on the Genivar 2010a report for wells 2 and 3 and Stantec (2022a,b; 2024) for Well 4 and 5.

15.3.1 Groundwater Vulnerability Assessment

The Wellhead Protection Area (WHPA) is the primary Vulnerable Area delineated to ensure the protection of the municipal water supply wells. The Groundwater Vulnerability has been assessed to provide an indication, within the WHPA, which current (or future) Threats at the surface present the greatest risk to contaminate the water supply. The Vulnerability Analysis considers the WHPA and the Groundwater Vulnerability, as well as the potential for the vulnerability to be increased by man-made (anthropogenic) structures, through Transport Pathways, by developing a "Vulnerability Score" within the WHPA. Conversion of Vulnerability categories (High, Medium and Low) to Vulnerability Scores (10, 8, 6, 4 and 2) results in a new map for each WHPA that expresses the relative degree to which a Threat could affect the drinking water supply. A higher value Vulnerability Score will always be assigned to the immediate vicinity of the well and to any areas that are shown to be vulnerable.

The Groundwater Vulnerability for the Craighurst Water Supply has been delineated following the process recommended in the Technical Rules (MECP, 2021). The areas that determined to contribute groundwater to the wells within 25 years were delineated as WHPA. The Groundwater Vulnerability within the WHPA was assessed and included consideration for the effects of man-made structures that may increase the vulnerability. The WHPA and the Vulnerability were considered together as per the Technical Rules to determine a Vulnerability Score for the Craighurst WHPA. Details of the methods for the Vulnerability Analysis are provided in Technical Memorandum A1 – Groundwater Vulnerability Assessment Methods (Appendix MO).

15.3.1.1 Wellhead Protection Area (WHPA) Delineation

The WHPA for the Craighurst wells 2 and 3 were originally delineated in 2005 by Golder using a 2-dimensional analytical groundwater flow model. The WHPAs were updated using the Regional 3-D FEFLOW Model (Kempenfelt Bay). The calibration for this model was centered on area surrounding the Barrie wellfield identified as the "Well Field Focus Area". The northern boundary of this area is approximately 10km south of Craighurst. Further, an updated survey of well locations was commissioned by SGBLS in 2009 to provide improved accuracy for

delineation of the WHPA. A minor translation was required to adjust the Craighurst well locations and the WHPA. The updated well locations and the WHPA are shown in Figure 15a-1. WHPA delineation and adjustment details are documented in Genivar, 2010a.

The WHPA delineation for the Craighurst Well 4 was based on the Uniform Flow Method, as described in the Ministry of Environment, Conservation, and Parks' (MECP) Draft Guidance Module 3 for Groundwater Vulnerability Analysis (MECP 2006). Further, the WHPA is based on the analysis of the drawdown interpreted from the 30-day pumping test which is most accurate within approximately 600m of the well which encompasses the WHPA-A and WHPA-B; and a portion of the WHPA-C. The interpreted capture area of Well 4 pumping (at 36 L/s) is considered a reasonable interpretation considering the inherent data gaps (i.e., no water wells are completed within the A3 aquifer beyond those considered within this study).

The exiting WHPA-B, -C and D of Well 4 is retained as the WHPA-B, -C, and -D for Well 5 as it draws water from the same property and aquifer as Well 4, and does not increase the capacity of the system. Neither the shape nor the orientation of the WHPA-B, -C, -D is expected to change by adding Well 5 12 m south of Well 4. The 100m circular WHPA-A is shifted slightly south to reflect the 12 m separation of Well 4 and 5 (Stantec, 2024).

WHPA-A has been added to include the 100 m radius from each municipal well. The Golder (2005) study delineated time-of-travel zones (TOT) for 50 days, 2 years, 10 years and 25 years. WHPA-C, representing the 5-year TOT zone, was estimated under this study as per Technical Memorandum A2 5-year Time-of-Travel Estimation Methods (Appendix MO).

The WHPAs reflects groundwater flow from east to west. This is reasonable based on available data describing regional groundwater flow patterns.

15.3.1.2 Groundwater Vulnerability

The Craighurst wells draw water from a confined overburden aquifer layer (regional aquifer system A2 and A3). The Groundwater Vulnerability for the aquifer in the area to the northeast of Lake Simcoe was determined using the regional Aquifer Vulnerability Index (AVI methods outlined in Technical Memorandum A1 – Groundwater Vulnerability Assessment Methods (Appendix MO). The regional Groundwater Vulnerability is illustrated in Technical Memorandum B1– Regional Groundwater Vulnerability Mapping.

The Groundwater Vulnerability within the WHPA of the three municipal wells in the Craighurst Water Supply is shown in Figure 15a-1. When the water supply aquifers overlap, the uppermost aquifer is used to determine the Vulnerability ranking. The Groundwater Vulnerability for the municipal water supply aquifer within the WHPA is considered to be Medium near the municipal wells and Low within WHPA-B to WHPA-D east of the wells.

15.3.1.3 Transport Pathway Increase

Technical Memorandum A3 (Appendix MO) documents the consideration of Transport Pathways to increase the Vulnerability Rating as per the Technical Rules. The Vulnerability Rating can be increased from Medium to High, Low to Medium, or from Low to High in accordance with the potential for artificial transport pathways to increase the observed vulnerability.

Private wells, and particularly wells that either do not contain seals that will prevent water from moving down around the outside of the well pipe, and wells that are no longer used and/or that have not been sealed, present the greatest potential for increasing the rated Vulnerability. The available data from the Provincial Water Well Information System (WWIS) database was screened to identify wells that penetrate to the water supply aquifers and have potential to increase the Vulnerability of the natural stratigraphic profile. There is potential that other wells may exist that are not included in the database, particularly in areas now serviced by municipal water that formerly obtained water supply from private wells.

No wells were identified within the Craighurst WHPAs that are considered to have the potential to be a Transport Pathway. The Groundwater Vulnerability map (Figure 15a-1) is therefore proposed to be used to generate the Vulnerability Scores.

15.3.1.4 WHPA-E

None of the Craighurst municipal wells have evidence of having a hydraulic connection between the well and the surface water bodies near the well. Therefore, delineation of a WHPA-E was not required.

15.3.1.5 Vulnerability Score

The WHPA zones for the Craighurst Water Supply, as shown in Figure 15a-1, and the Groundwater Vulnerability, as shown in Figure 15a-2, were used to assign a Vulnerability Score by using the matrix from Table 5.3 (Chapter 5: Methods Overview, Section 5.2.4). Figure 15a-3 illustrates the Vulnerability Scores for the Craighurst WHPA. Figure 15a-3 will be used to assess Drinking Water Threats in Section 15.3.3.

15.3.1.6 Uncertainty Rating

The Technical Rules require that an Uncertainty Rating of either High or Low be assigned with each Vulnerable Area as outlined in the Technical Rules (MECP, 2021). A second component of the Uncertainty Rating is to be provided in association with the Vulnerability Assessment.

The Uncertainty Rating of the Craighurst WHPAs delineation for wells 2 and 3 was determined by peer reviewers from Dillon Consulting using a standard scoring matrix (Table 1, Appendix MO). The Uncertainty Rating assigned for the Craighurst WHPAs is High. The full results of the WHPA delineation Peer Review process, for Craighurst is available in Appendix OM and discussed in Chapter 5 (Methods Overview). Similarly, the Uncertainty Rating for the Craighurst Well 4 WHPA is high (Stantec, 2022b).

The assessment of the uncertainty for the Vulnerability Assessment considers the type, quantity and quality of available data, the methods used to determine the Groundwater Vulnerability, and the nature of the groundwater flow system.

The Uncertainty Rating assigned for the Vulnerability Assessment Component for the Craighurst WHPAs is High. The Vulnerability Rating for the Craighurst Water Supply has been determined using decisions and assumptions that would err on the conservative side (higher vulnerability scores). In this case, the High Uncertainty Rating reflects that additional data to describe the continuity, thickness and types of soils within the delineated WHPAs could potentially be used to improve the understanding of local hydrostratigraphy and to increase the confidence in the Vulnerability Analysis. For further information, refer to Technical Memorandum A1.

15.3.2 Drinking Water Issues Evaluation

The intent of the Issues Evaluation is to identify parameters (e.g. chemicals or pathogen) in the raw drinking water that will limit the ability of the water to serve as a drinking water source either now, or in the future. To be considered a Drinking Water Issue, a parameter needs to be at a concentration that may result in the deterioration of the quality of the water for use as a source of drinking water or if there is a trend of increasing concentrations of the parameter and a continuation of that trend that would result in the deterioration of the quality of the water as a source of drinking water (Technical Rule 114.(1)(a-b)). However, a parameter may not be considered an Issue in cases where it is naturally occurring or effective treatment is in place.

Available data describing raw water quality and treated water quality for the Craighurst Water Supply have been reviewed to identify Drinking Water Issues that are considered likely to result in a deterioration of the quality of water for use as a source of drinking water. Details of the Drinking Water Issues Evaluation for Craighurst for wells 2 and 3 are provided in Technical Memorandum L1 – Drinking Water Issues Evaluation – Oro-Medonte (Appendix OM). Regarding Well 4, the analytical results indicate that the quality of groundwater from is good, meeting all healthrelated parameters of the Ontario Drinking Water Quality Standards (ODWQS). No parameters are identified as drinking water issues at Well 4,

No Drinking Water Issues were identified for the Craighurst Water Supply.

Sodium concentrations have exceeded the guideline of 20 mg/L used by the Medical Officer of Health for sodium restricted diets but are not projected to exceed the ODWQS objective of 200 mg/L within 50 years.

Trihalomethanes and other disinfection by-products are present in trace concentrations in the treated water as by-products of disinfection by chlorination. Trihalomethane concentrations are typically well below ODWQS values and do not display increasing trends.

The rare presence of coliform bacteria in raw or treated water is not considered to represent a specific Drinking Water Issue as these parameters have only been rarely observed under circumstances that are not considered to be persistent.

Well 4 groundwater quality is good, meeting all health-related objectives of the Ontario Drinking Water Standards (Stantec 2022a). Further, the quality of groundwater pumped is a magnesium bicarbonate water type. This water is characteristic of local overburden aquifers. The groundwater quality does not contain detectable or elevated concentrations of nitrate, sodium or chloride, which could indicate the influence of surface water or land use contamination.

15.3.3 Drinking Water Threats Evaluation

An assessment of Drinking Water Threats for the Craighurst Water Supply was completed in accordance with the detailed methodology presented in Technical Memo – A5 (Appendix MO). A Drinking Water Threat is defined as “an Activity, or Condition that adversely affects or has the potential to adversely affect, the quality and quantity of any water that is or may be used as a source of drinking water, and includes any Activity or Condition that is prescribed by the regulations as a drinking water threat.” An Activity is one or a series of related processes, natural or anthropogenic that occurs within a geographical area and may be related to a particular land use, whereas a Condition refers to the presence of a contaminant in the soil, sediment, or groundwater resulting from past activities. Therefore, it is not only presently existing Threats that must be regulated, but future ones as well.

The Drinking Water Threats Assessment for the Craighurst Water Supply builds on the information from the Vulnerability Analysis and Issues Evaluation and includes preparation of:

- a list of Drinking Water Threats for Activities,
- a list of Drinking Water Threats for Conditions,
- maps showing areas that are or would be Significant, Moderate, or Low Drinking Water Threats for Activities, and
- maps showing areas that are or would be Significant, Moderate, or Low Drinking Water Threats for Conditions.

- an enumeration of Drinking Water Threats

15.3.3.1 List of Drinking Water Threats – Activities

The list of Prescribed Drinking Water Threats considered in the assessment for the Craighurst Drinking Water Supply is provided in Chapter 5, section 5.5.1.

No additional Drinking Water Threats were identified for consideration. No local circumstances for prescribed Threats were identified.

15.3.3.2 List of Drinking Water Threats – Conditions

Methods used to assess Conditions are described in Technical Memorandum A5 (Appendix MO). The following information sources were consulted to identify existing Conditions that could affect the Craighurst Water Supply system:

- Files provided by the Ministry of the Environment local offices pertaining to licenses, and records of spills in the area of the delineated WHPA.
- Records available from the Ministry of the Environment website containing registry of Brownfield Sites.
- Records from available technical studies and previous contaminant source inventories that identified situations that may qualify as conditions.
- Interviews of Township of Oro-Medonte staff to identify potential conditions within the identified WHPA for the drinking water supply.

No confirmed Conditions have been identified for the Craighurst Water Supply. No potential Conditions have been identified for consideration at this time.

15.3.3.3 Identifying Areas of Significant/Moderate/Low Threats – Activities

The areas where Activities are or would be Drinking Water Threats are illustrated on a series of maps based on the Vulnerability Scores and Vulnerable Area delineations. The maps combined with the Technical Rules threat circumstances can be used to correlate activities that are or would be Drinking Water Threats with the Vulnerability Scores The circumstances can be found at https://threats.swpip.ca/.

15.3.3.3.1 Pathogen Parameters

The Technical Rules can be used in conjunction with the Vulnerability Scores to identify the areas where activities associated with pathogen Threats are or would be Significant, Moderate, or Low Drinking Water Threats for the Craighurst Water Supply Figure 15a-3). Activities that are

or would be Significant Drinking Water Threats for pathogens can be observed within the areas where the Vulnerability Score is 10. Pathogens can also only be a Significant, Moderate or Low Threat within WHPA-A and WHPA-B.

15.3.3.3.2 Chemical Parameters

The Technical Rules can be used in conjunction with the Vulnerability Scores to identify the areas where activities associated with chemical Threats are or would be Significant, Moderate, or Low Drinking Water Threats for the Craighurst Water Supply (Figure 15a-4). Activities that are or would be Significant Drinking Water Threats for chemicals can be observed within areas where the Vulnerability Score is equal to or greater than 8.

15.3.3.3.3 DNAPL Chemical Parameters

Figure 15a-5 illustrates the area of the 5-year time-of-travel zone (WHPA-C) and areas with a Vulnerability Score of 6, where activities associated with DNAPL parameters are considered to be a Significant Drinking Water Threat for the Craighurst Water Supply. Technical Rules can used to identify the circumstances in which Activities associated with DNAPL threats would be Significant Drinking Water Threats.

15.3.3.4 Identifying Areas of Significant/Moderate/Low Threats – Conditions

Further to Section 15.3.3.2, no Conditions have been confirmed within the WHPA for the Craighurst Water Supply.

A Condition or potential Condition that has not been identified would potentially be a Significant, Moderate, or Low Threat to Drinking Water based on the combination of Hazard Rating and Vulnerability Rating as described in Section 5.5.5 (Chapter 5: Methods Overview) and Technical Memorandum A5 (Appendix MO). The Hazard Rating is dependent on whether there is evidence the Condition is causing off-site contamination, and whether the Condition is located on the same property as the supply well.

A Condition would be a threat to municipal drinking water in the following situations:

- **Significant**: where the Vulnerability Score is ≥ 8 and there is evidence that the Condition is causing off-site contamination, and/or that the Condition is located on the same property as the supply well
- **Moderate**:
    1. where the Vulnerability Score ≥ 6 and < 8, and there is evidence that the Condition is causing off-site contamination, and/or that the Condition is located on the same property as the supply well; or

2. where the Vulnerability Score is 10, and there is no evidence of off-site contamination

- **Low**: where the Vulnerability Score ≥ 8 and < 10 and there is no evidence of off-site contamination

Figure 15a-3 illustrates the Vulnerability Score map for Craighurst Water Supply that can be used to determine where a Condition is or would be a Significant, Moderate or Low Threat to Drinking Water.

15.3.3.5 Enumerating Drinking Water Threats

The number of Significant Drinking Water Threats for the Craighurst Water Supply has been determined using the methodology outlined in Technical Memorandum A5 (Appendix MO) and refined using the methodology outlined in Chapter 5 (Section 5.5.6.4) of this Assessment Report. There are no Significant Threats associated with Conditions or Drinking Water Issues.

Table 15-2 documents the enumeration of existing and potential activities that are considered to be Significant Drinking Water Threats within the WHPAs for the Craighurst Water Supply. Potential Significant Drinking Water Threats were identified within WHPA-A and for parcels within WHPA B & C that are identified as potentially having a threat related to DNAPL.

Thirty activities that are considered to be potential Significant Drinking Water Threats were identified in association with thirty land parcels in the WHPA for the Craighurst Water Supply. Twenty (20) parcels are identified as having significant threat activities relating to residential land use via the use of private individual sewage disposal systems. One threat activity and parcel has been included to represent the potential for subsurface storage of fuel for home heating purposes within the area where the Vulnerability Score is 10. There are 21 residential parcels within this area. Nine parcels were identified as having potential for the handling/storage of DNAPLs within WHPA-C, including seven parcels associated to Wells 4 and 5. The shift of the WHPA-A of Well 4 related to the addition of Well 5 does not result in the addition of any new properties or any new threats.

Table 15-2: Number of Significant Drinking Water Threats for the Craighurst Drinking Water Supply, Enumeration of Significant Threats (Wellhead Protected Area):

Threat Number	Threat	Significant Threat Counts Number of Threats
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V or the Environmental Protection Act	0

Threat Number	Threat	Significant Threat Counts Number of Threats
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	20
3	The application of agricultural source material to land	0
4	The storage of agricultural source material to land	0
5	The management of agricultural source material	0
6	The application of non-agricultural source material to land	0
7	The handling and storage of non-agricultural source material	0
8	The application of commercial fertilizer to land	0
9	The handling and storage of commercial fertilizer to land	0
10	The application of pesticide to land	0
11	The handling and storage of pesticide	0
12	The application of road salt	0
13	The handling and storage of road salt	0
14	The storage of snow	0
15	The handling and storage of fuel	1
16	The handling and storage of dense non-aqueous phase liquid	9
17	The handling and storage of an organic solvent	0
18	The management of runoff that contains chemicals used in the de-icing of aircraft	0

Threat Number	Threat	Significant Threat Counts Number of Threats
21	The use of land as livestock grazing or pasturing land, and outdoor confinement area, or a farm-animal yard	0
22	The establishment and operation of a liquid hydrocarbon pipeline. O. Reg. 385/08, s. 3; O. Reg. 206/18, s. 1.	0
-	**Total Number**	**30*** significant threats (on **30** properties)

Notes for the table above:

1. The number of parcels identified will typically be less than the number of significant threats as multiple threats can be observed per parcel

15.3.3.5.1 Managed Lands

Technical Rule 16(9) requires the Assessment Report to include maps showing the location of Managed Lands and the percentage of Managed Lands within a Vulnerable Area, including WHPA-A, -B, -C, -D. This mapping is not required where the Vulnerability Scores for the area are less than the Vulnerability Score necessary for the Activity to be considered a threat in the Technical Rules.

Managed Lands were identified and the managed lands proportions were determined for the WHPA of the Craighurst Water Supply as outlined in Technical Memorandum A5 (Appendix MO). The results from this analysis were used in the enumeration of Significant Drinking Water Threats (Section 15.3.3.5). The Managed Lands are used in the identification of threat activities associated with the application of Agricultural Source Material, Non-Agricultural Source Material and commercial fertilizer.

Figure 15a-7 16a-6 illustrates the location and proportion of Managed Lands within the delineated WHPA zones for the Craighurst Water Supply where Vulnerability Scores were greater than 6 for WHPA-A to WHPA-D.

15.3.3.5.2 Livestock Density

Technical Rule 16(10) requires the Assessment Report to include maps showing the livestock density within WHPA-A, -B, -C, -D. This mapping is not required where the Vulnerability Scores for the area are less than the Vulnerability Score necessary for the Activity to be considered a Threat in the Technical Rules.

The Livestock Density was determined for the delineated WHPA zones of the Craighurst Water Supply as outlined in Technical Memorandum A5 (Appendix MO). The results from this analysis were used in the enumeration of Significant Drinking Water Threats (Section 15.3.3.5). Nutrient units per farm are in the identification of Threat activities associated with the storage of Agricultural Source Material, and the grazing and/or confinement of livestock.

Figure 15a-7 illustrates the distribution of Livestock Density within the delineated WHPA zones for the Craighurst Water Supply where Vulnerability Scores were greater than 6 for WHPA-A to WHPA-D. The Livestock Density figure reflects the distribution of Agricultural Managed Lands as determined in accordance with Technical Memorandum A5 (Appendix MO).

15.3.3.5.3 Impervious Surfaces

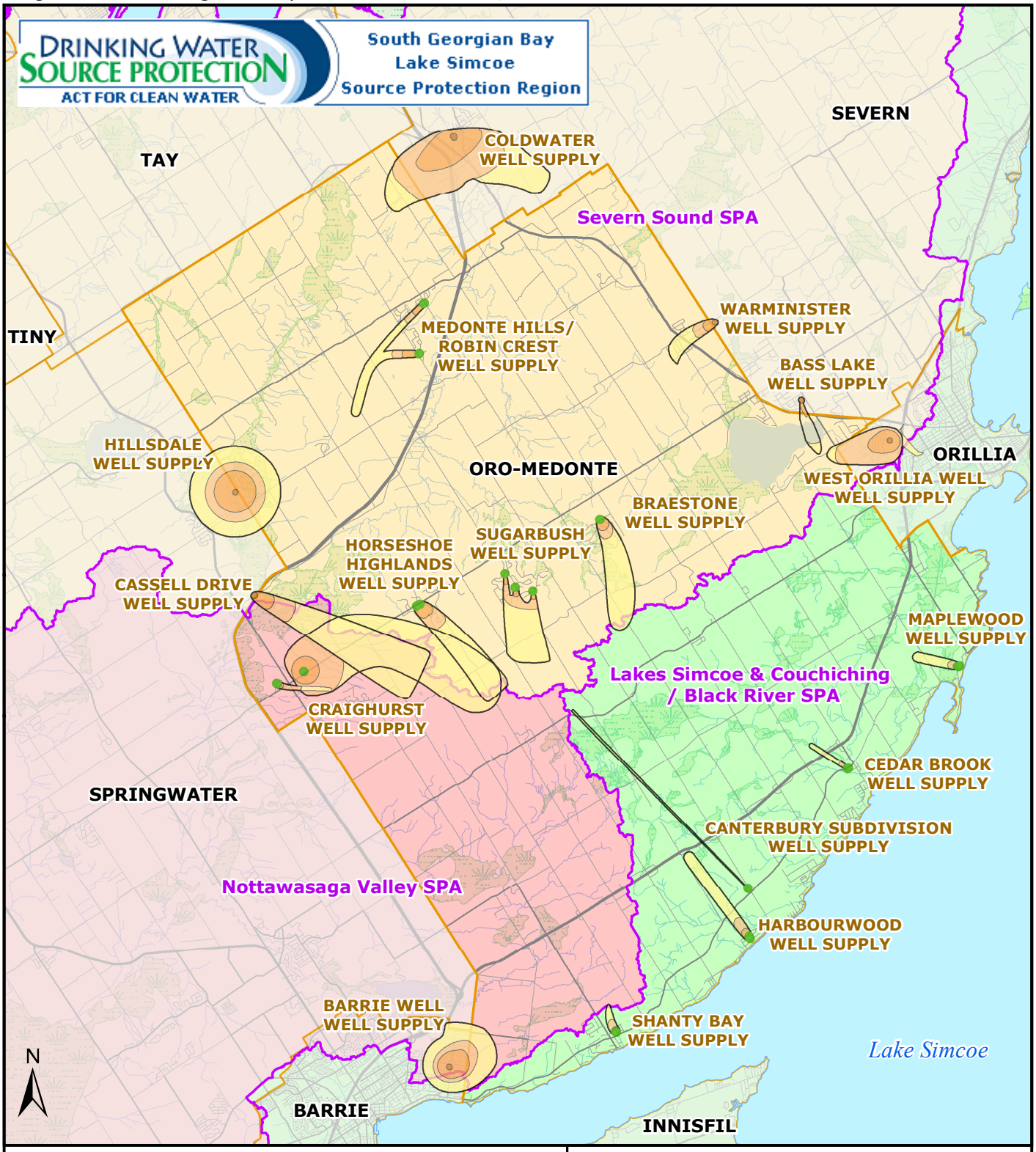
Technical Rule 16(11) requires the Assessment Report to include maps showing the percentage of surface area where road salt could be applied to Impervious Surfaces within WHPA-A, -B, -C,

-D. This mapping is not required where the Vulnerability Scores for the area are less than the Vulnerability Score necessary for the Activity to be considered a Threat in the Technical Rules.

The proportion of impervious surfaces within the delineated WHPA zones for the Craighurst Water Supply were manually quantified using GIS measurement tool and using Google satellite imagery. They were calculated based on the total area of individual WHPA zones. Methodology in Technical Memorandum A5.1 (Appendix MO) was used in 2023 to update the proportion of Impervious Surfaces within the delineated WHPA zones using the 2021 Technical Rules. The results from this analysis were used in the enumeration of Significant Drinking Water Threats (Section 15.3.3.5). The Impervious Surfaces are used in the identification of threat activities associated with the application of winter de-icing agents (salt).

Figure 15a-8 illustrates the distribution of Impervious Surfaces within the delineated WHPA zones for the Craighurst Water Supply where Vulnerability Scores were greater than 6 for WHPA-A to WHPA-D.

Figure 15-1: Drinking Water System Vulnerable Areas, Oro-Medonte



- Municipal Supply Wells
- WHPA-A (100m)
- WHPA-B (2 years time of travel)
- WHPA-C (5 years time of travel)
- WHPA-D (25 years time of travel)
- Source Protection Area Boundary
- Municipality Boundary

Drinking Water System Vulnerable Areas Township of Oro-Medonte

Created by: LSRCA, 2024-01-25

Scale 1:200,000

0 3 6 9km

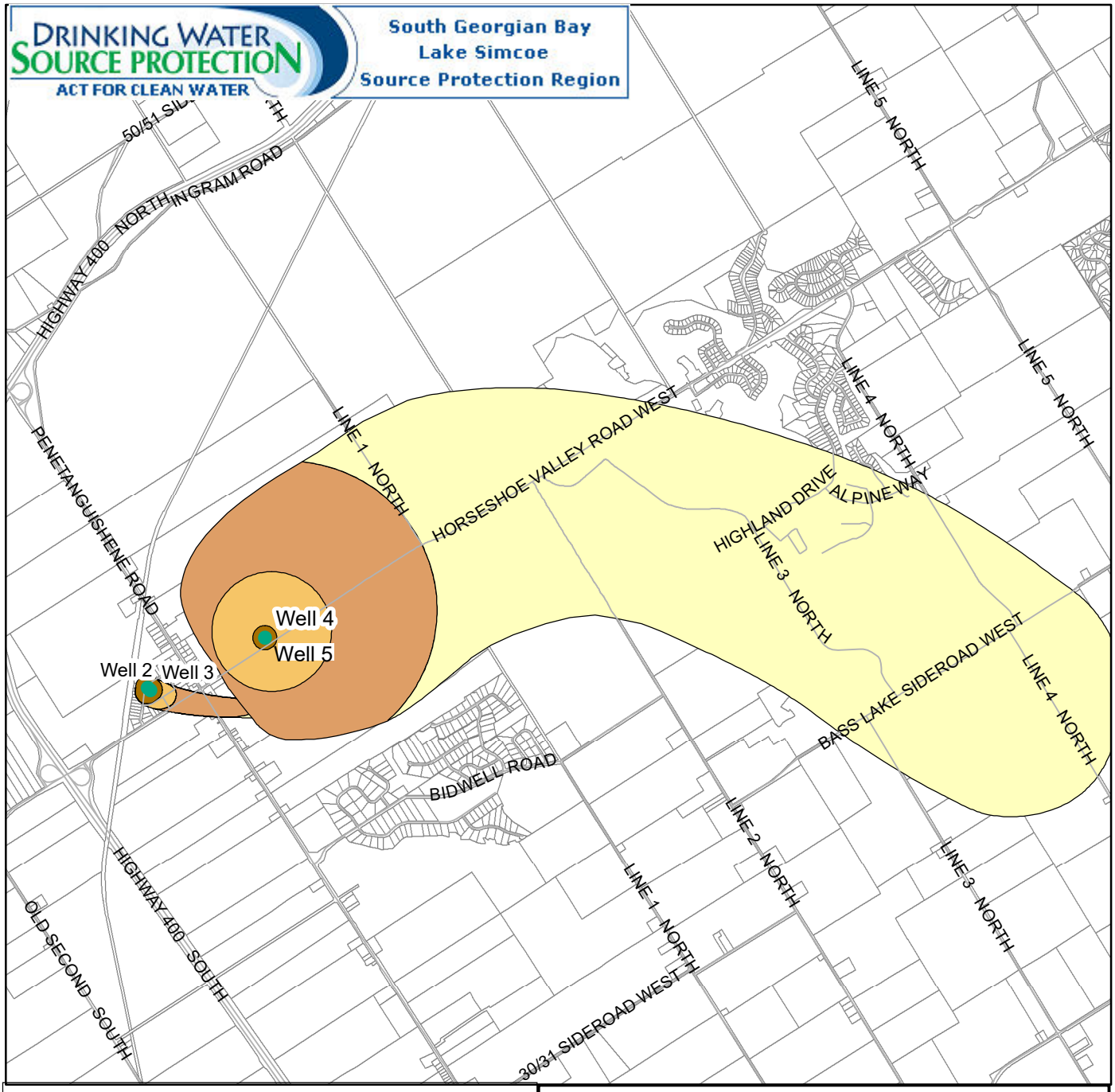
UTM Zone 17N, NAD83

This map was produced by the Lake Simcoe Region Conservation Authority, lead agency of the South Georgian Bay Lake Simcoe Region Source Protection Region. Base data have been compiled from various sources, under data sharing agreements.
While every effort has been made to accurately depict the base data, errors may exist.

Ontario

Figure 15-1

Figure 15a-1: Wellhead Protection Areas - Craighurst



WELLHEAD PROTECTION AREAS-CRAIGHURST, ORO-MEDONTE

ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

Created by: NVCA
Date: 2024-09

Scale: 1:50,000

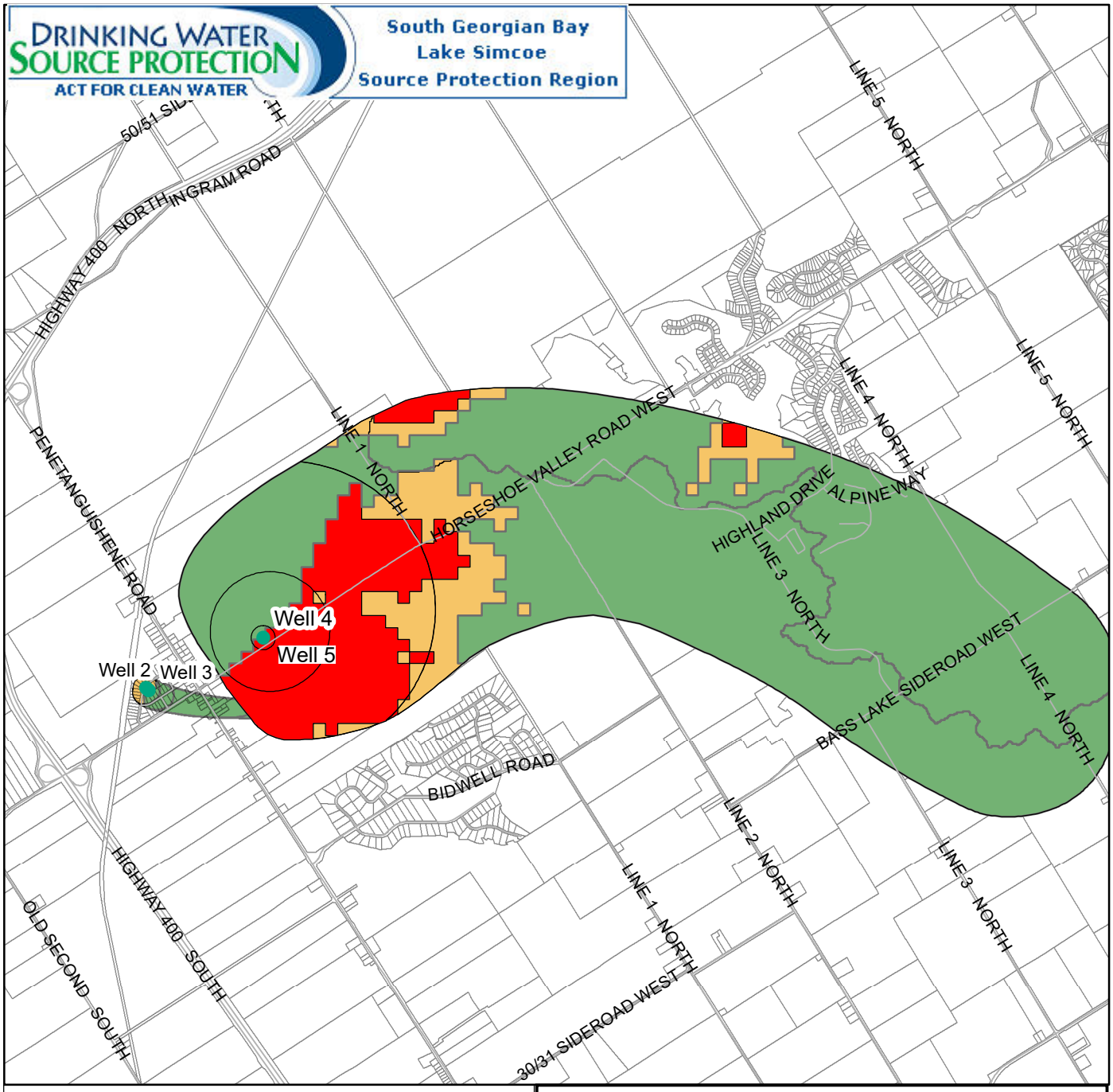
UTM Zone 17N, NAD83

Ontario

Figure 15a-1

This map was produced for the South Georgian Bay Lake Simcoe Protection Region for the purpose of completing the South Georgian Bay Lake Simcoe Assessment Report. Base data have beencompiled from various sources, under data sharing agreements. While every effort has been made to accurately depict the base data, errors may exist.

Figure 15a-2: Groundwater Vulnerability - Craighurst



Legend

N W E S

- MUNICIPAL WELL LOCATION

Aquifer Vulnerability Index

- High
- Medium
- Low

1,000 500 0 1,000 Meters

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GROUNDWATER VULNERABILITY-CRAIGHURST

ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

Created by: NVCA
Date: 2024-09

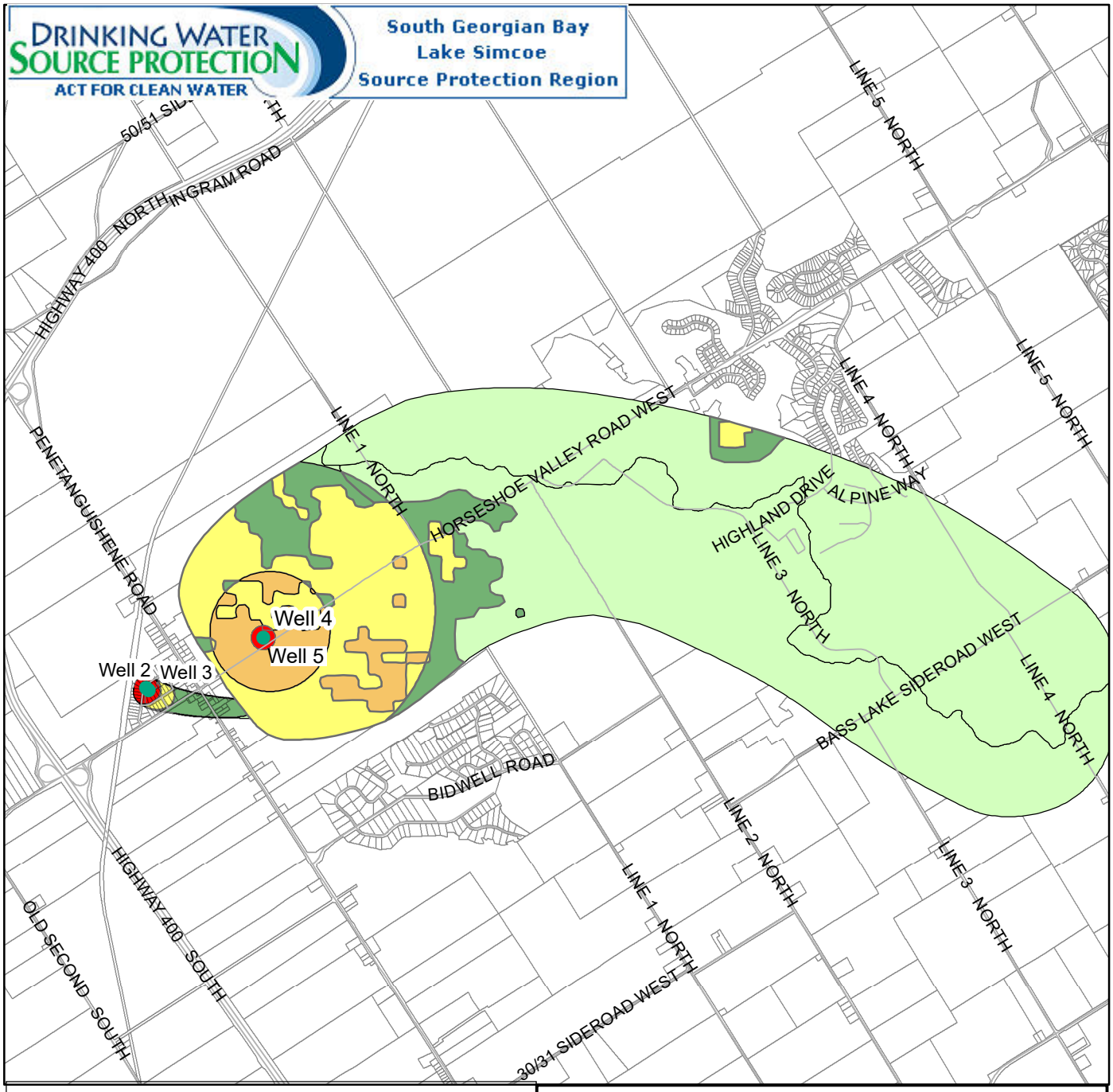
Scale: 1:50,000

UTM Zone 17N, NAD83

Ontario

Figure 15a-2

Figure 15a-3: Vulnerability Scores - Craighurst



VULNERABILITY SCORES- CRAIGHURST

ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

Created by: NVCA
Date: 2024-09

Scale: 1:50,000

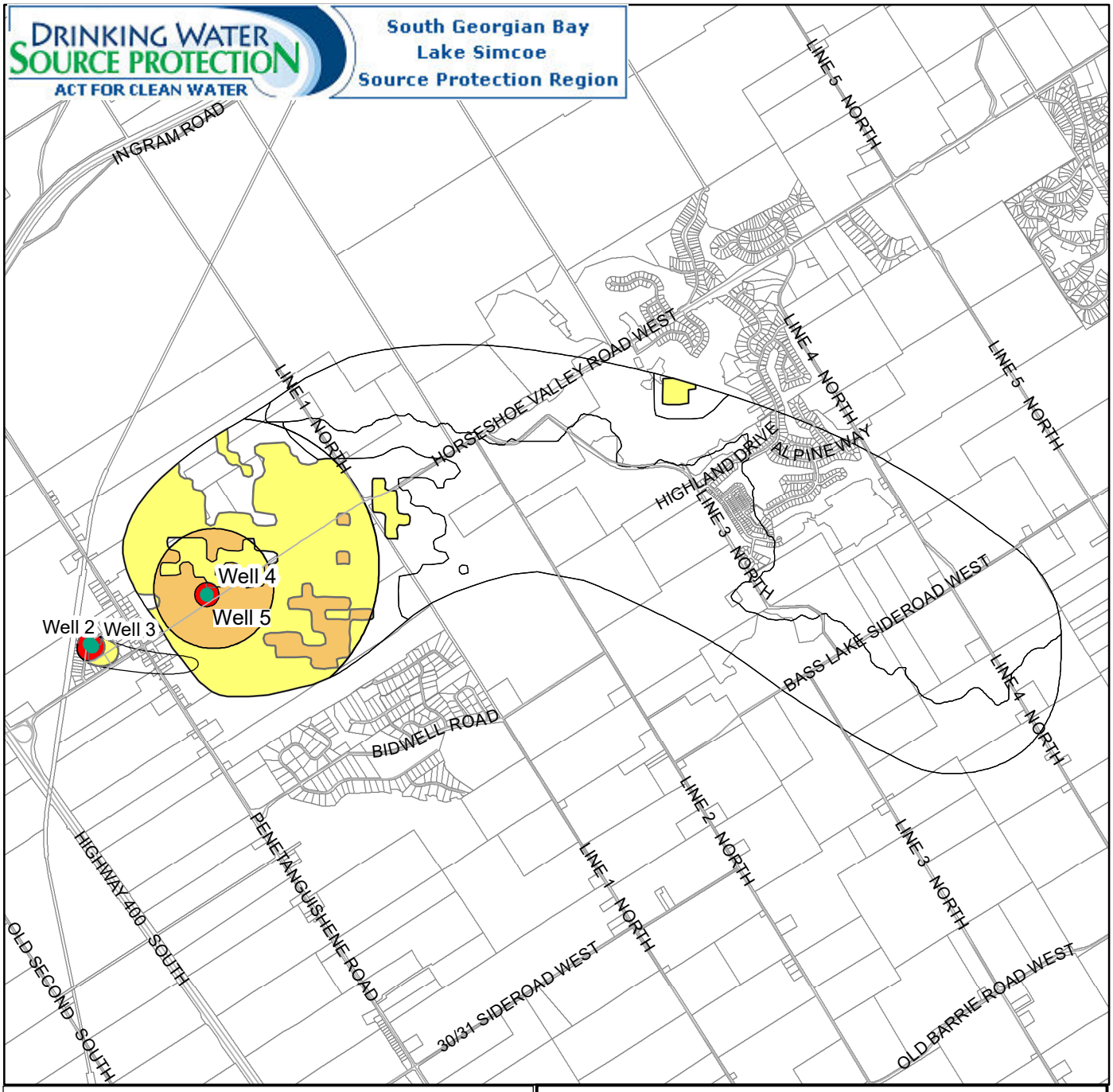
UTM Zone 17N, NAD83

Ontario

Figure 15a-3

This map was produced for the South Georgian Bay Lake Simcoe Protection Region for the purpose of completing the South Georgian Bay Lake Simcoe Assessment Report. Base data have been compiled from various sources, under data sharing agreements. While every effort has been made to accurately depict the base data, errors may exist.

Figure 15a-4: Areas where Pathogens are or would be Significant, Moderate or Low Threats - Craighurst



Legend

- MUNICIPAL WELL LOCATION

Vulnerability

- 10
- 8
- 6

1,000 500 0 1,000 Meters

N W E S

This figure is to be used to identify the areas where a landuse activity is or would be a drinking water threat based on the Technical Rules

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AREAS WHERE PATHOGENS ARE OR WOULD BE SIGNIFICANT, MODERATE, OR LOW THREATS- CRAIGHURST

ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

Created by: NVCA
Date: 2024-09

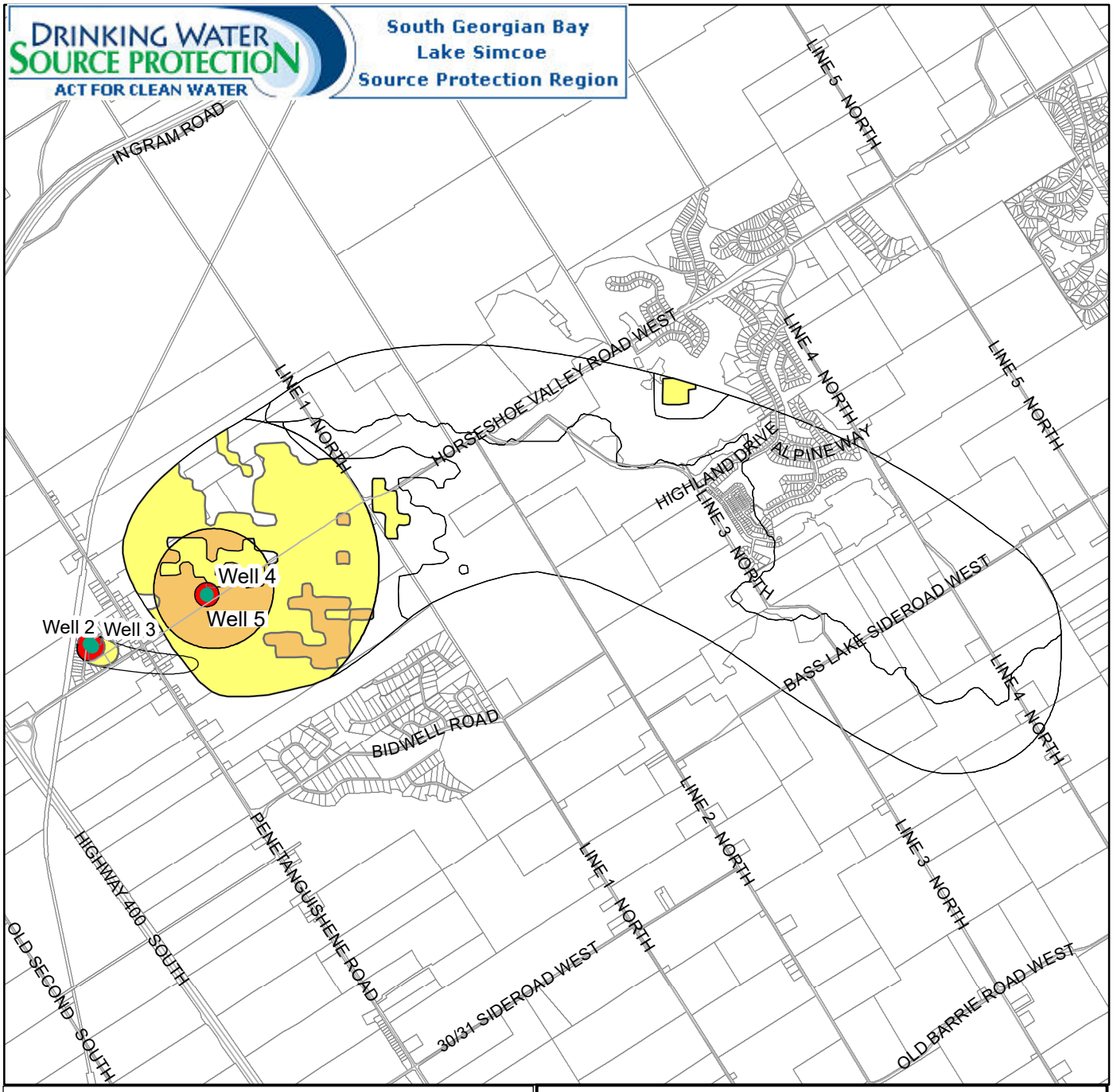
Scale: 1:50,000

UTM Zone 17N, NAD83

Ontario

Figure 15a-4

Figure 15a-5: Areas where Chemicals are or would be Significant, Moderate or Low Threats - Craighurst



Legend

- MUNICIPAL WELL LOCATION

Vulnerability

- 10
- 8
- 6

N W E S

1,000 500 0 1,000 Meters

This figure is to be used to identify the areas where a landuse activity is or would be a drinking water threat based on the Technical Rules

This map was produced for the South Georgian Bay Lake Simcoe Protection Region for the purpose of completing the South Georgian Bay Lake Simcoe Assessment Report. Base data have beencompiled from various sources, under data sharing agreements. While every effort has been made to accurately depict the base data, errors may exist.

AREAS WHERE CHEMICALS ARE OR WOULD BE SIGNIFICANT, MODERATE, OR LOW THREATS- CRAIGHURST

ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

Created by: NVCA
Date: 2024-09

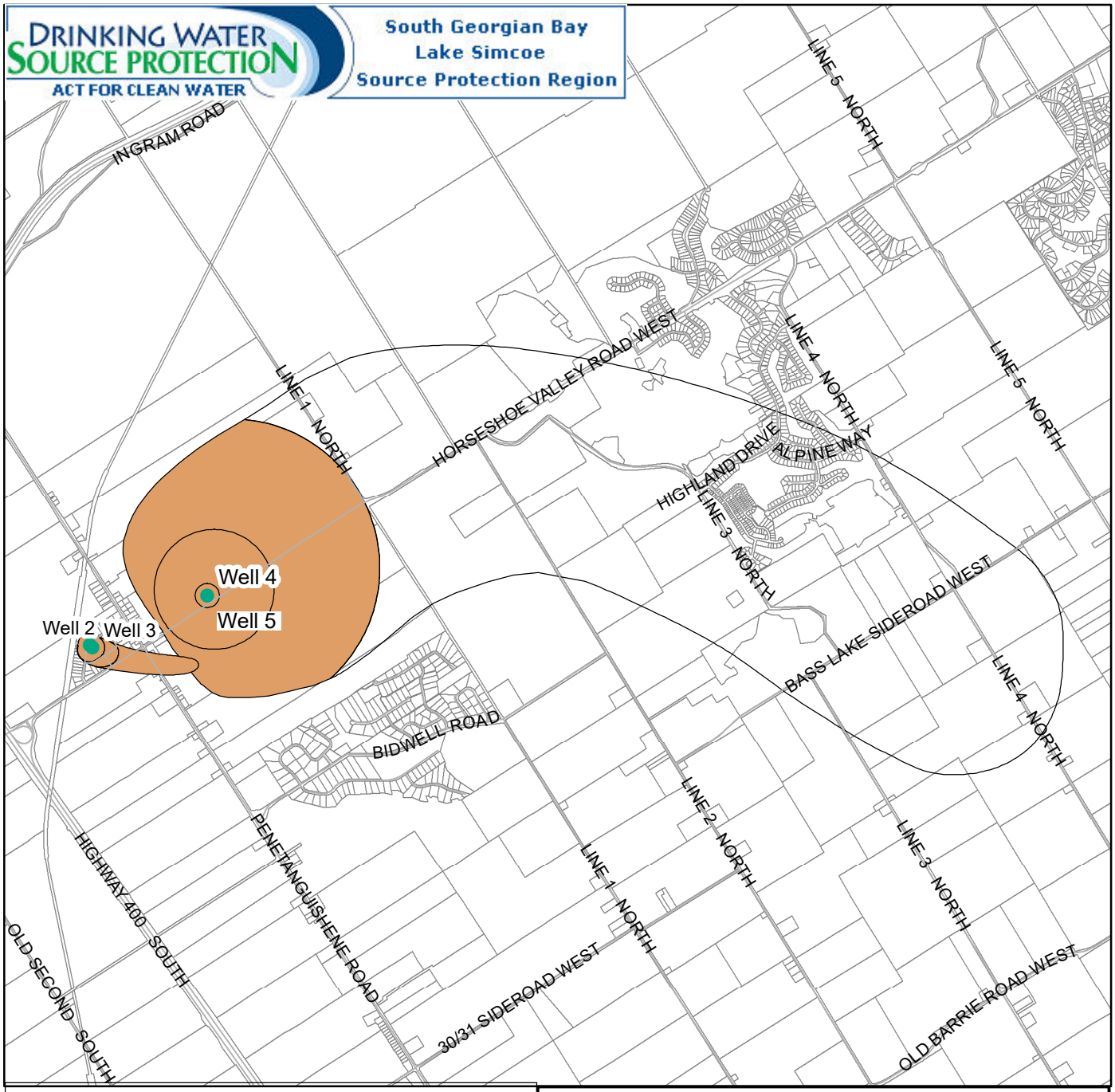
Scale: 1:50,000

UTM Zone 17N, NAD83

Ontario

Figure 15a-5

Figure 15a-6: Areas where DNAPLs are or would be Significant, Moderate or Low Threats - Craighurst



Legend

- MUNICIPAL WELL LOCATION
- WHPA-C (5-YEAR TIME-OF-TRAVEL)

N W E S

1,000 500 0 1,000 Meters

This figure is to be used to identify the areas where a landuse activity is or would be a drinking water threat based on the Technical Rules.

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AREAS WHERE DNAPLS ARE OR WOULD BE SIGNIFICANT, MODERATE, OR LOW THREATS- CRAIGHURST

ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

Created by: NVCA
Date: 2024-09

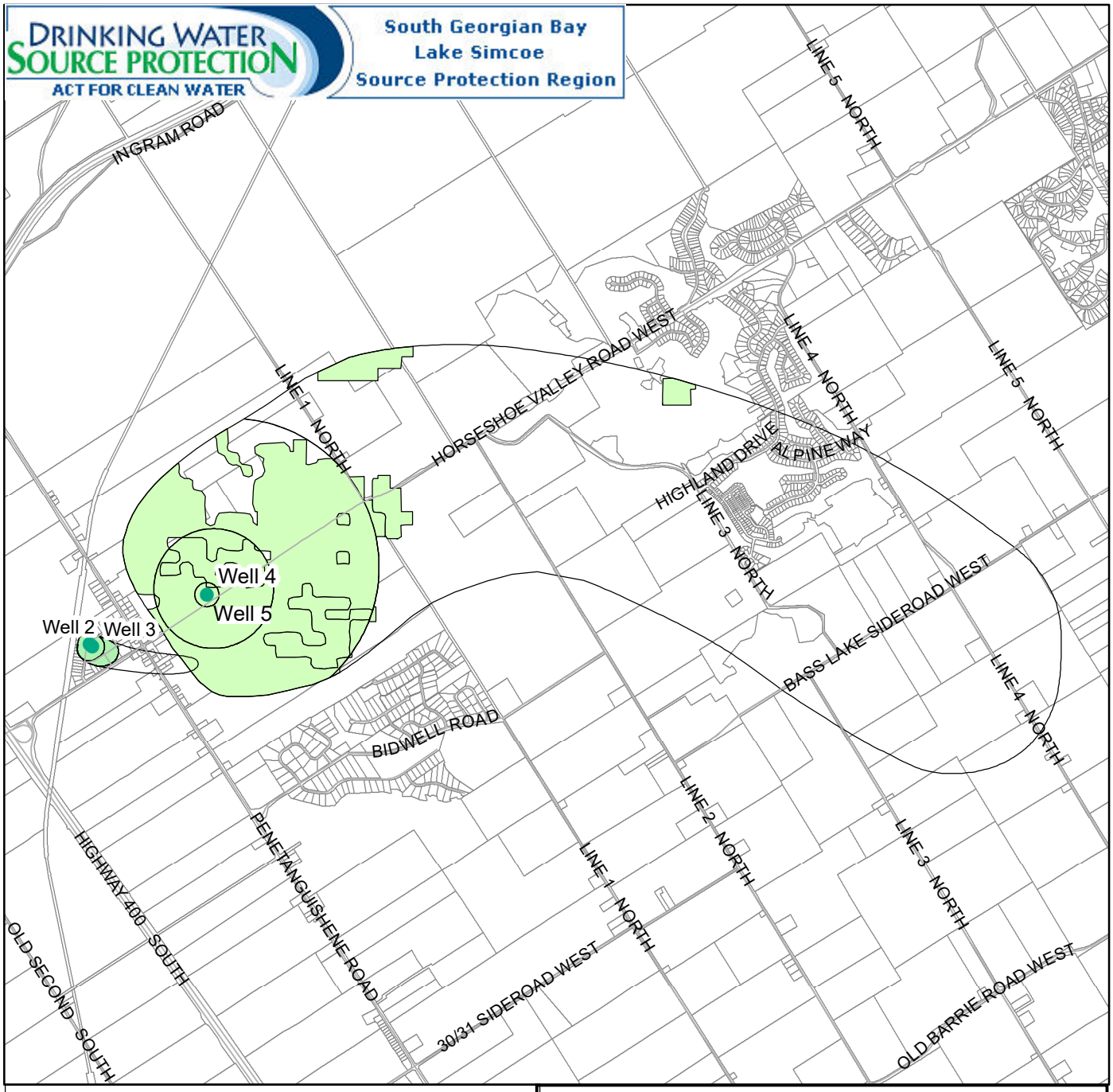
Scale: 1:50,000

UTM Zone 17N, NAD83

Ontario

Figure 15a-6

Figure 15a-7: Managed Lands – Craighurst



Legend

- MUNICIPAL WELL LOCATION
- MANAGED LANDS (<40%)
- MANAGED LANDS (40-80%)
- MANAGED LANDS (>80%)

1,000 500 0 1,000 Meters

The Managed Lands proportion is illustrated where the vulnerability score is greater than 6.

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MANAGED LANDS- CRAIGHURST

ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

Created by: NVCA
Date: 2024-09

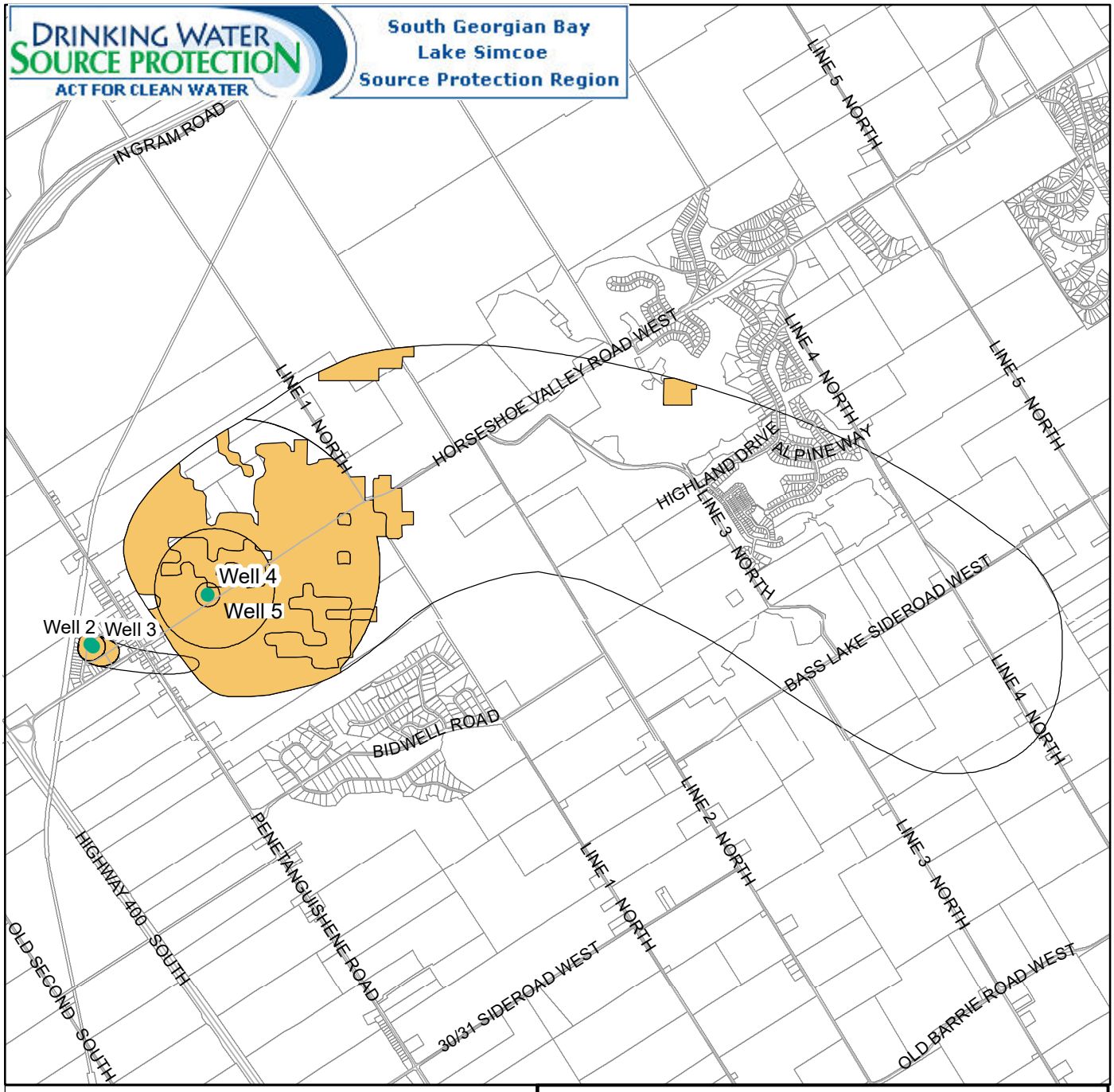
Scale: 1:50,000

UTM Zone 17N, NAD83

Ontario

Figure 15a-7

Figure 15a-8: Livestock Density - Craighurst



Legend

- MUNICIPAL WELL LOCATION
- LIVESTOCK DENSITY (<0.5 NUTRIENT UNITS/ACRE)
- LIVESTOCK DENSITY (0.5-1.0 NUTRIENT UNITS/ACRE)
- LIVESTOCK DENSITY (>1.0 NUTRIENT UNITS/ACRE)

1,000 500 0 1,000 Meters

The Livestock Density proportion is illustrated where the vulnerability score is greater than 6.

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LIVESTOCK DENSITY-CRAIGHURST

ASSESSMENT OF DRINKING WATER THREATS
SELECTED MUNICIPAL GROUNDWATER SUPPLIES
South Georgian Bay Lake Simcoe
Source Protection Region

Created by: NVCA
Date: 2024-09

Scale: 1:50,000

UTM Zone 17N, NAD83

Ontario

Figure 15a-8

Figure 15a-9: Impervious Surfaces – Craighurst