APPENDIX A:
GROUNDWATER ASSESSMENT

Stantec

Groundwater Assessment – Highway 401 Rehabilitation / Replacement of Various Structures and Pavement Reconstruction, City of Brockville (GWP 4003-19-00/WP 4006-1901)

FINAL REPORT

November 6, 2020

Prepared for:

Ontario Ministry of Transportation

Prepared by:

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Table of Contents

LIST OF APPENDICES

GROUNDWATER ASSESSMENT – HIGHWAY 401 REHABILITATION / REPLACEMENT OF VARIOUS STRUCTURES AND PAVEMENT RECONSTRUCTION, CITY OF BROCKVILLE (GWP 4003-19-00/WP 4006-1901)

Abbreviations

AMSL	above mean sea level
ANSI	Area of Natural and Scientific Interest
BGS	below ground surface
CSPA	Cataraqui Source Protection Area
CSPC	Cataraqui Source Protection Committee
EA	Environmental Assessment
EASR	Environmental Activity Sector Registry
GWP	Group Work Project
HVA	Highly Vulnerable Aquifers
IPZ	Intake Protection Zone
ICA	Issue Contributing Area
MECP	Ministry of the Environment, Conservation and Parks
MTO	Ontario Ministry of Transportation
OGS	Ontario Geological Survey
PSW	Provincially Significant Wetland
PTTW	Permit to Take Water
SGRA	Significant Groundwater Recharge Area
SPA	Source Protection Area
SPP	Source Protection Plan
Stantec	Stantec Consulting Ltd.
WHPA	Well Head Protection Area
WWR	Water Well Records

1.0 INTRODUCTION

Stantec Consulting Ltd. (Stantec) was retained by the Ministry of Transportation, Ontario (MTO) to complete the Preliminary Design and Environmental Assessment (EA) to evaluate rehabilitation and/or replacement of various structures and pavement reconstruction along Highway 401 within the City of Brockville. Group Work Project (GWP) 4003-19-00 and Work Plan (WP) 4006-1901 are part of this project. The project was initiated in accordance with the *Class Environmental Assessment for Provincial Transportation Facilities* (2000) (MTO Class EA).

The project limits are from 2 km west of the Highway 401 and Stewart Boulevard Interchange (IC 696) to 750 m east of the Highway 401 and North Augusta Road Interchange (IC 698) for a total length of approximately 4.5 km. The five structural sites included in the project are:

- Hwy 401 & Stewart Boulevard Interchange (16-121)
- Hwy 401 & CNR Overhead (16-122)
- Hwy 401 Buells Creek Culvert (16-237/C)
- Hwy 401 & Ormond Street Overpass (16-123)
- Hwy 401 & North Augusta Road Interchange (16-124)

Figure 1 (Appendix A) shows the project limits and location of the five structural sites (the Sites). For the purpose of this report, the area within 500 m of the project limits and structural sites is referred to as ‘the Study Area’ (Figure 1).

Stantec has completed the following hydrogeologic assessment for the rehabilitation/replacement of the five structures. The assessment was completed based on a review of the available groundwater resource information for the area. The objectives of the hydrogeologic assessment were:

- To provide background information pertaining to the project, potential construction activities and hydrogeological settings
- To determine potential impacts to groundwater quality and/or quantity due to the proposed project work
- To provide design recommendations, if necessary, based on groundwater source and vulnerable areas

The results of the hydrogeological assessment are documented in this report, which is organized into five sections, including this introduction (Section 1.0). Section 2.0 presents the project background. Section 3.0 presents the hydrogeological setting. Section 4.0 discusses potential groundwater constraints

GROUNDWATER ASSESSMENT – HIGHWAY 401 REHABILITATION / REPLACEMENT OF VARIOUS STRUCTURES AND PAVEMENT RECONSTRUCTION, CITY OF BROCKVILLE (GWP 4003-19-00/WP 4006-1901)

Introduction
November 6, 2020

and recommendations for mitigation. References are provided in Section 5.0. Figures referenced throughout the report are provided in Appendix A.

1.1 PROJECT BACKGROUND

Highway 401 within the City of Brockville is a four-lane divided highway. Potential construction activities include interchange improvements, rehabilitation/replacement of structures, expansion and pavement reconstruction to accommodate the future widening of Highway 401 to eight-lanes, and associated drainage improvements.

2.0 SITE SETTING

The site setting is described below including topography and drainage, physiography and geology, hydrogeology, private wells, and source protection.

2.1 TOPOGRAPHY AND DRAINAGE

The Sites lie within the Cataraqui Source Protection Area (CSPA) and extend across the Buells Creek subwatershed which is located within the jurisdiction of the Cataraqui Region Conservation Authority (Figure 2). Buells Creek is located approximately 50 m east of the Ormond Street Overpass (16-123), and the existing Buells Creek Culvert (16-237/C) conveys water from the creek beneath Highway 401 (Figure 2). Buells Creek flows southerly towards Butlers Creek which drains into the St. Lawrence River (Lake of the Isles), located approximately 2 km southeast of Highway 401 (Figure 2).

Regional topography within the CSPA generally slopes southwestward toward the St. Lawrence River (CSPC 2008). Ground surface topography across the Study Area is relatively flat, generally ranging from approximately 95 m above mean sea level (AMSL) in the vicinity of the Ormond Street Overpass (16-123) and Buells Creek Culvert (16-237/C) to approximately 105 m AMSL in the vicinity of the Stewart Boulevard Interchange (16-121) and North Augusta Road Interchange (16-124) (Figure 2).

The Sites do not intersect any Provincially Significant Wetlands (PSWs) or Areas of Natural and Scientific Interest (ANSIs). There are mapped unevaluated wetland areas located approximately 30 m north of the Buells Creek Culvert (16-237/C), 50 m north of the Ormond Street Overpass (16-123), and 50 m southeast of the CNR Overhead (16-122) (Figure 2).

2.2 PHYSIOGRAPHY AND GEOLOGY

The Study Area is located within the physiographic region defined by Chapman and Putnam (1984) as the Smith Falls Limestone Plain, which is characterized by shallow soil overlying limestone or dolostone bedrock. Deeper soils are present in some areas as a result of old beach deposits, isolated drumlins, and clay deposits that have infilled depressions in the bedrock surface (CSPC 2017).

A review of the surficial geological mapping by the Ontario Geological Survey (OGS 2010), indicated the CNR Overhead (16-122), Buells Creek Culvert (16-237/C), Ormond Street Overpass (16-123), and North Augusta Road Interchange (16-124) lie within fine textured glaciolacustrine massive to well laminated deposits of silt and clay with minor sand and gravel (Unit 10a, Figure 3). The Stewart Boulevard Interchange (16-121) is located in stone-poor, carbonate-derived silty to sandy till (Unit 5d, Figure 3) and near areas of Paleozoic bedrock drift-complex (Unit 4, Figure 3). The overburden is underlain by Paleozoic bedrock of the March Formation comprising interbedded sandstones and dolostones (Armstrong and Dodge 2007). The Nepean Formation sandstones are interpreted to underlie the March

GROUNDWATER ASSESSMENT – HIGHWAY 401 REHABILITATION / REPLACEMENT OF VARIOUS STRUCTURES AND PAVEMENT RECONSTRUCTION, CITY OF BROCKVILLE (GWP 4003-19-00/WP 4006-1901)

Site Setting
November 6, 2020

Formation, followed by Precambrian bedrock, which is exposed at surface (Unit 1, Figure 3) in the western extent of the Study Area as part of the Frontenac Axis (CSPC 2017).

Available regional mapping presented in the Watershed Characterization Report for the CSPA (CSPC 2008) indicated overburden thickness in the Study Area generally ranges from less than 1 m to up to 4 m in thickness and consists primarily of clay and/or sand. Basal sands and gravel have been noted at the contact between the clay and underlying bedrock in some locations.

A review of the Ministry of the Environment, Conservation and Parks (MECP) water well records (WWR) in the vicinity of the Sites indicated the following:

- Overburden (sand, clay and/or hardpan) in the vicinity of the Stewart Boulevard Interchange (16-121) generally ranged between 0.3 m and 2 m in thickness with top of bedrock reported at elevations ranging from 101 m AMSL to 105 m AMSL. Thicker overburden deposits ranging up to 9 m were noted in WWRs mapped approximately 400 m to 500 m west/northwest of the Stewart Boulevard Interchange (16-121).
- Overburden in the vicinity of the CNR Overhead (16-122) consisted of clay ranging up to approximately 4 m in thickness. Top of bedrock was reported between 89 m AMSL and 91 m AMSL.
- WWRs did not provide subsurface information in the vicinity of the Buells Creek Culvert (16-237/C) and the Ormond Street Overpass (16-123). Based on review of a 1955 foundation investigation report for the Osmond Street Overpass available from the MTO foundation library (MTO 2020), overburden consisted of clay up to 5.3 m in thickness with top of bedrock encountered between 86 m AMSL and 88 m AMSL.
- Overburden (clay, sand, gravel, and/or hardpan) in the vicinity of the North Augusta Road Interchange (16-124) ranged from 0.9 m to 9.4 m in thickness with top of bedrock reported at elevations between 91 m AMSL and 99 m AMSL.

2.3 HYDROGEOLOGY

Due to the generally thin overburden within the CSPA, aquifers have primarily been identified in the bedrock (CSPC 2017). The bedrock aquifers predominantly consist of Paleozoic limestones, dolostones, sandstones, and Precambrian rock. The most permeable bedrock material in the CSPA is the Nepean Formation sandstone, which is known to be a high yielding aquifer (CSPC 2017). The March formation is also reported to be relatively permeable due to the sandstone layers (CSPC 2017).

CSPC (2017) indicated that some areas with thicker soil cover can act as a protective barrier to the bedrock aquifers, especially where mainly clay overburden is present and that areas with less soil cover tend to be highly susceptible to surface contamination as fractures in bedrock can act as a pathway for contaminants to reach groundwater.

A review of the MECP WWRs (Figure 4) within 500 m of the Sites provided static water level data, in which the data are potentiometric water levels within the bedrock aquifers or levels to which water in a confined aquifer would rise in a well, as summarized below:

- Static water levels ranged from 0.9 m BGS to 9.1 m BGS (elevations from 93 m AMSL to 106 m AMSL) in bedrock wells completed in the vicinity of the Stewart Boulevard Interchange (16-121).
- The static water level was reported at 6 m BGS (88 m AMSL) in a bedrock well completed in the vicinity of the CNR Overhead (16-122).
- WWRs did not provide water level data in the vicinity of Buell's Creek Culvert (16-237/C) or the Osmond Street Overpass (16-123). Review of a 1955 foundation investigation report for the Osmond Street Overpass (MTO 2020) indicated water was encountered entering a borehole at an elevation of 90 m AMSL (approximately 2.7 m BGS).
- Static water levels ranged from 0.3 m BGS to 6.1 m BGS (elevations from 92 m AMSL to 101 m AMSL) in bedrock wells completed in the vicinity of the North Augusta Road Interchange (16-124).

2.4 MUNICIPAL AND PRIVATE WATER SUPPLY

The majority of the developed areas within the City of Brockville are serviced with municipal water obtained from St. Lawrence River surface water (MMM 2016). The nearest surface water intake is for the City of Brockville's Water Treatment Plant, located approximately 2.4 km south of the Stewart Boulevard Interchange (16-121).

Based on review of available water distribution mapping for the City of Brockville, it is interpreted that municipal water servicing does not extend into a rural area along a portion of Parkdale Avenue to the west of Stewart Boulevard within the Study Area. The rural residences/businesses may be connected to the municipal water supply system or may be supplied by private groundwater supply wells.

To be conservative, the potential for private wells was reviewed for the Study Area as a whole. A review of the MECP WWRs (Figure 4) identified 193 historical WWRs within 500 m as follows:

- 79 WWRs were identified as test hole, monitoring, observation, abandoned, not used and/or unknown use.
- One industrial supply well installed in 1959 to a depth of 41 m in bedrock.
- 11 commercial supply wells, two of which are also used for domestic purposes, installed between 1950 and 1981, to depths ranging from 7 m BGS to 29 m BGS in bedrock.
- Two pubic supply wells, 3606591 and 3605194, installed in 1956 and 1973 to depths of 56 m BGS and 15 m BGS in bedrock, respectively. WWR 3605194 is mapped approximately 1.5 km southwest of the Stewart Boulevard Interchange (16-121) and further review of the well record indicated this well

GROUNDWATER ASSESSMENT – HIGHWAY 401 REHABILITATION / REPLACEMENT OF VARIOUS STRUCTURES AND PAVEMENT RECONSTRUCTION, CITY OF BROCKVILLE (GWP 4003-19-00/WP 4006-1901)

Site Setting
November 6, 2020

is located on the Highland Golf Course property along Parkdale Avenue and north of Highway 401 (Figure 4). WWR 3606591 is mapped approximately 900 m northeast of the North Augusta Road Interchange (16-124) and further review of the well record indicated the water supply well was for a trailer park and was owned by Oxford Acers Ltd. Review of recent aerial imagery (Figure 4) did not indicate the presence of a trailer park in the area of WWR 3606591.

- Four municipal wells (3612722, 3613098, 3613099, 3613100) installed for monitoring use in 1993 and 1994, to depths ranging from 18 m BGS and 26.5 m BGS in bedrock. These wells are mapped on the Highland Golf Course property along Parkdale Avenue and a property further west on Old Red Road with a communication tower (Figure 4). The nearest well is located greater than 1 km to the southwest of the Stewart Boulevard Interchange (16-121).
- One irrigation well installed in 1951 to a depth of 18 m BGS in bedrock.
- 95 domestic supply wells installed between 1949 and 2008 to depths ranging from 7.6 m BGS to 76 m BGS in bedrock.

It is expected that the majority of locations are now supplied by municipal water, apart from potential locations where municipal water servicing has not been extended (i.e., along the western extent of Parkdale Avenue to the west of the Stewart Boulevard Interchange (16-121)).

Based on the WWR review, private wells in the Study Area are reported to be installed in bedrock. It is recommended that as part of final design, the location of below ground excavation be reviewed to determine the need for and extent of private well monitoring in select areas.

2.5 SOURCE WATER PROTECTION

In accordance with the *Clean Water Act* (2006), the Cataraqui Source Protection Committee (CSPC) completed source water protection assessments for the CSPA (CSPC 2017). As part of the assessment process, vulnerable areas within the source water area were defined. Vulnerable areas include Wellhead Protection Areas (WHPAs), Highly Vulnerable Aquifers (HVAs), and Significant Groundwater Recharge Areas (SGRAs) for groundwater supply sources, and Intake Protection Zones (IPZs) for surface water supply sources.

Issue Contributing Areas (ICAs) were also defined for municipal sources, as needed, where historical raw water quality data suggested that anthropogenic activity could be deteriorating drinking water quality.

Vulnerable areas and ICAs are regulated under the *Clean Water Act*. Land use policies have been developed to control "drinking water threats" in these areas; where a "drinking water threat" is defined as an activity or condition that adversely affects, or has the potential to adversely affect, the quality or quantity of any water that is or may be used as a source of drinking water.

The CSPA Source Protection Plan (CSPC 2014) identify the vulnerable areas, and applicable *"*drinking water threats"*,* which are subject to regulation.

The following sections present the local vulnerable areas, identify where “drinking water threats” are controlled per the SPP, and discuss the relevance of the above to the proposed project for Highway 401.

2.5.1 Well Head Protection Areas

There are no WHPAs delineated in the vicinity of the Sites. The nearest WHPA is associated with the Miller Manor Apartment Well Supply in the village of Mallorytown, located approximately 19 km southwest of the Stewart Boulevard Interchange (16-121) (CSPC 2017; MECP 2020).

2.5.2 Highly Vulnerable Aquifers

The Sites lie within HVA areas, as the majority of the entire CSPA is considered a HVA with an assigned vulnerability score of 6 (CSPC 2017).

The CSPA SPP (CSPC 2014) includes policies related to HVAs for fuel and chemical use and/or storage that may apply to the proposed construction activities. Applicable mitigation measures should be included for construction within HVA areas.

2.5.3 Significant Groundwater Recharge Areas

Review of available mapping (CSPC 2017; MECP 2020) indicated the Sites do not intercept a SGRA, however, there are pockets of SGRAs with assigned vulnerability scores of 6 delineated in the vicinity of the Stewart Boulevard Interchange (16-121) and the North Augusta Road Interchange (16-124).

The CSPA SPP (CSPC 2014) includes policies related to SGRAs for fuel and chemical use and/or storage that may apply to the proposed construction activities. Applicable mitigation measures should be included for construction within SGRAs areas.

2.5.4 Intake Protection Zones

There are no IPZs within the vicinity of Sites. The nearest IPZ is for the City of Brockville’s Water Treatment Plant, with IPZ-2 being located approximately 1.4 km south/southeast of the Stewart Boulevard Interchange (16-121) (CSPC 2017).

2.5.5 Issue Contributing Areas

There are no ICAs in the CSPA.

3.0 CONSTRAINTS AND MITIGATION MEASURES

Based on the preliminary review of available data, the following constraints are identified:

- There is limited subsurface information and groundwater level data available in the vicinity of the Buells Creek Culvert (16-237/C) and the Ormond Street Overpass (16-123).
- The Sites lie within HVA areas, as the majority of the entire CSPA is considered a HVA with a vulnerability score of 6.
- The Sites do not intersect a mapped highly vulnerable SGRA, however, there are mapped highly vulnerable SGRAs located in the vicinity of the Stewart Boulevard Interchange (16-121) and the North Augusta Road Interchange (16-124).

Based on the preliminary review of available data, the following recommendations are provided:

- It is anticipated that a groundwater Permit to Take Water (PTTW) or registration with the Environmental Activity Sector Registry (EASR) would be required for work involving bridge replacement and culvert rehabilitation/replacement. The need for an EASR or a PTTW in select areas would be determined as part of the detailed design. It is our understanding that MTO will complete additional geotechnical work in support of the detailed design.
- Based on review of MECP WWRs, it is interpreted that potential private groundwater supply wells are located within 500 m of the Stewart Boulevard Interchange (16-121). The potential private wells are installed within bedrock. Based on the location and typical depth of private wells, it is not anticipated that a well monitoring program will be required for general excavation activities. The need for and extent of private well monitoring in areas of excavation should be confirmed as part of the supporting documentation for any PTTW application/EASR registration.
- Various mitigation techniques will be employed during construction to reduce the risk of impacts to natural environment features. During construction activity, the primary concern regarding groundwater quality would be the potential for a contaminant spill. To address this concern, the following mitigation measures are proposed:
  - Refuelling of equipment should be completed away from SGRAs and HVAs, whenever possible, to minimize potential impacts to groundwater quality in the event that an accidental spill occurs.
  - To minimize the impact of potential contaminant spills, the Contractor should implement best management protocols such as secondary containment of any temporary fuel storage and preparation of a spill response plan and proper facility management during operation and maintenance.
  - Materials for spill response such as drip pans and spill contingency kits must be maintained on site.

4.0 REFERENCES

Armstrong, D. K. and Dodge, J. E. P. 2007. *Paleozoic geology of southern Ontario.* Ontario Geological Survey, Miscellaneous Release—Data 219.

Cataraqui Source Protection Committee (CSPC), 2008. Watershed Characterization Report, Cataraqui Source Protection Area. March 2008.

Cataraqui Source Protection Committee (CSPC), 2014. Cataraqui Source Protection Plan. Approved November 26, 2014. Effective Date: April 1, 2015.

Cataraqui Source Protection Committee (CSPC), 2017. Assessment Report: Cataraqui Source Protection Area. Approved June 2011, revised June 2017.

Chapman, L. J. and Putnam, D. F. 1984. *The Physiography of Southern Ontario*. Ministry of Natural Resources, Ontario Geological Survey, Special Volume 2.

MMM Group Ltd. (MMM), 2016. City of Brockville Employment Lands Secondary Report. Draft, December 2016.

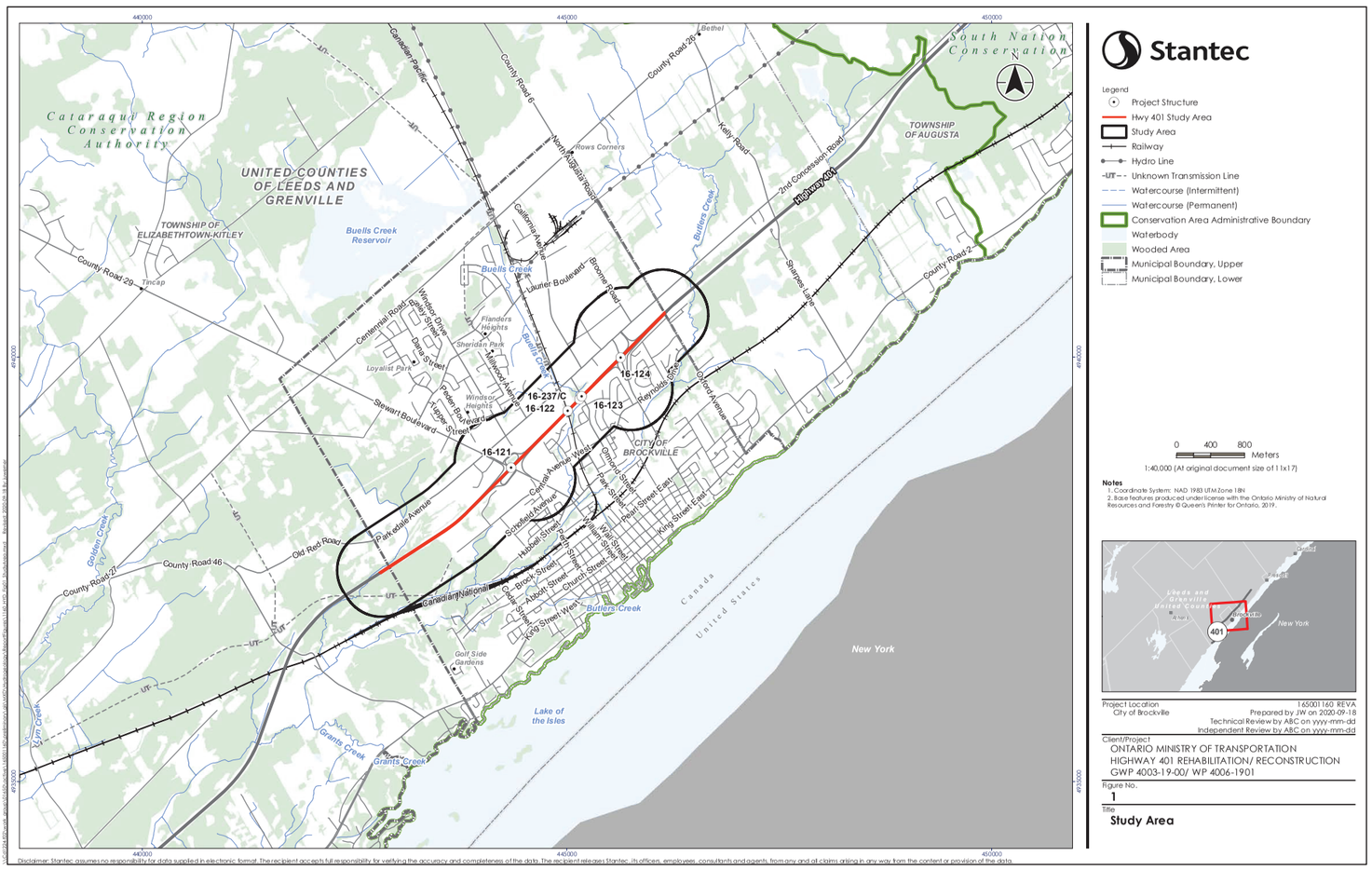
Ontario Geological Survey (OGS). 2010. *Surficial Geology of Southern Ontario.* Ontario Geological Survey, Miscellaneous Release—Data 128—Revised.

Ontario Ministry of the Environment, Conservation and Parks (MECP). Well Record Dataset, Ontario Water Well Information System. April 2020.

Ontario Ministry of the Environment, Conservation and Parks (MECP). Source Protection Information Atlas. Accessed September 2020. https://www.gisapplication.lrc.gov.on.ca/SourceWaterProtection/Index.html?site=SourceWaterProtection&viewer=SWPViewer&locale=en-US

Ontario Ministry of Transportation (MTO), 2020. Online Foundation Library service. Accessed August 2020. http://www.mto.gov.on.ca/FoundationLibrary/index.shtml

APPENDIX A: FIGURES



Stantec

Legend
- Project Structure
- Hwy 401 Study Area
- Study Area
- Railway
- Hydro Line
- Unknown Transmission Line
- Watercourse (Intermittent)
- Watercourse (Permanent)
- Conservation Area Administrative Boundary
- Waterbody
- Wooded Area
- Municipal Boundary, Upper
- Municipal Boundary, Lower

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Notes
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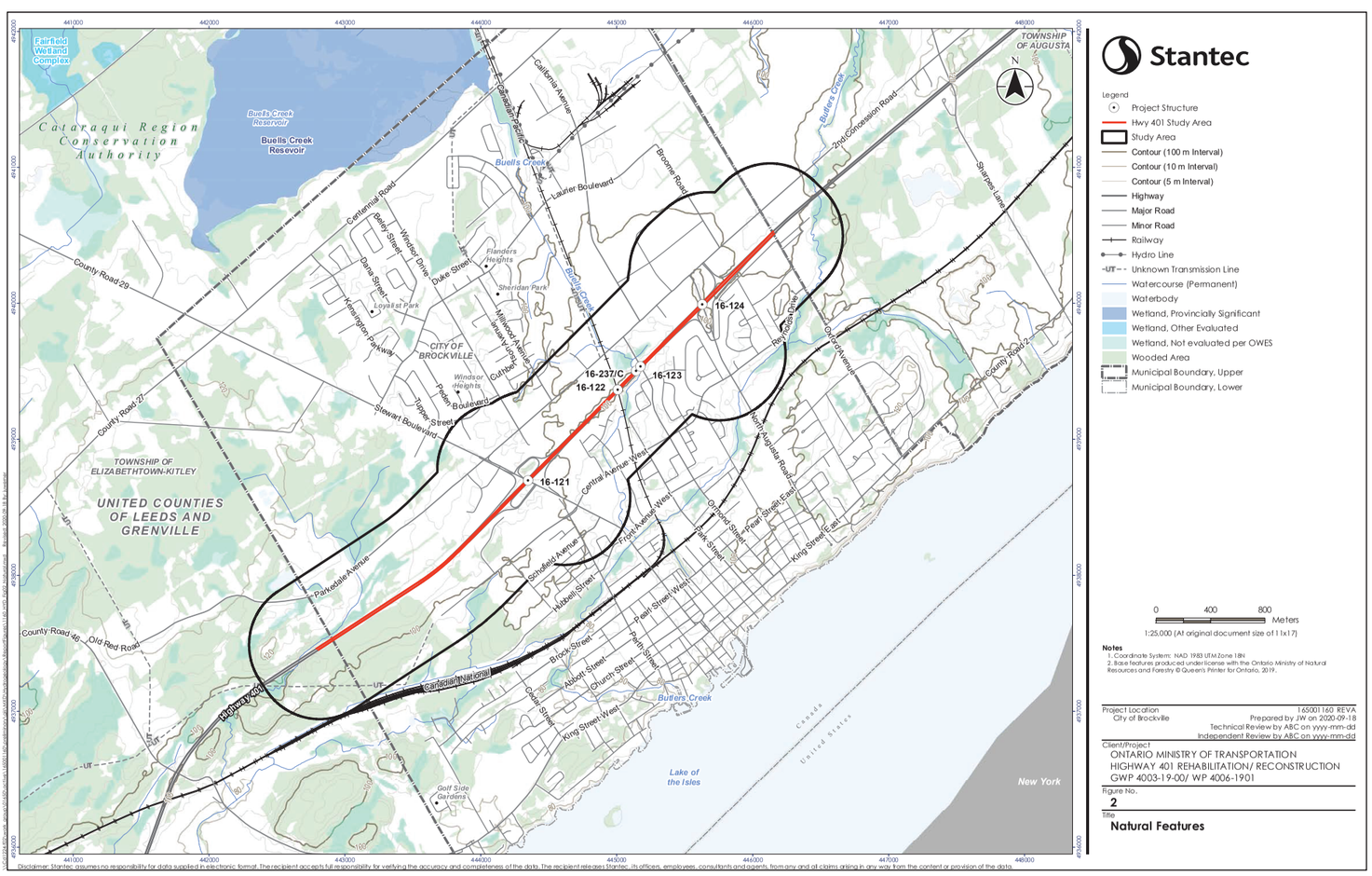
Project Location
City of Brockville

165001160 REVA
Prepared by JW on 2020-09-18
Technical Review by ABC on yyyy-mm-dd
Independent Review by ABC on yyyy-mm-dd

Client/Project
ONTARIO MINISTRY OF TRANSPORTATION
HIGHWAY 401 REHABILITATION/ RECONSTRUCTION
GWP 4003-19-00/ WP 4006-1901

Figure No.
1

Title
Study Area



Stantec

Legend
- Project Structure
- Hwy 401 Study Area
- Study Area
- Contour (100 m Interval)
- Contour (10 m Interval)
- Contour (5 m Interval)
- Highway
- Major Road
- Minor Road
- Railway
- Hydro Line
- Unknown Transmission Line
- Watercourse (Permanent)
- Waterbody
- Wetland, Provincially Significant
- Wetland, Other Evaluated
- Wetland, Not evaluated per OWES
- Wooded Area
- Municipal Boundary, Upper
- Municipal Boundary, Lower

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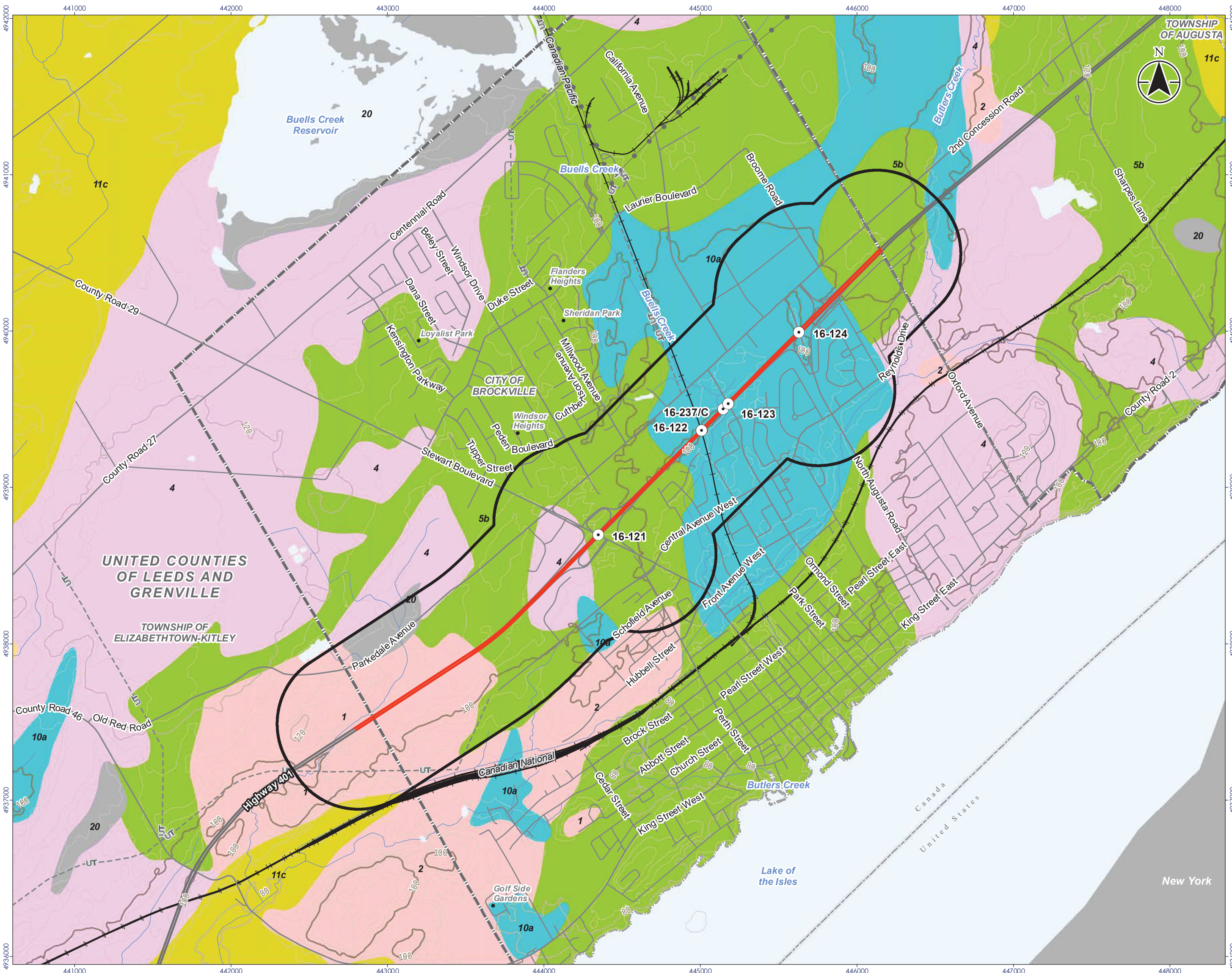
Figure No.
2

Title
Natural Features



Stantec

Legend

- Project Structure
- Hwy 401 Study Area
- Study Area
- Contour (100 m Interval)
- Contour (10 m Interval)
- Contour (5 m Interval)
- Highway
- Major Road
- Minor Road
- Railway
- Hydro Line
- UT Unknown Transmission Line
- Watercourse (Permanent)
- Waterbody
- Municipal Boundary, Upper
- Municipal Boundary, Lower

Surficial Geology

- 20: Organic deposits
- 11c: Coarse-textured glaciomarine deposits (Foreshore-basinal deposits)
- 10a: Fine-textured glaciomarine deposits (Massive-well laminated)
- 7: Glaciofluvial deposits
- 5b: Stone-poor, carbonate-derived silty to sandy till
- 4: Paleozoic bedrock-drift complex
- 2: Precambrian bedrock-drift complex
- 1: Precambrian bedrock

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GWP 4003-19-00/ WP 4006-1901

Figure No.
3

Title
Surficial Geology

Stantec

Legend

- Project Structure
- Hwy 401 Study Area
- Study Area
- MECP Water Well Record (within 500 m)
  - Unkown
  - Municipal
  - Commercial
  - Domestic
  - Monitoring
  - Not Used/ Abandoned
  - Public

0 200 400 Meters

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GWP 4003-19-00/ WP 4006-1901

Figure No.
4a

Title
MECP Water Well Records (within 500 m)

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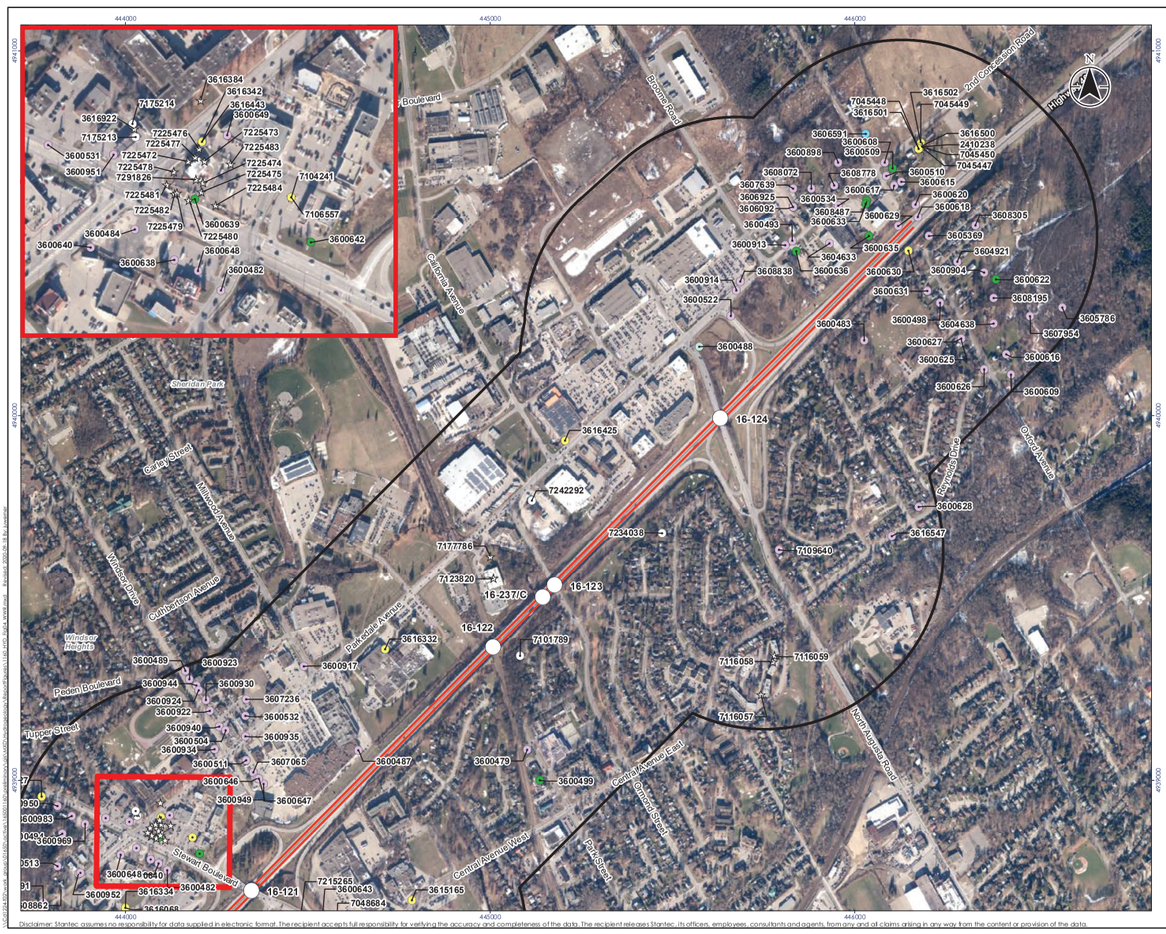

Stantec

Legend

- Project Structure
- Hwy 401 Study Area
- Study Area

MECP Water Well Record (within 500 m)

- Unkown
- Commercial
- Domestic
- Industrial
- Monitoring
- Not Used/ Abandoned
- Public

0 200 400 Meters

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GWP 4003-19-00/ WP 4006-1901

Figure No.
4b

Title
MECP Water Well Records (within 500 m)